COMMISSION OF THE EUROPEAN COMMUNITIES

13th REPORT OF THE MINES SAFETY AND HEALTH COMMISSION

YEAR 1975

LUXEMBOURG, 3 SEPTEMBER 1976

COMMISSION OF THE EUROPEAN COMMUNITIES

13th REPORT OF THE MINES SAFETY AND HEALTH COMMISSION

YEAR 1975

LUXEMBOURG, 3 SEPTEMBER 1976

C O N T E N T S

LIST OF ANNEXES

1. Common statistical summary of underground accidents at mines in 1975 (Annex I)

2. Terms of reference and rules of procedure of the Mines Safety Commission (Annex II)

3. Terms of reference of the various Working Parties of the Mines Safety and Health Commission (Annex III)

4. Composition of the Mines Safety and Health Commission, the Restricted Committee and the Working Parties (Annex IV)

5. Implementation of Recommendations up to 1 January 1976 of the Mines Safety and Health Commission (Annex V)

6. List of specialists for borehole rescue work and equipment available on the 1.1.1976 (Annex VI)

7. Minimum safety requirements for winding and balance rope suspension gear, for shaft winding and sinking installations (Annex VII)

8. Information report " New aspects of the testing of ropes in winding installations subject to high and maximum stress " by Dr. Ing. ARNOLD, Seilprüfstelle der Westfälischen Berggewerkschaftskasse, Bochum (Annex VIII)

9. Decision of the Mines Safety and Health Commission concerning the use of light alloys for the construction of electrical apparatus for use in mines which are liable to be affected by firedamp (Annex IX)

10. A First report on filter self-rescuers for use in coal mines in the european Community countries - Part I : minimum design requirements and testing procedures (Annex X)

11. Bibliography

<u>Has been printed separately:</u>

Fifth Report on specifications and testing conditions relating to fire-resistant fluids for power transmission (Nov. 1974)

1. SECTION I

GENERALITIES ON THE ACTIVITIES OF THE MINES SAFETY AND HEALTH COMMISSION

1.1. INTRODUCTION

1.1.1. The year 1975, covered by this report, is the third year of the enlarged Community including the United Kingdom, Ireland and Denmark; the terms 'Community of Nine' and 'Community of Six' or 'Eur. 9' and 'Eur. 6' will, however, still be used.

1.1.2. Coal mining activities

As in the three previous reports, a number of statistics on activities in the coal mining sector are given below. These are based on the records of the Statistical Office of the European Communities, the statistical telegram of 21 January 1976 and figures supplied by the national mines inspectorates (see table below).

Coal production in 1975 was 5.9% up on that of the previous year, increasing from 242.6 to 256.8 million tonnes. But this apparent increase is largely explained by a production loss in 1974 of approximately 16 million tonnes, resulting from the miners' strike early in that year.

In the Federal Republic of Germany, the stabilization of production that was becoming apparent towards the end of the previous year did not materialize fully because of the downturn in industrial consumption of electricity.

In France, the 14% and 11% decreases in production in previous years were arrested, and for this year the loss in productive capacity was 2%.

In Belgium, however, the decline of 7 to 8% recorded in previous years continued.

	Eur. 9	D	F	I	B	U.K.
Production (million t) 1973	270,2	103,6	25,7	0,005	8,8	130,2
" " 1974	242,6	101,5	22,9	0,004	4,1	109,2
" " 1975	256,8	99,1	22,4	0,004	7,5	127,7
% change 1974/1973	- 10,2	- 2,1	- 10,9	- 20	- 8,3	- 16,1
% change 1975/1974	+ 5,9	- 2,3	- 2,1	-	- 7,5	+ 17,0
Output per manshift Kg/Shift						
Underground - 1974	3572	4196	2799	-	2597	3350
1975	3567	4061	2761	-	2424	3493
% change 1975/1974	- 0,1	- 3,2	- 1,4	-	- 6,7	+ 4,3
Underground workers on books (1000)						
Average 1974	341,0	113,7	42,0	0,2	18,6	169,2
Average 1975	342,0	109,3	40,5	0,2	18,8	172,5
% change 1973/1972	- 8,5	- 9,3	- 12,7	-	-12,3	- 11,2
% change 1974/1973	- 5,7	- 3,9	- 10,1	-	- 6,0	- 6,6
% change 1975/1974	+ 0,3	+ 0,5	- 1,4	-	+ 1,1	+ 2,0
Number of working mines at the end						
of 1974	344	47	31	1	15	250
of 1975	336	46	29	-	14	242
Capacity abandoned in 1975 (million t)	1,4	0,8	0	-	0,1	0,4
Pithead coal stocks at the end						
of 1973	23,9	9,0	3,4	0	0,2	10,9
of 1974	11,9	2,4	3,2	0	0,2	6,0
of 1975	26,2	9,2	5,5	0	0,8	10,7
% change 1975/1974	+ 121	+ 288	+ 69	-	+ 230	+ 79
Stocks of hard coke at coling plants						
at the end of 1974 (million t)	4	1,7	0,3	0,7	0,3	0,1
of 1975	12,8	7,9	1,1	1,3	0,1	2,4
% change 1975/1974	+ 223	+371	+ 67		- 51	+ 146
Percentage of output produced by						
mechanized means in 1973	95,6	95,5	86,9	-	86,7	98,1
in 1974	96,6	96,9	89,2	-	91,3	98,3
in 1975	97,3	97,9	89,9	-	95,9	98,3
Percentage of powered support: 1973	71,5	55,5	40,0	-	48,1	92,4
1974	80,0	75,7	40,6	-	54,8	94,4
1975	83,8	82,1	41,2	-	53,2	94,5

Eight collieries were closed in 1975 (23 in 1974 and 52 in 1975), resulting in a reduction in production capacity equivalent to 1.4 million tonnes, i.e. 0.5% of the toal amount mined (11 million tonnes in 1974 and 18 million in 1973).

The number of registered underground workers did not decrease further; it rose slightly in the United Kingdom, the Federal Republic of Germany and Belgium, and decreased slightly in France. In previous years the decline was in the region of 10 to 12%.

The average underground output per manshift changed only slightly in the Community as a whole, from 3572 kg in 1974 to 3567 kg in 1975. The sharp drop recorded in Belgium and the Federal Republic of Germany may be explained by the large number of shifts provisionally assigned to development work, with a view to stabilizing production levels.

1.1.3. Overall accident figures (accidents occuring underground only).

These figures could not be shown on the same basis for both the Six and the United Kingdom, where a different system of accident classification from the "Six" is used. Harmonisation of the system of classifying accidents in the Community of 9 is one of the projects which cannot be pursued as a result of shortage of staff.

1.1.3.1. For the Community of Six.

1.1.3.1.1. Accidents resulting in an absence from work of 4 to 20 days were 33 985 for a total of 318,6 million man-hours, i.e. a rate of 106,67 accidents per million man-hours (mio/h) compared with a rate of 110,97 in 1974 (out of a total of 34 797 accidents).

1.1.3.1.2. Accidents resulting in an absence from work of 21 - 56 days were 15 454, i.e. a rate of 48,50 per mio/h compared with 50,62 in 1974 (out of a total of 15 875 accidents).

1.1.3.1.3. Accidents resulting in an absence from work of more than 56 days were 4 795, i.e. a rate of 15,05 per mio/h compared with 16,12 in 1974 (out of a total of 5 054 accidents).

1.1.3.1.4. There were 110 fatal accidents (0 collective accident), i.e. a rate of 0,345 per mio/h compared with 0,456 in 1974, when there were 143 fatalities, 47 of them in two collective accidents.

1.1.3.1.5. The total number of personnes injured (including casualties requiring at least 4 days' absence from work and fatalities) was 54 344, i.e. a rate of 170,57 per mio/h compared with 55 869 casualties and a rate of 178,16 per mio/h in 1974.

1.1.3.2. For the United Kingdom.

The number of persons fatally injured in 1975 was 55, i.e. a rate of 0,181 per mio/h compared with 37 fatalities and a rate of 0,138 per mio/h in 1974.

1.1.3.3. Details and comments on these statistics are given in section IV.

1.2. GENERAL ACTIVITIES OF THE MINES SAFETY AND HEALTH COMMISSION

1.2.1. Staffing of Secretariat - Meetings held

One post for a principal administrator which had been vacant since 1971 was filled on 15 August 1974; the occupant of the post resigned on 31 October 1975, bringing the number of qualified engineers acting as secretaries for the working parties down to three.

The Mines Safety and Health Commission held three meetings, on 20 March, 11 July and 2 December; the Restricted Committees held preliminary discussions on the day before each of these meetings and also met on 10 January 1975.

The working parties and their committees of experts met 33 times on a total of 42 days and there were in addition 23 restricted preparatory meetings. The total number of meetings held, including special conferences rose to 65, on a total of 75 days.

Because of the shortage of typing and office staff in the Secretariat, made even more serious by long periods of sick leave, it has again been impossible to keep pace with all the work arising from the tasks given to the working parties by the Mines Safety and Health Commission, and only preparatory work could be undertaken to extend the work of the Mines Safety and Health Commission to all mineral extractive industires.

1.2.2. Group accidents

One group accident (accidents resulting in the death or incapacity for a period of at least eight weeks of not less than five victims) occurred in 1975 and was immediatley reported to the Secretariat of the Mines Safety and Health Commission. This was an explosion at Houghton Main Colliery in the United Kingdom, in which five persons were killed and a sixth was seriously injured, on 12th June 1975.

Also, six persons were killed when part of a disused spoil heap (waste tip) collapsed on 26th August 1975, at No. 6. Pit, at Marles in Calonne-Ricouart. (x)

The Mines Safety and Health Commission studied these accidents at its meetings on 11 July and 2 December. In the course of its three meetings, it also studied the accident which occurred at Lens-Liévin (Nord et Pas-de-Calais, France) on 27 December 1974, when a firedamp and coal-dust explosion killed 42 persons.

On 11 July it gave the following mandates to the Working Party on Ventilation and Firedamp and the Working Party on Flammable Dusts:

- Working Party on Ventilation and Firedamp (x)

The Mines Safety and Health Commission asks the Working Party on Ventilation and Firedamp to study all aspects of the accident at Lens-Liévin which might help to prevent firedamp explosions, and from this to draw up proposals on preventive measures to be taken to control firedamp emission from old workings, whether or not they are being salvaged, and from cul-de-sacs (blind headings, drifts or development drivages)

- Working Party on Flammable Dusts

The Mines Safety and Health Commission asks the Working Party on Flammable Dusts to continue its examination of the circumstances and causes of the accident at Lens-Liévin on 27 December 1974. Great importance is attached to any conclusions which might be reached, especially if standardized measures for the most effective reduction in the risk of dust explosion in coal mines can be proposed.

Reports on these three group accidents are given in Section III.

(x) The mandate of the Working Party was further extended on 6.5.76.

1.2.3. Decisions of the Mines Safety and Health Commission

1.2.3.1. The Mines Safety and Health Commission either approved findings or took decisions on the reports of its working parties in the fields of winding ropes and shaft guides; winding engines and winches; light alloys; electricity; and the extension of its responsibilities to cover the other extractive industries as follows:

1.2.3.1.1. The Mines Safety and Health Commission approved three reports on 20 March 1975 and requested that abstracts of them be included in the 12th Report so that they would be brought to the attention of interested parties more swiftly (see 12th Report, 2.2.4.)

The three information reports were:

(a) A summary of current techniques in shaft winding and rope haulage with special reference to the design of winding engines, by Mr. H. Arnold, Head of the Seilprüfstelle in Bochum (Doc. No 2883/74); (x)

(b) The safety requirements for brakes on winding engines and winches in the shaft winding plant on the German mining industry, by Mr. G. Hauesler, Ing. dipl. of the Seilprüfstelle in Bochum (Doc. No 3254/74); (x)

(c) Shaft winding and safety, by Dr Hoischen, Oberhausen-Sterkrade (Doc. No 4046/74). (x)

1.2.3.1.2. In the same field, the following reports were approved on 2 December 1975:

(d) A proposal to national governments on 'Minimum safety requirements for winding and balance rope suspension gear, for shaft winding and sinking installations'.
It is reproduced in Annex VII of this Report; it was presented to the governments as a proposition aimed at improving safety in accordance with Article 1 of the Mines Safety and Health Commission's terms of reference.

(x) These documents are available on application to the Secretariat of the Mines Safety and Health Commission, DG V, Commission of th European Communities, The Jean MONNET Building, The Kirchberg, Luxembourg,Tel. No. Lux. 43011.

(e) An 'Information report on new aspects of the testing of ropes in winding installations subject to high and maximum stress', which is given in Annex VIII.

1.2.3.1.3. In connection with its work on light alloys, the Mines Safety and Health Commission took a decision at its meeting on 11 July 1975 on a question from Cenelec on the use of light alloys for enclosures of electrical equipment in gassy mines; this was without prejudice to any opinion which the Mines Safety and Health Commission might give on the use of light alloys for mining equipment in general. This matter is discussed in paragraph 2.3. on the Working Party on Electricity, and the question and answer are reproduced in Annex IX of this report.

1.2.3.2.4. In connection with its work on electricity, the Mines Safety and Health Commission approved on 2 December 1975 a draft directive to be presented to the Council by the Commission on the approximation of legislation in the Member States regarding electrical equipment liable to be used in an explosive atmosphere in gassy mines. This procedure was an exceptional one for the Mines Safety and Health Commission and is described in paragraph 2.3.

1.2.4. Extension of the Mines Safety and Health Commission's responsibilities

In the course of its three meetings the Mines Safety and Health Commission studied the implementation of the Council Decision of 27 June 1974 on the extension of its responsibilities, bearing in mind the shortage of staff in the Secretariat and taking into account the preparatory work done by the Restricted Committee on 10 January. As a result, on 11 July it was decided to set up an Ad hoc Committee to compensate for the fact that the Rules of Procedure of the Mines Safety and Health Commission were not amended by the Council Decision extending the field of activity to all extractive industries. (The number of members of the MSHC is thereby limited to 36).

This temporary committee[(x)] is to include representatives of the three sectors, viz. coal, oil and gas and other minerals extracted by drilling, and all other minerals whether won in underground mines or by opencast methods. Its task is to advise the Mines Safety and Health Commission on the organization of working parties, taking account of the priorities and the number of staff in the Secretariat, and to give opinions on:

(a) priority topics in the extractive industries other than coal mining, which could be discussed in existing working parties or which would call for new working parties;

and

(b) the possibility of merging existing working parties and putting other less urgent problems 'on ice'.

The Mines Safety and Health Commission also decided, on 11 July 1975, to set up a Working Party on petroleum, gas and other material extracted by drilling, with the following terms of reference:

' 1) to collect any information available on safety and health hazards and on the causes of accidents during prospecting, boring and extracting to obtain petroleum, gas and other materials in the Community countries;

2) to pinpoint the fields in which new Community work might play a useful part;

and

3) to be aware of work being carried out at international level by both the working parties set up at the London Conference of 1972 and the European Diving Technology Committee so as to keep the Mines Safety and Health Commission informed of progress'.

The composition of these two Working Parties (i.e. the Ad hoc Committee on Petrol and Gas) was fixed at the Mines Safety and Health Commission meeting on 2 December 1975; in the early stages, both will be limited to one or two government representatives per country.

(x) This 'Ad hoc' group met on 18 February 1976.

In the same connection, the Mines Safety and Health Commission examined the activities of all the working parties on 2 December to work out priorities for work which might be necessary in view of the staff situation in the Secretariat and the extension of its responsibilities.

Meanwhile the Secretariat has maintained its close contact with the European Diving Technology Committee.

Experts from iron ore mines attended several working party meetings on matters concerning them.

The name "The Mines Safety and Health Commission" would be maintained, but would be completed by "(including the Petrol & Gas and other extraction industries)".

1.2.5. Dissemination of information - Conference for engineers from Mines Inspectorates in the Member States in Bochum on 9, 10 and 11 December 1975

This was organized by the German members of the Mines Safety and Health Commission, the Westfälische Berggwerkschaftskasse, and the Secretariat of the Mines Safety and Health Commission, for 70 engineers from mines inspectorates, most of whom were not members of Mines Safety and Health Commission Working Parties.

Papers were presented on the general situation of the German mining industry and on shield support systems. These were followed by reports on the activities of most of the working parties, especially current work to be done in the near future; visits to mines and mining establishments were organized. A brief report on this conference is given in 2.7.

1.2.6. Community safety campaigns

These were conducted as described in 2.7.

2. SECTION II

ACTIVITIES OF THE WORKING PARTIES

2.1. Chapter A - Rescue arrangements, mine fires and underground combustion

2.1.1. This Working Party held four plenary meetings on 30 January, 25 February and 14 November 1975 in Luxembourg, and on 25 and 26 June in Yorkshire (United Kingdom). Meetings of the Committees of Experts were held as follows:

- Conveyor belts: four meetings, of which three were plenary;
- Fire-resitant hydraulic fluids: five meetings, of which three were plenary and two were for medical experts only;
- Stabilization of ventilation: eight meetings, of which two were plenary;
- self-rescuers (anti-CO masks): four meetings
  making a toal of 25 meetings, of which 16 were plenary.

2.1.2. The Working Party and its Committees of Experts continued the work described in the 12th Report; they studied an instance of fire neutralization by means of nitrogen in the Federal Republic of Germany, reached agreement on the initial series of harmonized tests on self-rescuers, and made further progress in the harmonization at Community level of tests on fire-resistant hydraulic fluids and conveyor belts.

Furthermore, two reports were drawn up by independant experts on the stabilization of ventilation in the event of fire.

2.1.3. Activities of the Working Party within the framework of its general terms of reference.

At its four plenary meetings, the Working Party continued the exchange of information on various topics, in accordance with its general terms of reference (Annex III):

2.1.3.1. It studied reports of the rescue operations following the explosions at Lens-Liévin (27 December 1974) and Houghton Main Colliery (12 June 1975); the rescue workers had managed to evacuate the injured and dead rapidly and without incident, and to minimize material damage - at Houghton-Main Colliery this had involved sealing off the affected area.

2.1.3.2. The Working Party examined a British document on 'Fires in Coal Mines - Prevention and Control' by P. Thorp of the National Coal Board, which was presented at a conference in Montreal in April 1975. The document had already been examined in 1974 in connection with work on the stabilization of ventilation, by members of the relevant Committee of Experts (12th Report 2.1.5.). Mr. Thorp's report provided a means of comparing the methods used and objectives in the United Kingdom and the Community of Six in the prevention and control of open fires and spontaneous combustion. In the report a distinction is made between fire fighting techniques for small fires and severe ones. It is available from the Secretariat of the Mines Safety and Health Commission in English, French and German.

2.1.3.3. In spite of the fact that timber is being increasingly dispensed with underground, since the disaster at Marcinelle, its utilization is still unavoidable in certain cases and attention is still being given to fire-proofing treatment for wood. In the course of its visit to the United Kingdom on 25 and 26 June, the Working Party had an opportunity to study the British method of increasing the fire resistance of wood by impregnating it under pressure with magnesium and calcium salts. The method is currently used for lagging wood and is to be extended to other types of mine timber. Impregnation is monitored by reduced scale tests, and a full-scale experimental gallery has been constructed on the surface at the NCB's Yorkshire Regional Laboratory in Wath-on-Dearn. Harmonization at Community level of the conditions for 1/1 -scale tests is envisaged.

2.1.3.4. Experiments have been continued in the Tremonia experimental gallery for the same purpose, with financial aid from the Commission, as mentioned in the 12th Report in 2.1.7.2., but the timber being impregnated with $Ca\ Cl_2$ and $M_g\ Cl_2$ salts. Backing of smoke and the length of fire-breaking zones are also studied in these tests, which are described in an interim report produced at the beginning of 1976 (Doc. No 719/76, available in English, French and German).

2.1.3.5. The Working Party studied a method for neutralizing a district on fire with inert gases that was used in the Osterfeld Colliery at the beginning of December 1974. At the suggestion of the Head of the Essen Mine Rescue Station, nitrogen was injected into a district where there was a risk of explosion so that it could be sealed off. The gas was brought to the mine in tanker lorries of 13 tonnes capacity, evaporated in surface plant and introduced into the relevant area through the existing air and water pipelines, at a rate of 30 and then 60 m^3 per minute. 154 000 m^3 of nitrogen were used.

This successful operation was described in an article in the mining magazine 'Gluckauf', which may be obtained from the Secretariat of the Mines Safety and Health Commission, in English, French and German (Doc. No 2036/75).

A recapitulatory report giving details of a number of applications will be submitted to the Working Party in 1976.

2.1.3.6. The Working Party took note of an instruction circular from the Landesoberbergamt of North Rhine-Westphalia in Dortmund, dated 13 September 1974, on the use of polyurethane, for injection into strata.

The Mines Safety and Health Commission has already expressed an opinion on the use of foamed urethanefor surface coating purposes, in view of the inflammability of the product, and advised that it be used only in special cases under strict supervision.

(7th Report of the Mines Safety and Health Commission, Annex VI).

The Landesoberbergamt recommendations and the instructions for use accompanying them concern the use and approval of polyurethane-based resins underground for stabilizing strata, when introduced into the rock through drill holes, by injection or using cartridges.

The instruction circular may be obtained from the Secretariat in English, French and German (Doc. No 700/75).

The Working Party, together with the Working Party on Roof Control, is continuing its search for mortars and sealing products that have the same high adhesion properties as the above-mentioned products but are completely fireproof.

2.1.3.7. A general outline was obtained of the use of hand-held instruments for measuring the oxygen content, total explosibility, and carbon monoxide content of gas and fumes. The replies to a questionnaire gave the dimensions, weights, operating principle and stage of development of these instruments for each country. Copies of this data may be obtained from the Secretariat of the Mines Safety and Health Commission.(x) The United Kingdom also has a data bank on this subject for major mining countries throughout the world, located at the Safety in Mines Research Establishment, Harpur Hill, Buxton, England; requests for access to this information should be made to the Secretariat of the Mines Safety and Health Commission.

2.1.3.8. On 31 December 1975 the information on rescue techniques using drill holes was updated and is given in Annex VI.

2.1.4. Conveyor belts

As stated in the 12th Report, in 2.1.3., the Mines Safety and Health Commission adopted the 'First report on tests and criteria of flammability of conveyor belts with fabric core used in coal mines in the European Community' on 15 November 1974 (Annex VI to the 12th Report).

This report was forwarded to national governments at the beginning of 1975 as a proposal aimed at improving safety in mines.

The German, Belgian and United Kingdom mining authorities adopted the two tests recommended, viz. the propane burner and drum friction tests.

In France the manufacturers were aware of the existence of these tests and in Belgium the conveyor belts currently produced for the coal mining industry comply with these norms.

Additional tests are stipulated in Germany (DIN 22118 - Tremonia model experimental gallery test) and in the United Kingdom (Barthel burner test).

Descriptions of these tests may be obtained from the Secretariat of the Mines Safety and Health Commission in English, French and German.(xx) As requested by the Mines Safety and Health Commission (12th Report, 2.1.3.), the various testing centres - INIEX (Belgium), Cerchar (France), Versuchsgnebengesellschaft (F.R.Germany) and NCB Harrow/Bretby

(x) Doc. No. 3065/75
(xx) Doc. No. 709/3/74 and 4047/74

(United Kingdom) - continued their comparative tests on belts manufactured in these countries, using five types of test: the two tests recommended in the first report, the DIN 22118 and Barthel burner tests and a critical oxygen test. A quality control test has proved to be necessary and a suitable method is being sought. The first report has been brought up to date, defining more exactly certain details, especially those relating to the burner diaphragm, and to rejection and acceptance criteria (Doc. 3425/75, available from the Secretariat of the Mines Safety and Health Commission in English, French and German).

The Committee of Experts examined a method used in France for the laboratory testing metal carcass belts, and the possibility of adapting the propane burner test for use on this type of belt. No decision has been reached; in the Federal Republic if Germany, these belts are tested in the Tremonia full-scale gallery, but the test is costly and not suitable for frequent use, and further research is necessary to find a small scale test for metal carcass belts.

2.1.5. Fire-resistant hydraulic fluids

Following the publication of the 5th Report listing the specifications and testing conditions from the 4th Report which were applicable in the former Community of Six on the one hand and adding the specifications for the United Kingdom on the other, the Committee continued its harmonization work, especially with regard to tests of fire-resistance and toxicity.

A new flammability test is under study at the SMRE (Great Britain) which can measure the flame persistance or heat output; the results are analyzed statistically. This method was used to test fluids fulfilling the requirements for the British test as well as fluids fulfilling the requirements given in the 4th Report. The Committee of Experts met in the United Kingdom on 11 and 12 October 1975 to study this apparatus and the other testing methods used in that country.

As for health hazards, the Committee of Medical Experts continued its tests on chlorinated diphenyls and compared the British and continental points of view on the basis of the tests described in the 5th Report.

A statistical survey was conducted on the consumption of the various types of hydraulic fluid. At the end of the year, the Committee requested that its terms of reference be extended to include lubricants, as oils and greases had played a part in an appreciable number of fires, or combustions reported to the Inspectorates, especially in the United Kingdom.

2.1.6. Filter self-rescuers

As mentioned in the 12th Report, a Committee of Experts was set up at the end of 1974 and drew up a list of universal minimum criteria for the design and testing of the filter self-rescuers in use in Community mines. The first part of this report was completed in the course of the year and submitted to the Mines Safety and Health Commission on 6 May 1976; it was then forwarded to national governments as a proposal aimed at improving safety in coal mines. These minimum requirements may even be too low for certain countries where regulations in this field are already more stringent. The report does not, however, state that it is necessary to use these types of filter.

Although this first part was only approved by the Mines Safety and Health Commission in 1976, it is reproduced in Annex X of the 13th Report to bring it to the attention of interested parties as quickly as possible

The second part of the report will be concerned with the maintenance of self-rescuers and training in the use of the equipment in the sort of conditions in which they would be used, i.e. hampered by darkness, dust, fumes and heat; the need for this type of training has been referred to in the Report of the Chief Inspector on the disaster at Houghton Main Colliery (12th June 1975).

2.1.7. Stabilization of ventilation in the event of fire

The Committee of Experts met twice to continue its examination of a document entitled 'Summary of the measures taken to stabilize ventilation in the event of fires in underground workings (other than shafts)'.

This report consists of a concise (7 page) summary of the results of various work collated by two independent experts, an important document that is currently being translated into French and German. The work was subsidized by the Commission of the European Communities and the results will be distributed under the names of the authors, whereas the summary will be examined by the M.S.H.C.

2.2. Chapter B : Winding ropes and shaft guides, winding engines and winches

2.2.1. The Working Party met in Bochum on 14 and 15 April and in Luxembourg on 12 September.

2.2.2. In Bochum the Working Party visited the Rope Testing Centre, and in Sterkrade the winding engine works of the Gutehoffnungshütte (GHH) Sterkrade Aktiengesellschaft, where it saw an illustration of the techniques described in the information reports (summarized in the 12th Report, and approved by the Mines Safety and Health Commission on 20 March 1975 (see 1.2.3.1.1. above); see also information report mentioned in this chapter and reproduced in Annex VIII of this Report). These techniques are essentially designed for modern conditions, with high payloads and speeds, for both vertical and horizontal applications (e.g. shaft winches and monorails). The reports cover braking systems for winding engines (a braking system was responsible for the Markham accident) and the study of dynamic-stress fatigue in ropes and components of captive rail horizontal transport systems, monorails or floor-mounted rail track haulage.

2.2.3. On 12 September the Working Party completed work on its draft safety proposals for winding and balance rope suspension gear, mentioned in 1.2.2.1.2. above, for submission to the Mines Safety and Health Commission on 2 December 1975.(x) These are minimum requirements which could be incorporated in national regulations. The Working Party nominated experts on winding engines to form a sub-committee which would keep in touch with the British committee set up after the Markham accident (30 July 1973), especially with the study group examining braking systems. The experts met in Great Britain on 19 and 20 November 1975 to study ongoing research in this field, which it should be possible to incorporate, without duplication of effort, into the research project receiving financial aid from the Commission mentioned in the 12th Report in paragraph 2.2.5.

(x) Adopted by the Mines Safety and Health Commission on 2 December 1975 (see Annex VII of this Report).

Lastly the Working Party began work on a study for the harmonization of regulations on ropes, taking account of the regulations in force in Community countries and the standards set by the International Standards Organization. It began by studying ways of calculating the breaking load for winding ropes.

2.3. Chapter C - Electricity

2.3.1. The Working Party held plenary meetings on 5 and 6 February, 4 and 5 March, 29 and 30 April, 26 and 27 June, 2 and 3 September and 6 October, and held three preparatory meetings on 4 June, 15 September and 16 October, making a total of 14 days of meetings.

2.3.2. Continuing the harmonization studies begun in 1974 and mentioned in 2.3. of the 12th Report, the Working Party drew up and finalized a Draft Directive to be submitted to the Council of Ministers on the approximation of the laws of the Member States concerning electrical equipment for use in potentially explosive atmospheres in gassy mines. (Doc. No 1411/8/75, available from the Secretariat of the Mines Safety and Health Commission in English, French and German) and an explanatory memorandum giving the grounds for this directive (Doc. No 2032/5/75).

2.3.2.1. It submitted the Draft Directive to the Mines Safety and Health Commission together with a report (Doc. No 1807/4/75) which explains that this draft is an adaptation to gassy mines of a directive produced by Directorate-General XI, in connection with the removal of barriers to free circulation, on the design of electrical equipment for use in potentially explosive atmospheres (which excluded equipment designed for work underground in mines susceptible to firedamp), adopted by the Council of Ministers on 18 December 1975 (OJ No L 24, 30.1.1976, p. '().

2.3.2.2. This directive would be accompanied by harmonized standards based on European standards produced by the European Committee for Electrotechnical Standardization (CENELEC) which would also be examined by the Working Party to adapt them to gassy mines, and presented to the Mines Safety and Health Commission for adoption as harmonized standards. This work was begun in 1974; more recently the Mines Safety and Health Commission was able to offer a solution to three questions asked by CENELEC (see 12th Report, S.3., and Annex VIII); the fourth question, on the use of light alloys for the construction of enclosures for electrical equipment, was also settled by the Mines Safety and Health Commission in 1975 (see 1.2.3.1.3. and Annex IX).

2.3.2.3. The Mines Safety and Health Commission adopted this draft directive on 2 December 1975, taking into account that the harmonization referred to was optional; i.e. a date was not specified by which all national standards would have to be rescinded. It is therefore permissible at the moment for the national standards and harmonized standards to exist concurrently.

2.3.3. The Working Party also started work on part of the third phase of their mandate on acceptance procedures.

2.4. Chapter D - Flammable dusts

2.4.1. The Working Party met on 10 June and 10 November 1975 and a Committee of Experts met on 4 December 1975.

2.4.2. The meeting on 10 June was devoted to examining all the aspects of the part played by flammable dusts in the Liévin disaster on 27 December 1974. The Working Party decided to draft recommendations on methods for neutralizing coal dust with hygroscopic salts,(x) and on water barriers, especially wide-action water barriers. These subjects were discussed in information reports approved by the Mines Safety and Health Commission on 22 January 1974 and annexed to the 11th Report (Annexes VI and VII). The reports are to be updated and presented in an appropriate form, following discussions of the advantages and drawbacks of these methods. Their place in the range of measures already in existence, will be indicated.

The Mines Safety and Health Commission ratified the Working Party's approach on 11 July and instructed it 'to continue its examination of the circumstances and causes of the Lens-Liévin accident (27 December 1974). Great importance is attached to any conclusions which might be reached, especially if standardized measures for the most effective control of dust explosions in coal mines can be proposed'.

2.4.3. On 10 November 1975 the Working Party continued its examination of the circumstances and causes of the accident at Liévin on the basis of the information given in the standard questionnaire. 'Memorandum on information necessary for the examination of coal-dust explosions or ignitions of firedamp in mines', (completed by personnel of the Mines Inspectorate carrying out the enquiry) which is based on a recommendation by the Mines Safety and Health Commission adopted on 6 February 1973 (Annex VII to the 10th Report). It took note of a programme instituted by Charbonnages de France to minimize the danger of firedamp and coal-dust explosions in mines classified as at risk by:'

(a) improving neutralization by permanent wetting, new efficient methods of stone dusting, and dust binding using hygroscopic salts;

(x) adopted by the M.S.H.C. on 3.9.76. (Doc. No. 735/3/76.)

(b) new methods for preventing coal-dust explosions using water barriers of the wide-action or concentrated type, depending on the location.

The Working Party drew up its own programme consisting, initially, of work on the following: neutralization with hygroscopic salts, water barriers, sampling and use of water (including water infusion). It appointed a group of experts which met on 4 December 1975 to examine a draft recommendation on hygroscopic salts.

2.5. Chapter E - Joint accident statistics

2.5.1. The expert's study mentioned in the 11th and 12th Reports in 2.5. was updated for 1973 and 1974. It is contained in a document entitled 'Trends in very serious and fatal accidents in the United Kingdom and in the Community of Six in 1958-74' (Doc. No 932/76). The Working Party was unable to examine this document in 1975. This work will be continued in 1976 if the Secretariat has sufficient means at its disposal.

2.6. Chapter F - Health

2.6.1. The Working Party met once, on 29 January.

2.6.2. It continued its study of the replies to a questionnaire on the analysis of mine airs with regard to concentrations of respirable dusts (Doc. No 1771/74).

2.6.2.1. In a general summary (Doc. No 3079/74), the replies to the questionnaire are compared; for each country, they show the arrangements made to measure respirable dusts, the apparatus and sampling methods used, the staff responsible for obtaining samples, the evaluation of the results, the positioning of samplers and the duration and frequency of sampling depending on the working areas concerned.

Finally, the maximum concentrations of dust normally allowed in each country are shown, with the criteria originally used for defining these limits, the action to be taken if the permissible limits are exceeded and the criteria justifying this action, as well as the intervals between and arrangements for X-ray examinations of the thorax.

2.6.2.2. Analysis of this information resulted in the following conclusion:

2.6.2.2.1. Document 3079/74 (amended) could be distributed for information.

2.6.2.2.2. In connection with the comparison of maximum concentrations with a view to their standardization:

(a) maximum dust concentration levels were fixed, on the basis of medical studies, to minimize the number of workers affected;

(b) these limits are dependent on both the point of sampling and the apparatus used;
(c) the limits were chosen to take account of the fact that different types of dust have different effects on health;
(d) a programme of comparative measurements with different measuring equipment is being conducted, with financial aid from the Commission, in the United Kingdom, Belgium, Federal Republic of Germany and France, in ten workings using all the measuring instruments simultaneously, positioned as stipulated in the regulations;
(e) only when the results of these comparative tests are available will it be possible to continue the comparison of maximum admissible concentrations with a view to standardization.

2.6.3. The Working Party took note of a document of basic scientific information on noise and lighting. It considered that available knowledge and findings about noise should be pooled to see what technical studies were still necessary and should be encouraged, and to permit it to compare regulations or draft regulations. Little data was available with regard to lighting in the mining environment.

2.6.4. This work has been temporarily suspended as a result of the resignation of the Working Party's secretary.

2.6.5. Further work should give priority to the following:

(a) the control of dust from powered support systems and face crushers;
(b) noise control (technical and legal aspects);
(c) heat control.

The work on comparison of regulations relative to measurements of respirable dust concentrations and the determination of maximum admissible concentrations should be restarted as soon as the results of the comparative tests now in progress are known.

2.7. Chapter G - Sociological and psychological factors affecting safety

- Dissemination of information and safety campaigns.

2.7.1. The Working Party met on 23 May and 17 November 1975, mainly in order to examine the results of the safety campaigns. The following reports were considered:

2.7.1.1. Campine coalfield - 1973 - 'Accidents due to falls of heavy rock, during the drivage of roadways and stables, (Doc. No 4169/73).

The campaign was divided into four stages:

(a) a programme of information for supervisory staff;
(b) analysis of the hazards in different situations;
(c) establishment of instructions based on the reports drawn up by the 'organizers';
(d) personal contacts.

As a result of this campaign, lists of hazards and of measures to be taken during operations were drawn up.

2.7.1.2. Campine coalfield - 1974 - 'Accidents during drivage of roadways and stables' (Doc. No 3917/74).

This was carried out along the same lines as the previous campaign but covered all drivage operations, i.e. all hazards.

The results of the two safety campaigns at Campine are difficult to quantify, but the workers' safety sense and the quality of work have improved.

2.7.1.3. Saar Coalfield - 1973 - 'Continuous conveyors' (Doc. No 713/74)

This campaign was in five stages:

(a) programme of information for administrative staff and the press;
(b) programme of information for management staff, supervisory staff and workers' representavies;
agreement on the content of the campaign;

distribution of check lists;

(c) planning and implementation of measures to maximize safety in work with continuous conveyors;
(d) training of specialized staff;
(e) programme of information for all staff.

Comparison of the figures showing accidents six months before and six months after the campaign have shown that total accidents caused by continuous conveyors, for which the figure was 0.900 per 10 000 shifts before the campaign, dropped to 0.696 per 10 000 shifts after the campaign; there had therefore been a 22.7% drop in accidents.

2.7.1.4. Ruhr coalfield - Ruhrkohle AG campaigns - 1973 and 1974 (Doc. No 1391/75) and the 'Gewerkschaft Auguste Victoria' mining company - 1973 (Doc. No 1392/75) on "continuous conveyors".

These campaigns were carried out along the same lines as those in the Saar area. In one of the Ruhrkohle AG groups of mines (Bergbau AG - Dortmund), the campaign also included an exhibition of all the safety devices concerned.

2.7.1.5. Charbonnages de France - 1973 and 1974 - 'Prevention of accidents linked with mechanized handling operations' (Doc. No 3993/75)

This campaign involved:

1) training and raising safety-awareness of staff and workers at all levels,
2) major back-up by audiovisual media;
3) studies aimed at improving or adapting equipment.

2.7.1.6. All coalfields in the Federal Republic of Germany - 1975 and 1976 - 'Accidents caused by falls of ground' (Doc. No 3993/75)

This campaign was begun in autumn 1975. It comprises the same stages as the campaign on 'continuous conveyors', but the production of check lists has been abandoned.

2.7.1.7. All mines in the Federal Republic of Germany - 1974 and 1975 - 'Noise' (Doc. No 3994/75)

The aims of this campaign were:

1) to reduce the harmful effects of noise by methods that could be put into practice in the short and medium term;
2) elimination of extreme noise levels (above 100 dBa at the workplace);
3) to encourage 'noise-awareness' among workers;
4) to eliminate potential accident hazards due to noise.

Financial assistance from the Commisssion of the European Communities could not be granted for this campaign.

2.7.2. In 1975 the following financial assistance was awarded by the Commission of the European Communities:

- Campine: FB 500 000 (Safety campaign on the prevention of accidents linked with handling of equipment)
- Saar: FB 500 000 (Safety campaign on 'Accidents caused by falls of ground').

2.7.3. Conference for engineers from Mines Inspectorates in Bochum (FR Germany) on 9, 10 and 11 December 1975.

A summary is given below of the proceedings of this conference, which was mentioned in 1.2.5. above and which was attended by 70 engineers from Mines Inspectorates in the Member States.

2.7.3.1. Papers presented on the first day.

2.7.3.1.1. The participants were welcomed by Mr Schnase, Ministerialrat in the Federal Ministry for Economic Affairs in Bonn and a member of the Mines Safety and Health Commission, by Mr Hurck, member of the managing board of the Westfälische Berggewerkschaftkasse in Bochum and Mr Shanks, Director-General for Social Affairs at the Commission of the European Communities in Brussels.

The following papers were presented:

2.7.3.1.2. Survey of the coal mining industry in the Federal Republic of Germany, by Mr Jakob, chief executive secretary of the General Association of the German Coal Mining Industry, Essen (Doc. No 3736/75, available in English, French , German and Italian.

Mr Jakob listed the coal deposits, their location and characteristics, and the main reserves of coal (24 000 million tonnes of workable coal), and went on to describe the conditions and main features of mining operations, stressing the economic importance of the German coal mining industry which supplied that country's iron and steel industry with coke and accounted for a major part of electricity production. He analysed the effects of the economic recession on the energy policy agreed on in 1973, one of whose aims had been to stabilize coal production.

2.7.3.1.3. The extraction of minerals (except hard coal) in the Federal Republic of Germany, by Mr Reiche, President of the Geologisches Landesamt (Geological Office) for North Rhine-Westphalia, Krefeld (Doc. No 3744/75, available in English, French, German and Italian).

Mr Reiche also listed the various non-hard-coal deposits, with their location and estimated reserves; in the case of lignite, there were 35 000 million tonnes or 11 000 million t.c.e. of reserves that were workable and profitable under the present conditions (126 million tonnes were produced in 1974);
oil- 74 million tonnes of known and probable reserves (6.2 million tonnes were produced in 1974);
natural gas - 315 000 million m^3 of known reserves and probable reserves, 20 000 million m^3 production in 1974;
salts and potash - production more than covered German requirements;
iron, zinc and lead ores - production covered 7%, 25% and 10% of German needs respectively.

The value of all the minerals extracted, including basalt, sand, gravel and other materials, is estimated at 40-42 000 million DM at 1974 prices.

2.7.3.1.4. Occupational safety in mines in the Federal Republic of Germany, a joint task for mines inspectorates, companies, trade associations and technical services, by Mr Coenders, President of the Landesoberbergamt for North Rhine-Westphalia in Dortmund, and member of the Mines Safety and Health

Commission (Doc. No 3826/75, available in English, French, German and Italian).

It was pointed out that in the Federal Republic of Germany mining plans were subject to an official approval procedure. They were drawn up by mining operators, approved or otherwise by the Mines Inspectorate, and if contested were examined by experts from the trade associations and technical services. The provisions of the plan were binding once it had been approved.
Similar collaboration was necessary before new regulations could be published.
Each mine had its own safety and occupational medicine service.
In 1975 North Rhine-Westphalia had spent 9 million DM on studies to improve safety and health in mines, not including the financial assistance given to the Versuchsgrubenesellschaft in Dortmund.

2.7.3.1.5. Use of powered shield support systems in hard coal mines in the Federal Republic of Germany, by Mr Grotowsky, Mining Director of the Hugo Mine of Ruhrkohle AG (Doc. No 3735/75, available in English, French, German and Italian).

The paper illustrated the technical theme chosen for the conference because of its topicality. The development of powered support systems since 1969 was outlined; thanks to the use of shields, such systems had been adapted to difficult conditions, e.g. fragile roof conditions, larg seam thicknesses and steep gradients.

In July 1975, 75 faces had been equipped with this type of support, with seam thicknesses between 1.6. and 3.3. metres and angles of dip from 18 degrees to as much as 36 degrees. Safety at the face had been improved - the frequency of accidents due to falls of ground was halved when individual steel supports were replaced by conventional powered supports, and was reduced to one sixth when shield support systems were introduced.

Mr Ritter of the Landesoberbergamt in Dortmund enlarged upon this report by describing the administrative provisions affecting this type of support, especially with regard to resistance to roof lowering and directives governing approval of types of powered supports (Doc. No 3945/75, available in English, French, German and Italian).

2.7.3.1.6. These papers on the situation of the mining industry in Germany and the technical, economic and legal aspects affecting health and safety in mines were followed bt a paper by Mr Leclercq, the Secretary of the Mines Safety and Health Commission, who outlined the history of the Mines Safety and Health Commission, beginning with the Bois de Cazier disaster in Marcinelle in 1956, and describing the way in which the MSHC took action, under its mandate from the Council to make proposals to governments, its working methods with its eleven working parties, its achievements, its current work and its prospects for the future, especially in view of the extension of its responsibilities to cover all extractive industries (Doc. No 1600/75, available in English, French, German and Italian).

2.7.3.2. On the second day, the Chairmen of the working parties described the activities of their Working Parties.

2.7.3.3. Finally, on the third day, the participants visited workings with shield support systems, or alternatively, lignite mines owned by the Rheinische Braunkohlenwerke Aktiengesellschaft in Cologne or mining establishments in the Ruhr area.

2.8. Chapter H - Ventilation and Firedamp

2.8.1. The Working Party met in Luxembourg on 7 May and 11 November 1975. A preparatory meeting was held in Bochum on 6 June.

2.8.2. On 7 May the Working Party examined an interim report on the disaster at Lens-Liévin on 27 December 1974. It continued this work on 11 November and also studied the report on the accident at Houghton Main colliery (12 June 1975). These two accidents will be examined further, on the basis of the report following the official public inquiry chaired by HM Chief Inspector of Mines and Quarries, for the Houghton Main Colliery explosion and the replies to the MSHC standard questionnaire (Memorandum on information necessary for the examination of coal-dust explosions or ignitions of firedamp in mines) for Lens-Liévin. The Mines Safety and Health Commission's mandate for the latter accident is, we repeat, worded as follows: 'The Mines Safety and Health Commission asks the Working Party on Ventilation and Firedamp to study all aspects of the accident at Lens-Liévin which might help to prevent firedamp explosions, and from this to draw up proposals on preventive measures to be taken to control firedamp emission from old workings, whether or not they are being salvaged, and from dead ends'. (x)

In this connection, the Working Party took note of a British document entitled 'The Control of Methane emitting from sealed-off areas using pressure chamber techniques', summarized in six pages in Doc. No 3965/75 (available in English, French and German).

2.8.3. In addition, the Working Party continued the work already mentioned in the 12th Report in 2.8.3.

2.8.3.1. In connection with its work on methanometers, the Working Party collected data on the criteria and specifications for hand-held methanometers; Doc. Nos (Germany) 2996/74, (France) 3003/74, (Belgium) 2349/75, (United Kingdom) 2227/74, available in English, French and German. These data were collated in a document entitled 'Summary of the specifications and testing regulations for hand-held methanometers in Community countries' and will be discussed by a committee of experts in 1976 with a view to standardization.

(x) This mandate was further modified on 6.5.76.

2.8.3.2. No further progress has been made in the study of the effect of firedamp on the explosibility of coal dust, pending the results of tests being carried out in the Federal Republic of Germany by the Westfälische Berggewerkschaftskasse (Doc. No 1836/76, currently available in English, French and German).

2.8.3.3. Danger of firedamp ignition underneath armoured conveyors.

The findings of a series of systematic measurements of methane concentrations underneath this equipment, requested by the Mines Safety and Health Commission on 15 November 1974 (see 12th Report, 2.8.3.3.) have been collated for Belgium, France, and the Federal Republic of Germany. A general report has been drawn up by one of the experts concerned and will serve as the basis for a further report, to be drafted by a restricted committee of experts, on measures recommended to combat this danger.

2.8.3.4. Use of Diesel engines in mines: problem of exhaust gases and of protection against explosion and fire. An independent expert had been charged with this study for which financial assistance has been granted by the Commission of the European Communities. It will be available in June 1976 and will be discussed by the Working Party.

2.8.3.5. Finally, the Working Party has gathered together a series of documents on firedamp ignitions caused by power loader and heading machines that have occurred in the past ten years in the United Kingdom, in the past five years in the Federal Republic of Germany, and this year in Belgium, and on tests and research conducted in the United Kingdom in this field. The following documents are available from the Secretariat of the Mines Safety and Health Commission in English, French and German.

National Coal Board Report on 'Frictional ignitions' (Doc. No 578/75)

Ignition of firedamp by friction during rock cutting - SMRE Report (Doc. No 2228/75)

Ignitions of firedamp by power loaders and heading machines - List of accidents occurring between 1 January 1970 and 30 June 1975 in the districts of the Landesobergamt (Mines Inspectorate) for North Rhine-Westphalia and the Oberbergamt for the Saarland and Rhineland Pfalz (Doc. No 3072/75)

Report on ignitions of firedamp by power loaders in the Campine coal-field - Incidents occurring on 16 and 24 April 1975 (Doc. No 3073/75)

Third Interim Report of the Joint NCB/HSE/CUMM Co-ordinating Committee on frictional ignitions (Doc. No 3738/75

The ignition of methane-air by machine picks cutting into rock by F. Powell, K. Billinge and D.P. Cutler of the SMRE (Doc. No 3075/75)

2.9. Chapter I - Mechanization

2.9.1. The Working Party met in Luxembourg on 19 September 1975 and in Rossington and Doncaster in the United Kingdom on 24 and 25 November 1975. In addition, a drafting committee met on 7 October, 22 October and 3 December 1975.

2.9.2. On 19 September 1975 the Working Party examined the reports on specific subjects requested from each of the delegations at the end of 1974. The topics were: shearers, ploughs, armoured conveyors and haulage chains, and each of the reports shows the lessons learnt from accidents, the measures taken to avoid repetitions, an analysis of available data on the subject, conclusions that can be put into practice and prospective trends. The reports are:

(a) Serious accidents associated with shearer loaders, by Mr Bourne of the British delegation (Doc. No 2215/75)

(b) Recommended safety measures for stripping coal winning with plough and scraper chain conveyor in the coal mining industry, by Mr Schönwälder of the German delegation (Doc. No 1619/75)

(c) Study of accidents and proposals for preventive measures, by Mr Deckers, for the Belgian and Netherlands delegations (Doc. No 2380/75)

Following the examination of these reports, the first general report on safety techniques in winning areas was drawn up at the end of the year.

2.9.3. The Working Party also visited a face in the United Kingdom where shearer haulage was by a 'Rack-a-track' system, which eliminates haulage chain, breakage or whipping which, in Great Britain, cause between 30 and 40% of the accidents associated with machines. At the end of 1975 39 of these and other chainless shearer haulage systems were in use in Great Britain, compared with 27 in the previous year. They were studied by the Working Party at the Doncaster regional headquarters of the N.C.B.

2.10. <u>Chapter J - Strata Control</u>

2.10.1. The Working Party met in Luxembourg on 8 January, 2 July and 13 November 1975, and in Ashby, Leicestershire in the United Kingdom on 24 and 25 April 1975.

2.10.2. It continued work on the topics already mentioned in the 12th Report in 2.10.2.

2.10.2.1. The document mentioned there, Doc. No 2751/74, describes methods for developing the ends of long wall faces so that they can be mechanized and the risk of accidents can be reduced. One of these methods involves a technique employed on advancing faces in the NCB's South Midlands area by which the roadway is formed 'in line' with the face and the roof is normally cut by the shearer, so that the area of roof exposed is reduced to a minimum, and there is no break in the support system, which is also of the powered type, at the roadhead. The Working Party saw this method in use during its visit to the Midlands on 24 and 25 April and noted its advantages, not only for reducing accidents at the roadhead and end of the coal face, but also for roadway stability outbye.

2.10.2.2. The Working Party also continued work on ways of protecting roadways by means of gateside packs made with hydraulic binders, especially by the use of natural anhydrite, as employed for several years now in the Federal Republic of Germany (Doc. No 3775/74, available in English, French and German); in Great Britain pumped packing systems have been used, taking coal from the conveyor together with water, bentonite and cement (Doc. No 2090/75, available in English, French and German).

2.10.2.3. A number of papers were received on improving the stability of roadways by rock bolting and the injection of adhesive products (polyurethane, resins, etc.); some of these were 'Experience with roof bolting in coal and other mines in Germany (Doc. No 3774/74), 'long-term effectiveness of bolting in France' (Doc. No 2095/75), 'Strata reinforcement in NCB mines' (Doc. No 345/75) and 'Strata consolidation by injection in France' (Doc. No 2089/75).

An information report summarizing all these papers is being prepared by a restricted committee of experts.

2.10.2.4. Injection of adhesive products was discussed in two other memoranda describing the precautions to be taken during injection of certain of these products.

2.10.3. The Working Party continued its examination of the lessons to be learnt from the accident which occurred at Seafield mine in Scotland on 10 May 1973, in which five men were killed by an extensive fall of roof in an inclined seam, where powered supports were employed at the face.

The British National Committee responsible for examining all the aspects of this type of working forwarded its report entitled 'First report of the National Committee on Steep seam working in British coal mines' (Doc. No 1408/75, available in English, French and German), and the Working Party took note of the report at the end of the year.

Examination of this matter will be continued in 1976; special powered supports have been designed for gradients of more than 18°, so that the use of powered supports is now possible in steep seams; in workings equipped with powered supports, the line of face should always be at right angles to the roadways.

2.10.4. The work on rock bursts begun in 1973 by a restricted group of experts on rock mechanics could not, unfortunately, be resumed owing to the limited resources of the Secretariat, but it is necessary to continue with this; the subject might be suitable for a research contract to enable a report to be presented in 1977.

2.10.5. The Working Party examined a statistical report on the effect of powered support systems on the frequency of serious and fatal accidents in the United Kingdom, where 94% of coal production is currently mined on faces equipped with powered supports. The marked advantages of using this type of support indicate that the possibility should be studied of extending it to all types of faces, in thick, thin and steep seams as well as to roadheads. The Working Party intends to draw up similar statistics for the other countries.

2.10.6. The Working Party discussed the problems arising from the extension of the Mines Safety and Health Commission's responsibilities to the other extractive industries. It considered itself competent to deal with these other industries and from 1975 onwards has called on the non-coal industries, mainly from French and Swedish (observer) iron ore mines, where roof bolting and guniting techniques are highly developed, to assist in its work. It has been found that some techniques could be applied in coal mines, such as automatic insertion of rock bolts and mechanized cleaning of roofs, followed by guniting. Conversely, information on long wall mining and powered support systems is likely to be of interest for engineers working in iron ore mines.

3. SECTION III

STUDY OF GROUP ACCIDENTS

These accidents are mentioned in 1.2.2.

3.1. Accident at Lens-Liévin

3.1.1. The circumstances and causes of this accident were studied by the Mines Safety and Health Commission at its meetings of 20 March, 11 July and 2 December 1975, with the help of the French Government delegation, and an interim written note from this delegation dated 15 January 1975, as well as the replies to the memorandum on information necessary for the examination of coal-dust explosions or ignition of firedamp in mines (10th Report of the Mines Safety and Health Commission, Annex VII) addressed to the Mines Safety and Health Commission by the French Government delegation on 3 November 1975 (Doc. 3424/75, available from the Secretariat in German, French and English).

The administrative inquiry is complete, and a judicial inquiry is being carried out at the time of writing.

3.1.2. On 27 December 1974 an explosion killed 42 men and injured 7 in pit 3 of mine 19 of the Lens production unit (mines 18 and 7-19-4). This pit, forming part of pit 4, produces 729 tons per day of a type of coking coal with 23 % VM.

The inquiry showed that the accident was caused by a firedamp explosion which was transformed into a light coal-dust explosion. This explosion occurred in the 'Six Sillons' area at a depth of 710 metres and travelled through a newly developed face 90 m in length and 2 500 m of roadways. The face, 1 to 1.2 m high was equipped with powered supports and had been advanced only $1^1/2$ metres before the 5-day Christmas break, in readiness for the permanent installation of these supports.

The accident occurred at about 6.15 a.m., shortly after the arrival of the shift. The victims were quickly taken to the surface: the deaths and injuries were caused by mechanical effects, by burning or by asphyxia.

3.1.3. The following information is taken from the above-mentioned memorandum:

3.1.3.1. The workings are generally classified as gassy and dusty.

The "Six Sillons" seam has the following characteristics:

- volatile matter content: 23%
- the firedamp emission is 5 m^3/t and the specific emission per tonne varies from 11-33 m^3/t
- ash content: 8%
- seam thickness: 1.1 - 1.2 m with 70 cm of coal and 20 cm of middlings. The coefficient of cleanness $\frac{\text{net}}{\text{gross}} = 50\%$
- the dip is from 5-27°. The seam profile is irregular with undulations in the roof and floor, in particular, the top end of the face is broken up by a series of rolls and faulting.

40 m and 100 m respectively above the "Six Sillons" seam are the Marthe and Jeanne seams. 67 m below is the Victor seam.

3.1.3.2. Operating conditions in the explosion zone

The only drivage or winning operations taking place at the time of the disaster were those in Vm 33. Drivage was begun on 9 December 1974; on 21 December it measured 47.6 m, with a rise of 12° and a total width of 1.25 m (seam thickness).

VC 72 was driven in October and November 1974, work stopped on 7 December 1974 at 190 m; ventilation was stopped on 20 December and the area closed.

V_M 31 is a new face in which machinery was being installed: it was due to be brought into operation at the beginning of 1975.

Explosives were not used in the district.

In normal operating conditions the procedure was as follows:

- the products of seam 31 are conveyed via VC 11, which leads into VC 4,
- VC 4 leads into cross-cut 306 which terminates at mine-car loading-point 031.

Material would be transported to the seam via VC 4 - VC 5 - VC 54 - 70 - 71.

3.1.3.3. Ventilation conditions in the explosion zone

3.1.3.3.1. See diagram for the flow of the air current.
The volumes of air in the various workings are as follows (m^3/s):
VC 5 : $8m^3$; VC 7 : $5.5m^3$; VM 31 : $9m^3$; VC 71 : $2m^3$; VC 7 : $3m^3$; VC 11 : $4.5m^3$; in each direction; VC 4 : $9.5m^3$.

3.1.3.3.2. Measurements revealed a firedamp content which never exceeded 0.2 - 0.3%, and no abnormal outbursts were recorded.

3.1.3.3.3. In VC 72 there was an accumulation of firedamp as a result of the shutdown of the auxiliary ventilation.

By examining the flow of the firedamp at the entrance to the working it was established:

(a) the firedamp was flowing to the entrance of this heading at a rate of 1.5 l/s.

(b) tests have shown that the firedamp leaving VC 72 could not back up VC 70 against the airflow.

(c) this firedamp could only increase the average firedamp content of the air current circulating in VM 31 and VC 71 by 0.1 - 0.2%.

(d) the flow of this firedamp could intermittently take the form of a "roof layer" with an explosive content, situated in the crown of the roadway in the lagging: this layer was between 10 cm and 20 cm thick at the entrance to VC 72.

3.1.3.3.4. In rise heading VM 33, the ventilation ventube was crushed for some hours before the disaster; ventilation of this heading was therefore disrupted during this time. The re-placing of the supports when the new shift arrived may have caused a bleed. The tests have shown that it could not have an explosive content, however.

3.1.3.3.5. A strong barometric depression was recorded between 22 hours on 26 December and 8 hours on 27 December; by morning the barometric pressure had fallen from 762 to 752 mm, i.e. 10 mm in 10 hours with a peak rate of 2 mm/h between 0 and 6 hours.

Examination of the remote methanometry recordings made during this period in the adjoining districts does not show any unusual change of the content curves, and it may be inferred that, in general, this depression did not have a typical effect on the emission of gas from the old workings.

3.1.3.3.6. <u>Flow of firedamp from the old workings</u>: there is a constant flow of air from VC 2 on stoppage days as a result of a natural air flow.

It has been shown by measurement that this flow of air is weak (less than 10 l/s); most of the time it is not very gassy, since its maximum firedamp content has rarely exceeded 20%. With a 100% firedamp content, this flow would only have had a negligible effect (less than 0.5 of one thousandth) on the average firedamp content of the air current of $21.5 m^3/s$ circulating in VN 1.

3.1.3.4. <u>Coal-dust in the working zone and the dust-suppression measures</u>

3.1.3.4.1. The quantity of dust deposited in the district was low since the seam was not in normal operation.

3.1.3.4.2. An average humidity was maintained in the district before the disaster.

The dust-suppression methods used in winning work involved spraying.

In the roadways there are spraying and fine-spraying ramps at the delivery ends of and along the conveyors. This method is primarily intended to suppress noxious dusts.

3.1.3.4.3. Flammable dusts were suppressed by neutralization with stonedust.

The neutralization ratio measured in the roadways before the disaster was around 90%; the recorded interval between two checks was less than three months.

Sampling is carried out by sweeping a 20 cm wide band of dust from a thin layer on the periphery of the roadway. Samples are taken every 50 m.

After the disaster it was established that no samples were taken at floor level in damp roadways and that the neutralization ratio was only measured on the walls and roof. In normal operating conditions this state of affairs appeared satisfactory, but after a stoppage of several days the floor became dry and there was a distinct difference between the total neutralization ratio and the measured ratio. The decrease is around 40% after a stoppage of 4 - 5 days.

3.1.3.4.4. <u>State of the explosion barriers</u>

The explosion barriers in question contained 400 kg of stonedust per m^2 of roadway cross-section. They consist of shelves 60 cm wide resting directly on pipes between 10 and 12 cm diameter. The number of barriers is variable and depends on their length and load, which is usually about 100 kg, but sometimes 120 kg or 200 kg.

These explosion barriers are checked every month.

The layout of the explosion barriers is given in the attached diagram. After the explosion their conditions were as follows:

Cross-cut 2003: both explosion barriers intact.
VN 1 : three shelves worked.
Cross-cut 306: ten shelves upset and eight remained in position.
Cross-cut 102: three shelves worked. No other effects.
Cross-cut 1007: the explosion barrier functioned with 50% efficiency. No other effects.

3.1.3.5. <u>Mechanical and thermal effects and condition of the injured</u>

3.1.3.5.1. These effects are described in detail in the memorandum.

To sum up, the dynamic effects were on the whole slight, with more violent effects in certain areas, such as VC 4 (between VC 1 and VC 5) where the conveyor was uprooted and hurled some distance, VC 5 where the arches were tilted first one way and then the other, and VC 54 where the arches were tilted and the monorail shifted.

3.1.3.5.2. Thermal effects were apparent in VC 71 where wooden boards were burnt, and the monorail chains and cable sheaves were thickly encrusted with coke in VC 7, between VC 70 and VM 32, and at the entrance to VM 33.

A plan of the flame effects has been drawn up giving the percentage of cenospheres of coke and semi-coke and the percentage of melted coal.

3.1.3.5.3. Of the 49 persons who were in the district:

- one has no injuries (Cliquet)
- one has injuries but no burns (Carlier)
- five have injuries and burns (Hanot, Veret, Delille, Nazar and Sczepanski)
- 38 have died as a result of injuries and burns
- two were poisoned and had slight burns (Delplanque and Kubiak)

- two were poisoned and had burns to the face and hands (Obert and Lhermitte) .

3.1.3.6. Causes of the explosion

The theory proposed after extensive investigation is that an ignition of firedamp occurred at the intersection of VC 70 and VC 71 where, as pointed out above, there was a layer of firedamp at the roof and above the supports. The cause of ignition of this firedamp cannot be stated with a great deal of certainty; however, it is thought that a leak from a compressed air hose with a diameter of 100 mm was the most probable cause, by charging electrostatically a fibre. A hole of about 8 mm in diameter was found in the air hose some 2 hours before the disaster : the leakage may well have contained particles of rust. This was the only thing in front of the leakage which could have been well insulated and become sufficiently charged (see Doc. No. 3435/75).

The firedamp ignition caused an ignition of dusts: this was quite possible since, as stated above, the neutralization ratio after the five-day Christmas break was inadequate.

3.2. Accident at Houghton Main Mine, occurring on 12th June 1975, which resulted in the death of 5 miners, and the serious injury of another

3.2.1. This accident was the subject of a public inquiry held by H.M. Chief Inspector of Mines and Quarries, which started on 26 August 1975 and lasted 9 days. Preliminary information on this explosion was dicussed by the Mines Safety and Health Commission during its meetings of 11 July and 2 December 1975. The Official Report of the explosion was received by the Secretariat of the MSHC during 1976 and has been translated in extenso into French and German. Copies of the original document and the translations are available from the Secretariat.

3.2.2. The following is a summary of the causes of the accident prepared from the Official Report, but for a full explanation, see the original report. The Recommendations of H.M. Chief Inspector are reproduced in full.

3.2.2.1. In a nearly level seam, 1.5 metres thick, a 360 m long arched development heading had been driven taking the seam and some of the roof beds. The heading had been temporarily stopped. Normally it was ventilated by an exhausting fan of a bifurcated design, (driven by an electric motor), with a wet dust filter attached, but due to a mechanical failure which caused frictional sparking the fan had been stopped for 9 days before the explosion.

3.2.2.2. At the end of the afternoon shift on 12 June 1975, two electricians and a deputy are thought to have attempted to restart the fan and shortly afterwards, a violent explosion took place which travelled at least 700 metres down the intake or conveyor roadway, resulting in the death of four persons immediately. A fifth miner died whilst trying to escape in the return air; he was wearing a self-rescuer around his neck but the mouthpiece was not in his mouth.

3.2.3. H.M. Chief Inspector's recommendations were sent to the Mines Safety and Health Commission at the end of 1975, so that they could be studied by Members in 1976. They are fully reproduced below so as to give them as rapid diffusion as possible.

RECOMMENDATIONS

129 I recommend that:

(1) There should be amendments to the following statutory provisions:

(a) The Mines and Quarries Act 1954: Section 10: the person appointed to read reports on behalf of the manager should be the holder of a first or second class certificate of competency.

(b) The Coal and Other Mines (Managers and Officials) Regulations 1956:

(i) The provisions of Regulation 6A relating to the appointment of a competent person to read reports on behalf of an under-manager should be revoked.

(ii) A statutory shift report should be introduced for officials superior to deputies but subordinate to undermanagers.

(c) The Coal and Other Mines (Surveyors and Plans) Regulations 1956:

The manager should ensure that any information that is necessary to be supplied to the surveyor for recording on the plans and sections which are required to be kept at the mine is accurate and should certify this by counter-signing all such plans and sections prepared by or under the supervision of the appointed surveyor for the mine.

(d) The Coal Mines (Precautions Against Inflammable Dust) Regulations 1956:

Regulation 10A should be amended to include the recording on a plan the position of all the stone dust barriers specified in the manager's scheme by virtue of this Regulation.

(e) The Coal and Other Mines (Ventilation) Regulations 1956

These Regulations should be amended to include the following provisions:

(i) Rules should be made for the installation and operation of auxiliary fans.

(ii) Narrow drivages which require at any time to be ventilated by auxiliary means are, thereafter, constantly ventilated by positive means.

(iii) The manager should specify the construction of any fence erected to prevent access to an unventilated part of a mine and should ensure that it is maintained constantly in an effective condition.

(f) (i) The Coal and Other Mines (Fire and Rescue) Regulations 1956:

Regulation 27 should prescribe standards for the size, equipment and facilities of rescue rooms. The room should be maintained solely for rescue work.

(ii) Regulations should be made to cover the approval, carrying and training in the use of self-rescuers.

(2) The National Coal Board should implement as they arise any interim findings of the National Committee referred to in para 124.

(3) The National Coal Board Committee studying the design of self-rescuers should be reconvened as soon as possible. The membership and terms of reference should be reviewed.

(4) The National Coal Board should ensure that wherever possible its specifications for auxiliary and booster fans are completed during the time this new equipment is in the prototype stage. Such prototype equipment should be used only in closely controlled conditions. The test and assessment requirements for new equipment of this type should include standards or construction, perfomance and ease of maintenance underground.

(5) When a plan for the ventilation of a development in a mine has been prepared and signed no change should be made in the proposed system of ventilation without the agreement of all signatories of the said plan.

(6) Any change made in a ventilation circuit should be recorded forthwith on the rescue and ventilation plans. Furthermore, a joint working party should be set up to review the frequency of up-dating all statutory plans and the available methods of plan reproduction so as to reduce the time between survey and issue.

(7) The equipment to enable deputies to detect flammable gas in extensive roof cavities should be readily available where needed. Such cavities should be positively ventilated or filled.

(8) At large collieries consideration should be given to the appointment of a chief engineer to coordinate the activities of the electrical and mechanical engineering departments. Where there is no chief engineer arrangements should be made to ensure that in respect of matters likely to affect safety, there is a daily exchange of information between the mechanical and electrical engineers for the mine.

(9) The National Coal Board should provide effective means for the immobilization of apparatus which may be dangerous by reason of some mechanical or electrical defect or abnormality.

(10) The National Coal Board should review the appointment of deputy managers and safety engineers at collieries. The provisions of Section 1 of the Mines Management Act 1971 should be more widely applied in this respect.

(11) The duties of safety officers, ventilation officers, roadway dust samplers, and stone dust barrier supervisors should be specified in writing by the colliery manager.

(12) The format of M & Q Forms No. 231 qnd No. 232 relating to deputies inspections should be reviewed to take account of current mining practice.

3.3. Tip accident at No 6 Mine, Marles at Calonne-Ricouart (Pas-de-Calais) 26.8.75. - 6 persons killed.

3.3.1. This accident was examined by the Mines Safety and Health Commission at its meeting on 2 December 1975 on the report of the discussion by the French Government.

3.3.2. A tip which had not been used for 15 years had burned, and the red shale was being used by a contractor as road-base material. A sudden slip occurred during the night of 26 August 1975, when there was no one on the tip. Large lumps were found up to 150 m, and fine dust up to 350 m away. A house in a workers' estate was destroyed and six people killed.(x) There had apparently not been an explosion, as had originally been thought, but rather a collapse of the face, which at the time of the accident was 70 m high, almost vertical and being worked from the bottom. This collapse presumably caused hot dust to be transported by air pressure.

(x) These fatal accidents are not included in the statistics for 1975. (See paragraph 1.1.3. and 1.2.2., p. 3 - p. 4).

3.3.3. The discussion of this incident recalled earlier accidents resulting from slippage of materials, some of which had been made transportable by water, or from gas explosions. Various members expressed concern with regard to the stability of tips, many of which were being worked. The topic would be taken up at the next meeting, when the enquiry would be finished.

3.3.4. This subject will be considered in greater detail in 1976, in view of the general interest in the stability of tips, many of which are currently being exploited for burnt shale, on the basis of a report to be submitted by the French delegation.

4. SECTION IV.

JOINT ACCIDENT STATISTICS

4.1. Annex I contains tables 1a) and 1b), which give absolute figures and frequency rates (per million hours) for fatalities and injuries for 1974 according to the 13 technical causes and 4 accident locations. Tables 2a) and 2b), which give a similar information concerning fatalities and injuries in accordance with the severity and locality of the injuries. These tables cover Belgium, Italy, the Federal Republic of Germany with seperate tables for each coal field (in Germany and France). A summary has been made for these countries for tables 1a) and 1b), but not for 2a) and 2b) as it was not possible for Belgium to provide the necessary details.

For the United Kingdom, tables 1a) and 1b), 2a) and 2b) have been drawn up but only for fatalities and "serious injuries". (see paragraph 4.2.1.).

4.2. The results for the United Kingdom and the Community of Six can only be partially compared with reservations for the following reasons :

4.2.1. United Kingdom injury figures cannot be incorporated in their present form in the tables by the Mines Safety and Health Commission. Records are kept for all accidents giving rise to more than three days' incapacity whereas for the Community of Six, the records are for at least 4 days of incapacity and under different headings.

4.2.2. Different criteria are used to define the term "serious" accidents: in the United Kingdom it means those which result in serious fractures or amputations and other injuries which might endanger life or lead to permanent incapacity, while in the Community of Six, it means accidents causing temporary incapacity of more than 56 days. These accident rates are not comparable in their present form. The study mentioned in 2.5.1. will attempt to deal with this matter.

4.2.3. Fatal accidents mean those resulting in death within 52 weeks after the accident in the United Kingdom, and within 56 calendar days in the Community of Six. In spite of this difference, rates for these accidents are generally comparable.

4.3. As in earlier days, the tables in this chapter include a chronological comparison of serious and fatal accidents since 1958 for the Community of Six. These figures are given in tables A, B and C (collective accidents) and D, which summarizes the important factors. The lower section of the latter table gives the corresponding figures for the United Kingdom in 1974 and 1975.

A summary of the frequency rates of all accidents in 1975 in the Community of Six is also given with these tables (1b),2b)) and tables 1b) and 2b) for the United Kingdom, but for fatalities and "serious injuries" only.

4.4. As has been mentionned, the only comparison which can properly be made without further investigation is that of fatal accidents. In 1975 there were 55 fatalities in the United Kingdom, representing a rate of 0.181 per million man-hours, and 110 fatalities (a rate of 0.345 per mio/h) in the Community of Six. For the purposes of statistical comparison,it is preferable to deduct fatalities resulting from collective accidents (5 in the United Kingdom and 0 in the Community of Six), after which the rates are 0.165 and 0.345 respectively. Here too the rate for the United Kingdom is considerably and significantly lower than the Community rate.

4.5. Returning to the chronological analysis of serious and fatal accidents in the Community of Six, the same reservations apply as in earlier years. The rates cannot be compared as such and a certain margin or confidence interval should be allowed. This confidence has been chosen here with a probability of 84 %. The difference between the two rates is significant at more than 95 % when these intervals do not touch.

Summarizing the tendencies which can be observed from table D.

The number of fatalities for the Community of Six, per million man-hours, fell from 0.456 to 0.345, a decrease of 24 %. Disregarding collective accidents, these rates are 0.307 and 0.345 respectively, which represents an increase of 12 %, which however is not a statistically significant variation at 95 % confidence.

For the United Kingdom the fatality rate rose from 0,138 at 0,181 per million man-hours, an increase of 31 %. Disregarding the collective accident from 1975 (5 fatalities), these rates are 0,138 and 0,165 per mio/h respectively, an increase of 19,5 %, increase not a statistically significant variation.

For the Community of Nine there were 165 fatalities for 622 mio/h in 1975, a rate of 0,265, whilst in 1974 there were 180 fatalities (with the accident of Liévin) for 581 mio/h, a rate of 0,310.

Disregarding collective accidents, there were 160 fatalities in 1975, representing a rate of 0,258, whilst in 1974 there were 133 fatalities, a rate of 0,299, an increase in the rate of 0,029 or 12,6 % which is a statistically "non significant" variation.

The incidence of serious injuries in the Community of Six fell from 16.12 in 1974 to 15.05 in 1975, a statistically significant decrease of 6.7 %.

The decrease in serious injuries, since 1973, was marked as regards accidents involving falls of ground (I), haulage and transport and fall of the victim (II and III), and at last the machinery and falling objets (IV and V), as may be seen in Table A below.

For the United Kingdom, the incidence of serious injuries rose from 1.555 in 1974 (417 injuries) to 1.722 in 1975 (522 injuries), an increase of 10.7 % which is not statistically significant at the 95% level, since the higher level of the confidence interval in 1974 was 1.67 and the lower level for 1975 was 1.46.

4.6. As previously stated, a chronological analysis of other accidents can only be made for the former Community of Six and only for a period of four years, which is too short a time to yield a statistically valid interpretation of the changes observed.

Repeating these reservations, and by way of illustration (see Tables 1a) and 1b)), it should be mentionned that:

- the number of casualties resulting in an absence from work of 21 - 56 days (15 875 in 1974) fell to 15 474, representing a statistically significant fall of 4.2 % in the rate, from 50.62 to 48.50 per mio/h.

- the number of casualties resulting in an absence from work of 4 - 20 days (34 797 in 1974) fell to 33 985, representing a statistically significant fall of 3.9 % in the rate, from 110.97 to 106.67 per mio/h .

  It should be remembered, however, as regards this category of accidents, that the Working Party believes that the change in these accident figures do not provide a reliable reflection of changes in safety standards.

4.7. In the same way as last year, Table 1a) gives a breakdown of accidents in the first five categories of "technical causes" for the Community of Six and the United Kingdom. For the United Kingdom, the only division is into "serious injuries" and "fatalities".

However, headings I - V account for almost all injuries and sizeable variations were not noted as compared with 1974 in each of these headings, regarding collective accidents.

1975	Community (Six)					United Kingdom		
	4 to 20 days %	21 to 56 days %	> 56 days %	Fatalities %	Total	Serious	Fatalities %	Total
I Falls of ground	31.0	24.8	24.1	29.0	27.2	26.2	14.5	25.1
II Haulage and transport	5.4	8.1	15.4	31.8	7.1	33.4	36.4	33.6
III Falls by accident victim	22.6	27.4	22.4	13.6	23.9	13.6	1.8	12.5
IV Machinery, tools etc.	17.2	16.5	15.3	13.6	16.6	12.4	16.3	12.6
V Falling objects	20.6	20.4	18.4	10.9	20.7	8.4	7.3	8.3
Total I to V	95.8	97.2	95.6	98.9	95.5	94.0	86.3	92.1

4.8. To sum up, it is apparent that within the former Community of Six the rate of injuries has decreased in all categories of injuries. The fatality rate also fell as in 1974 there was the 1974 collective accident at Liévin, but disregarding this, the fatality rate has still increased but not by a statistically significant amount.

On the other hand, in the United Kingdom, however, the fatality rate has increased , but not significantly, and is still considerably lower than the rate for the Community of Six; the serious injury rate has also increased, but not statistically significantly.

A. Comparative Table of numbers of persons incapacitated by underground accidents for eight weeks or longer years 1958-1975 per '000,000 man-hours (frequency)

GERMANY	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	4,843	4,779	4,886	4,797	4,682	4,663	4,894	4,732	4,721	4,524	4,618	4,736	4,321	4,354	4,20	4,30	4,08	3,69		
2) Haulage and transport	2,550	2,569	2,445	2.458	2,501	2,433	2,385	2,411	2,067	1,913	1,994	2,195	2,007	1,724	1,81	1,80	1,68	2,16		
3) Movement of personnel	2,497	2,463	2,348	2,512	2,608	2,646	2,744	3,032	2,852	2,974	3,300	3,399	3,370	3,246	3,48	3,98	4,15	3,37		
4) Machinery, handling of tools and supports	0,767	0,914	0,920	0,867	1,046	1,213	1,242	1,234	1,244	1,124	1,396	1,291	1,382	1,597	1,38	1,61	1,58	2,16		
5) Falling objects	2,537	2,719	2,738	2,945	3,077	3,038	3,242	3,344	3,272	3,642	3,773	4,036	4,166	3,313	3,49	3,49	3,37	2,97		
6) Explosives	0,015	0,011	0,010	0,009	0,008	0,006	0,006	0,005	0,005	0,017	0,011	0,007	0,008	-	-	-	0,01	-		
7) Explosions of firedamp or coal dust	0,011	0,016	-	0,002	0,123	0,010	-	0,014	0,013	-	0,004	0,004	-	0,012	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	0,005	-	0,003	-	-	-	-	-	-	-	-		
9) Underground combustion and fires	-	-	0,003	0,002	-	-	-	-	-	-	0,004	-	-	-	-	-	-	-		
10) Inrushes of water	0,004	-	-	-	-	0,004	-	-	-	-	-	-	-	-	-	-	-	-		
11) Electricity	0,010	0,014	0,012	0,014	0,006	0,012	0,009	0,002	0,010	0,006	0,011	0,026	0,012	0,008	0,01	0,005	-	0,009		
12) Other causes	0,487	0,522	0,457	0,503	0,488	0,473	0,477	0,354	0,414	0,396	0,429	0,402	0,532	0,632	0,96	0,99	0,52	0,32		
TOTAL	13,721	14,007	13,819	14,109	14,539	14,499	14,999	15,133	14,598	14,599	15,540	16,096	15,798	14,886	15,31	16,19	15,40	14,69		
BELGIUM	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**
1) Falls of ground	5,911	4,294	4,324	4,071	4,439	4,432	4,417	3,574	3,568	3,850	3,676	5,075	4,673	3,989	4,6	4,02	3,99	2,79		
2) Haulage and transport	4,132	2,979	2,709	2,770	3,331	3,565	3,419	2,866	3,269	2,960	3,220	3,169	3,018	3,365	2,8	3,33	2,43	2,39		
3) Movement of personnel	1,354	0,998	1,008	1,062	1,136	1,066	0,961	0,771	0,936	0,903	1,122	1,186	1,144	1,496	1,3	1,41	1,70	1,29		
4) Machinery, handling of tools and supports	2,804	2,085	2,386	2,097	2,461	2,414	2,310	2,126	2,146	2,265	1,903	2,353	1,801	2,469	1,7	2,58	2,18	1,66		
5) Falling objects	0,414	0,371	0,354	0,301	0,445	0,547	0,397	0,292	0,349	0,459	0,358	1,244	1,242	1,870	1,5	1,44	1,84	1,46		
6) Explosives	0,027	0,007	0,032	0,018	-	0,019	0,018	-	0,013	0,056	0,049	-	-	0,025	0,03	-	-	-		
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	0,009	0,031	-	-	-	0,019	-	-	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,011	-	-	-	-	-	-	-	0,013	-	-	-	-	-	-	-	-	-		
9) Underground combustion and fires	-	-	-	-	-	-	-	0,021	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	-	-	-	-	0,010	-	-	-	-	-	-	-	-	0,025	-	-	-	-		
11) Electricity	0,011	-	0,016	0,018	0,010	0,009	-	0,010	0,015	-	0,016	0,019	-	-	-	0,03	0,03	0,03		
12) Other causes	0,260	0,255	0,260	0,301	0,351	0,198	0,268	0,333	0,362	0,278	0,228	0,175	0,195	0,324	0,2	0,36	0,41	0,06		
TOTAL	14,924	10,989	11,089	10,638	12,161	12,250	11,799	10,024	10,669	10,771	10,572	13,240	12,097	13,563	12,13	13,16	12,61	9,71		

A. Comparative Table of numbers of persons incapacitated by underground accidents for eight weeks or longer years 1958-1975 per '000,000 man-hours (frequency)

FRANCE *	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	5,027	4,665	4,744	4,416	4,222	4,177	4,308	3,941	3,927	3,634	4,162	4,044	3,761	3,721	3,79	4,38	4,52	3,75		
2) Haulage and transport	1,980	1,695	1,920	2,106	2,196	2,364	2,278	2,153	1,858	1,918	1,946	1,556	1,666	1,959	1,89	2,37	2,36	2,63		
3) Movement of personnel	1,505	1,118	2,873	2,334	2,458	2,368	2,383	2,087	2,239	2,174	2,815	3,226	3,372	3,667	4,51	4,79	4,11	4,29		
4) Machinery, handling of tools and supports	0,914	1,022	1,621	2,523	2,991	3,096	3,042	2,272	2,639	2,773	3,016	3,070	3,332	2,373	2,63	2,84	2,98	2,94		
5) Falling objects	1,890	2,187	1,893	2,292	2,073	2,278	2,074	1,839	1,785	2,114	2,386	2,537	2,515	4,566	4,96	5,00	5,12	4,11		
6) Explosives	0,043	0,051	0,031	0,017	0,051	0,009	0,013	0,037	0,010	0,011	-	0,050	0,016	-	0,02	-	-	0,03		
7) Explosions of firedamp or coal dust	0,047	0,088	-	-	0,004	-	-	-	0,029	-	-	-	0,087	-	-	-	0,08	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,004	-	-	-	-	-	-	-	-	0,005	-	-	-	-	-	-	-	0,01		
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,01	0,03	0,01		
10) Inrushes of water	-	-	-	-	-	-	0,018	-	0,005	-	0,006	-	0,032	-	0,01	0,04	-	-		
11) Electricity	0,014	-	0,004	0,029	0,004	0,014	0,009	0,014	-	0,005	0,006	0,014	0,024	0,009	0,01	-	9,01	0,03		
12) Other causes	2,956	2,768	0,793	0,362	0,240	0,354	0,227	0,174	0,200	0,185	0,233	0,291	0,294	0,314	0,43	0,67	0,63	0,64		
TOTAL	14,380	13,594	13,909	14,079	14,239	14,660	14,347	12,517	12,692	12,819	14,570	14,788	15,099	16,609	18,24	20,09	19,85	18,44		
ITALY	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	1,355	1,378	1,808	-	0,792	0,366	0,893	5,572	6,360	5,580	0,182	3,656	-	5,958	2,20	-	-	-		
2) Haulage and transport	1,335	0,984	1,205	0,676	1,847	1,465	1,787	-	0,707	0,797	0,812	-	-	3,404	-	-	-	-		
3) Movement of personnel	0,668	0,394	1,005	1,578	1,056	0,732	1,787	-	0,707	1,594	0,812	1,462	-	1,702	-	3,25	-	-		
4) Machinery, handling of tools and supports	1,169	0,984	0,603	0,902	1,584	1,465	3,127	7,164	7,067	13,552	7,304	8,043	6,896	2,553	-	-	-	4,00		
5) Falling objects	1,169	1,698	1,808	2,029	2,375	3,296	3,574	0,796	-	6,377	6,493	3,656	-	1,702	-	-	1,64	-		
6) Explosives	0,167	-	-	0,225	-	0,366	-	-	-	-	-	-	-	-	-	-	-	-		
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8) Sudden outburst of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
11) Electricity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
12) Other causes	0,334	0,591	0,603	0,451	-	-	-	1,592	3,360	3,189	0,812	-	5,172	0,851	-	-	-	-		
TOTAL	6,197	6,299	7,032	5,861	7,654	7,690	11,168	15,124	18,201	31,089	17,043	16,817	12,068	16,170	2,20	3,25	1,64	4,00		

* Including Provence as from 1970.

A. Comparative Table of numbers of persons incapacitated by underground accidents for eight weeks or longer

years 1958-1975 per '000,000 man-hours (frequency)

NETHERLANDS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	1,326	1,464	1,305	1,829	2,238	1,742	2,017	1,923	1,688	2,466	2,450	2,737	2,634	2,528	2,06	4,219	1,041	-		
2) Haulage and transport	1,511	1,562	1,898	1,924	2,590	1,826	1,952	2,808	2,621	1,866	2,407	2,562	2,634	1,820	2,19	2,443	2,603	-		
3) Movement of personnel	0,324	0,386	0,187	0,514	0,580	0,630	0,472	0,774	0,605	0,766	1,160	1,165	0,905	0,404	1,03	0,888	0,521	-		
4) Machinery, handling of tools and supports	0,617	0,402	0,780	0,915	1,015	1,050	1,094	1,282	2,066	0,833	1,031	1,689	1,894	3,033	1,81	1,554	4,686	-		
5) Falling objects	0,401	0,515	0,492	0,819	0,642	0,630	0,923	0,862	0,958	0,866	1,590	1,106	0,659	1,213	1,55	0,888	1,562	-		
6) Explosives	-	-	-	-	-	-	0,021	-	-	-	-	-	-	-	-	-	-	-		
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
11) Electricity	-	-	-	-	0,021	-	0,021	-	-	-	-	-	-	-	-	-	-	-		
12) Other causes	0,262	0,161	0,390	0,210	0,497	0,147	0,129	0,088	0,353	0,700	0,301	0,116	0,165	0,202	0,52	0,666	-	-		
TOTAL	4,441	4,490	5,051	6,212	7,583	6,025	6,629	7,737	8,291	7,497	8,939	9,375	8,891	9,201	9,15	10,659	10,413			

COMMUNITY (IV)	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	4,846	4,490	4,571	4,434	4,387	4,337	4,509	4,215	4,186	4,060	4,261	4,492	4,135	4,109	4,08	4,29	4,15	3,61		
2) Haulage and transport	2,602	2,347	2,310	2,371	2,521	2,520	2,346	2,416	2,173	2,037	2,139	2,118	2,016	1,953	1,93	2,11	1,91	2,28		
3) Movement of personnel	2,003	1,823	2,185	2,185	2,282	2,261	2,326	2,364	2,320	2,354	2,795	3,023	3,084	3,117	3,47	3,88	3,89	3,38		
4) Machinery, handling of tools and supports	1,098	1,064	1,264	1,423	1,712	1,818	1,848	1,773	1,815	1,790	1,945	1,865	2,011	1,876	1,75	2,01	1,98	2,29		
5) Falling objects	1,962	2,161	2,105	2,353	2,375	2,406	2,442	2,415	2,362	2,638	2,858	3,185	3,308	3,506	3,62	3,63	3,62	3,08		
6) Explosives	0,023	0,020	0,017	0,012	0,018	0,010	0,011	0,013	0,007	0,019	0,015	0,019	0,011	0,002	0,008	-	0,01	0,006		
7) Explosions of firedamp or coal dust	0,017	0,030	0,010	0,001	0,071	0,006	0,001	0,011	0,016	-	0,002	0,004	0,025	0,007	-	-	0,02	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,002	-	-	-	-	-	-	0,002	0,001	0,003	-	-	-	-	-	-	-	0,003		
9) Underground combustion and fires	-	-	0,002	0,001	-	-	-	0,002	-	-	0,002	-	-	-	-	0,003	0,01	0,003		
10) Inrushes of water	0,002	-	-	-	0,001	0,002	0,003	-	0,001	-	0,002	-	0,009	0,002	0,003	0,009	-	-		
11) Electricity	0,010	0,008	0,010	0,018	0,007	0,012	0,008	0,006	0,007	0,005	0,010	0,021	0,014	0,007	0,008	0,006	0,01	0,016		
12) Other causes	0,985	1,012	0,513	0,428	0,404	0,390	0,364	0,289	0,354	0,337	0,341	0,333	0,434	0,509	0,73	0,84	0,53	0,37		
TOTAL	13,551	12,954	12,986	13,227	13,781	13,781	13,861	13,506	13,242	13,246	14,370	15,160	15,047	15,088	15,60	16,77	16,12	15,05		

B. Underground accidents resulting in death within eight weeks

years 1958-1975

per '000,000 man-hours (frequency)

GERMANY	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	0,268	0,290	0,263	0,216	0,280	0,260	0,200	0,184	0,197	0,206	0,148	0,192	0,113	0,147	0,10	0,08	0,12	0,12		
2) Haulage and transport	0,179	0,169	0,182	0,196	0,149	0,178	0,300	0,191	0,175	0,150	0,126	0,143	0,128	0,103	0,16	0,13	0,07	0,12		
3) Movement of personnel	0,094	0,097	0,070	0,086	0,059	0,089	0,071	0,070	0,094	0,076	0,079	0,056	0,058	0,032	0,06	0,06	0,06	0,06		
4) Machinery, handling of tools and supports	0,010	0,027	0,012	0,027	0,037	0,019	0,028	0,025	0,030	0,020	0,014	0,034	0,031	0,032	0,03	0,02	0,02	0,05		
5) Falling objects	0,065	0,041	0,039	0,065	0,072	0,072	0,054	0,058	0,048	0,063	0,051	0,049	0,035	0,047	0,06	0,02	0,04	0,05		
6) Explosives	0,009	0,003	0,003	-	0,004	-	0,002	-	-	-	0,004	-	-	-	-	-	-	-		
7) Explosions of firedamp or coal dust	0,011	0,012	-	-	0,660	0,002	0,002	0,019	0,056	-	0,061	-	-	0,008	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,005	0,003	0,002	0,004	0,002	-	-	0,002	0,002	0,007	-	0,004	-	0,008	0,004	0,005	-	-		
9) Underground combustion and fires	-	0,003	-	0,002	-	0,006	0,009	0,005	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	-	0,003	0,002	-	-	0,004	-	-	-	-	-	-	0,012	-	-	-	-	-		
11) Electricity	0,022	0,008	0,002	0,005	0,010	0,002	0,004	0,005	-	0,003	0,004	0,004	0,004	-	0,004	0,005	-	-		
12) Other causes	0,025	0,025	0,036	0,049	0,049	0,025	0,017	0,023	0,027	0,017	0,022	0,022	0,027	0,083	0,04	0,09	0,03	0,005		
TOTAL	0,687	0,680	0,611	0,651	1,344	0,657	0,587	0,582	0,629	0,542	0,509	0,504	0,408	0,460	0,46	0,420	0,34	0,41		

BELGIUM	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	0,223	0,213	0,299	0,266	0,246	0,264	0,222	0,239	0,324	0,264	0,179	0,214	0,268	0,100	0,08	0,21	0,06	0,03		
2) Haulage and transport	0,101	0,124	0,157	0,168	0,142	0,245	0,166	0,166	0,187	0,180	0,114	0,097	0,170	0,125	0,18	0,21	0,06	0,16		
3) Movement of personnel	0,011	0,027	0,008	0,035	0,010	0,057	0,028	0,011	0,025	-	0,033	-	-	0,049	0,03	-	0,03	-		
4) Machinery, handling of tools and supports	0,005	0,014	0,016	0,027	0,047	-	0,018	0,052	0,025	0,028	0,065	-	-	0,025	-	0,03	-	0,09		
5) Falling objects	0,016	-	0,008	-	0,010	0,019	0,018	-	-	-	0,016	-	-	-	0,03	-	0,03	-		
6) Explosives	0,011	0,014	-	-	-	-	-	-	-	-	0,016	-	-	-	-	-	-	-		
7) Explosions of firedamp or coal dust	-	-	0,016	-	-	-	-	0,011	-	-	-	-	-	-	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,016	0,014	-	-	0,047	-	-	0,041	0,013	-	-	-	-	0,025	0,18	0,06	-	-		
9) Underground combustion and fires	-	0,007	-	-	-	-	-	0,011	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	0,011	-	-	0,044	0,047	0,019	-	-	-	-	-	-	-	-	-	-	-	-		
11) Electricity	0,021	-	0,024	-	-	0,009	0,009	0,011	-	0,014	0,033	0,019	0,024	-	-	-	-	-		
12) Other causes	0,005	-	0,008	0,009	0,019	0,028	0,009	-	0,013	0,042	-	-	-	-	0,03	0,03	-	-		
TOTAL	0,420	0,413	0,536	0,549	0,568	0,641	0,471	0,542	0,587	0,528	0,456	0,330	0,462	0,324	0,53	0,54	0,20	0,29		

B. Underground accidents resulting in death within eight weeks

years 1958-1975

per '000,000 man-hours (frequency)

FRANCE *	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	0,235	0,192	0,186	0,219	0,167	0,120	0,127	0,164	0,214	0,159	0,177	0,149	0,143	0,117	0,07	0,20	0,11	0,06		
2) Haulage and transport	0,115	0,085	0,082	0,122	0,077	0,121	0,141	0,052	0,126	0,088	0,101	0,186	0,127	0,108	0,08	0,07	0,12	0,07		
3) Movement of personnel	0,007	0,018	0,027	0,008	0,043	0,009	0,009	0,042	0,024	0,016	0,025	0,014	0,016	0,072	0,01	0,01	0,01	0,03		
4) Machinery, handling of tools and supports	0,018	0,040	0,016	0,008	0,030	0,009	0,036	0,009	0,015	0,016	0,006	-	0,032	0,027	-	0,02	0,03	-		
5) Falling objects	0,025	0,007	0,004	0,017	0,030	0,009	0,018	0,019	0,015	0,011	0,031	0,014	0,016	0,045	-	0,04	0,03	0,03		
6) Explosives	-	0,026	-	-	-	0,005	0,005	0,009	0,005	0,005	0,006	-	0,108	0,018	-	-	-	-		
7) Explosions of firedamp or coal dust	0,115	0,121	-	-	0,004	-	-	0,155	-	-	0,038	-	0,127	-	-	-	0,58	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,043	0,026	0,019	0,004	-	0,019	0,009	-	0,005	0,027	0,019	0,007	-	0,072	-	0,01	-	-		
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,01	-	0,01	-		
10) Inrushes of water	-	-	-	0,004	-	-	-	0,005	-	0,005	-	-	0,016	-	0,01	-	-	-		
11) Electricity	-	0,011	0,012	-	0,009	0,024	-	-	0,010	-	-	0,007	-	-	-	-	-	-		
12) Other causes	0,036	0,029	0,008	-	0,009	0,014	0,014	-	0,005	0,005	-	0,007	-	0,009	0,03	-	-	-		
TOTAL	0,594	0,555	0,354	0,382	0,369	0,330	0,359	0,455	0,419	0,332	0,403	0,384	0,484	0,468	0,21	0,37	0,89	0,18		
ITALY	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	0,167	-	0,201	0,225	-	0,366	-	-	-	-	-	-	-	-	2,20	-	-	-		
2) Haulage and transport	-	0,197	-	-	-	-	-	-	-	0,797	-	-	-	-	-	-	-	-		
3) Movement of personnel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4) Machinery, handling of tools and supports	-	-	-	-	-	-	-	-	-	0,797	-	-	-	-	-	-	-	-		
5) Falling objects	-	0,197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
6) Explosives	0,501	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,167	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
11) Electricity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
12) Other causes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TOTAL	0,835	0,394	0,201	0,226	-	0,366	-	-	-	1,594	-	-	-	-	2,20	-	-	-		

* Including Provence as from 1970.

B. Underground accidents resulting in death within eight weeks

years 1958-1975

per '000,000 man-hours (frequency)

NETHERLANDS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	0,262	0,064	0,034	0,114	0,062	0,084	0,043	0,044	0,050	0,100	0,172	0,058	0,082	0,101	-	-	-	-		
2) Haulage and transport	0,077	0,145	0,067	0,095	0,062	0,105	0,172	0,177	0,126	-	0,086	-	0,165	-	0,26	-	-	-		
3) Movement of personnel	-	-	-	-	-	-	-	-	-	-	-	0,058	-	-	-	-	-	-		
4) Machinery, handling of tools and supports	0,015	0,016	-	-	0,041	-	-	0,022	-	0,067	-	0,117	-	-	-	-	-	-		
5) Falling objects	-	0,016	-	-	-	-	0,043	-	-	-	0,043	-	-	-	-	-	0,521	-		
6) Explosives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10) Inrushes of water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
11) Electricity	-	-	-	0,019	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
12) Other causes	-	-	0,017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TOTAL	0,355	0,241	0,119	0,229	0,166	0,189	0,258	0,243	0,176	0,167	0,301	0,233	0,247	0,101	0,26	-	0,521			

COMMUNITY	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1) Falls of ground	0,253	0,242	0,235	0,217	0,234	0,217	0,175	0,177	0,208	0,192	0,160	0,176	0,135	0,133	0,092	0,13	0,11	0,10		
2) Haulage and transport	0,147	0,141	0,146	0,168	0,124	0,167	0,178	0,149	0,160	0,128	0,115	0,145	0,132	0,104	0,141	0,12	0,08	0,11		
3) Movement of personnel	0,057	0,063	0,047	0,056	0,045	0,060	0,045	0,051	0,060	0,044	0,054	0,038	0,039	0,043	0,043	0,04	0,05	0,047		
4) Machinery, handling of tools and supports	0,011	0,028	0,012	0,021	0,037	0,013	0,030	0,024	0,023	0,024	0,017	0,023	0,027	0,029	0,019	0,02	0,02	0,047		
5) Falling objects	0,045	0,027	0,024	0,041	0,062	0,046	0,037	0,037	0,030	0,036	0,040	0,031	0,025	0,041	0,038	0,02	0,04	0,038		
6) Explosives	0,009	0,010	0,002	-	0,002	0,001	0,002	0,002	0,001	0,002	0,006	-	0,002	0,005	-	-	-	-		
7) Explosions of firedamp or coal dust	0,032	0,036	0,002	-	0,375	0,001	0,001	0,053	0,030	-	0,044	-	0,037	0,005	-	-	0,13	-		
8) Sudden outbursts of firedamp, suffocation by natural gases	0,016	0,010	0,006	0,003	0,007	0,005	0,002	0,006	0,004	0,012	0,006	0,004	-	0,027	0,022	0,012	-	-		
9) Underground combustion and fires	-	0,003	-	0,001	-	0,003	0,005	0,005	-	-	-	-	-	-	0,003	-	-	-		
10) Inrushes of water	0,002	0,002	0,001	0,006	0,005	0,005	-	0,001	-	0,002	-	-	0,011	-	0,003	0,003	-	-		
11) Electricity	0,016	0,007	0,007	0,004	0,008	0,008	0,003	0,004	0,003	0,004	0,006	0,006	0,004	-	0,003	0,003	-	-		
12) Other causes	0,023	0,021	0,024	0,029	0,032	0,021	0,014	0,013	0,017	0,015	0,012	0,015	0,016	0,053	0,035	0,06	0,02	0,003		
TOTAL	0,610	0,590	0,507	0,546	0,932	0,547	0,492	0,522	0,536	0,457	0,460	0,438	0,429	0,440	0,399	0,413	0,456	0,35		

C. Comparative Table of underground group accidents (see (1) below)

years 1960–1975

CAUSES	1960			1961			1962			1963			1964		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	2	2	10	1	–	7	3	3	18	–	–	–	–	–	–
2) Haulage and transport	–	–	–	–	–	–	–	–	–	–	–	–	2	5	14
3) Movement of personnel	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4) Machinery, handing of tools and supports	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5) Falling objects	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6) Explosives	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7) Explosions of firedamp or coal dust	–	–	–	–	–	–	3	62	338	–	–	–	–	–	–
8) Sudden outbursts of firedamp, suffocation by natural gases	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9) Underground combustion and fires	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10) Inrushes of water	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11) Electricity	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12) Ohter causes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	2	2	10	1	–	7	6	65	356	–	–	–	2	5	14

CAUSES	1965			1966			1967			1968			1969		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	–	–	–	–	–	–	–	–	–	–	–	–	1	–	6
2) Haulage and transport	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3) Movement of personnel	–	–	–	–	–	–	–	–	–	–	–	–	1	–	5
4) Machinery, handing of tools and supports	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5) Falling objects	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6) Explosives	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7) Explosions of firedamp or coal dust	3	4	41	3	11	21	–	–	–	1	–	17	–	–	–
8) Sudden outbursts of firedamp, suffocation by natural gases	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9) Underground combustion and fires	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10) Inrushes of water	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11) Electricity	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12) Ohter causes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	3	4	41	3	11	21	–	–	–	1	–	17	2	–	11

CAUSES	1970			1971			1972			1973			1974		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	–	–	–	2	–	12	–	–	–	2	–	9	1	1	5
2) Haulage and transport	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3) Movement of personnel	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4) Machinery, handing of tools and supports	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5) Falling objects	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6) Explosives	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7) Explosions of firedamp or coal dust	1	11	16	–	–	–	–	–	–	–	–	–	1	5	42
8) Sudden outbursts of firedamp, suffocation by natural gases	–	–	–	1	–	8	–	–	–	–	–	–	–	–	–
9) Underground combustion and fires	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10) Inrushes of water	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11) Electricity	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12) Ohter causes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL	1	11	16	3	–	20	–	–	–	2	–	9	2	6	47

CAUSES	1975			1976			1977			1978			1979		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	–	–	–												
2) Haulage and transport	–	–	–												
3) Movement of personnel	–	–	–												
4) Machinery, handing of tools and supports	–	–	–												
5) Falling objects	–	–	–												
6) Explosives	–	–	–												
7) Explosions of firedamp or coal dust	–	–	–												
8) Sudden outbursts of firedamp, suffocation by natural gases	–	–	–												
9) Underground combustion and fires	–	–	–												
10) Inrushes of water	–	–	–												
11) Electricity	–	–	–												
12) Ohter causes	–	–	–												
TOTAL	–	–	–												

(1) Accidents involving more than five casualties of type (a).
(N) Number of groups accidents.
(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.

REPARTITION :

	Germany			Belgium			France		
	N	a	b	N	a	b	N	a	b
1960	2	2	10	–	–	–	–	–	–
1961	–	–	–	–	–	–	1	–	7
1962	4	63	344	1	2	6	1	–	6
1964	2	5	14	–	–	–	–	–	–
1965	1	4	8	2	–	33	–	–	–
1966	2	5	21	1	6	–	–	–	–
1968	1	–	17	–	–	–	–	–	–
1969	–	–	–	–	–	–	2	–	11
1970	–	–	–	–	–	–	1	11	16
1971	2	–	12	–	–	–	1	–	8
1973	2	–	9	–	–	–	–	–	–
1974	1	1	5	–	–	–	1	5	42

D. RECAPITULATION : COMMUNITY OF THE SIX

Year	Extraction (1)	Underground o.m.s. (kg.)	Million man-hours worked	Fatalities	Serious injuries (4) (disablement for 8 weeks or over	Fatalities per m. tons	Serious injuries (4) per m. tons	Fatalities per m. man-hours	Serious injuries per m. man-hours
1958	252 278	1 634	1 260	770	17 074	3,052	67,68	0,610	13,551
1959	240 602	1 788	1 122	622	14 539	2,585	60,43	0,590	12,950
1960	239 967	1 958	1 037	526	13 459	2,192	56,09	0,507	12,986
1961	235 848	2 100	962	527	12 720	2,235	53,93	0,548	13,227
1962	233 233	2 229	901	840 (3) 541 (4)	12 418	3,602 (3) 2,320 (4)	53,24	0,932 (3) 0,600 (4)	13,781
1963	229 769	2 331	849	465	11 686	2,024	50,86	0,547	13,761
1964	235 007	2 395	841	411	11 726	1,749	49,89	0,493	13,860
1965	224 249	2 461	784	410	10 595	1,828	47,25	0,522	13,506
1966	210 189	2 611	698	374	9 247	1,779	43,99	0,536	13,242
1967	189 484	2 824	587	269	7 781	1,420	41,06	0,457	13,246
1968	181 016	3 065	522	240	7 501	1,326	41,44	0,460	14,370
1969	176 749	3 265	476	209	7 222	1,181	40,82	0,438	15,160
1970	170 355	3 442	438	188	6 591	1,104	38,69	0,429	15,047
1971	164 910	3 514	414	182	6 249	1,104	37,89	0,440	15,088
1972	151 809	3 659	369	147	5 763	1,033	26,34	0,399	15,60
1973	139 700	3 755	332	137	5 560	0,981	39,80	0,413	16,77
1974	133 300	3 742	313	143	5 054	1,073	37,91	0,456	16,12
1975	129 100	3 632	319	110	4 795	0,852	37,14	0,35	15,05
1976									
1977									
1978									

(1) Net extraction, slurry and dust.
(2) Incl. Luisenthal explosion.
(3) Excl. Luisenthal explosion.
(4) Casualties were unable to resume work for at least eight weeks.

UNITED KINGDOM

1973	130 200	3 598	306	74	490	0,568	3,76	0,242	1,60
1974	109 200	3 260	268	37	417	0,339	3,82	0,138	1,555
1975	127 700	3 493	303	55	522	0,431	4,09	0,181	1,722
1976									
1977									
1978									

Note : It is only possible to compare the figgers in table 1 (Community of the Six) with those in table 2, by refering to the explanatory notes in Section IV, paragraphe 4.2.

ANNEXES

LIST OF ANNEXES

1. Common statistical summary of underground accidents at mines in 1975 (Annex I)

2. Terms of reference and rules of procedure of the Mines Safety Commission (Annex II)

3. Terms of reference of the various Working Parties of the Mines Safety and Health Commission (Annex III)

4. Composition of the Mines Safety and Health Commission, the Restricted Committee and the Working Parties (Annex IV)

5. Implementation of Recommendations up to 1 January 1976 of the Mines Safety and Health Commission (Annex V)

6. List of specialists for borehole rescue work and equipment available on the 1.1.1976 (Annex VI)

7. Minimum safety requirements for winding and balance rope suspension gear, for shaft winding and sinking installations (Annex VII)

8. Information report " New aspects of the testing of ropes in winding installations subject to high and maximum stress " by Dr. Ing. ARNOLD, Seilprüfstelle der Westfälischen Berggewerkschaftskasse, Bochum (Annex VIII)

9. Decision of the Mines Safety and Health Commission concerning the use of light alloys for the construction of electrical apparatus for use in mines which are liable to be affected by firedamp (Annex IX)

10. A First report on filter self-rescuers for use in coal mines in the european Community countries - Part I : minimum design requirements and testing procedures (Annex X)

11. Bibliography

<u>Has been printed separately:</u>

Fifth Report on specifications and testing conditions relating to fire-resistant fluids for power transmission (Nov. 1974)

ANNEX I

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS
AT MINES IN 1975

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY : Federal Republic of Germany

COAL-FIELD : N.R.W.

YEAR 1975

MAN-HOURS WORKED (1) 197 052 115

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	2 604	1 414	423	9	4 450	1 472	665	218	13	2368	15	3	5	–	23	300	155	41	1	497	4 391	2 237	687	23	7 338	–	–	–
II. TRANSPORT, TOTAL	207	229	131	5	572	74	58	46	1	179	91	81	75	9	256	271	293	166	7	737	643	661	418	22	1 744	–	–	–
a) Continuous Transport	89	110	63	2	264	20	14	16	1	51	7	4	4	1	16	17	18	15	–	50	133	146	98	4	381	–	–	–
b) Discontinuous Transport	118	119	68	3	308	54	44	30	–	128	84	77	71	8	240	254	275	151	7	687	510	515	320	18	1 363	–	–	–
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	1 739	1 044	284	4	3 071	1 069	613	138	1	1821	238	185	65	3	491	1 280	783	207	5	2 275	4 326	2 625	694	13	7 658	–	–	–
a) while moving about the mine	–	–	–	–	–	–	–	–	–	–	4	2	–	–	6	–	–	–	–	–	4	2	–	–	6	–	–	–
b) in the course of other activities	1 739	1 044	284	4	3 071	1 069	613	138	1	1821	234	183	65	3	485	1 280	783	207	5	2 275	4 322	2 623	694	13	7 652	–	–	–
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	1 202	753	262	4	2 221	552	307	93	5	957	56	26	4	–	86	397	201	43	3	644	2 207	1 287	402	12	3 908	–	–	–
a) Machines	191	131	80	1	403	100	76	32	5	213	15	5	2	–	22	91	55	25	1	172	397	267	139	7	810	–	–	–
b) Tools	347	172	41	–	560	274	106	30	–	410	34	18	2	–	54	216	94	12	–	322	871	390	85	–	1 346	–	–	–
c) Supports	664	450	141	3	1 258	178	125	31	–	334	7	3	–	–	10	90	52	6	2	150	939	630	178	5	1 752	–	–	–
V. FALLS OF OBJECTS	1 821	1 111	348	5	3 285	730	294	104	–	1128	122	89	30	–	241	615	322	117	5	1 059	3 288	1 816	599	10	5 713	–	–	–
VI. EXPLOSIVES	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	1	1	–	–	2	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	2	1	–	–	3	–	–	–
a) Outbursts of Gas	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
b) De-oxygenation and Poisoning by natural Gases	1	1	–	–	2	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	2	1	–	–	3	–	–	–
IX. HEATINGS OR FIRES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
X INRUSHES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
XI ELECTRICITY	3	4	–	–	7	1	–	–	–	1	1	–	–	–	1	4	3	2	–	9	9	7	2	–	18	–	–	–
XII. OTHER CAUSES	99	37	9	–	145	57	18	4	–	79	12	6	3	–	21	89	28	8	1	126	257	89	24	1	371	–	–	–
TOTAL	7 676	4 593	1457	27	13753	3955	1 956	603	20	6 534	535	390	182	12	1119	2 957	1 785	584	22	5 348	15123	8 724	2 826	81	26 754	–	–	–

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme

(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks).

(3) Calendar days

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY : Federal Republic of Germany

COAL-FIELD N.R.W.

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 197 052 115

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I FALLS OF GROUNDS AND ROCKS	13,21	7,18	2,15	0,05	22,59	7,47	3,37	1,11	0,07	12,02	0,08	0,02	0,03	–	0,12	1,52	0,79	0,21	0,01	2,52	22,28	11,35	3,49	0,12	37,24	–	–	–
II. TRANSPORT, TOTAL	1,05	1,16	0,66	0,03	2,90	0,37	0,29	0,23	0,01	0,91	0,46	0,41	0,38	0,05	1,30	1,38	1,49	0,84	0,04	3,74	3,27	3,35	2,12	0,11	8,85	–	–	–
a) Continuous Transport	0,45	0,56	0,32	0,01	1,34	0,10	0,07	0,08	0,01	0,26	0,04	0,02	0,02	0,01	0,08	0,09	0,09	0,08	–	0,25	0,67	0,74	0,50	0,02	1,93	–	–	–
b) Discontinuous Transport	0,60	0,60	0,35	0,02	1,56	0,27	0,22	0,15	–	0,65	0,43	0,39	0,36	0,04	1,22	1,29	1,40	0,77	0,04	3,49	2,59	2,61	1,62	0,09	6,92	–	–	–
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	8,83	5,30	1,44	0,02	15,58	5,42	3,11	0,70	0,01	9,24	1,21	0,94	0,33	0,02	2,49	6,50	3,97	1,05	0,03	11,55	21,95	13,32	3,52	0,07	38,86	–	–	–
a) while moving about the mine	–	–	–	–	–	–	–	–	–	–	0,02	0,01	–	–	0,03	–	–	–	–	–	0,02	0,01	–	–	0,03	–	–	–
b) in the course of other activities	8,83	5,30	1,44	0,02	15,58	5,42	3,11	0,70	0,01	9,24	1,19	0,93	0,33	0,02	2,46	6,50	3,97	1,05	0,03	11,55	21,93	13,31	3,52	0,07	38,83	–	–	–
IV MACHINES, TOOLS AND SUPPORTS TOTAL	6,10	3,81	1,33	0,02	11,27	2,80	1,56	0,47	0,03	4,85	0,28	0,13	0,02	–	0,43	2,01	1,02	0,22	0,02	3,26	11,20	6,53	2,04	0,06	19,83	–	–	–
a) Machines	0,97	0,66	0,41	0,01	2,05	0,51	0,39	0,16	0,03	1,08	0,08	0,03	0,01	–	0,11	0,46	0,28	0,13	0,01	0,87	2,01	1,35	0,71	0,04	4,11	–	–	–
b) Tools	1,76	0,87	0,21	–	2,84	1,39	0,54	0,15	–	2,08	0,17	0,09	0,01	–	0,27	1,10	0,48	0,06	–	1,63	4,42	1,98	0,43	–	6,83	–	–	–
c) Supports	3,37	2,28	0,72	0,02	6,38	0,90	0,63	0,16	–	1,69	0,04	0,02	–	–	0,05	0,46	0,26	0,03	0,01	0,76	4,77	3,20	0,90	0,02	8,89	–	–	–
V. FALLS OF OBJECTS	9,24	5,64	1,77	0,03	16,67	3,70	1,49	0,53	–	5,72	0,62	0,45	0,15	–	1,22	3,12	1,63	0,59	0,03	5,37	16,69	9,22	3,04	0,05	28,99	–	–	–
VI. EXPLOSIVES	–	–	–	–	–	–	0,01	–	–	0,01	–	–	–	–	–	–	–	–	–	–	–	0,01	–	–	0,01	–	–	–
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0,01	0,01	–	–	0,01	–	–	–	–	–	–	–	–	–	–	0,01	–	–	–	0,01	0,01	0,01	–	–	0,02	–	–	–
a) Outbursts of Gas	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
b) De-oxygenation and Poisoning by natural Gases	0,01	0,01	–	–	0,01	–	–	–	–	–	–	–	–	–	–	0,01	–	–	–	0,01	0,01	0,01	–	–	0,02	–	–	–
IX. HEATINGS OR FIRES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
X. INRUSHES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
XI. ELECTRICITY	0,02	0,02	–	–	0,04	0,01	–	–	–	0,01	0,01	–	–	–	0,01	0,02	0,02	0,01	–	0,05	0,05	0,04	0,01	–	0,09	–	–	–
XII. OTHER CAUSES	0,50	0,19	0,05	–	0,74	0,29	0,09	0,02	–	0,04	0,06	0,03	0,02	–	0,11	0,45	0,14	0,04	0,01	0,64	1,30	0,45	0,12	0,01	1,88	–	–	–
TOTAL	38,96	23,31	7,40	0,14	69,80	20,06	9,92	3,06	0,12	33,16	2,72	1,93	0,92	0,06	5,68	15,01	9,06	2,96	0,11	27,14	76,72	44,30	14,34	0,41	135,77	–	–	–

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY FEDERAL REPUBLIC OF GERMANY

COAL-FIELD N.R.W.

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 197 052 115

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I Head and neck	-	-	-	55	20	241	2	-	20	18	2	168	66	4	2585	-	-	25				1	-	2	2275	598	142	26	3041
II. Eyes	1	-	3							1	-	9	42	-	636	3	-	68				1	-	23	620	71	48	-	739
III Trunk	-	1	1	140	24	487	5	-	71	3	5	20	68	2	1673	3	-	25				-	1	7	1282	750	219	33	2284
IV Upper limbs (excluding the hands) (3)	3	-	4	196	-	328	18	-	131				91	-	2769	5	-	37				-	-	4	2246	714	313	-	3273
V Hands	76	-	155	599	-	2 677	28	-	180				254	1	7026	2	-	32				-	-	2	5008	4104	959	1	10072
VI Lower limbs (excluding feet) (4)	4	-	4	358	1	453	81	-	371				176	-	2787	1	-	26				1	-	4	1864	1159	621	1	3645
VII Feet	8	-	12	348	-	949	35	-	678				107	-	1822	1	-	10				1	-	3	1722	1252	500	-	3474
VIII Multiple locations	-	1	1	13	12	35	1	-	2	1	4	7	9	2	169	-	-	8				-	1	1	104	75	24	20	223
IX Not specified																-	-	-	-	-	3	-	-	-	2	1	-	-	3
TOTAL	92	2	180	1709	57	5170	170	-	1453	23	11	204	813	9	19467	15	-	231	-	-	3	4	2	46	15123	8724	2826	81	26754

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY FEDERAL REPUBLIC OF GERMANY

COAL-FIELD N.R.W.

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 197 052 115

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																														
I. Head and neck	–	–	–	0,28	0,10	1,22	0,01	–	0,10	0,09	0,01	0,85	0,33	0,02	13,12	–	–	0,13				0,01	–	0,01	11,55	3,03	0,72	0,13	15,43
II. Eyes	0,01	–	0,02							0,01	–	0,05	0,20	–	3,22	0,02	–	0,34				0,01	–	0,12	3,15	0,36	0,24	–	3,75
III. Trunk	–	0,01	0,01	0,70	0,12	2,47	0,03	–	0,36	0,02	0,03	0,10	0,34	0,01	8,48	0,02	–	0,13				–	0,01	0,04	6,51	3,81	1,11	0,17	11,59
IV Upper limbs (excluding the hands) (3)	0,02	–	0,02	0,99	–	1,66	0,09	–	0,66				0,46	–	14,05	0,03	–	0,19				–	–	0,02	11,40	3,62	1,59	–	16,61
V Hands	0,40	–	0,78	3,04	–	13,64	0,14	–	0,90				1,29	0,01	35,63	0,01	–	0,16				–	–	0,02	25,38	20,85	4,88	0,01	51,11
VI. Lower limbs (excluding feet) (4)	0,02	–	0,02	1,82	0,01	2,30	0,41	–	1,88				0,89	–	14,14	0,01	–	0,13				0,01	–	0,03	9,46	5,88	3,15	0,01	18,50
VII Feet	0,04	–	0,06	1,77	–	4,82	0,18	–	3,44				0,54	–	9,24	0,01	–	0,05				0,01	–	0,02	8,74	6,35	2,54	–	17,63
VIII. Multiple locations	–	0,01	0,01	0,06	0,06	0,18	0,01	–	0,01	0,01	0,02	0,03	0,05	0,01	0,85	–	–	0,04				–	0,01	0,01	0,53	0,38	0,12	0,10	1,13
IX Not specified																–	–	–	–	–	0,02	–	–	–	0,01	0,01	–	–	0,02
TOTAL	0,48	0,01	0,92	8,66	0,28	26,29	0,86	–	7,35	0,13	0,06	1,03	4,10	0,05	98,73	0,08	–	1,17	–	–	0,02	0,04	0,01	0,26	76,72	44,30	14,34	0,41	135,77

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications
(3) The shoulders and the wrists are included under "upper limbs"
(4) The hips and the ankles are included under "Lower limbs"
(5) Calender days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY : Federal Republic of Germany

COAL-FIELD Saar

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 19 285 592

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	231	145	83	2	461	47	28	19	2	96	-	-	-	-	-	26	19	9	-	54	304	192	111	4	611	-	-	-
II. TRANSPORT, TOTAL	10	10	15	-	35	6	10	7	1	24	5	5	2	-	12	37	35	25	2	99	58	60	49	3	170	-	-	-
a) Continuous Transport	6	8	12	-	26	2	5	2	-	9	-	-	-	-	-	1	1	-	-	2	9	14	14	-	37	-	-	-
b) Discontinuous Transport	4	2	3	-	9	4	5	5	1	15	5	5	2	-	12	36	34	25	2	97	49	46	35	3	133	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	45	31	15	-	91	25	21	5	-	51	2	6	-	-	8	50	61	15	-	126	122	119	35	-	276	-	-	-
a) while moving about the mine	22	15	7	-	44	10	10	2	-	22	2	3	-	-	5	20	15	8	-	43	54	43	17	-	114	-	-	-
b) in the course of other activities	23	16	8	-	47	15	11	3	-	29	-	3	-	-	3	30	46	7	-	83	68	76	18	-	162	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	171	111	40	-	322	49	19	11	-	79	1	2	-	-	3	43	24	15	-	82	264	156	66	-	486	-	-	-
a) Machines	12	20	6	-	38	6	5	3	-	14	-	-	-	-	-	3	3	3	-	9	21	28	12	-	61	-	-	-
b) Tools	25	20	4	-	49	32	9	4	-	45	1	2	-	-	3	28	13	7	-	48	86	44	15	-	145	-	-	-
c) Supports	134	71	30	-	235	11	5	4	-	20	-	-	-	-	-	12	8	5	-	25	157	84	39	-	280	-	-	-
V. FALLS OF OBJECTS	76	35	13	-	124	35	17	11	-	63	4	1	3	-	8	61	46	17	-	124	176	99	44	-	319	-	-	-
VI. EXPLOSIVES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XII. OTHER CAUSES	50	30	13	-	93	31	20	9	-	60	2	12	3	-	17	71	53	21	-	145	154	115	46	-	315	-	-	-
TOTAL	583	362	179	2	1126	193	115	62	3	373	14	26	8	-	48	288	238	102	2	630	1078	741	351	7	2177	-	-	-

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme.
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

1/5

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY : Federal Republic of Germany
COAL-FIELD Saar

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 19 285 592

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	11,98	7,52	4,30	0,10	23,90	2,44	1,45	0,99	0,10	4,98	-	-	-	-	-	1,35	0,99	0,47	-	2,80	15,76	9,96	5,76	0,21	31,68	-	-	-
II. TRANSPORT, TOTAL	0,52	0,52	0,78	-	1,81	0,31	0,52	0,36	0,05	1,24	0,26	0,26	0,26	-	0,62	1,92	1,81	1,30	0,10	5,13	3,01	3,11	2,54	0,16	8,81	-	-	-
a) Continuous Transport	0,31	0,41	0,62	-	1,35	0,10	0,26	0,10	-	0,47	-	-	-	-	-	0,05	0,05	-	-	0,20	0,47	0,73	0,73	-	1,92	-	-	-
b) Discontinuous Transport	0,21	0,10	0,16	-	0,47	0,21	0,26	0,26	0,05	0,78	0,26	0,26	0,10	-	0,62	1,87	1,76	1,30	0,10	5,03	2,54	2,39	1,81	0,16	6,90	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	2,33	1,61	0,78	-	4,72	1,30	1,09	0,26	-	2,64	0,10	0,31	-	-	0,41	2,59	3,16	0,78	-	6,53	6,33	6,17	1,81	-	14,31	-	-	-
a) while moving about the mine	1,14	0,78	0,36	-	2,28	0,52	0,52	0,10	-	1,14	0,10	0,16	-	-	0,26	1,04	0,78	0,41	-	2,23	2,80	2,23	0,88	-	5,91	-	-	-
b) in the course of other activities	1,19	0,83	0,41	-	2,44	0,78	0,57	0,16	-	1,50	-	0,16	-	-	0,16	1,56	2,39	0,36	-	4,30	3,53	3,94	0,93	-	8,40	-	-	-
IV MACHINES, TOOLS AND SUPPORTS TOTAL	8,87	5,76	2,07	-	16,70	2,54	0,99	0,57	-	4,10	0,05	0,10	-	-	0,16	2,23	1,24	0,78	-	4,25	13,69	8,09	3,42	-	25,20	-	-	-
a) Machines	0,62	1,04	0,31	-	1,97	0,31	0,26	0,16	-	0,73	-	-	-	-	-	0,16	0,16	0,16	-	0,47	1,09	1,45	0,62	-	3,16	-	-	-
b) Tools	1,30	1,04	0,21	-	2,54	1,66	0,47	0,21	-	2,33	0,05	0,10	-	-	0,16	1,45	0,67	0,36	-	2,49	4,46	2,28	0,78	-	7,52	-	-	-
c) Supports	6,95	3,68	1,56	-	12,19	0,57	0,26	0,21	-	1,04	-	-	-	-	-	0,62	0,41	0,26	-	1,30	8,14	4,36	2,02	-	14,52	-	-	-
V. FALLS OF OBJECTS	3,94	1,81	0,67	-	6,43	1,81	0,98	0,57	-	3,27	0,21	0,05	0,16	-	0,41	3,16	2,39	0,88	-	6,43	9,13	5,13	2,28	-	16,54	-	-	-
VI. EXPLOSIVES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XII. OTHER CAUSES	2,59	1,56	0,67	-	4,87	1,61	1,04	0,47	-	3,11	0,10	0,62	0,16	-	0,88	3,68	2,75	1,09	-	7,52	7,99	5,96	2,39	-	16,33	-	-	-
TOTAL	30,23	18,77	9,28	0,10	58,39	10,01	5,96	3,21	0,16	19,34	0,73	1,35	0,81	-	2,49	14,93	12,34	5,29	0,10	32,67	55,90	38,42	18,20	0,36	112,88	-	-	-

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY FEDERAL REPUBLIC OF GERMANY

COAL-FIELD SAAR

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 19 285 592

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4		
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY												
I Head and neck	-	-	-	4	4	9	3	-	8	1	-	1
II. Eyes	-	-	-							-	-	-
III Trunk	-	-	-	2	1	10	2	-	50	-	-	1
IV Upper limbs (excluding the hands) (3)	-	-	-	7	-	7	9	-	40			
V Hands	10	-	44	20	-	79	14	-	95			
VI Lower limbs (excluding feet) (4)	1	-	1	21	-	22	27	-	108			
VII Feet	-	-	2	12	-	29	30	-	127			
VIII Multiple locations	-	1	1	4	1	5	16	-	61	-	-	-
IX Not specified												
TOTAL	11	1	48	70	6	161	101	-	489	1	-	2

NATURE OF THE INJURY	Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8		
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY												
I Head and neck	7	-	196	-	-	-				1	-	11
II. Eyes	2	-	129	-	-	-				-	-	1
III Trunk	9	-	60	-	-	-				1	-	25
IV Upper limbs (excluding the hands) (3)	8	-	136	-	-	-				2	-	7
V Hands	51	-	524	-	-	-				-	-	8
VI Lower limbs (excluding feet) (4)	26	-	129	-	-	-				9	-	26
VII Feet	27	-	111	-	-	-				-	-	6
VIII Multiple locations	23	-	101	-	-	-				1	-	6
IX Not specified	-	-	-	-	-	-	-	-	-	1	-	1
TOTAL	153	-	1386		-	-	-	-	-	15	-	91

NATURE OF THE INJURY	TOTAL 9				
PERIOD OF INCAPACITY	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY					
I Head and neck	122	83	16	4	225
II. Eyes	75	53	2	-	130
III Trunk	73	58	14	1	146
IV Upper limbs (excluding the hands) (3)	95	69	26	-	190
V Hands	380	275	95	-	750
VI Lower limbs (excluding feet) (4)	120	82	84	-	286
VII Feet	134	72	69	-	275
VIII Multiple locations	79	49	44	2	174
IX Not specified	-	-	1	-	1
TOTAL	1078	741	351	7	2177

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme

(2) including complications

(3) The shoulders and the wrists are included under „upper limbs

(4) The hips and the ankles are included under „Lower limbs"

(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY FEDERAL REPUBLIC OF GERMANY
COAL-FIELD SAAR

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 19 285 592

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I. Head and neck	-	-	-	0,21	0,21	0,47	0,16	-	0,41	0,05	-	0,05	0,36	-	10,16	-	-	-				0,05	-	0,57	6,33	4,30	0,83	0,21	11,67
II Eyes	-	-	-							-	-	-	0,10	-	6,69	-	-	-				-	-	0,05	3,89	2,75	0,10	-	6,74
III Trunk	-	-	-	0,10	0,05	0,52	0,10	-	2,59	-	-	0,05	0,47	-	3,11	-	-	-				0,05	-	1,30	3,79	3,01	0,73	0,05	7,57
IV Upper limbs (excluding the hands) (3)	-	-	-	0,36	-	0,36	0,47	-	2,07				0,41	-	7,05	-	-	-				0,10	-	0,36	4,93	3,58	1,35	-	9,85
V. Hands	0,52	-	2,28	1,04	-	4,10	0,73	-	4,93				2,64	-	27,17	-	-	-				-	-	0,41	19,70	14,26	4,93	-	38,89
VI. Lower limbs (excluding feet) (4)	0,05	-	0,05	1,09	-	1,14	1,40	-	5,60				1,35	-	6,69	-	-	-				0,47	-	1,35	6,22	4,25	4,36	-	14,83
VII Feet	-	-	0,10	0,62	-	1,50	1,56	-	6,59				1,40	-	5,76	-	-	-				-	-	0,31	6,95	3,73	3,58	-	14,26
VIII. Multiple locations	-	0,05	0,05	0,21	0,05	0,26	0,83	-	3,16	-	-	-	1,19	-	5,24	-	-	-				0,05	-	0,31	4,10	2,54	2,28	0,10	9,02
IX Not specified													-	-	-	-	-	-	-	-	-	0,05	-	0,05	-	-	0,05	-	0,05
TOTAL	0,57	0,05	2,49	3,63	0,31	8,35	5,24	-	25,36	0,05	-	0,10	7,93	-	71,87	-	-	-	-	-	-	0,78	-	4,72	55,90	38,42	18,20	0,36	112,88

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY FEDERAL REPUBLIC OF GERMANY

COAL-FIELD TOTAL

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 216 337 707

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	2835	1559	506	11	4911	1519	693	237	15	2464	15	3	5	-	23	326	174	50	1	551	4695	2429	798	27	7949	-	-	-
II. TRANSPORT, TOTAL	217	239	146	5	607	80	68	53	2	203	96	86	77	9	268	308	328	191	9	836	701	721	467	25	1914	-	-	-
a) Continuous Transport	95	118	75	2	290	22	19	18	1	60	7	4	4	1	16	18	19	15	-	52	142	160	112	4	418	-	-	-
b) Discontinuous Transport	122	121	71	3	317	58	49	35	1	143	89	82	73	8	252	290	309	176	9	784	559	561	355	21	1496	-	-	-
III FALLS AND MOVEMENT OF THE VICTIM, TOTAL	1784	1075	299	4	3162	1094	634	143	1	1872	240	191	65	3	499	1330	844	222	5	2401	4448	2744	729	13	7934	-	-	-
a) while moving about the mine	22	15	7	-	44	10	10	2	-	22	6	5	-	-	11	20	15	8	-	43	58	45	17	-	120	-	-	-
b) in the course of other activities	1762	1060	292	4	3118	1084	624	141	1	1850	234	186	65	3	488	1310	829	214	5	2358	4390	2699	712	13	7814	-	-	-
IV MACHINES, TOOLS AND SUPPORTS TOTAL	1373	864	302	4	2543	601	326	104	5	1036	57	28	4	-	89	440	225	58	3	726	2471	1443	468	12	4394	-	-	-
a) Machines	203	151	86	1	441	106	81	35	5	227	15	5	2	-	22	94	58	28	1	181	418	295	151	7	871	-	-	-
b) Tools	372	192	45	-	609	306	115	34	-	455	35	20	2	-	57	244	107	19	-	370	957	434	100	-	1491	-	-	-
c) Supports	798	521	171	3	1493	189	130	35	-	354	7	3	-	-	10	102	60	11	2	175	1096	714	217	5	2032	-	-	-
V. FALLS OF OBJECTS	1897	1146	361	5	3409	765	311	115	-	1191	126	90	33	-	249	676	368	134	5	1183	3464	1915	643	10	6032	-	-	-
VI. EXPLOSIVES	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	2	1	-	-	3	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b) De-oxygenation and Poisoning by natural Gases	1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	2	1	-	-	3	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	3	4	-	-	7	1	-	-	-	1	1	-	-	-	1	4	3	2	-	9	9	7	2	-	18	-	-	-
XII. OTHER CAUSES	149	67	22	-	238	88	38	13	-	139	14	18	6	-	38	160	81	29	1	271	411	204	70	1	686	-	-	-
TOTAL	8259	4955	1636	29	14879	4148	2071	665	23	6907	549	416	190	12	1167	3245	2023	686	24	5978	16201	9465	3177	88	28931	-	-	-

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme

(2) Accidents involving more than five casualties (i.e who either died or were unable to resume work underground for at least eight weeks)

(3) Calendar days

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY FEDERAL REPUBLIC OF GERMANY

COAL-FIELD TOTAL

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 216 337 707

SITE OF THE ACCIDENT / CAUSES OF ACCIDENTS	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	13,10	7,21	2,34	0,05	22,70	7,02	3,20	1,10	0,07	11,39	0,07	0,01	0,02	-	0,11	1,51	0,80	0,23	0,005	2,55	21,70	11,23	3,69	0,12	36,74	-	-	-
II. TRANSPORT, TOTAL	1,00	1,10	0,67	0,02	2,81	0,37	0,31	0,24	0,009	0,94	0,44	0,40	0,36	0,04	1,24	1,42	1,52	0,88	0,04	3,86	3,24	3,33	2,16	0,12	8,85	-	-	-
a) Continuous Transport	0,44	0,55	0,35	0,009	1,34	0,10	0,09	0,08	0,005	0,28	0,03	0,02	0,02	0,005	0,07	0,08	0,09	0,07	-	0,24	0,66	0,74	0,52	0,02	1,93	-	-	-
b) Discontinuous Transport	0,56	0,56	0,33	0,01	1,47	0,27	0,23	0,16	0,005	0,66	0,41	0,38	0,34	0,04	1,16	1,34	1,43	0,81	0,04	3,62	2,58	2,59	1,64	0,10	6,92	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	8,24	4,97	1,38	0,02	14,62	5,06	2,93	0,66	0,005	8,65	1,11	0,88	0,30	0,01	2,31	6,15	3,90	1,03	0,02	11,10	20,56	12,69	3,37	0,06	36,67	-	-	-
a) while moving about the mine	0,10	0,07	0,03	-	0,20	0,05	0,05	0,009	-	0,10	0,03	0,02	-	-	0,05	0,09	0,07	0,04	-	0,20	0,27	0,21	0,08	-	0,55	-	-	-
b) in the course of other activities	8,14	4,90	1,35	0,02	14,41	5,01	2,88	0,65	0,005	8,55	1,08	0,86	0,30	0,01	2,26	6,06	3,83	0,99	0,02	10,90	20,29	12,48	3,29	0,06	36,12	-	-	-
IV MACHINES, TOOLS AND SUPPORTS TOTAL	6,35	3,99	1,40	0,02	11,75	2,78	1,51	0,48	0,02	4,79	0,26	0,13	0,02	-	0,41	2,03	1,04	0,27	0,01	3,36	11,42	6,67	2,16	0,05	20,31	-	-	-
a) Machines	0,94	0,70	0,40	0,005	2,04	0,49	0,37	0,16	0,02	1,05	0,07	0,02	0,009	-	0,10	0,43	0,27	0,13	0,005	0,84	1,93	1,36	0,70	0,03	4,03	-	-	-
b) Tools	1,72	0,89	0,21	-	2,82	1,41	0,53	0,16	-	2,10	0,16	0,09	0,009	-	0,26	1,13	0,49	0,09	-	1,71	4,42	2,01	0,46	-	6,89	-	-	-
c) Supports	3,69	2,41	0,79	0,01	6,90	0,87	0,60	0,16	-	1,64	0,03	0,01	-	-	0,05	0,47	0,28	0,05	0,009	0,81	5,07	3,30	1,00	0,02	9,39	-	-	-
V. FALLS OF OBJECTS	8,77	5,30	1,67	0,02	15,76	3,54	1,44	0,53	-	5,51	0,58	0,42	0,15	-	1,15	3,12	1,70	0,62	0,02	5,47	16,01	8,85	2,97	0,05	27,88	-	-	-
VI. EXPLOSIVES	-	-	-	-	-	-	0,005	-	-	0,005	-	-	-	-	-	-	-	-	-	-	-	0,005	-	-	0,005	-	-	-
VII IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0,005	0,005	-	-	0,009	-	-	-	-	-	-	-	-	-	-	0,005	-	-	-	0,005	0,009	0,005	-	-	0,01	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b) De-oxygenation and Poisoning by natural Gases	0,005	0,005	-	-	0,009	-	-	-	-	-	-	-	-	-	-	0,005	-	-	-	0,005	0,009	0,005	-	-	0,01	-	-	-
IX HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI ELECTRICITY	0,01	0,02	-	-	0,03	0,005	-	-	-	0,005	0,005	-	-	-	-	0,02	0,02	0,01	-	0,04	0,04	0,03	0,009	-	0,08	-	-	-
XII. OTHER CAUSES	0,69	0,31	0,10	-	1,10	0,41	0,17	0,06	-	0,64	0,07	0,08	0,03	-	0,17	0,74	0,37	0,13	0,005	1,25	1,90	0,94	0,32	0,005	3,17	-	-	-
TOTAL	38,18	22,90	7,56	0,13	68,78	19,17	9,55	3,07	0,11	31,93	2,54	1,97	0,88	0,06	5,39	15,00	9,35	3,17	0,11	27,63	74,89	43,75	14,69	0,41	133,73	-	-	-

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme

(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)

(3) Calendar days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

Table 2a

COUNTRY FEDERAL REPUBLIC OF GERMANY
COAL-FIELD TOTAL

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 216 337 707

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I Head and neck	-	-	-	59	24	250	5	-	28	19	2	169	73	4	2781	-	-	25				1	-	13	2397	681	158	30	3266
II Eyes	1	-	3							1	-	9	44	-	765	3	-	68				1	-	24	695	124	50	-	869
III Trunk	-	1	1	142	25	497	7	-	121	3	5	21	77	2	1733	3	-	25				1	1	32	1355	808	233	34	2430
IV Upper limbs (excluding the hands) (3)	3	-	4	203	-	335	27	-	171				99	-	2905	5	-	37				2	-	11	2341	783	339	-	3463
V Hands	86	-	199	619	-	2756	42	-	275				305	1	7550	2	-	32				-	-	10	5388	4379	1054	1	10822
VI Lower limbs (excluding feet) (4)	5	-	5	379	1	475	108	-	479				202	-	2916	1	-	26				10	-	30	1984	1241	705	1	3931
VII Feet	8	-	14	360	-	978	65	-	805				134	-	1933	1	-	10				1	-	9	1856	1324	569	-	3749
VIII Multiple locations	-	2	2	17	13	40	17	-	63	1	4	7	32	2	270	-	-	8				1	1	7	183	124	68	22	397
IX Not specified													-	-	-	-	-	-	-	-	3	1	-	1	2	1	1	-	4
TOTAL	103	3	228	1779	63	5331	271	-	1942	24	11	206	966	9	20853	15	-	231	-	-	3	19	2	137	16201	9465	3177	88	28931

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY FEDERAL REPUBLIC OF GERMANY
COAL-FIELD TOTAL

YEAR 1975
MAN-HOURS WORKED (1) 216 337 707

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I. Head and neck	-	-	-	0,27	0,11	1,16	0,02	-	0,13	0,09	0,009	0,78	0,34	0,02	12,85	-	-	0,12				0,005	-	0,06	11,08	3,15	0,73	0,14	15,10
II. Eyes	0,005	-	0,01							0,005	-	0,04	0,20	-	3,54	0,01	-	0,31				0,005	-	0,11	3,21	0,57	0,23	-	4,02
III Trunk	-	0,005	0,005	0,66	0,12	2,30	0,03	-	0,56	0,01	0,02	0,10	0,36	0,009	8,01	0,01	-	0,12				0,005	0,005	0,15	6,26	3,73	1,08	0,16	11,23
IV. Upper limbs (excluding the hands) (3)	0,01	-	0,02	0,94	-	1,55	0,12	-	0,79				0,46	-	13,43	0,02	-	0,17				0,009	-	0,05	10,82	3,62	1,57	-	16,01
V. Hands	0,40	-	0,92	2,86	-	12,74	0,19	-	1,27				1,41	0,005	34,90	0,009	-	0,15				-	-	0,05	24,91	20,24	4,87	0,005	50,02
VI. Lower limbs (excluding feet) (4)	0,02	-	0,02	1,75	0,005	2,20	0,50	-	2,21				0,93	-	13,48	0,005	-	0,12				0,05	-	0,14	9,17	5,74	3,26	0,005	18,17
VII. Feet	0,04	-	0,06	1,66	-	4,52	0,30	-	3,72				0,62	-	8,94	0,005	-	0,05				0,005	-	0,04	8,58	6,12	2,63	-	17,33
VIII. Multiple locations	-	0,009	0,009	0,08	0,06	0,18	0,08	-	0,29	0,005	0,02	0,03	0,15	0,009	1,25	-	-	0,04				0,005	0,005	0,03	0,85	0,57	0,31	0,10	1,84
IX. Not specified													-	-	-	-	-	-	-	-	0,01	0,005	-	0,005	0,009	0,005	0,005	-	0,02
TOTAL	0,48	0,1	1,05	8,22	0,29	24,64	1,25	-	8,98	0,11	0,05	0,95	4,47	0,04	96,39	0,07	-	1,07	-	-	0,01	0,09	0,009	0,63	74,89	43,75	14,69	0,41	133,73

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) Including complications.
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs".
(5) Calendar days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY BELGIUM
COAL-FIELD TOTAL

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 30.045.120

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	2264	360	60	1	2685	810	114	16	-	940	17	3	1	-	21	220	24	7	-	251	3311	501	84	1	3897			
II. TRANSPORT, TOTAL	156	51	18	-	225	246	64	25	3	338	62	25	9	1	97	231	66	20	1	318	695	206	72	5	978			
a) Continuous Transport	145	48	16	-	209	73	25	10	1	109	-	-	-	-	-	52	12	4	-	68	270	85	30	1	386			
b) Discontinuous Transport	11	3	2	-	16	173	39	15	2	229	62	25	9	1	97	179	54	16	1	250	425	121	42	4	592			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	198	45	11	-	254	346	67	16	-	429	63	11	3	-	77	297	56	9	-	362	904	179	39	-	1122			
a) while moving about the mine	41	9	2	-	52	81	19	6	-	106	20	3	1	-	24	62	17	2	-	81	204	48	11	-	263			
b) in the course of other activities	157	36	9	-	202	265	48	10	-	323	43	8	2	-	53	235	39	7	-	281	700	131	28	-	859			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	787	238	29	3	1057	462	68	9	-	539	28	8	3	-	39	260	40	9	-	309	1537	354	50	3	1944			
a) Machines	74	24	5	3	106	50	15	3	-	68	3	2	1	-	6	22	8	1	-	31	149	49	10	3	211			
b) Tools	194	23	3	-	220	150	13	-	-	163	17	1	2	-	20	102	10	4	-	116	463	47	9	-	519			
c) Supports	519	191	21	-	731	262	40	6	-	308	8	5	-	-	13	136	22	4	-	162	925	258	31	-	1214			
V. FALLS OF OBJECTS	450	86	15	-	551	503	92	16	-	611	104	11	-	-	115	376	66	13	-	455	1433	255	44	-	1732			
VI. EXPLOSIVES	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1			
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-	1			
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
XI. ELECTRICITY	1	-	-	-	1	-	2	-	-	2	-	-	-	-	-	1	-	1	-	2	2	2	1	-	5			
XII. OTHER CAUSES	95	7	1	-	103	95	11	1	-	107	12	2	-	-	14	85	5	-	-	90	287	25	2	-	314			
TOTAL	3951	787	134	4	4876	2463	418	83	3	2967	286	60	16	1	363	1471	257	59	1	1788	8171	1522	292	9	9994			

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme.
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY BELGIUM
COAL-FIELD TOTAL

YEAR 1975
MAN-HOURS WORKED (1) 30.045.120

SITE OF THE ACCIDENT / CAUSES OF ACCIDENTS	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	75,35	11,98	1,99	0,03	89,36	26,95	3,79	0,53	-	31,28	0,56	0,09	0,03	-	0,69	7,32	0,79	0,23	-	8,35	110,20	16,67	2,79	0,03	129,70			
II. TRANSPORT, TOTAL	5,19	1,69	0,59	-	7,48	8,18	2,13	0,83	0,09	11,24	2,06	0,83	0,29	0,03	3,22	7,68	2,19	0,66	0,03	10,58	23,13	6,85	2,39	0,16	32,55			
a) Continuous Transport	4,82	1,59	0,53	-	6,95	2,42	0,83	0,33	0,03	3,62	-	-	-	-	-	1,73	0,39	0,13	-	2,26	8,98	2,82	0,99	0,03	12,84			
b) Discontinuous Transport	0,36	0,09	0,06	-	0,53	5,75	1,29	0,49	0,06	7,62	2,06	0,83	0,29	0,03	3,22	5,95	1,79	0,53	0,03	8,32	14,14	4,02	1,39	0,13	19,70			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	6,59	1,49	0,36	-	8,45	11,51	2,22	0,53	-	14,27	2,09	0,36	0,09	-	2,56	9,88	1,86	0,29	-	12,04	30,08	5,95	1,29	-	37,34			
a) while moving about the mine	1,36	0,29	0,06	-	1,73	2,69	0,63	0,19	-	3,52	0,66	0,09	0,03	-	0,79	2,06	0,56	0,06	-	2,69	6,78	1,59	0,36	-	8,75			
b) in the course of other activities	5,22	1,19	0,29	-	6,72	8,82	1,59	0,33	-	10,75	1,43	0,26	0,06	-	1,76	7,82	1,29	0,23	-	9,35	23,29	4,36	0,93	-	28,59			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	26,19	7,92	0,96	0,09	35,18	15,37	2,26	0,29	-	17,93	0,93	0,26	0,09	-	1,29	8,65	1,33	0,29	-	10,28	51,15	11,78	1,66	0,09	64,70			
a) Machines	2,46	0,79	0,16	0,09	3,52	1,66	0,49	0,09	-	2,26	0,09	0,06	0,03	-	0,19	0,73	0,26	0,03	-	1,03	4,95	1,63	0,33	0,09	7,02			
b) Tools	6,45	0,76	0,09	-	7,32	4,99	0,43	-	-	5,42	0,56	0,03	0,06	-	0,66	3,39	0,33	0,13	-	3,86	15,41	1,56	0,29	-	17,27			
c) Supports	17,27	6,35	0,69	-	24,33	8,72	1,33	0,19	-	10,25	0,26	0,16	-	-	0,43	4,52	0,73	0,13	-	5,39	30,78	8,58	1,03	-	40,40			
V. FALLS OF OBJECTS	14,97	2,86	0,49	-	18,33	16,74	3,06	0,53	-	20,33	3,46	0,36	-	-	3,82	12,51	2,19	0,43	-	15,14	47,69	8,48	1,46	-	57,64			
VI. EXPLOSIVES	-	-	-	-	-	0,03	-	-	-	0,03	-	-	-	-	-	-	-	-	-	-	0,03	-	-	-	0,03			
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,03	-	-	-	0,03	0,03	-	-	-	0,03			
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
XI. ELECTRICITY	0,03	-	-	-	0,03	-	0,06	-	-	0,06	-	-	-	-	-	0,03	-	0,03	-	0,06	0,06	0,06	0,03		0,16			
XII. OTHER CAUSES	3,16	0,23	0,03	-	3,42	3,16	0,36	0,03	-	3,56	0,39	0,06	-	-	0,46	2,82	0,16	-	-	2,99	9,55	0,83	0,06	-	10,45			
TOTAL	131,50	26,19	4,45	0,13	162,28	81,97	13,91	2,76	0,09	98,75	9,51	1,99	0,53	0,03	12,08	48,95	8,55	1,96	0,03	59,51	271,95	50,65	9,71	0,29	332,63			

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme.
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY BELGIUM
COAL-FIELD TOTAL

YEAR 1975
MAN-HOURS WORKED (1) 30.045.120

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (3) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I Head and neck	-	-	-	5	3	8	-	-	-	-	-	-	5	2	7	-	-	-				-	-	-	-	-	10	5	15
II Eyes	-	-	-							-	-	-	7	-	7	-	-	-				1	-	1	-	-	8	-	8
III Trunk	-	-	-	8	-	8	1	-	1	-	2	2	6	1	7	-	-	-				-	1	1	-	-	15	4	19
IV Upper limbs (excluding the hands) (3)	1	-	1	18	-	18	-	-	-				14	-	14	-	-	-				-	-	-	-	-	33	-	33
V Hands	9	-	9	52	-	52	1	-	1				41	-	41	1	-	1				1	-	1	-	-	105	-	105
VI Lower limbs (excluding feet) (4)	2	-	2	38	-	38	5	-	5				28	-	28	-	-	-				4	-	4	-	-	77	-	77
VII Feet	2	-	2	25	-	25	-	-	-				10	-	10	-	-	-				-	-	-	-	-	37	-	37
VIII Multiple locations	-	-	-	5	-	5	-	-	-	-	-	-	2	-	2	- -	-	-				-	-	-	-	-	7	-	7
IX Not specified													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	14	-	14	151	3	154	7	-	7	-	2	2	113	3	116	1	-	1	-	-	-	6	1	7	-	-	292	9	301

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY BELGIUM
COAL-FIELD TOTAL

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 30.045.120

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I. Head and neck	-	-	-	0,1	0,0	0,2	-	-	-	-	-	-	0,1	0,0	0,2	-	-	-							-	-	0,3	0,1	0,4
II. Eyes	-	-	-							-	-	-	0,2	-	0,2	-	-	-				0,0	-	90	-	-	0,2	-	0,2
III. Trunk	-	-	-	0,2	-	0,2	0,0	-	0,0	-	0,0	0,0	0,1	-	0,2	-	-	-				-	0,0	0,0	-	-	0,4	0,1	0,6
IV Upper limbs (excluding the hands) (3)	0,0	-	0,0	0,5	-	0,5	-	-	-				0,4	-	0,4	-	-	-				-	-	-	-	-	1,0	-	1,0
V. Hands	0,2	-	0,2	1,7	-	1,7	0,0	-	0,0				1,3	-	1,3	0,0	-	0,0				0,0	-	0,0	-	-	3,4	-	3,4
VI Lower limbs (excluding feet) (4)	0,0	-	0,0	1,2	-	1,2	0,1	-	0,1				0,9	-	0,9	-	-	-				0,1	-	0,1	-	-	2,5	-	2,5
VII. Feet	0,0	-	0,0	0,8	-	0,8	-	-	-				0,3	-	0,3	-	-	-				-	-	-	-	-	1,2	-	1,2
VIII. Multiple locations	-	-	-	0,1	-	0,1	-	-	-	-	-	-	0,0	-	0,0	-	-	-				-	-	-	-	-	0,2	-	0,2
IX Not specified													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0,4	-	0,4	5,0	-	5,1	0,2	-	0,2	-	0,0	0,0	3,7	-	3,8	0,0	-	0,0	-	-	-	0,1	0,0	92	-	-	9,7	0,2	10,0

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) Including complications.
(3) The shoulders and the wrists are included under „upper limbs".
(4) The hips and the ankles are included under „Lower limbs".
(5) Calendar days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY FRANCE
COAL-FIELD NORTH

YEAR 1975
MAN-HOURS WORKED (1) 37.629.904

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	779	252	81	2	1114	364	123	35	0	522	4	0	1	0	5	150	33	8	0	191	1297	408	125	2	1832	0	0	0
II. TRANSPORT, TOTAL	27	27	6	1	61	72	27	11	0	110	12	11	4	0	27	112	71	36	1	220	223	136	57	2	418	0	0	0
a) Continuous Transport	18	19	3	1	41	27	9	6	0	42	0	0	0	0	0	8	8	6	0	22	53	36	15	1	105	0	0	0
b) Discontinuous Transport	9	8	3	0	20	45	18	5	0	68	12	11	4	0	27	104	63	30	1	198	170	100	42	1	313	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	175	74	22	0	271	257	108	31	1	397	30	12	9	0	51	343	153	47	0	543	805	347	109	1	1262	0	0	0
a) while moving about the mine	139	55	17	0	211	207	82	24	0	313	27	9	5	0	41	276	113	31	0	420	649	259	77	0	985	0	0	0
b) in the course of other activities	36	19	5	0	60	50	26	7	1	84	3	3	4	0	10	67	40	16	0	123	156	88	32	1	277	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	487	151	46	0	684	258	76	18	0	352	8	4	0	0	12	201	78	19	0	298	954	309	83	0	1346	0	0	0
a) Machines	32	15	10	0	57	22	10	4	0	36	1	0	0	0	1	14	10	8	0	32	69	35	22	0	126	0	0	0
b) Tools	178	45	7	0	230	130	30	5	0	165	7	3	0	0	10	79	31	5	0	115	394	109	17	0	520	0	0	0
c) Supports	277	91	29	0	397	106	36	9	0	151	0	1	0	0	1	108	37	6	0	151	491	165	44	0	700	0	0	0
V. FALLS OF OBJECTS	668	228	70	0	966	385	137	36	0	558	26	10	6	0	42	496	215	51	0	762	1575	590	163	0	2328	0	0	0
VI. EXPLOSIVES	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3	1	0	0	4	5	1	0	0	6	0	0	0
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	4	0	0	0	4	5	0	1	0	6	0	0	0
a) Outbursts of Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b) De-oxygenation and Poisoning by natural Gases	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	4	0	0	0	4	5	0	1	0	6	0	0	0
IX. HEATINGS OR FIRES	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	3	0	0	0	3	3	2	1	0	6	0	0	0
X. INRUSHES	3	0	0	0	3	1	0	0	0	1	0	0	0	0	0	3	1	0	0	4	7	1	0	0	8	0	0	0
XI. ELECTRICITY	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	0	0	0
XII. OTHER CAUSES	124	18	8	0	150	97	12	1	0	110	15	5	1	0	21	103	18	7	0	128	339	53	17	0	409	0	0	0
TOTAL	2264	751	234	3	3252	1436	485	133	1	2055	95	42	21	0	158	1418	572	168	1	2159	5213	1850	556	5	7624	0	0	0

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY FRANCE
COAL-FIELD NORTH

YEAR 1975
MAN-HOURS WORKED (1) 37.629.904

SITE OF THE ACCIDENT / CAUSES OF ACCIDENTS / Period of incapacity	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	20,70	6,70	2,15	0,05	29,60	9,67	3,27	0,93	0,00	13,87	0,11	0,00	0,03	0,00	0,13	3,99	0,88	0,21	0,00	5,08	34,47	10,84	3,32	0,05	48,68	0,00	0,00	0,00
II. TRANSPORT, TOTAL	0,72	0,72	0,16	0,03	1,62	1,91	0,72	0,29	0,00	2,92	0,32	0,29	0,11	0,00	0,72	2,98	1,89	0,96	0,03	5,85	5,93	3,61	1,51	0,05	11,11	0,00	0,00	0,00
a) Continuous Transport	0,48	0,50	0,08	0,03	1,09	0,72	0,24	0,16	0,00	1,12	0,00	0,00	0,00	0,00	0,00	0,21	0,21	0,16	0,00	0,58	1,41	0,96	0,40	0,03	2,79	0,00	0,00	0,00
b) Discontinuous Transport	0,24	0,21	0,08	0,00	0,53	1,20	0,48	0,13	0,00	1,81	0,32	0,29	0,11	0,00	0,72	2,76	1,67	0,80	0,03	5,26	4,52	2,66	1,12	0,03	8,32	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	4,65	1,97	0,58	0,00	7,20	6,83	2,87	0,82	0,03	10,55	0,80	0,32	0,24	0,00	1,36	9,12	4,07	1,25	0,00	14,43	21,39	9,22	2,90	0,03	33,54	0,00	0,00	0,00
a) while moving about the mine	3,69	1,46	0,45	0,00	5,61	5,50	2,18	0,64	0,00	8,32	0,72	0,24	0,13	0,00	1,09	7,33	3,00	0,82	0,00	11,16	17,25	6,88	2,05	0,00	26,18	0,00	0,00	0,00
b) in the course of other activities	0,96	0,50	0,13	0,00	1,59	1,33	0,69	0,19	0,03	2,23	0,08	0,08	0,11	0,00	0,27	1,78	1,06	0,43	0,00	3,27	4,15	2,34	0,85	0,03	7,36	0,00	0,00	0,00
IV MACHINES, TOOLS AND SUPPORTS TOTAL	12,94	4,01	1,22	0,00	18,18	6,86	2,02	0,48	0,00	9,35	0,21	0,11	0,00	0,00	0,32	5,34	2,07	0,50	0,00	7,92	25,35	8,21	2,21	0,00	35,77	0,00	0,00	0,00
a) Machines	0,85	0,40	0,27	0,00	1,51	0,58	0,27	0,11	0,00	0,96	0,03	0,00	0,00	0,00	0,03	0,37	0,27	0,21	0,00	0,85	1,83	0,93	0,58	0,00	3,35	0,00	0,00	0,00
b) Tools	4,73	1,20	0,19	0,00	6,11	3,45	0,80	0,13	0,00	4,38	0,19	0,08	0,00	0,00	0,27	2,10	0,82	0,13	0,00	3,06	10,47	2,90	0,45	0,00	13,82	0,00	0,00	0,00
c) Supports	7,36	2,42	0,77	0,00	10,55	2,82	0,96	0,24	0,00	4,01	0,00	0,03	0,00	0,00	0,03	2,87	0,98	0,16	0,00	4,01	13,05	4,38	1,17	0,00	18,60	0,00	0,00	0,00
V. FALLS OF OBJECTS	17,75	6,06	1,86	0,00	25,67	10,23	3,64	0,96	0,00	14,83	0,69	0,27	0,16	0,00	1,12	13,18	5,71	1,36	0,00	20,25	41,86	15,68	4,33	0,00	61,87	0,00	0,00	0,00
VI. EXPLOSIVES	0,03	0,00	0,00	0,00	0,03	0,03	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,08	0,03	0,00	0,00	0,11	0,13	0,03	0,00	0,00	0,16	0,00	0,00	0,00
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S). TOTAL	0,00	0,00	0,03	0,00	0,03	0,03	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,11	0,00	0,00	0,00	0,11	0,13	0,00	0,03	0,00	0,16	0,00	0,00	0,00
a) Outbursts of Gas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
b) De-oxygenation and Poisoning by natural Gases	0,00	0,00	0,03	0,00	0,03	0,03	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,11	0,00	0,00	0,00	0,11	0,13	0,00	0,03	0,00	0,16	0,00	0,00	0,00
IX. HEATINGS OR FIRES	0,00	0,03	0,00	0,00	0,03	0,00	0,03	0,03	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,08	0,00	0,00	0,00	0,08	0,08	0,05	0,03	0,00	0,16	0,00	0,00	0,00
X. INRUSHES	0,08	0,00	0,00	0,00	0,08	0,03	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,08	0,03	0,00	0,00	0,11	0,19	0,03	0,00	0,00	0,21	0,00	0,00	0,00
XI ELECTRICITY	0,00	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,00	0,05	0,00	0,08	0,00	0,00	0,08	0,00	0,00	0,00
XII. OTHER CAUSES	3,30	0,48	0,21	0,00	3,99	2,58	0,32	0,03	0,00	2,92	0,40	0,13	0,03	0,00	0,56	2,74	0,48	0,19	0,00	3,40	9,01	1,41	0,45	0,00	10,87	0,00	0,00	0,00
TOTAL	60,16	19,96	6,22	0,08	86,42	38,16	12,89	3,53	0,03	54,61	2,52	1,12	0,56	0,00	4,20	37,68	15,20	4,46	0,03	57,37	138,53	49,16	14,78	0,13	202,60	0,00	0,00	0,00

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY FRANCE
COAL-FIELD NORTH

YEAR 1975
MAN-HOURS WORKED (1) 37.629.904

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																																
I Head and neck	0	0	0	3	2	5	0	0	0	1	0	1	7	0	7	0	0	0				0	0	0	370	67	11	2	450
II. Eyes	0	0	0							1	0	1	4	0	4	0	0	0				0	0	0	439	33	5	0	477
III Trunk	0	0	0	23	0	23	11	0	11	1	0	1	12	1	13	0	0	0				1	0	1	690	257	48	1	996
IV Upper limbs (excluding the hands) (3)	1	0	1	38	0	38	3	0	3				28	0	28	1	0	1				0	0	0	635	119	71	0	825
V. Hands	16	0	16	105	0	105	2	0	2				75	0	75	0	0	0				1	0	1	1732	746	199	0	2677
VI Lower limbs (excluding feet) (4)	0	0	0	63	0	63	17	0	17				74	0	74	0	0	0				1	0	1	715	340	155	0	1210
VII Feet	1	0	1	37	0	37	0	0	0				9	0	9	0	0	0				0	0	0	479	233	47	0	759
VIII Multiple locations	0	0	0	3	0	3	1	0	1	0	0	0	8	0	8	1	0	1				6	2	8	140	52	19	2	213
IX Not specified													0	0	0	0	0	0	0	0	0	1	0	1	13	3	1	0	17
TOTAL	18	0	18	272	2	274	34	0	34	3	0	3	217	1	213	2	0	2	0	0	0	10	2	12	5213	1850	556	5	7624

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

I/19

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY FRANCE
COAL-FIELD NORTH

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 37.629.904

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																															
I. Head and neck	0,00	0,00	0,00	0,08	0,05	0,13	0,00	0,00	0,00	0,03	0,00	0,03	0,19	0,00	0,19	0,00	0,00	0,00				0,00	0,00	0,00	9,83	1,78	0,29	0,05	11,96
II. Eyes	0,00	0,00	0,00							0,03	0,00	0,03	0,11	0,00	0,11	0,00	0,00	0,00				0,00	0,00	0,00	11,67	0,88	0,13	0,00	12,68
III Trunk	0,00	0,00	0,00	0,61	0,00	0,61	0,29	0,00	0,29	0,03	0,00	0,03	0,32	0,03	0,35	0,00	0,00	0,00				0,03	0,00	0,03	18,34	6,83	1,28	0,03	26,47
IV. Upper limbs (excluding the hands) (3)	0,03	0,00	0,03	1,01	0,00	1,01	0,08	0,00	0,08				0,74	0,00	0,74	0,03	0,00	0,03				0,00	0,00	0,00	16,87	3,16	1,89	0,00	21,92
V Hands	0,43	0,00	0,43	2,79	0,00	2,79	0,05	0,00	0,05				1,99	0,00	1,99	0,00	0,00	0,00				0,03	0,00	0,03	46,03	19,82	5,29	0,00	71,14
VI Lower limbs (excluding feet) (4)	0,00	0,00	0,00	1,67	0,00	1,67	0,45	0,00	0,45				1,97	0,00	1,97	0,00	0,00	0,00				0,03	0,00	0,03	19,00	9,04	4,12	0,00	32,16
VII Feet	0,03	0,00	0,03	0,98	0,00	0,98	0,00	0,00	0,00				0,24	0,00	0,24	0,00	0,00	0,00				0,00	0,00	0,00	12,73	6,19	1,25	0,00	20,17
VIII Multiple locations	0,00	0,00	0,00	0,08	0,00	0,08	0,03	0,00	0,03	0,00	0,00	0,00	0,21	0,00	0,21	0,03	0,00	0,03				0,16	0,05	0,21	3,72	1,38	0,50	0,05	5,66
IX Not specified													0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,03	0,35	0,08	0,03	0,00	0,45
TOTAL	0,48	0,00	0,48	7,23	0,05	7,28	0,90	0,00	0,90	0,08	0,00	0,08	5,77	0,03	5,79	0,05	0,00	0,05	0,00	0,00	0,00	0,27	0,05	0,32	138,53	49,16	14,78	0,13	202,60

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme
(2) Including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days.

1/20

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY FRANCE

COAL-FIELD LORRAINE

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 20 532 640

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	566	306	74	2	948	119	70	22	0	211	0	0	0	0	0	17	6	3	0	26	702	382	99	2	1185	0	0	0
II. TRANSPORT, TOTAL	56	61	25	0	142	18	20	18	0	56	1	1	0	1	3	61	51	36	2	150	136	133	79	3	351	0	0	0
a) Continuous Transport	34	35	15	0	84	3	4	5	0	12	0	0	0	0	0	5	4	6	0	15	42	43	26	0	111	0	0	0
b) Discontinuous Transport	22	26	10	0	58	15	16	13	0	44	1	1	0	1	3	56	47	30	2	135	94	90	53	3	246	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	653	350	50	1	1054	249	162	28	0	439	10	11	1	0	22	314	254	51	0	619	1226	777	130	1	2134	0	0	0
a) while moving about the mine	179	83	12	0	274	43	33	5	0	81	3	5	0	0	8	128	79	21	0	228	353	199	39	0	591	0	0	0
b) in the course of other activities	474	267	38	1	780	206	129	23	0	358	7	6	1	0	14	186	175	30	0	391	873	578	91	1	1543	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	466	200	50	0	716	133	60	19	0	212	2	1	0	0	3	40	33	8	0	81	641	294	77	0	1012	0	0	0
a) Machines	41	14	16	0	71	10	12	3	0	25	0	0	0	0	0	2	5	2	0	9	53	31	21	0	105	0	0	0
b) Tools	267	86	23	0	376	95	28	12	0	135	2	1	0	0	3	38	28	6	0	72	402	143	41	0	586	0	0	0
c) Supports	158	100	11	0	269	28	20	4	0	52	0	0	0	0	0	0	0	0	0	0	186	120	15	0	321	0	0	0
V. FALLS OF OBJECTS	172	91	28	1	292	55	28	12	0	95	2	1	0	0	3	57	48	20	1	126	286	168	60	2	516	0	0	0
VI. EXPLOSIVES	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	0	0	0
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a) Outbursts of Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b) De-oxygenation and Poisoning by natural Gases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IX. HEATINGS OR FIRES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
X. INRUSHES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XI. ELECTRICITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0
XII. OTHER CAUSES	57	10	1	0	68	34	4	0	0	38	7	0	0	0	7	28	14	1	0	43	126	28	2	0	156	0	0	0
TOTAL	1970	1020	229	4	3223	608	344	99	0	1051	22	14	1	1	38	517	407	119	3	1046	3117	1785	448	8	5358	0	0	0

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme.
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY FRANCE
COAL-FIELD LORRAINE

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 20 532 640

SITE OF THE ACCIDENT / CAUSES OF ACCIDENTS — Period of incapacity	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	27,57	14,90	3,60	0,10	46,17	5,80	3,41	1,07	0,00	10,28	0,00	0,00	0,00	0,00	0,00	0,83	0,29	0,15	0,00	1,27	34,19	18,60	4,82	0,10	57,71	0,00	0,00	0,00
II. TRANSPORT, TOTAL	2,73	2,97	1,22	0,00	6,92	0,88	0,97	0,88	0,00	2,73	0,05	0,05	0,00	0,05	0,15	2,97	2,48	1,75	0,10	7,31	6,62	6,48	3,85	0,15	17,09	0,00	0,00	0,00
a) Continuous Transport	1,66	1,70	0,73	0,00	4,09	0,15	0,19	0,24	0,00	0,58	0,00	0,00	0,00	0,00	0,00	0,24	0,19	0,29	0,00	0,73	2,05	2,09	1,27	0,00	5,41	0,00	0,00	0,00
b) Discontinuous Transport	1,07	1,27	0,49	0,00	2,82	0,73	0,78	0,63	0,00	2,14	0,05	0,05	0,00	0,05	0,15	2,73	2,29	1,46	0,10	6,57	4,58	4,38	2,58	0,15	11,98	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	31,80	17,05	2,44	0,05	51,33	12,13	7,89	1,36	0,00	21,38	0,49	0,54	0,05	0,00	1,07	15,29	12,37	2,48	0,00	30,15	59,71	37,84	6,33	0,05	103,93	0,00	0,00	0,00
a) while moving about the mine	8,72	4,04	0,58	0,00	13,34	2,09	1,61	0,24	0,00	3,94	0,15	0,24	0,00	0,00	0,39	6,23	3,85	1,02	0,00	11,10	17,19	9,69	1,90	0,00	28,78	0,00	0,00	0,00
b) in the course of other activities	23,09	13,00	1,85	0,05	37,99	10,03	6,28	1,12	0,00	17,44	0,34	0,29	0,05	0,00	0,68	9,06	8,52	1,46	0,00	19,04	42,52	28,15	4,43	0,05	75,15	0,00	0,00	0,00
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	22,70	9,74	2,44	0,00	34,87	6,48	2,92	0,93	0,00	10,33	0,10	0,05	0,00	0,00	0,15	1,95	1,61	0,39	0,00	3,94	31,22	14,32	3,75	0,00	49,29	0,00	0,00	0,00
a) Machines	2,00	0,68	0,78	0,00	3,46	0,49	0,58	0,15	0,00	1,22	0,00	0,00	0,00	0,00	0,00	0,10	0,24	0,10	0,00	0,44	2,58	1,51	1,02	0,00	5,11	0,00	0,00	0,00
b) Tools	13,00	4,19	1,12	0,00	18,31	4,63	1,36	0,58	0,00	6,57	0,10	0,05	0,00	0,00	0,15	1,85	1,36	0,29	0,00	3,51	19,58	6,96	2,00	0,00	28,54	0,00	0,00	0,00
c) Supports	7,70	4,87	0,54	0,00	13,10	1,36	0,97	0,19	0,00	2,53	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	9,06	5,84	0,73	0,00	15,63	0,00	0,00	0,00
V. FALLS OF OBJECTS	8,38	4,43	1,36	0,05	14,22	2,68	1,36	0,58	0,00	4,63	0,10	0,05	0,00	0,00	0,15	2,78	2,34	0,97	0,05	6,14	13,93	8,18	2,92	0,10	25,18	0,00	0,00	0,00
VI. EXPLOSIVES	0,00	0,10	0,05	0,00	0,15	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,10	0,05	0,00	0,15	0,00	0,00	0,00
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
a) Outbursts of Gas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
b) De-oxygenation and Poisoning by natural Gases	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
IX. HEATINGS OR FIRES	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
X. INRUSHES	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
XI. ELECTRICITY	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,00	0,05	0,00	0,05	0,00	0,00	0,05	0,00	0,00	0,00
XII. OTHER CAUSES	2,78	0,49	0,05	0,00	3,31	1,66	0,19	0,00	0,00	1,85	0,34	0,00	0,00	0,00	0,34	1,36	0,68	0,05	0,00	2,09	6,14	1,36	0,10	0,00	7,60	0,00	0,00	0,00
TOTAL	95,94	49,68	11,15	0,19	56,97	29,61	16,75	4,82	0,00	51,19	1,07	0,68	0,05	0,05	1,85	25,18	19,82	5,80	0,15	50,94	151,81	86,93	21,82	0,39	260,95	0,00	0,00	0,00

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY FRANCE
COAL-FIELD LORRAINE

YEAR 1975
MAN-HOURS WORKED [1] 20 532 640

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified [2] 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days [5]	Fatal accidents	total	> 56 days [5]	Fatal accidents	total	> 56 days [5]	Fatal accidents	total	> 56 days [5]	Fatal accidents	total	> 56 days [5]	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days [5]	21 to 56 days [5]	> 56 days [5]	Fatal accidents	total
LOCATION OF THE INJURY I Head and neck	0	0	0	7	3	9	2	0	2	5	0	5	16	0	16	0	0	0				0	0	0	325	132	30	3	490
II Eyes	0	0	0							0	0	0	4	0	4	0	0	0				0	0	0	311	32	4	0	347
III Trunk	0	0	0	15	1	16	13	0	13	3	1	4	9	0	9	0	0	0				3	0	3	437	345	43	2	827
IV Upper limbs (excluding the hands) [3]	0	0	0	29	0	29	6	0	6				11	0	11	0	0	0				0	0	0	483	183	46	0	712
V Hands	5	0	5	75	0	75	12	0	12				65	0	65	0	0	0				1	0	1	675	554	158	0	1387
VI Lower limbs (excluding feet) [4]	0	0	0	55	1	56	16	0	16				44	0	44	0	0	0				3	0	3	552	313	118	1	984
VII Feet	0	0	0	21	0	21	0	0	0				8	0	8	0	0	0				0	0	0	218	135	29	0	382
VIII Multiple locations	0	0	0	1	1	2	0	0	0	0	0	0	18	0	18	0	0	0				0	1	1	113	88	19	2	222
IX Not specified													0	0	0	0	0	0	1	0	1	0	0	0	3	3	1	0	7
TOTAL	5	0	5	203	6	208	49	0	49	8	1	9	175	0	175	0	0	0	1	0	1	7	1	8	3117	1785	448	8	5358

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner s social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY FRANCE
COAL-FIELD LORRAINE

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 20 532 640

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4		
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY												
I. Head and neck	0,00	0,00	0,00	0,34	0,15	0,44	0,10	0,00	0,10	0,24	0,00	0,24
II Eyes	0,00	0,00	0,00							0,00	0,00	0,00
III Trunk	0,00	0,00	0,00	0,73	0,05	0,78	0,63	0,00	0,63	0,15	0,05	0,19
IV Upper limbs (excluding the hands) (3)	0,00	0,00	0,00	1,41	0,00	1,41	0,29	0,00	0,29			
V Hands	0,24	0,00	0,24	3,65	0,00	3,65	0,58	0,00	0,58			
VI Lower limbs (excluding feet) (4)	0,00	0,00	0,00	2,68	0,05	2,73	0,78	0,00	0,78			
VII Feet	0,00	0,00	0,00	1,02	0,00	1,02	0,00	0,00	0,00			
VIII. Multiple locations	0,00	0,00	0,00	0,05	0,05	0,10	0,00	0,00	0,00	0,00	0,00	0,00
IX. Not specified												
TOTAL	0,24	0,00	0,24	9,89	0,29	10,13	2,39	0,00	2,39	0,39	0,05	0,44

NATURE OF THE INJURY	Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																	
I. Head and neck	0,78	0,00	0,78	0,00	0,00	0,00				0,00	0,00	0,00	15,83	6,43	1,46	0,15	23,86
II Eyes	0,19	0,00	0,19	0,00	0,00	0,00				0,00	0,00	0,00	15,15	1,56	0,19	0,00	16,90
III Trunk	0,44	0,00	0,44	0,00	0,00	0,00				0,15	0,00	0,15	21,78	16,80	2,09	0,10	40,78
IV Upper limbs (excluding the hands) (3)	0,54	0,00	0,54	0,00	0,00	0,00				0,00	0,00	0,00	23,52	8,91	2,24	0,00	34,68
V Hands	3,17	0,00	3,17	0,00	0,00	0,00				0,05	0,00	0,05	32,87	26,98	7,70	0,00	67,55
VI Lower limbs (excluding feet) (4)	2,14	0,00	2,14	0,00	0,00	0,00				0,15	0,00	0,15	26,88	15,24	5,75	0,05	47,92
VII Feet	0,39	0,00	0,39	0,00	0,00	0,00				0,00	0,00	0,00	10,62	6,57	1,41	0,00	18,60
VIII. Multiple locations	0,88	0,00	0,88	0,00	0,00	0,00				0,00	0,05	0,05	5,50	4,29	0,93	0,10	10,81
IX. Not specified	0,00	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,05	0,00	0,00	0,00	0,15	0,15	0,05	0,00	0,34
TOTAL	8,52	0,00	8,52	0,00	0,00	0,00	0,05	0,00	0,05	0,34	0,05	0,39	151,81	86,93	21,82	0,39	260,95

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) Including complications.
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY FRANCE
COAL-FIELD TOTAL

YEAR 1975
MAN-HOURS WORKED (1) 71 808 585

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	1446	604	173	4	2227	551	236	67	0	854	4	0	1	0	5	210	67	28	0	305	2211	907	269	4	3391	0	0	0
II. TRANSPORT, TOTAL	92	98	37	1	228	97	50	39	0	186	15	17	6	1	39	217	164	107	3	491	422	328	189	5	944	0	0	0
a) Continuous Transport	60	62	23	1	146	30	14	15	0	59	0	0	0	0	0	24	21	17	0	62	115	96	55	1	267	0	0	0
b) Discontinuous Transport	32	36	14	0	82	67	36	24	0	127	15	17	4	1	37	193	143	90	3	429	307	232	132	4	681	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	879	445	80	1	1405	558	291	68	1	918	48	28	13	0	89	825	555	147	0	1527	2310	1319	308	2	3939	0	0	0
a) while moving about the mine	354	149	34	0	537	283	127	33	0	443	35	18	8	0	61	517	283	83	0	883	1189	576	159	0	1924	0	0	0
b) in the course of other activities	525	296	46	1	868	275	164	35	1	475	13	10	5	0	28	308	272	64	0	644	1121	743	149	2	2015	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	1008	399	115	0	1522	453	165	50	0	668	12	7	2	0	21	318	177	44	0	539	1791	748	211	0	2750	0	0	0
a) Machines	77	36	30	0	143	37	25	9	0	71	2	1	0	0	3	22	22	15	0	59	138	84	54	0	276	0	0	0
b) Tools	471	150	38	0	659	256	67	22	0	345	9	5	1	0	15	165	85	19	0	269	901	307	80	0	1288	0	0	0
c) Supports	460	213	47	0	720	160	73	19	0	252	1	1	1	0	3	131	70	10	0	211	752	357	77	0	1186	0	0	0
V. FALLS OF OBJECTS	916	376	118	1	1411	502	201	58	0	761	35	17	7	0	59	726	392	112	1	1231	2179	986	295	2	3462	0	0	0
VI. EXPLOSIVES	3	3	2	0	8	1	0	0	0	1	0	0	0	0	0	3	1	0	0	4	7	4	2	0	13	0	0	0
VII IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	4	0	0	0	4	6	0	1	0	7	0	0	0
a) Outbursts of Gas	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0
b) De-oxygenation and Poisoning by natural Gases	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	4	0	0	0	4	5	0	1	0	6	0	0	0
IX. HEATINGS OR FIRES	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	3	0	0	0	3	3	2	1	0	6	0	0	0
X. INRUSHES	3	0	0	0	3	1	0	0	0	1	0	0	0	0	0	3	1	0	0	4	7	1	0	0	8	0	0	0
XI ELECTRICITY	0	0	0	0	0	2	1	0	0	3	0	0	1	0	1	2	5	1	0	8	4	6	2	0	12	0	0	0
XII. OTHER CAUSES	262	54	16	0	332	150	23	4	0	177	28	11	4	0	43	208	73	22	0	303	648	161	46	0	855	0	0	0
TOTAL	4609	1980	542	7	7138	2316	968	287	1	3572	143	80	34	1	258	2519	1435	461	4	4419	9588	4462	1324	13	15387	0	0	0

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i e who either died or were unable to resume work underground for at least eight weeks).
(3) Calendar days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY FRANCE
COAL-FIELD TOTAL

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 71 808 585

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS	20,14	8,41	2,41	0,06	31,01	7,67	3,29	0,93	0,00	11,89	0,06	0,00	0,01	0,00	0,07	2,92	0,93	0,39	0,00	4,25	30,79	12,63	3,75	0,06	47,22	0,00	0,00	0,00
II. TRANSPORT, TOTAL	1,28	1,36	0,52	0,01	3,18	1,35	0,70	0,54	0,00	2,59	0,21	0,24	0,08	0,01	0,54	3,02	2,29	1,49	0,04	6,84	5,88	4,57	2,63	0,07	13,15	0,00	0,00	0,00
a) Continuous Transport	0,84	0,86	0,32	0,01	2,03	0,42	0,19	0,21	0,00	0,82	0,00	0,00	0,00	0,00	0,00	0,33	0,29	0,24	0,00	0,36	1,60	1,34	0,77	0,01	3,72	0,00	0,00	0,00
b) Discontinuous Transport	0,45	0,50	0,19	0,00	1,14	0,93	0,50	0,33	0,00	1,77	0,21	0,24	0,06	0,01	0,52	2,69	1,99	1,25	0,04	5,97	4,28	3,23	1,84	0,06	9,48	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	12,24	6,20	1,11	0,01	19,57	7,77	4,05	0,95	0,01	12,78	0,67	0,39	0,18	0,00	1,24	11,49	7,73	2,05	0,00	21,26	32,17	18,37	4,29	0,03	54,85	0,00	0,00	0,00
a) while moving about the mine	4,93	2,07	0,47	0,00	7,48	3,94	1,77	0,46	0,00	6,17	0,49	0,25	0,11	0,00	0,85	7,20	3,94	1,16	0,00	12,30	16,56	8,02	2,21	0,00	26,79	0,00	0,00	0,00
b) in the course of other activities	7,31	4,12	0,54	0,01	12,09	3,83	2,28	0,49	0,01	6,61	0,18	0,14	0,07	0,00	0,39	4,29	3,79	0,89	0,00	8,97	15,61	10,35	2,07	0,03	28,06	0,00	0,00	0,00
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	14,04	5,56	1,60	0,00	21,20	6,31	2,30	0,70	0,00	9,30	0,17	0,10	0,03	0,00	0,29	4,43	2,46	0,61	0,00	7,51	24,94	10,42	2,94	0,00	38,30	0,00	0,00	0,00
a) Machines	1,07	0,50	0,42	0,00	1,99	0,52	0,35	0,13	0,00	0,99	0,03	0,01	0,00	0,00	0,04	0,31	0,31	0,21	0,00	0,82	1,92	1,17	0,75	0,00	3,84	0,00	0,00	0,00
b) Tools	6,56	2,09	0,53	0,00	9,18	3,57	0,93	0,31	0,00	4,80	0,13	0,07	0,01	0,00	0,21	2,30	1,18	0,26	0,00	3,75	12,55	4,28	1,11	0,00	17,94	0,00	0,00	0,00
c) Supports	6,41	2,97	0,65	0,00	10,03	2,23	1,02	0,26	0,00	3,51	0,01	0,01	0,01	0,00	0,04	1,82	0,97	0,14	0,00	2,94	10,47	4,97	1,07	0,00	16,52	0,00	0,00	0,00
V. FALLS OF OBJECTS	12,76	5,24	1,64	0,01	19,65	6,99	2,80	0,81	0,00	10,60	0,49	0,24	0,10	0,00	0,82	10,11	5,46	1,56	0,01	17,14	30,34	13,73	4,11	0,03	48,21	0,00	0,00	0,00
VI. EXPLOSIVES	0,04	0,04	0,03	0,00	0,11	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,04	0,01	0,00	0,00	0,06	0,10	0,06	0,03	0,00	0,18	0,00	0,00	0,00
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0,00	0,00	0,01	0,00	0,01	0,01	0,00	0,00	0,00	0,01	0,01	0,00	0,00	0,00	0,01	0,06	0,00	0,00	0,00	0,06	0,08	0,00	0,01	0,00	0,10	0,00	0,00	0,00
a) Outbursts of Gas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,01	0,00.	0,00	0,00
b) De-oxygenation and Poisoning by natural Gases	0,00	0,00	0,01	0,00	0,01	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,06	0,00	0,00	0,00	0,06	0,07	0,00	0,01	0,00	0,08	0,00	0,00	0,00
IX. HEATINGS OR FIRES	0,00	0,01	0,00	0,00	0,01	0,00	0,01	0,01	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,04	0,04	0,03	0,01	0,00	0,08	0,00	0,00	0,00
X. INRUSHES	0,04	0,00	0,00	0,00	0,04	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,04	0,01	0,00	0,00	0,06	0,10	0,01	0,00	0,00	0,11	0,00	0,00	0,00
XI. ELECTRICITY	0,00	0,00	0,00	0,00	0,00	0,03	0,01	0,00	0,00	0,04	0,00	0,00	0,01	0,00	0,01	0,03	0,07	0,01	0,00	0,11	.0,06	0,08	0,03	0,00	0,17	0,00	0,00	0,00
XII. OTHER CAUSES	3,65	0,75	0,22	0,00	4,62	2,09	0,32	0,06	0,00	2,46	0,39	0,15	0,06	0,00	0,60	2,90	1,02	0,31	0,00	4,22	9,02	2,24	0,64	0,00	11.91	0,00	0,00	0,00
TOTAL	64,18	27,57	7,55	0,10	99,40	32,25	13,48	4,00	0,01	49,74	1,99	1,11	0,47	0,01	3,59	35,08	19,98	6,42	0,06	61,54	133,52	62,14	18,44	0,18	214,28	0,00	0,00	0,00

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme.
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY FRANCE
COAL-FIELD TOTAL

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 71 808 585

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I. Head and neck	0	0	0	14	5	17	5	0	5	8	0	8	29	0	29	0	0	0				0	0	0	798	239	56	5	1098
II. Eyes	0	0	0							1	0	1	11	0	11	0	0	0				0	0	0	857	78	12	0	947
III Trunk	0	0	0	50	1	51	53	0	51	10	1	11	32	1	33	0	0	0				4	0	4	1350	803	149	3	2305
IV Upper limbs (excluding the hands) (3)	1	0	1	78	0	76	11	0	11				48	0	47	1	0	1				0	0	0	1243	344	139	0	1726
V Hands	29	0	26	230	0	223	18	0	18				163	0	160	0	0	0				2	0	2	2698	1540	442	0	4680
VI Lower limbs (excluding feet) (4)	1	0	1	151	1	145	54	0	53				144	0	137	0	0	0				4	0	4	1492	792	354	1	2639
VII Feet	3	0	2	72	0	71	2	0	2				29	0	28	0	0	0				1	0	1	800	454	107	0	1361
VIII Multiple locations	0	0	0	7	1	8	2	0	2	0	0	0	28	0	28	2	0	2				17	3	20	301	186	56	4	547
IX Not specified													2	0	2	0	0	0	1	0	1	6	0	6	49	26	9	0	84
TOTAL	34	0	30	602	8	591	145	0	142	19	1	20	486	1	475	3	0	3	1	0	1	34	3	37	9588	4462	1324	13	15387

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner s social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY FRANCE
COAL-FIELD TOTAL

YEAR 1975
MAN-HOURS WORKED (1) 71 808 585

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I Head and neck	0,00	0,00	0,00	0,19	0,07	0,24	0,07	0,00	0,07	0,11	0,00	0,11	0,40	0,00	0,40	0,00	0,00	0,00				0,00	0,00	0,00	11,11	3,33	0,78	0,07	15,29
II. Eyes	0,00	0,00	0,00							0,01	0,00	0,01	0,15	0,00	0,15	0,00	0,00	0,00				0,00	0,00	0,00	11,93	1,09	0,17	0,00	13,19
III. Trunk	0,00	0,00	0,00	0,70	0,01	0,71	0,74	0,00	0,71	0,14	0,01	0,15	0,45	0,01	0,46	0,00	0,00	0,00				0,06	0,00	0,06	18,80	11,18	2,07	0,04	32,10
IV Upper limbs (excluding the hands) (3)	0,01	0,00	0,01	1,09	0,00	1,06	0,15	0,00	0,15				0,67	0,00	0,65	0,01	0,00	0,01				0,00	0,00	0,00	17,31	4,79	1,94	0,00	24,04
V Hands	0,40	0,00	0,36	3,20	0,00	3,11	0,25	0,00	0,25				2,27	0,00	2,23	0,00	0,00	0,00				0,03	0,00	0,03	37,57	21,45	6,16	0,00	65,17
VI Lower limbs (excluding feet) (4)	0,01	0,00	0,01	2,10	0,01	2,02	0,75	0,00	0,74				2,01	0,00	1,91	0,00	0,00	0,00				0,06	0,00	0,06	20,78	11,03	4,93	0,01	36,75
VII Feet	0,04	0,00	0,03	1,00	0,00	0,99	0,03	0,00	0,03				0,40	0,00	0,39	0,00	0,00	0,00				0,01	0,00	0,01	11,14	6,32	1,49	0,00	18,95
VIII. Multiple locations	0,00	0,00	0,00	0,10	0,01	0,11	0,03	0,00	0,03	0,00	0,00	0,00	0,39	0,00	0,39	0,03	0,00	0,03				0,24	0,04	0,28	4,19	2,59	0,78	0,06	7,62
IX Not specified													0,03	0,00	0,03	0,00	0,00	0,00	0,01	0,00	0,01	0,08	0,00	0,08	0,68	0,36	0,13	0,00	1,17
TOTAL	0,47	0,00	0,42	8,38	0,11	8,23	2,02	0,00	1,98	0,26	0,01	0,28	6,77	0,01	6,61	0,04	0,00	0,04	0,01	0,00	0,01	0,47	0,04	0,52	133,52	62,14	18,44	0,18	214,28

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs".
(5) Calender days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY ITALY

COAL-FIELD SULCIS

YEAR 1975

MAN-HOURS WORKED (1) 437 139

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS						3	1			4											3	1			4			
II. TRANSPORT, TOTAL						1				1											1				1			
a) Continuous Transport																												
b) Discontinuous Transport						1				1											1				1			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL						10	2			12											10	2			12			
a) while moving about the mine						6	2			8											6	2			8			
b) in the course of other activities						4				4											4				4			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL						6	2	2		10											6	2	2		10			
a) Machines							1			1												1			1			
b) Tools						4	1	1		6											4	1	1		6			
c) Supports						2		1		3											2		1		3			
V FALLS OF OBJECTS						1				1											1				1			
VI. EXPLOSIVES																												
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST																												
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL																												
a) Outbursts of Gas																												
b) De-oxygenation and Poisoning by natural Gases																												
IX. HEATINGS OR FIRES																												
X. INRUSHES																												
XI. ELECTRICITY																												
XII OTHER CAUSES						4				4											4				4			
TOTAL						25	5	2		32											25	5	2		32			

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY ITALY
COAL-FIELD SULCIS

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 437 139

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal accidents	total	56 days (3)	Fatal accidents	total
I. FALLS OF GROUNDS AND ROCKS						7	2			9											7	2			9			
II. TRANSPORT, TOTAL						2				2											2				2			
a) Continuous Transport																												
b) Discontinuous Transport						2				2											2				2			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL						23	5			28											23	5			28			
a) while moving about the mine						14	5			19											14	5			19			
b) in the course of other activities						9				9											9				9			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL						14	5	4		23											14	5	4		23			
a) Machines							2			2												2			2			
b) Tools						9	3	2		14											9	3	2		14			
c) Supports						5		2		7											5		2		7			
V. FALLS OF OBJECTS						2				2											2				2			
VI. EXPLOSIVES																												
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST																												
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL																												
a) Outbursts of Gas																												
b) De-oxygenation and Poisoning by natural Gases																												
IX. HEATINGS OR FIRES																												
X. INRUSHES																												
XI. ELECTRICITY																												
XII. OTHER CAUSES						9				9											9				9			
TOTAL						57	12	4		73											57	12	4		73			

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)
(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

Table 2a

COUNTRY ITALY
COAL-FIELD SULCIS

YEAR 1 9 7 5
MAN-HOURS WORKED (1) 437 139

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY I Head and neck																													
II. Eyes																									2				2
III Trunk																									2	1			3
IV Upper limbs (excluding the hands) (3)																									1				1
V Hands	1		1	1		1																			10	2	2		14
VI Lower limbs (excluding feet) (4)																									2	1			3
VII Feet																									4				4
VIII Multiple locations																									4	1			5
IX Not specified																													
TOTAL	1		1	1		1																			25	5	2		32

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY ITALY

COAL-FIELD SULCIS

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 437 139

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY I Head and neck																													
II Eyes																									5				5
III. Trunk																									4	3			7
IV Upper limbs (excluding the hands) (3)																									2				2
V Hands	2		2	2		2																			23	5	4		32
VI Lower limbs (excluding feet) (4)																									5	2			7
VII Feet																									9				9
VIII. Multiple locations																									9	2			11
IX. Not specified																													
TOTAL	2		2	2		2																			57	12	4		73

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) Including complications.
(3) The shoulders and the wrists are included under „upper limbs
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days.

1/32

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY UNITED KINGDOM

COAL-FIELD

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 303 199 425

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I FALLS OF GROUNDS AND ROCKS			82	5	87			45	2	47			-	-	-			10	1	11			137	8	145			
II. TRANSPORT, TOTAL			18	5	23			17	-	17			3	1	4			136	14	150			174	20	194			
a) Continuous Transport																												
b) Discontinuous Transport																												
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL			6	-	6			11	-	11			2	-	2			52	1	53			71	1	72			
a) while moving about the mine																												
b) in the course of other activities																												
IV. MACHINES, TOOLS AND SUPPORTS TOTAL																												
a) Machines			20	2	22			14	2	16			-	-	-			4	2	6			38	6	44			
b) Tools			5	-	5			3	-	3			-	-	-			9	-	9			17	-	17			
c) Supports			9	3	12			-	-	-			-	-	-			-	-	-			9	3	12			
V FALLS OF OBJECTS			16	-	16			10	-	10			2		2			16	4	20			44	4	48			
VI. EXPLOSIVES			1	-	1			-	2	2			-	-	-			1	-	1			2	2	4			
VII IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST			-	-	-			-	-	-			-	-	-			1	5	6			1	5	6	1	5	6
VIII OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
a) Outbursts of Gas																												
b) De-oxygenation and Poisoning by natural Gases																												
IX HEATINGS OR FIRES			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
X. INRUSHES			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
XI. ELECTRICITY			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
XII. OTHER CAUSES			12	1	13			3	-	3			3	4	7			11	1	12			29	6	35			
TOTAL			169	16	185			103	6	109			10	5	15			240	28	268			522	55	577	1	5	6

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks).
(3) Calendar days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY UNITED KINGDOM

COAL-FIELD

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 303 199 425

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS			0.270	0.016	0.287			0.148	0.007	0.155			-	-	-			0.033	0.003	0.036			0.452	0.026	0.478			
II. TRANSPORT, TOTAL			0.059	0.016	0.076			0.056	-	0.056			0.010	0.003	0.013			0.449	0.046	0.495			0.574	0.066	0.640			
a) Continuous Transport																												
b) Discontinuous Transport																												
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL			0.020	-	0.020			0.036	-	0.036			0.007	-	0.007			0.171	0.003	0.175			0.234	0.003	0.237			
a) while moving about the mine																												
b) in the course of other activities																												
IV. MACHINES, TOOLS AND SUPPORTS TOTAL																												
a) Machines			0.066	0.007	0.073			0.046	0.007	0.053			-	-	-			0.013	0.007	0.020			0.125	0.020	0.145			
b) Tools			0.016	-	0.016			0.010	-	0.010			-	-	-			0.030	-	0.030			0.056	-	0.056			
c) Supports			0.030	0.010	0.040			-	-	-			-	-	-			-	-	-			0.030	0.010	0.040			
V. FALLS OF OBJECTS			0.053	-	0.053			0.033	-	0.033			0.007	-	0.007			0.053	0.013	0.066			0.145	0.013	0.158			
VI. EXPLOSIVES			0.003	-	0.003			-	0.007	0.007			-	-	-			0.003	-	0.003			0.007	0.007	0.013			
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST			-	-	-			-	-	-			-	-	-			0.003	0.016	0.020			0.003	0.016	0.020			
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
a) Outbursts of Gas																												
b) De-oxygenation and Poisoning by natural Gases																												
IX. HEATINGS OR FIRES			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
X. INRUSHES			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
XI. ELECTRICITY			-	-	-			-	-	-			-	-	-			-	-	-			-	-	-			
XII. OTHER CAUSES			0.040	0.003	0.043			0.010	-	0.010			0.010	0.013	0.023			0.036	0.003	0.040			0.096	0.020	0.115			
TOTAL			0.557	0.053	0.610			0.340	0.020	0.359			0.033	0.016	0.049			0.791	0.092	0.884			1.722	0.181	1.903			

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme.
(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks).
(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

Table 2a

COUNTRY UNITED KINGDOM

COAL-FIELD

(absolute figures)

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 303 199 425

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4		
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY												
I. Head and neck	-	-	-	22	11	33	-	-	-	2	2	4
II. Eyes	3	-	3							-	-	-
III Trunk	-	-	-	66	1	67	-	-	-	7	2	9
IV Upper limbs (excluding the hands) (3)	1	-	1	115	-	115	20	-	20			
V Hands	1	-	1	1	-	1	-	-	-			
VI Lower limbs (excluding feet) (4)	9	-	9	251	2	253	2	1	3			
VII Feet	3	-	3	7	-	7	-	-	-			
VIII Multiple locations	-	-	-	6	2	8	-	-	-	-	2	2
IX Not specified												
TOTAL	17	-	17	468	16	484	22	1	23	9	6	15

NATURE OF THE INJURY	Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																	
I. Head and neck	1	-	1	1	-	1				-	2	2			26	15	41
II. Eyes	-	-	-	-	-	-				-	-	-			3	-	3
III Trunk	-	-	-	-	-	-				1	12	13			74	15	89
IV Upper limbs (excluding the hands) (3)	-	-	-	-	-	-				-	-	-			136	-	136
V Hands	-	-	-	-	-	-				1	-	1			3	-	3
VI Lower limbs (excluding feet) (4)	-	-	-	-	-	-				-	-	-			262	3	265
VII Feet	-	-	-	-	-	-				1	-	1			11	-	11
VIII Multiple locations	-	-	-	-	-	-				-	8	8			6	12	18
IX Not specified	-	-	-	-	-	-	1	9	10	-	1	1			1	10	11
TOTAL	1	-	1	1	-	1	1	9	10	3	23	26			522	55	577

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs
(4) The hips and the ankles are included under „Lower limbs"
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY UNITED KINGDOM

COAL-FIELD

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 303 199 424

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I. Head and neck	-	-	-	0.073	0.036	0.109	-	-	-	0.007	0.007	0.013	0.003	-	0.003	0.003	-	0.003				-	0.007	0.007			0.086	0.049	0.135
II. Eyes	0.010	-	0.010							-	-	-	-	-	-	-	-	-				-	-	-			0.010	-	0.010
III Trunk	-	-	-	0.218	0.003	0.221	-	-	-	0.023	0.007	0.030	-	-	-	-	-	-				0.003	0.040	0.043			0.244	0.049	0.294
IV. Upper limbs (excluding the hands) (3)	0.003	-	0.003	0.379	-	0.379	0.066	-	0.066				-	-	-	-	-	-				-	-	-			0.449	-	0.449
V Hands	0.003	-	0.003	0.003	-	0.003	-	-	-				-	-	-	-	-	-				0.003	-	0.003			0.010	-	0.010
VI. Lower limbs (excluding feet) (4)	0.030	-	0.030	0.828	0.007	0.834	0.007	0.003	0.010				-	-	-	-	-	-				-	-	-			0.864	0.010	0.874
VII Feet	0.010	-	0.010	0.023	-	0.023	-	-	-				-	-	-	-	-	-				0.003	-	0.003			0.036	-	0.036
VIII. Multiple locations	-	-	-	0.020	0.007	0.026	-	-	-	-	0.007	0.007	-	-	-	-	-	-				-	0.026	0.026			0.020	0.040	0.059
IX. Not specified																-	-	-	0.003	0.030	0.033	-	0.003	0.003			0.003	0.033	0.036
TOTAL	0.056	-	0.056	1.543	0.053	1.596	0.073	0.003	0.076	0.030	0.020	0.049	0.003	-	0.003	0.003	-	0.003	0.003	0.030	0.033	0.010	0.076	0.086			1.722	0.181	1.903

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications.
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs".
(5) Calender days.

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(absolute figures)

Table 1a

COUNTRY COMMUNITY

COAL-FIELD

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 318 608 551

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	6545	2523	739	16	9823	2883	1044	320	15	4262	36	6	7	-	49	756	265	85	1	1107	10220	3838	1151	32	15241	-	-	-
II. TRANSPORT, TOTAL	465	388	201	6	1060	424	182	117	5	728	173	128	92	11	404	756	558	318	13	1645	1819	1255	728	35	3837	-	-	-
a) Continuous Transport	300	228	114	3	645	125	58	43	2	228	7	4	4	1	16	94	52	36	-	182	527	341	197	6	1071	-	-	-
b) Discontinuous Transport	165	160	87	3	415	299	124	74	3	500	166	124	86	10	386	662	506	282	13	1463	1292	914	529	29	2770	-	-	-
III FALLS AND MOVEMENT OF THE VICTIM, TOTAL	2861	1565	390	5	4821	2008	994	227	2	3231	351	230	81	3	665	2452	1455	378	5	4290	7672	4244	1076	15	13007	-	-	-
a) while moving about the mine	417	173	43	-	633	380	158	41	-	579	61	26	9	-	96	599	315	93	-	1007	1457	671	187	-	2315	-	-	-
b) in the course of other activities	2444	1392	347	5	4188	1628	836	186	2	2652	290	204	72	3	569	1853	1140	285	5	3283	6215	3573	889	15	10692	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	3168	1501	446	7	5122	1522	561	165	5	2253	97	43	9	-	149	1018	442	111	3	1574	5805	2547	731	15	9098	-	-	-
a) Machines	354	211	121	4	690	193	122	47	5	367	20	8	3	-	31	138	88	44	1	271	705	429	215	10	1359	-	-	-
b) Tools	1037	365	86	-	1488	716	196	57	-	969	61	26	5	-	92	511	202	42	-	755	2325	789	190	-	3304	-	-	-
c) Supports	1777	925	239	3	2944	613	243	61	-	917	16	9	1	-	26	369	152	25	2	548	2775	1329	326	5	4435	-	-	-
V FALLS OF OBJECTS	3263	1608	494	6	5371	1771	604	189	-	2564	265	118	40	-	423	1778	826	259	6	2869	7077	3156	982	12	11227	-	-	-
VI EXPLOSIVES	3	3	2	-	8	2	1	-	-	3	-	-	-	-	-	3	1	-	-	4	8	5	2	-	15	-	-	-
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	1	1	1	-	3	1	-	-	-	1	1	-	-	-	1	5	-	-	-	5	8	1	1	-	10	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-
b) De-oxygenation and Poisoning by natural Gases	1	1	1	-	3	1	-	-	-	1	-	-	-	-	-	5	-	-	-	5	7	1	1	-	9	-	-	-
IX. HEATINGS OR FIRES	-	1	-	-	1	-	1	1	-	2	-	-	-	-	-	4	-	-	-	4	4	2	1	-	7	-	-	-
X. INRUSHES	3	-	-	-	3	1	-	-	-	1	-	-	-	-	-	3	1	-	-	4	7	1	-	-	8	-	-	-
XI. ELECTRICITY	4	4	-	-	8	3	3	-	-	6	1	-	1	-	2	7	8	4	-	19	15	15	5	-	35	-	-	-
XII. OTHER CAUSES	506	128	39	-	673	337	72	18	-	427	54	31	10	-	95	453	159	51	1	664	1350	390	118	1	1859	-	-	-
TOTAL	16819	7722	2312	40	26893	8952	3462	1037	27	13478	978	556	240	14	1788	7235	3715	1206	29	12185	33993	15454	4795	110	54344	-	-	-

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme

(2) Accidents involving more than five casualties (i.e. who either died or were unable to resume work underground for at least eight weeks)

(3) Calendar days

MINES SAFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

DETAILED BREAKDOWN OF ACCIDENT VICTIMS ACCORDING TO CAUSE AND SITE OF ACCIDENT AND PERIOD OF INCAPACITY

(frequency rates)

Table 1b

COUNTRY COMMUNITY

COAL-FIELD

YEAR 1 9 7 5

MAN-HOURS WORKED (1) 318 608 551

SITE OF THE ACCIDENT	Production faces 1					Headings excluding shafts and staple-pits 2					Shafts and staple-pits 3					Other places 4					Total of accidents underground 5					Group accidents (2) 6		
CAUSES OF ACCIDENTS / Period of incapacity	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	4 to 20 days (3)	21 to 56 days (3)	> 56 days (3)	Fatal acci-dents	total	56 days (3)	Fatal acci-dents	total
I. FALLS OF GROUNDS AND ROCKS	20,54	7,92	2,32	0,05	30,83	9,05	3,28	1,00	0,05	13,38	0,11	0,02	0,02	-	0,15	2,37	0,83	0,27	0,003	3,47	32,08	12,05	3,61	0,100	47,84	-	-	-
II. TRANSPORT, TOTAL	1,46	1,22	0,63	0,02	3,33	1,33	0,57	0,37	0,02	0,29	0,54	0,40	0,29	0,035	1,27	2,37	1,75	1,00	0,04	5,16	5,71	3,94	2,28	0,110	12,04	-	-	-
a) Continuous Transport	0,94	0,72	0,36	0,009	2,02	0,39	0,18	0,14	0,006	0,72	0,02	0,013	0,13	0,003	0,05	0,30	0,16	0,11	-	0,57	1,65	1,07	0,62	0,019	3,36	-	-	-
b) Discontinuous Transport	0,52	0,50	0,27	0,009	1,30	0,94	0,39	0,23	0,009	1,57	0,52	0,39	0,27	0,03	1,21	2,08	1,59	0,89	0,04	4,59	4,06	2,87	1,66	0,091	8,69	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	8,98	4,91	1,22	0,016	15,13	6,30	3,12	0,71	0,006	10,14	1,10	0,72	0,25	0,009	2,09	7,70	4,57	1,19	0,016	13,46	24,08	13,32	3,38	0,047	40,82	-	-	-
a) while moving about the mine	1,31	0,54	0,13	-	1,99	1,19	0,50	0,13	-	1,82	0,19	0,08	0,028	-	0,30	1,88	0,99	0,29	-	3,16	4,57	2,11	0,59	-	7,27	-	-	-
b) in the course of other activities	7,67	4,37	1,09	0,016	13,14	5,11	2,62	0,58	0,006	8,32	0,91	0,64	0,23	0,009	1,79	5,82	3,58	0,90	0,016	10,30	19,51	11,21	2,79	0,047	33,55	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	9,94	4,71	1,40	0,02	16,08	4,78	1,76	0,52	0,016	7,07	0,30	0,14	0,028	-	0,47	3,20	1,39	0,35	0,009	4,94	18,22	7,99	2,29	0,047	28,56	-	-	-
a) Machines	1,11	0,66	0,38	0,01	2,17	0,61	0,38	0,15	0,016	1,15	0,06	0,03	0,009	-	0,10	0,43	0,28	0,14	0,003	0,85	2,21	1,35	0,67	0,031	4,27	-	-	-
b) Tools	3,25	1,15	0,27	-	4,67	2,25	0,62	0,18	-	3,04	0,19	0,08	0,016	-	0,29	1,60	0,63	0,13	-	2,37	7,30	2,48	0,60	-	10,37	-	-	-
c) Supports	5,58	2,90	0,75	0,009	9,24	1,92	0,76	0,19	-	2,88	0,05	0,03	0,003	-	0,08	1,16	0,48	0,08	0,006	1,72	8,71	4,17	1,02	0,016	13,92	-	-	-
V. FALLS OF OBJECTS	10,24	5,05	1,55	0,02	16,86	5,56	1,90	0,59	-	8,05	0,83	0,37	0,13	-	1,33	5,58	2,59	0,81	0,02	9,00	22,21	9,90	3,08	0,038	35,24	-	-	-
VI. EXPLOSIVES	0,009	0,009	0,006	-	0,025	0,006	0,003	-	-	0,009	-	-	-	-	-	0,009	0,003	-	-	0,013	0,025	0,015	0,006	-	0,047	-	-	-
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0,003	0,003	0,003	-	0,009	0,003	-	-	-	0,003	0,003	-	-	-	0,003	0,016	-	-	-	0,016	0,025	0,003	0,003	-	0,031	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	0,003	-	-	-	0,003	-	-	-	-	-	0,003	-	-	-	0,003	-	-	-
b) De-oxygenation and Poisoning by natural Gases	0,003	0,003	0,003	-	0,009	0,003	-	-	-	0,003	-	-	-	-	-	0,016	-	-	-	0,016	0,022	0,003	0,003	-	0,028	-	-	-
IX. HEATINGS OR FIRES	-	0,003	-	-	0,003	-	0,003	0,003	-	0,006	-	-	-	-	-	0,013	-	-	-	0,013	0,013	0,006	0,003	-	0,022	-	-	-
X. INRUSHES	0,009	-	-	-	0,009	0,003	-	-	-	0,003	-	-	-	-	-	0,009	0,003	-	-	0,013	0,022	0,003	-	-	0,025	-	-	-
XI. ELECTRICITY	0,012	0,012	-	-	0,025	0,009	0,009	-	-	0,02	0,003	-	0,003	-	0,006	0,02	0,024	0,012	-	0,06	0,047	0,047	0,016	-	0,110	-	-	-
XII. OTHER CAUSES	1,59	0,40	0,12	-	2,11	1,06	0,23	0,06	-	1,34	0,17	0,10	0,03	-	0,30	1,42	0,50	0,16	0,003	2,08	4,237	1,224	0,370	0,003	5,835	-	-	-
TOTAL	52,79	24,24	7,26	0,13	84,41	28,10	10,87	3,25	0,08	42,30	3,07	1,75	0,75	0,04	5,61	22,71	11.66	3,79	0,09	38,24	106,67	48,50	15,05	0,35	170.57	-	-	-

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miners' social insurance scheme

(2) Accidents involving more than five casualties (i.e who either died or were unable to resume work underground for at least eight weeks).

(3) Calendar days.

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2a

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(absolute figures)

COUNTRY COMMUNITY

COAL-FIELD

YEAR 1975

MAN-HOURS WORKED (1) 318 608 551

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4		
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY												
I. Head and neck	-	-	-	78	32	277	10	-	33	27	2	177
II Eyes	1	-	3							2	-	10
III Trunk	-	1	1	200	26	556	61	-	. 175	13	8	34
IV Upper limbs (excluding the hands) (3)	5	-	6	299	-	431	38	-	182			
V. Hands	125	-	238	902	-	3039	61	-	294			
VI Lower limbs (excluding feet) (4)	8	-	8	568	2	665	167	-	538			
VII Feet	13	-	19	457	-	1075	67	-	807			
VIII Multiple locations	-	2	2	29	14	53	19	-	65	1	4	7
IX Not specified												
TOTAL	152	3	277	2533	74	6096	423	-	2094	43	14	228

NATURE OF THE INJURY	Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																	
I. Head and neck	107	6	2817	-	-	25				1	-	13	3195	920	224	40	4379
II Eyes	62	-	783	3	-	68				2	-	25	1554	202	70	-	1826
III Trunk	115	4	1773	3	-	25				5	2	37	2707	1612	397	41	4757
IV Upper limbs (excluding the hands) (3)	161	-	2967	6	-	38				2	-	11	3585	1127	511	-	5223
V. Hands	509	1	7754	3	-	33				3	-	13	8096	5921	1603	1	15621
VI Lower limbs (excluding feet) (4)	374	-	3088	1	-	26				18	-	38	3478	2034	1136	2	6650
VII Feet	173	-	1972	1	-	10				2	-	10	2660	1778	713	-	5151
VIII Multiple locations	62	2	300	2	-	10				18	4	27	488	311	131	26	956
IX Not specified	2	-	2	-	-	-	1	-	4	7	-	7	51	27	10	-	88
TOTAL	1565	13	21456	19	-	235	1	-	4	58	6	181	25814	13932	4795	110	44651

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme
(2) including complications
(3) The shoulders and the wrists are included under , upper limbs'
(4) The hips and the ankles are included under Lower limbs'
(5) Calender days

MINES AFETY AND HEALTH COMMISSION

Common Statistics on victims of accidents underground in coal mines

Table 2b

DETAILED BREAKDOWN OF VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

COUNTRY COMMUNITY
COAL-FIELD

YEAR 1975
MAN-HOURS WORKED (1) 318 608 551

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twist and sprains 3			Concussion and internal injury 4			Open wounds contusion and muscular abrasions 5			Burns and harmful effects of electricity and radiation 6			Poisoning and suffocation 7			Multiple injuries of those not specified (2) 8			TOTAL 9				
PERIOD OF INCAPACITY	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	> 56 days (5)	Fatal accidents	total	4 to 20 days (5)	21 to 56 days (5)	> 56 days (5)	Fatal accidents	total
LOCATION OF THE INJURY																													
I. Head and neck	-	-	-	0,24	0,10	0,86	0,03	-	0,10	0,08	0,006	0,56	0,34	0,02	8,84	-	-	0,08				0,003	-	0,04	10,03	2,89	0,70	0,13	13,74
II Eyes	0,003	-	0,009							0,003	-	0,03	0,19	-	2,46	0,009	-	0,21				0,006	-	0,08	4,88	0,63	0,22	-	5,73
III Trunk	-	0,003	0,003	0,63	0,08	1,75	0,19	-	0,54	0,04	0,03	0,11	0,36	0,01	5,47	0,009	-	0,08				0,02	0,006	0,12	8,50	5,06	1,25	0,13	14,93
IV Upper limbs (excluding the hands) (3)	0,02	-	0,02	0,94	-	1,35	0,12	-	0,57				0,51	-	9,31	0,02	-	0,12				0,006	-	0,03	11,25	3,54	1,60	-	16,39
V Hands	0,39	-	0,74	2,83	-	9,52	0,19	-	0,92				1,60	0,003	24,33	0,009	-	0,10				0,009	-	0,04	25,41	18,58	5,03	0,003	49,03
VI. Lower limbs (excluding feet) (4)	0,003	-	0,003	1,78	0,006	2,07	0,52	-	1,69				1,17	-	9,61	0,003	-	0,08				0,06	-	0,12	10,92	6,38	3,57	0,006	20,87
VII. Feet	0,04	-	0,06	1,43	-	3,37	0,21	-	2,53				0,53	-	6,19	0,003	-	0,03				0,006	-	0,03	8,35	5,58	2,24	-	16,17
VIII. Multiple locations	-	0,006	0,006	0,09	0,04	0,17	0,06	-	0,20	0,003	0,01	0,02	0,19	-	0,94	0,006	-	0,03				0,06	0,01	0,08	1,53	0,98	0,41	0,08	3,00
IX. Not specified													0,006	-	0,006	-	-	-	0,003	-	0,01	0,02	-	0,02	0,16	0,08	0,03	-	0,28
TOTAL	0,48	0,009	0,86	6,07	0,23	19,07	1,33	-	6,56	0,13	0,04	0,72	4,91	0,04	67,21	0,06	-	0,74	0,003	-	0,01	0,19	0,02	0,57	81,02	43,73	15,05	0,35	140,14

(1) Number of hours worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications
(3) The shoulders and the wrists are included under „upper limbs"
(4) The hips and the ankles are included under „Lower limbs".
(5) Calender days.

ANNEX II

TERMS OF REFERENCE AND RULES OF PROCEDURE OF THE MINES SAFETY COMMISSION

(Decisions from the Council of Ministers of
9 July 1957, 11 March 1965 and 27 June 1974)

COUNCIL OF MINISTERS

DECISION

of 9 July 1957

concerning the terms of reference and rules of procedure of the Mines Safety Commission

Having taken note of the Recommendations adopted by the Conference on Safety in Coalmines and of the proposals submitted by the High Authority in connection with the Conference's final Report, which afford a working basis for the improvement of safety in coalmines, and

having regard to their Decisions at the Council's 36th and 42nd sessions on September 6, 1956 and on May 9 and 10, 1957, setting up the Mines Safety Commission,

THE REPRESENTATIVES OF THE GOVERNMENTS OF THE MEMBER STATES MEETING AT THE SPECIAL COUNCIL OF MINISTERS,

- hereby lay down that the terms of reference of the aforesaid Commission shall be as follows:

1. The Commission shall follow developments regarding safety in coalmines, including those regarding the safety regulations instituted by the public authorities, and assemble the necessary information concerning progress and practical results obtained, more especially in the matter of accident prevention.

   To secure the necessary information, the Commission shall apply to the Governments concerned.

   The Commission shall evaluate the information in its possession and submit to the Governments proposals for the improvement of safety in coalmines.

2. The Commission shall help the High Authority to work out a method of compiling intercomparable accident statistics.

3. The Commission shall ensure the prompt forwarding to the quarters directly concerned (including in particular mines inspectorates and employers' and workers' associations) of relevant information assembled by it.

4. The Commission shall ascertain, by regular contact with the Governments, what action is being taken to implement the proposals of the Conference on Safety in Coalmines, and such proposals as it may itself draw up.

5. The Commission shall propose such study and research as it deems most indicated for the improvement of safety, with notes as to the way in which these can best be effected.

6. The Commission shall facilitate the exchange of information and experience among persons responsible for safety matters, and propose appropriate measures for this purpose (e.g. organization of study sessions, establishment of documentation services).

7. The Commission shall propose appropriate measures for ensuring the necessary liaison among the rescue services of the Community countries.

8. The Commission shall submit annually to the Council of Ministers and the High Authority a Report on its activities and on developments regarding safety in coalmines in the different member States. In this connection, it shall in particular examine the statistics compiled on accidents and incidents in coalmines.

- The Representatives of the Governments further lay down that the rules of procedure of the Commission shall be those set forth in the Annex to the present Decision.
- The Representatives of the Governments trust that the High Authority will arrange for the Commission to start work at the earliest possible moment.

This Decision was adopted by the Council at its forty-fourth session, on July 9, 1957.

For the Council,

J. REY

President.

RULES OF PROCEDURE
of the Mines Safety Commission

CHAIRMAN

Article 1

The Chairman of the Mines Safety Commission shall be a Member of the High Authority of the European Coal and Steel Community.

Article 2

The Chairman shall conduct the work of the Commission in accordance with these Rules of Procedure.

MEMBERS

Article 3 (1)

The Commission shall consist of 36 members appointed by the Governments; each country shall have four members, of whom two shall be representatives of that country's Governments, one of the employers and one of the workers.

Each Government shall send in writing to the Chairman a nominal roll of the members appointed by it. It shall notify the Chairman of all changes in this.

Each Government may appoint for any particular meeting of the Commission one or two advisers, whose names it shall send to the Chairman.

I.L.O. PARTICIPATION

Article 4

Representatives of the International Labour Organization shall be invited to attend the proceedings of the Commission in a consultative capacity.

ORGANIZATION

(a) Restricted Committee

Article 5

A Restricted Committee shall be set up, to consist of Governments representatives on the Commission.

Article 6

The Chairman of the Commission shall act as Chairman of the Restricted Committee.

Article 7

The function of the Restricted Committee shall be to ensure permanent liaison among the Governments of the member States and between them and the Commission, more especially for the purpose of exchanging relevant information. The Restricted Committee shall see to the preparation of the Commission's activities.

Article 8 (1)

The Restricted Committee shall be convened by the Chairman.

The Chairman shall be required to convene it when asked to do so by the representatives of five or more Governments.

(b) Working Parties

Article 9

The Commission of the Restricted Committee may set up Working Parties of experts to consider specific technical matters.

Article 10

The Working Parties shall decide their own modus operandi.

Article 11

The Restricted Committee shall be given reports by the Working Parties on the results of their proceedings, which it shall submit to the Commission with the comments of its members.

In the event of differences of opinion within the Working Parties, the views expressed shall be given, together with the names of those expressing them.

SECRETARIAT

Article 12 (1)

The High Authority shall be responsible for the secretarial arrangements in connection with the work of the Commission, the Restricted Committee and the Working Parties.

These arrangements shall be under the charge of a High Authority staff member appointed to act as Secretary.

All documents shall be in the six official languages of the Community.

WORKING PROCEDURE

Article 13

The Chairman shall fix the agenda and the dates of meetings after consultation with the members of the Restricted Committee.

Article 14 (1)

The Chairman shall allow to speak any member of the Commission or representative of the International Labour Organization asking to do so.

The Chairman may allow advisers to speak.

Article 15

The members of the High Authority shall have the right to attend meetings of the Commission and of the Restricted Committee, and to speak there.

The Chairman may bring with him advisers, whom he may allow to speak.

Article 16

Where the Commission or the Restricted Committee deems it desirable to obtain information concerning the various aspects of safety in coalmines, it shall request this from the Governments of the member States.

Article 17 (1)

24 members shall constitute a quorum. Conclusions shall be adopted by majority of the members present.

Proposals by the Commission under 1,3 of its terms of reference shall, however, require a vote in favour by two-thirds of the members present, and by not less than nineteen members in all.

Any dissenting opinions shall be brought to the attention of the Governments should the members expressing them so request.

---

(1) Amended having regard to decision of the Council of the European Communities of 1 January 1973 (Official Journal of the European Communities L2 of 1 January 1973).

THE COUNCIL

DECISION *(1)*

of March 11, 1965

of the Representatives of the Governments of the Member States assembled in the Special Council of Ministers to modify the decision of July 9, 1957

concerning the terms of reference and rules of procedure of the Mines Safety Commission

THE REPRESENTATIVES OF THE GOVERNMENTS OF THE MEMBER STATES ASSEMBLED IN THE SPECIAL COUNCIL OF MINISTERS -

having regard to the decision of July 9, 1957 regarding the terms of reference and rules of procedure of the Mines Safety Commission, and

having regard to the High Authority's proposal of January 7, 1964, and

seeing that this decision in no way affects Article 118 of the Treaty setting up the European Economic Communununity,

DECIDE:

Article 1

The terms of reference of the Mines Safety Commission laid down by the decision of July 9, 1957 are replaced by the provisions in the annex.

Article 2

The provisions of Article 17 of the rules of procedure annexed to the Decision of July 9, 1957 are replaced by the following provisions:

"Should the Mines Safety Commission or the Restricted Committee consider it desirable to receive information regarding the various fields for which it is responsible, it shall apply to the Governments of the member States."

This decision was adopted by the Council at its one-hundredth session, on March 11, 1965.

For the Council

M. MAURICE-BOKANOWSKI

President

---

(1) See "Journal officiel de la Communauté européenne du charbon et de l'acier" no. 46 of 22nd March 1965.

ANNEX

TERMS OF REFERENCE FOR THE MINES SAFETY COMMISSION

1. The Commission shall follow developments regarding safety and measures to avoid at working-points conditions which represent a danger to health in coalmines, including to this end the safety regulations instituted by the public authorities and assemble the necessary information concerning progress and practical results obtained.

   To secure the necessary information, the Commission shall apply to the Governments concerned.

   The Commission shall evaluate the information in its possession and submit to the Governments proposals for the improvement of safety and health conditions in coalmines.

2. The Commission shall help the High Authority to work out a method of compiling intercomparable statistics on accidents and damage to health attributable to vocational activities in coalmines.

3. The Commission shall ensure the prompt forwarding to the quarters directly concerned (including in particular mines inspectorates and employers' and workers' associations) of relevant information assembled by it.

4. The Commission shall ascertain, by regular contact with the Governments, what action is being taken to implement the proposals of the Conference on Safety in Coalmines, and such proposals as it may itself draw up.

5. The Commission shall propose such study and research as it deems most indicated for the improvement of safety, and of healthy working conditions in coalmines, with notes as to the way in which these can be effected.

6. The Commission shall facilitate the exchange of information and experience among persons responsible for safety matters and the maintenance of healthy working conditions, and propose appropriate measures for this purpose (e.g. organization of study sessions, establishment of documentation services).

7. The Commission shall propose appropriate measures for ensuring the necessary liaison among the rescue services of the Community countries.

8. The Commission shall submit annually to the Council of Ministers and the High Autority a Report on its activities and on developments regarding safety and protection of health in coalmines in the different member States. In this connection, it shall in particular examine the statistics compiled in these fields.

COUNCIL DECISION

of 27 June 1974

on the extension of the responsibilities of the Mines Safety and Health Commission to all mineral-extracting industries

(74/326/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 145 thereof;

Having regard to the draft of the Commission;

Having regard to the Opinion of the European Parliament [1];

Having regard to the Opinion of the Economic and Social Committee;

Whereas the representatives of the Governments of the Member States meeting within the special Council of Ministers, by Decision of 9 and 10 May 1957, set up a Mines Safety and Health Commission whose terms of reference as laid down by Decision of 9 July 1957 [2] of the representatives of the Governments of the Member States meeting within the Special Council of Ministers, amended by Decision of 11 March 1965 [3] are to follow developments in safety and in the prevention of occupational risks to health in coal mines and to draw up proposals appropriate for the improvement of safety and health in coal mines;

Whereas this body has proved to be an effective and suitable instrument for safeguarding the health and safety of workers in coal mines;

Whereas problems of safety similar to those in coal mines also exist in other mineral-extracting industries;

Whereas the prevention of occupational accidents and diseases, as well as occupational hygiene, are among the objectives of the Treaty establishing the European Economic Community;

Whereas the Council resolution of 21 January 1974 [4] concerning a social action programme envisages an action programme for workers which aims *inter alia* at improvement in safety and health conditions at work;

Whereas the Safety and Health Commission should be assigned the task of extending to all mineral-extracting industries the preventive action which has hitherto been confined to coal mines;

Whereas the representatives of the Governments of the Member States meeting within the Council agreed to assign this task to the Safety and Health Commission,

HAS DECIDED AS FOLLOWS:

Article 1

1. Preventive action against risks of accident and occupational risks to the safety and health of workers in all mineral-extracting industries except simple excavation, excluding the protection of the health of workers against the dangers arising from ionizing radiations which is subject to special regulations pursuant to the Treaty establishing the European Atomic Energy Community shall be the responsibility of the Mines Safety and Health Commission within the terms of reference laid down by Decision of 11 March 1965 of the representatives of the Governments of the Member States meeting within the special Council of Ministers.

2. Mineral-extracting industries shall be taken to mean the activities of prospecting and of extraction in the strict sense of the word as well as of preparation of extracted materials for sale (crushing, screening, washing), but not the processing of such extracted materials.

3. Simple excavation shall be taken to mean work whose purpose is not the extraction of materials for use.

(1) OJ No C 40, 8. 4. 1974, p. 64.
(2) OJ No 28, 31. 8. 1957, p. 487/57.
(3) OJ No 46, 22. 3. 1965, p. 698/65.
(4) OJ No C 13, 12. 2. 1974, p. 1.

Article 2

1. This Decision shall enter into force on the fifth day following its publication in the *Official Journal of the European Communities.*

2. It shall apply :

— to the underground activities of the mineral-extracting industries : as from the day laid down in paragraph 1 ;

— to the other activities of the mineral-extracting industries : as from 1 January 1976.

Done at Luxembourg, 27 June 1974.

For the Council

The President

K. GSCHEIDLE

ANNEX III

TERMS OF REFERENCE OF THE VARIOUS WORKING PARTIES OF THE MINES SAFETY AND HEALTH COMMISSION

(as at 31.12.1975)

I - Working Party on Electrification - Chairman Mr Stassen

Terms of reference

1. Comparing adopted safety and accident prevention provisions relating to:
   (a) electric shock,
   (b) fire hazard,
   (c) explosion hazard.

2. Ascertaining the present position in Community countries with regard to safety regulations on underground electrical networks of low and medium voltage (up to 1 100 V) and feeder cables for movable equipment, with due regard to the specifications for the said cables.

3. Reporting on steps to be taken when work has to be carried out on electrical equipment under voltage.

4. Studying the construction of high-tension cables (of up to 6 000 V) used underground, and protective equipment.

5. Study of the problem of stray currents.

6. Periodic reports on oil-powered contactors used in gassy environments.

7. To follow the development of techniques designed to eliminate entirely the production of sparks on electrical contact lines (battery motors excluded).

8. Investigation of the use of remote-control circuits in automated mining operations.

9. The Mines Safety and Health Commission instructs the Working Party on Electricity:

   1(i) to take due note of the results of the work of the CENELEC Committee of Experts entrusted with harmonizing the rules covering the design of electrical equipment for use in explosive atmosphere;

   (ii) to examine the draft directive of the Commission of the European Communities dealing with the co-ordination in Member States of legislation on electrical equipment to be used in explosive atmosphere;

   2 to propose, if appropriate, modifications to the above documents to make them applicable to coal mines in countries of the European Community;

   3 to suggest the means by which harmonization of the certification procedures and reciprocal acceptance of the test methods and test certificates could be achieved;

   4 to compare the rules covering installation and use of underground electrical equipment now current in each to the Community countries, particularly in respect of the dangers of firedamp ignition; to ensure that the rules are uniform or to examine the equivalence of certain rules, so that such equipment can be used without modification in all the Community countries.

II - Working Party on Rescue Arrangements, Fires and Underground Combustion- Chairman Mr Coenders

A. General terms of reference

(Art. 7 of the Terms of Reference of the Mines Safety and Health Commission)

Exchange of experience between the Community countries and the United Kingdom on:

1. Rescue operations and action against spontaneous combustion, heatings and fires on the occasion of accidents or other events underground requiring the assistance of rescue teams, from which useful lessons have been learned:

2. Organization of rescue operations underground and the presentation of reports every two years;

3. The prevention of spontaneous combustion, heatings and fire outbreaks underground, the fighting and control of spontaneous combustion, heatings and fires, and reopening sealed-off workings.

B. Special terms of reference

1. Comparison of practical arrangements of rescue operations existing in the Community countries and the United Kingdom and possibly the drafting of a standard plan of procedure for the Community as a whole.

2. Exchange of experience and practical knowledge in the following fields:

(a) methods and apparatus for the early detection of combustion, heatings and pit fires,
(b) CO self-rescuers,
(c) Oxygen deficiency warning devices,
(d) Fires in long plant,
(e) Sealing off abandoned workings,
(f) Specifications and testing conditions for fire-resistant fluids for mechanical power transmission.

3. Condensed comparative survey of new regulations and guidelines promulgated by the mining authorities of member countries and the United Kingdom on rescue arrangements, first aid and fire fighting and prevention.

C. Analysis of results (partial or overall) of research projects at present in progress so as to:

1. Improve borehole rescue techniques,

2. Define the standards to which flameproof clothing should conform.

D. Studies to be completed by the Group of Experts on Budryk's theory on the following subjects:

1. Extent of instability of diagonal ventilation roadways,

2. Effects of a fire on workings with descensional ventilation,

3. Resources to be applied to combat the danger of explosion during firefighting.

III - Working Party on Winding Ropes and Shaft Guides: Chairman Mr Martens

Terms of reference

1. Follow-up of progress made in the testing of winding ropes by means of appropri-

ate instruments in order to obtain information concerning its application in the mines of the Community and the United Kingdom.

2. Testing of couplings for circular and flattened winding ropes.

3. Arrangements for the installation and inspection of capels.

4. Testing of guides for winding cages in drafts and guide mechanisms for cable haulage in roadways.

5. Maintenance required to ensure safe operation of winding ropes and balance ropes.

6. Use of studies on the dynamic behaviour of shaft and roadway ropes.

7. Exchange of views on the properties operating conditions and strength of winding ropes of particular interest.

8. Discussion on accidents involving winding and hauling ropes and their couplings, which could provide new information.

IV - Working Party on Mining Accident Statistics: Chairman Mr Koch

Terms of reference

In order to enable the Mines Safety and Health Commission to draw conclusions on accident prevention, the frequency of underground accidents in the Community coal mines should be examined, with the following objectives:

1. To decide on suitable mathematical statistical systems,

2. To evaluate, with their aid, chronological differences in frequency together with differences from country to country or coalfield to coalfield.

V - Working Party on Combustible Dusts: Chairman Mr Delacote

Terms of reference

Taking into account the mechanism of dust combustion and of flame propagation and the various factors which may influence this, including the fact that methane is frequently involved in this phenomenon, the working party is instructed to carry out a study of precautions against dust combustion, in particular:

(a) dust neutralization (dust control in situ, stone dusting, spraying, dust fixation by means of spreading salts and coagulating pastes, etc.), this study to include the comparative analysis of the regulations and instructions applied in the Community countries and the United Kingdom, along with the methods of application of the different processes,

(d) dust barriers of various types to halt dust explosions, mixed dust-methane explosions and pure methane explosions.

The working party may make any suggestions for research work considered necessary to advance the knowledge of the phenomena studied and to promote safety in these fields.

VI - Working Party on Health in Coal Mines: Chairman Mr Wilson

Studying, from the standpoint of technical prevention and industrial medicine, the prevention of environmental risks to the health of workers in coal mines.

1. General directives concerning airborne dust control methods where powered supports, underground crushers, coal cutting and getting and roadway drivage machinery is used.
2. Dust measurement (methods, frequency, measuring points, conclusions to be drawn etc.) and where necessary establishing a scale of comparison of the various methods employed.
3. Establishment of airborne dust thresholds. Definition of categories of permissible dustiness. Steps to be taken when faced with various categories of dustiness.
4. Medical problems:

   (a) Among the medical problems involved in the control of ambient health hazards to coal mine workers, priority must be given to the study of the following factors:
   climate, noise, vibration, lighting, gas, etc.

   (b) The Secretariat is to be instructed:
   (i) to set up a medical consultative committee,
   (ii) comparison of the provisions in force in the various countries concerning the organization of company medical services: selection and training of doctors, relations between medical services and technical departments and a list of the tasks and functions of industrial medicine,
   (iii) a draft scheme to standardize pre-recruitment medical examinations, periodic checks and checks in special instances,
   (iv) a draft scheme for a minimum degree of standardization in the detection of disorders and in the radiological supervision of workers as regards pneumoconiosis prevention,
   (v) a draft scheme for standards and criteria in workings in which miners already suffering from a deterioration in pulmonary function do not run the risk of this deterioration progressing further.

VII - Working Party on Effects of Working Time on Safety at Work, especially in Difficult or Unhealthy Conditions.

In suspension.

VIII- Working Party on Psychological and Sociological Factors affecting Safety: Chairman Mr Schnase

Terms of reference

1. Community safety campaigns.
2. Recommendation on the employment of foreign and young workers.
3. Practical measures for the prevention of accidents, taking into account psychological and sociological factors.

IX - Working Party on Ventilation and Mine Gas - Chairman Mr CARVER

A. General terms of reference

The Working Party on Ventilation and Mine Gas will examine general problems of ventilation, particularly where prevention of firedamp explosions is concerned and other means or measures should be applied in order to suppress or control firedamp.

In addition to the study of firedamp explosions occurring in the Community and the United Kingdom, attention will also be devoted to usable results of research in the field of firedamp outbursts, in particular where maximum permissible levels in ventilation air of firedamp and other poisonous gases are concerned, and the advance estimation of firedamp emission before a working is started.

Attention will also be devoted to appropriate speeds for the flow of ventilation air, measures to be taken in the event of deceleration of the flow of air, measures for the stabilzation of ventilation and the means and procedures for monitoring ventilation.

B. Special terms of reference

1. To study all the aspects of the accident which occurred at Lens Liévin which might be interesting and important for preventing firedamp explosion and in particular to propose measures which can be taken to control the emission of firedamp coming from old workings and from cul-de-sacs and districts being salvaged.

2. Preparation of a report or interim report on "Methane under conveyors".

3. Preparation of a report on "Ignitions of firedamp by power loaders and heading machines".

4. Preparation of a report on use of CH_4 monitoring instruments in the Community Countries.

5. Preparation of a report on "Heavy gas emissions".

6. Preparation of a report on "Effects of firedamp on the risk of explosion with coal dusts (in collaboration with the Working Party on "Flammable Dusts").

7. Drafting of uniform requirements and test specifications for CH_4 monitoring instruments.
(see point 5 of the agenda)

8. Preparation of a report on "Use of diesel engines underground in mines".

9. Drafting conclusions concerning 'Outbursts'.

X - Working Party on 'Mechanization' - Chairman Mr. Medaets

Taking into consideration current techniques in winning and roadway driving, linings and roadway conveyors, the working party is instructed to study particular ways of preventing accidents connected with mechanization.

In particular, it is to :

a) compile a schedule for machinery manufacturers of the minimum work safety requirements for mechanical protection of machines and equipment;

b) study safety provisions such as: visual and acoustic signalling, operating controls and in particular the ability to stop machines from any point on the face or roadway, taking account of modern means of telecommunication and remote control, electrical protection of motors in the event of overloading or jamming of equipment, lighting, etc.

XI - Working Party on 'Roof control' - Chairman Mr. Carver

The Working Party is instructed to examine, by exchanging experience and evaluating the results of research, whether it is possible to draw up measures or practical directives for the prevention of falls of ground, taking into account the individual features of coal measures and workings.

1. In particular: In the interest of better roof control, particularly within the tontext of working schedules, it will study :

   a) general measures to be taken into consideration in avoiding falls of ground, in the light of the type of measures and conditions of working, e.g. sequence of working the seams, features of the working areas (length, speed of advance, etc.), type and characteristics of the lining;

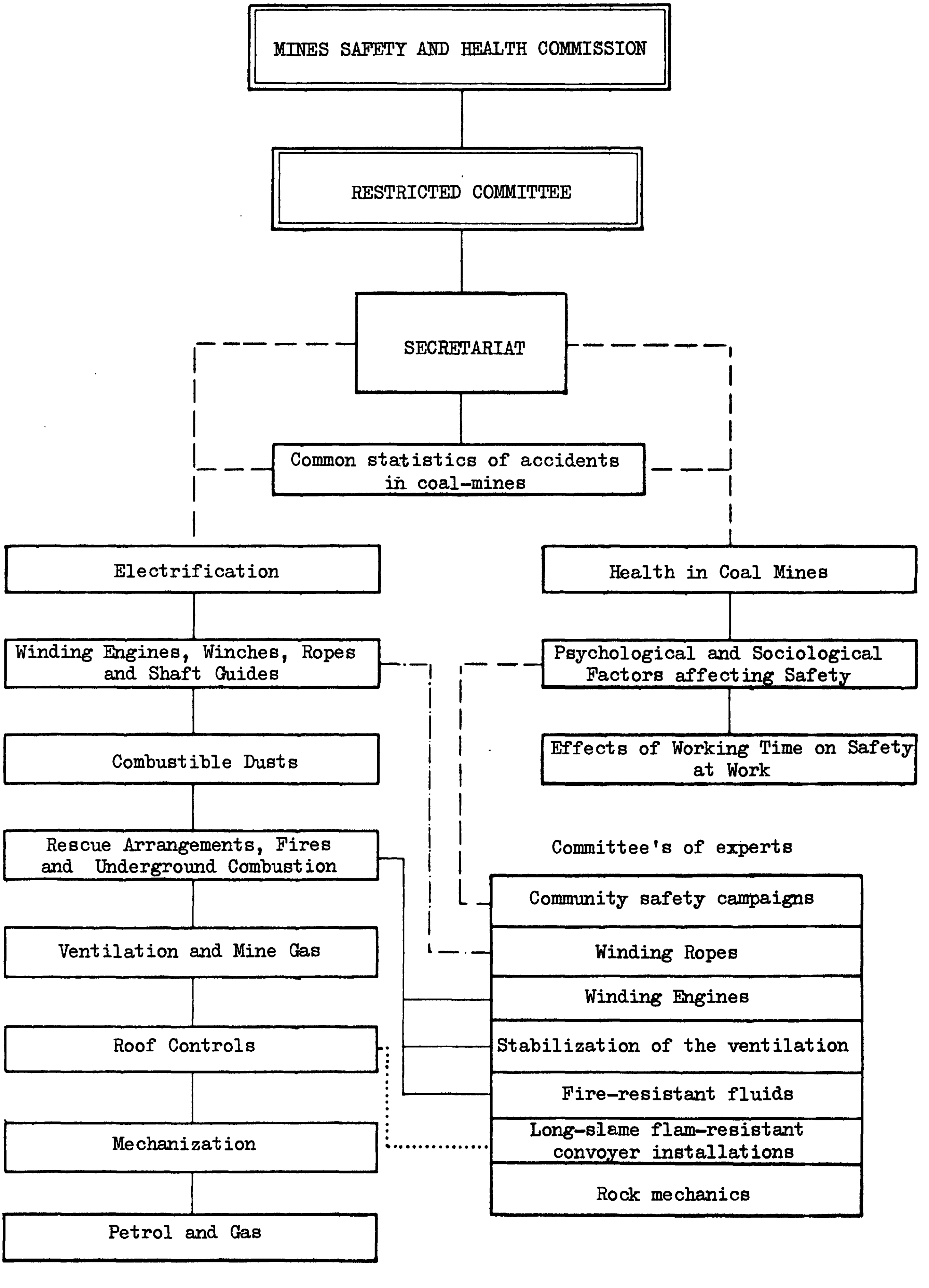
   b) specific measures to deal with individual difficulties which may or may not foreseeably arise in the long term, such as disturbance zones, protective banks, working of a face at right-angles to the end of an old seam, etc.

   c) specific measures to be taken when starting off a face in order to prevent abrupt subsidence of the roof.

2. It will also compare mining regulations on support and draw up minimum roof control requirements, taking into account the characteristics of the various faces (overall seam thickness, dip, dead rock.......).

ANNEX IV

COMPOSITION OF THE MINES SAFETY AND HEALTH COMMISSION AND ITS WORKING PARTIES


MINES SAFETY AND HEALTH COMMISSION
RESTRICTED COMMITTEE
SECRETARIAT
Common statistics of accidents in coal-mines
Electrification
Winding Engines, Winches, Ropes and Shaft Guides
Combustible Dusts
Rescue Arrangements, Fires and Underground Combustion
Ventilation and Mine Gas
Roof Controls
Mechanization
Petrol and Gas
Health in Coal Mines
Psychological and Sociological Factors affecting Safety
Effects of Working Time on Safety at Work
Committee's of experts
Community safety campaigns
Winding Ropes
Winding Engines
Stabilization of the ventilation
Fire-resistant fluids
Long-slame flam-resistant convoyer installations
Rock mechanics

A. MINES SAFETY AND HEALTH COMMISSION

FEDERAL REPUBLIC OF GERMANY

Government Representatives

Ministerialrat Dr. R. LINTZEN, Referat III A 1, Bunderministerium für Wirtschaft und Finanzen, 5300 Bonn

Dipl.-Ing. A. COENDERS, Präsident des Landesoberbergamts Nordrhein-Westfalen, 4600 Dortmund, Goebenstrasse, 25-27

Employers' Representative

Bergass. a.D.H. HARNISCH, Bergwerksdirektor Bergbau AG, Dortmund Postfach 872, 4600 Dortmund.

Workers' Representative

E. STEBEL, Leiter des Sachgebiets Arbeitsschutz, IG Bergbau und Energie, 4630 Bochum, Alte Hattingerstrasse,19

Technical Advisers

H. BERG, Ministerialrat, Ministerium für Wirtschaft, Mittelstand und Verkehr des Landes Nordrhein-Westfalen, 4 Düsseldorf, Haroldstrasse, 4

Berghauptmann K. HUEBNER, Leiter des Oberbergamts für das Saarland und das Land Rheinland-Pfalz, 6600 Saarbrücken, Am Staden, 17

BELGIUM

Government Representatives

J. MEDAETS, directeur-generaal der mijnen, Ministerie van Economische Zaken, Montoyerstraat 3,B 1040 Brussel

J. STASSEN, inspecteur général des mines, ministère des affaires économiques, rue Montoyer, 3, B 1040 Bruxelles

Employers' Representative

G. DEGUELDRE, Directeur de l'Institut d'Hygiène des Mines, 22, Hovermarkt, B 3500 Hasselt

Workers' Representative

S. CANTARELLI, F.G.T.B., rue Victor Rousseau 24, Apt. 16 - B 6520 FELUY

Technical Adviser

E. VANDENDRIESSCHE, secrétaire général de la Centrale des francs-mineurs, 26-32, avenue d'Auderghem, Bruxelles 4

FRANCE

Government Representatives

L. KOCH, ingénieur en chef des mines, Direction des mines, Ministère de l'industrie, du commerce et de l'artisanat, 99, rue de Crenelle, 75 Paris 7e

B. SCHNELL, ingénieur général des mines, Conseil général des mines, 35, rue St. Dominique, 75007 Paris

Employers' Representative

F. POT, directeur général des services techniques des Charbonnages de France, 9, avenue Percier, 75 Paris 8e

Workers' Representative

L. CHAUVEAU, fédération nationale des syndicats chrétiens des mineurs, 8, rue de Navarre, 75 Paris 5e

Technical Adviser

St. NOWAK, 4 rue Charcot, 62 Lens

ITALY

Government Representatives

Prof; Dott. Ing; A. GALATI, ministero dell'industria e commercio, Direzione generale delle miniere, Serv. sicurezza mineraria, via Veneto 33, 00100 Roma

P. SCIUTO, Ing. Direzione Generale Miniere, Officio Nazionale Minerario Idrocarburi, Via Molise 2, 00187 Roma

Employers' Representative

Prof. M. CARTA, Istituto arte mineraria della facoltà d'ingegneria, piazza d'Armi, Cagliari (Sardegna)

Workers' Representative

Dott. G. CRAVIOTTO, segretario generale della Federestrattive, via Isonzo 42, Roma

Technical Advisers

Comm. Dott; R. PURPURA, direttore generale del ministero del lavoro e riposo, via Aiaccio 14, 00198 Roma

Dott. C. MICHELAZZI, ispettore generale del ministero del lavoro e della previdenza sociale, via Flavia 6, Roma

LUXEMBOURG

Government Representative

A. SCHUSTER, ingénieur-directeur du travail et des mines, inspection du travail et des mines, 19, avenue Gaston-Diderich, Luxembourg

Employers' Representative

E. SCHMIT, ingénieur en chef, Administration Centrale, Arbed, B.P., 1802, Luxembourg

NETHERLANDS

Government Representatives

Ir. A.H.W. MARTENS, inspecteur-géneraal der mijnen, Staatstoezicht op de mijnen, Apollolaan, 9, Heerlen (L)

Ir. Th. M. JANSEN, Inspecteur der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen

Employers' Representative

Ir. G.B. DEBETS, directeur, Oranje-Nassau Mijnen, Heerlan (L)

Workers' Representative

J.M. WEIJERS, vice-vorzitter van de Nederlands Katholieke Mijnwerkersbond, Seringenstraat, 9, Passart-Zuid

UNITED KINGDOM

Government Representatives

J. CARVER, HM Chief Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

J.A. MARSHALL, Assistant Secretary, Health and Safety Executive, Thames House North, Millbank, London SWIP 4QL

Technical Adviser: L.D. RHYDDERCH, Deputy Chief Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

Employers' Representative

B. GODDARD, Director of mining environment, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

Workers' Representative

M. McGAHEY, Vice-President of the National Union of Mineworkers, 5, Hillside Crescent, Edinburgh, Scotland

Technical Adviser

A. BULMER, Head of Safety and Engineering Department, National Union of Mineworkers, 222 Euston Road, London NW1 2BX

IRELAND

Government Representatives

J. TONNER, Grade 1 Industrial Inspectors, Department of Labour, Ansley House, Mespil Road, Dublin 4

J. SINCLAIR, Grade 1 Industrial Inspectors, Department of Labour, Ansley House, Mespil Road, Dublin 4

Employers' Representative

R.J. ANDERSON, Administration Superintendent of Operations, Mogul of Ireland Ltd., Silvermines, Nenagh, Co. Tipperary

Workers' Representative

D. SHAW, National Group Secretary, Irish Transport and General Workers' Union, Liberty Hall, Dublin 1

DENMARK

Government Representative

B. SVENDSEN, Fabriksinspectør, Arbejdstilsunets Grønlands kreds, Direktoratet for Arbejdstilsynet, Rosenvaengets Allé 16-18, DK 2190, København Ø

DAN BUCH, Afdelingsingeniør, Ministeriet for Grønland, Hausergade, 3 DK 1128 København K

INTERNATIONAL LABOUR ORGANIZATION, Geneva

A representative of the International Labour Office sitting as an observer

B - RESTRICTED COMMITTEE

The Restricted Committee consits of the Government members of the Mines Safety and Health Commission

WORKING PARTIES

C - VENTILATION AND FIREDAMP

GERMANY

K. PALM, Abteilungsdirektor, Landesoberbergamt Nordrhein-Westfalen, 4600 Dortmund, GOEBENSTRASSE 25-27

Dipl.-Ing. H. BUSCHE, Bergwerksdirektor der Bergbau AG Niederrhein Bergwerksdirektion Friedrich Heinrich, 4132 Kamp-Lintfort, Postfach 88

Dipl.-Ing. E. SCHUBERT, Leiter der Prüfstelle für Grubenbewetterung der Westfälischen Berggewerkschaftskasse, 4630 Bochum, Hernerstrasse, 43-45

E. STEBEL, Hauptverwaltung der Industriegewerkschaft Bergbau und Energie, 4630 Bochum, Alte Hattingerstrasse 19

BELGIUM

H. GREGOIRE, Inspecteur Generaal der mijnen, Administratie van het Mijnwejen, 3 Montoyerstraat, B 1040 Brussel

J. PATIGNY, ingénieur divisionnaire, Havermarkt, 3500 HASSELT

M. COLINET, 33, rue de Monceau-Fontaine, 6031 Monceau-sur-Sambre

E. VANDENDRIESSCHE, 113, rue de Trazegnies, 6080 Courcelles

FRANCE

R. LELEUX, ingénieur divisionnaire des TPE (Mines), arrondissement minéralogique du Nord/Pas-de-Calais, 941 rue Ch.-Bourseul, 59508 DOUAI

BELIN, Cerchar, Verneuil-en-Halatte, BP 06, 60 - Creil

SIMODE, ingénieur en chef à la direction de l'économie et de l'information, Houillères du bassin de Lorraine, 5, rue Ambroise-Thomas, 57-Freyming

GRISARD, ingénieur principal, chef du service "sécurité des mines" Charbonnages de France, 9, avenue Percier, 75-Paris 8e

LARREUR, 54, rue Henri-Martin, 62-Liévin

ITALY

Dott. Ing. R. BONAZZA, Capo del distretto minerario, via Trieste 1, 58100 Grosseto

Prof. Dott. Ing. G. BULGARELLI, via Genova 22 - 35100 Padova

Prof. M. CARTA, istituti arte mineraria della facettà d'ingegneria, paizzi d'Armi, 09100 Cagliari (Sardegna - italia)

NETHERLANDS

Ir. Th. M. JANSEN, Inspecteur der mijnen, Staatstoezicht op de Mijnen, Apollolaan 9, Heerlen

Ir. J.W. ZURHAAR, Elisabeth-Straat 7, Linne-Roermond

UNITED KINGDOM

J. CARVER, (1) HM Chief Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

W. BROCKLEHURST, HM Senior District Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

R.A. SWIFT, Chief Ventilation Engineer, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

A. BULMER, Head of Safety and Engineering Department, National Union of Mineworkers, 222, Edson Road, London, NW1 2BX

---

(1) Chairman of the Working Party as representative of the Restricted Committee

D - WINDING ROPES AND SHAFT GUIDES, WINDING ENGINES AND WINCHES

GERMANY

Dr.-Ing. H. ARNOLD, Leiter des Seilprüfstelle der Westfälischen Berggewerkschaftskasse, 4630 Bochum, Dinnendahlstrasse,3

Dipl.-Ing. H. ROEHLINGER, Leiter des Seilprïfstelle der Saarbergwerke AG, 66 Saarbrücken, Trierer Strasse 1

Dipl.-Ing. R. HELFFERICH, Geschäftsführer der DEILMANN-HANIEL GmbH, 4600 Dortmund-Kurl, Haustenbecke 1

BELGIUM

G. MIGNION, ingénieur en Chef, directeur des mines, Administration des mines, 3, rue Montoyer, B 1040 Bruxelles

G. VAN GUCHT, Mijningenieur, Administratie van het Mijnwezen, afdeling Kempen, Thonissenlaan 18, B 3500 Hasselt

M. VERWILST, Association des industries de Belgique (AIB), 29, avenue A-Drouart, Auderghem

FRANCE

M.C. POIRIER, Ing. à la Direction Technique des Charbonnages de France, 9, avenue Percier, 75 - Paris 8e

C. ROGEZ, chef du poste central de secours des houillères du Nord et du Pas-de-Calais, rue Notre-Dame-de-Lorette, 62-Lens

M. SUEUR, Houillères du bassin de Lorraine, direction des travaux, service électromécanique, 57-Merlebach

ITALY

Prof. Dott. Ing. C. MORTARINO, Istituto di meccanica applicata del politecnico di Torino, corso Duca degli Abruzzi 24, Torino

NETHERLANDS

Ir. A.H.W. MARTENS (1), inspecteur-generaal der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

Ir. VAN BLARICUM, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

---

(1) Chairman of the Working Party as representative of the Restricted Committee

UNITED KINGDOM

G.E. WINDER, Head, Mechanical Engineering Section, Department of Energy, Safety in Mines Research Establishment, Red Hill, Off Broad Lane, Sheffield, 53 7 HQ

J. HOPKINSON, HM Senior Inspector of Mechanical Engineering, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

P. WOOD, Head of Shafts and Winding, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

EXPERTS ON WINDING ROPES

GERMANY

Dipl.-Ing. H. GRUPE, Seilprüfstelle der Westfälischen Berggewerkschaftskasse, 4630 Bochum, Dinnendahlstrasse 9

Dipl.-Ing. W. GOETZMANN, Seilprüfstelle des Westfälischen Berggewerkschaftskasse, 4630 Bochum, Dinnendahlstrasse 9

FRANCE

P. BURGUN, Directeur-adjoint principal de l'Association des industriels de France, 10, rue de Calais, 75 - Paris 9e

M. BOULICAULT, ingénieur des mines, arrondissement minéralogique de Metz, 1, rue Eugène Schneider, 5700 Metz

EXPERTS ON WINDING ENGINES

GERMANY

Dr. Ing. H. ARNOLD, Leiter der Seilprüfstelle der Westfälischen Berggewerkschaftskasse, 4630 Bochum, Dinnendahlstrasse 9

E.A. HAHN, Bergdirektor, Landesoberbergamt N.R.W., 4600 Dortmund, Goebenstrasse 25

FRANCE

C. ROGEZ, chef du poste central de secours des houillères du Nord et du Pas-de-Calais, rue Notre-Dame-de-Lorette, 62 Lens

M. SUEUR, Houillères du bassin de Lorraine, direction des travaux, service électromécanique, 57 Merlebach

UNITED KINGDOM

J. HOPKINSON, HM Senior Inpsector of Mechanical Engineering, Health and Safety Executive, Thames House North, Millbank; London SW1P 4QL

P. WOOD, Head of Shafts and Winding, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

BELGIUM

G. MIGNION, Ingénieur en chef, Directeur des mines, Administration des Mines, 3, rue Montoyer, B 1040 Bruxelles

NETHERLANDS

Ir. VAN BLARICUM, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

GERMANY

G. THIELEN, Bergdirektor, 6604 Guedingen (Saar), Wilhelmsklemm 18

U. GROTOWSKY, Dipl.-Ing., Bergwerksdirektor der Bergbau AG Gelsenkirchen, Bergwerksdirektion Hugo, 4650 Gelsenkirchen, Postfach 1727

H. RITTER, Dr.-Ing., Regierungsdirektor, Bundesministerium für Wirtschaft und Finanzen, 5300 Bonn-Duisdorf

BELGIUM

P.J. MAINIL, Ingénieur principal des mines , Ministère des affaires économiques, 3, rue Montoyer, 1040 Bruxelles

G. LECLERCQ, Directeur des travaux à la SA des Charbonnages de Roton- Farciennes et Oignies-Aiseau, rue Destréé 20, 6258 Lambusart

A. RENDERS, Voorzitter van de Centrale der Vrije Mijnwerkers van Belgie, Oudergemselaan 26-32, B 1040 Brussel

FRANCE

J.-F. RAFFOUX, Dr.-Ing., Laboratoire de mécanique des terrains du Cerchar, Ecole des mines, Parc du Saurupt, 54 Nancy

LARREUR, 54, rue Henri-Martin, 62 Liévin

M. POCHELSKI, Ingénieur T.P.E., (Mines), 35, rue Michelet, 62400 Bethune

ITALY

Prof. Dr. Ing. D. VITALI, capo del distretto minerario, via Ugo Bassi 7, 40121 Bologna

Prof. Dr. Ing. R. COTZA, istituto di arte mineraria dell'università 09100 Cagliari

M. TARABOCHIA, Federstrattive C.I.S.L., (Mineria di Niccioleta-G-R), via Isonzo, 42, 00918 Roma

LUXEMBOURG

A. SCHUSTER, ingénieur-directeur du travail et des mines, inspection du travail et des mines, 19, avenue Gaston-Diderich

H. BIEL, chef de service à l'Arbed, division des mines, Esch/Alzette

UNITED KINGDOM

J. CARVER, (1), HM Chief Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

Dr. P.D. BINNS, Chief Strata Control Engineer, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

A. BULMER, Head of Safety and Engineering Department, National Union of Mineworkers, 222, Euston Road, London NW1 2BX

J.S. MARSHALL, HM Principal Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

---

(1) Chairman of the Working Party as representative of the Restricted Committee

F. ELECTRICITY

GERMANY

Bergdirektor W. SCHOETTELNDREIER, Landeroberbergamt Nordrhein-Westfalen, 4600 Dortmund, Goebenstrasse 25-27

Dipl.-Ing. L GEBHARDT, Steinkohlenbergbauverein, 4300 Essen, Frillendorfer Strasse 351

Dr. J. UELPENICH, Land- und Seekabelwerke, 5000 Köln-Nippes, Niehler Strasse 100

Dipl.-Ing. F. KILLING, Berggewerkschaftliche Versuchsstrecke und Sprengsachverständigenstelle, 4600 Dortmund-Derne, Beylingstrasse 65

Dipl.-Ing. SCHRAMM, Bergbau A.G. Westfalen, Hauptabteilung T.2.4., 4702 Hessen Westfalen

BELGIUM

J. STASSEN (1), Inspecteur général des mines, Ministère des affaires économiques, rue Montoyer 3, B 1040 Bruxelles

L. RUY, Ingénieur en chef-directeur des mines, Ministère des affaires économiques, rue Montoyer 3, B 1040 Bruxelles

J. BRACKE, Hofdingénieur-directeur der mijnen, Institut des Industries Extractive (INIEX), 60, rue Grande, B 7260 Pâturages

J. LEYS, Ingénieur van de N.V. Kempense Steenkolenmijnen, Koolmijnlaan 48, B 3540 Zolder

A. GHISLAIN, Ingénieur, Ateliers de Constructions Electriques de Charleroi, avenue E. Rousseau, B 6001 Marcinelle

P. TAMO, Ingénieur principal, Ateliers de Constructions Electriques de Charleroi, avenue E. Rousseau, B 6001 Marcinelle

FRANCE

N. TRETIAKOW, ingénieur en Chef au Service Exploitation des Charbonnages de France, 9, avenue Percier, 75 Paris 8e

F. VIN, ingénieur, 3, rue J.J. Courtois, 60820 Boran-sur-Oise

A. MONOMAKHOFF, ingénieur, Chef du Groupe Agrément Sécurité, Centre de Recherches des Charbonnages de France, Creil

---

(1) Chairman of the Working Party as representative of the Restricted Committee

MONTAGNE, Président Directeur Général de la Société Alsacienne d'installation techniques, Boîte postale 24, 67000 Saverne

NETHERLANDS

Ir. E.A.R. HOEFNAGELS, inspecteur der mijnen, Staatstoezicht op de Mijnen, Apollolaan 9, Heerlen (L)

UNITED KINGDOM

S. LUXMORE, HM Principal Electrical Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

R. HARTILL, Chief Electrical Engineer, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

L. DAVISON, Senior Principal Scientific Officer, Safety in Mines Research Establishment, Red Hill, Sheffield S3 7HQ

G. HEATHERINGTON, Electrical Consultant, Victor Products (Wallsend) Ltd. Wallsend (Northumberland)

IRELAND

N. O'RIORDAN, Dip. I.E., C. Eng. Industrial Inspector, Gradde 11 - Dept. of Labour, Mespill Road, Dublin 4

OBSERVER OF THE CENELEC

C. PARMANTIER, Ingéieur, CENELEC, Boulevard de l'Emperuer, 5 B 1000 Bruxelles

G. PSYCHOLOGICAL AND SOCIOLOGICAL FACTORS AFFECTING SAFETY

GERMANY

Ministerialrat W. SCHNASE (1), Bunderministerium für Wirtschaft und Finanzen, Referat III A 1, 5300 Bonn

Ministerialrat H. BERG, Ministerium für Wirtschaft, Mittelstand und Verkehr des landes Nortshein-Westfalen, 4000 Düsseldorf, Haroldstr.4

Dr.-Ing. H. SCHRAER, Gesamtverband des deutschen Steinkohlenberbaus, 4300 Essen, Friedrichstrasse 1

F. NEUMANN, Bezisksleiter der IG Bergbau und Energie, 4630 Bochum, Kronprinzenstrasse 95

R. ROETTGER, Dipl. Ing., Ruhrkohle A.G., 43 Essen Postfach 5

BELGIUM

Y. PUT, ingénieur en chef-directeur des mines, administration des mines, 13, rue de Spa, B 4000 Liège

E. DE GROOT, e.a. Mijningenieur, Administratie van het Mijnwezen, Afdeling Kempen, Thonissenlaan 18, 3500 Hasselt

M. ROYER, Nieuwstraat, 100 - Genk

E. VANDENDRIESSCHE, secrétaire général de la Centrale des francs mineurs, 26-32, avenue d'Auderghem, Bruxelles 4

FRANCE

A. RAVIART, chef du service central de sécurité des Houillères du bassin du Nord et du Pas-de-Calais, 20 rue des minimes, 59 Douai

L. CHAUVEAU, Fédération nationale des syndicats chrétiens des mineurs, 8, rue de Navarre, 75 Paris 5e

ITALY

Dott. C. MICHELAZZI, ispettore generale del ministero del lavoro e della previdenza sociale, via Flavia 6, Roma

Avv. U. CUTTICA, dirigente della società nazionale Cogne, via S. Wuintino, Torino

Prof. N. DE PANPHILLIS, CISL, via I sonzo 42, Roma

---

(1) Chairman of the Working Party as representative of the Restricted Committee

LUXEMBOURG

A. SCHUSTER, ingénieur, directeur du travail et des mines, inspection du travail et des mines, 19, avenue Gaston-Diderich, Luxembourg

E. SCHMIT, ingénieur en chef, Administration Centrale, Arbed, B.P. 1802, Luxembourg

NETHERLANDS

Ir. Th. M. JANSEN, inspecteur der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

Ir. G.B. DEBETS, directeur Oranje-Nassau Mijnen, Heerlen (L)

C. CREMER, Nederlands Kath. Mijnwerkersbond, Schinkelstraat 13, Heerlen (L)

UNITED KINGDOM

J.L. COLLINSON, Chief Safety Engineer, National Coal Board, Hobart House, Grosvenor Place, London SW1X 7 AE

A. BULMER, Head of Safety and Engineering Department, National Union of Mineworkers, 222 Euston Road, London NW1 2 BX

EXPERTS ON SECURITY CAMPAIGNS

GERMANY

Ministerialrat W. SCHNASE, Bundesministerium für Wirtschaft und Finanzen, Referat III A 1, 5300 Bonn

Dr. Ing. FRITZE, Bergbau-Berufsgenossenschaft, 4630 Bochum, Marschnerstrasse 40

BELGIUM

M. COLINET, rue de Monceau-Fontaine 33, 6031 Lonceau-sur-Sambre

FRANCE

L. CHAUVEAU, Fédération Nationale des Syndicats Chrétiens des Mineurs, 8, rue de Navarre, 75005 Paris

ITALY

Dr. Ing. Ugo VIVIANI, Montecatini Edison S.p.A., Foro Buonaparte 31, 20121 Milano

NETHERLANDS

Ir. Th. M. JANSEN, Inspecteur der mijnen, Staatstoezicht op de Mijnen, Apollolaan 9, Heerlen (L)

I. MECHANIZATION

GERMANY

Dr.- Ing. F.K. BASSIER, Bergwerksdirektor, Bergbau AG Niederrhein, Bergwerksdirktion Walsum, 4132 Kamp-Lintfort, Postfach 88

Dr. K. BECKER, Seilprüfstelle der WBK, Dinnendahlstrasse 9, D 4630 Bochum

W. SCHOENWAELDER, Leitender Bergdirektor, Landesoberbergamt Nordrhein-Westfalen, 4600 Dortmund, Goebenstrasse 24

H. HARNISCH, Bergass. a.D., Bergwerksdirektor, BERGBAU AG Dortmund, 4600 Dortmund, Postfach 878

BELGIUM

J. MEDAETS (1), directeur géneraal der mijnen, Administratie van het mijnwezen, Ministerie van Ekonomische Zaken, 3, Montoyerstraat, 1040 Brussel

F. DECKERS, divisiedirecteur der mijnen, Thonissenlaan 18, 3500 Hasselt

M. MAUFORT, Steenweg op Beverlo 49, 3950 Beringen

S. CANTARELLI, FGTB, rue Victor Rousseau 24, Apt. 16 - B 6520 Feluy

FRANCE

ADAM, Charbonnages de France, 9 avenue Percier, 75 Paris 8e

L. TOURRAND, 20, rue Roger-Cadel, 57 Forbach

M.L. POIRIER, Ingénieur, Charbonnage de France, Direction des services techniques, 9, avenue Percier, 75008 Paris

M.P. GEIGER, Ingénieur directeur, Arrondissement Minéralogique de Metz, 1, rue Eugène Schneider, 5700 Metz

ITALY

Ing. G.B. NARBONE, Ministero dell'industria, del commercio e dell'artigianato, Direzione Generale delle Miniere, Servizio Sicurezza Mineraria, Via Veneto, 00100 Roma

Dr. Ing. COPPOLA, ENEL-direzione della produzione e trasmissione casella postale 386,00100 Roma

---

(1) Chairman of the Working Party as representative of the **Restricted Committee.**

NETHERLANDS

Ir. E.A.R. HOEFNAGELS, inpsecteur der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

UNITED KINGDOM

R.T. PURVIS, HM Principal Inspector of Mines and Quarries, Health and Safety Executive, Silver House, Silver Street, Doncaster, Yorkshire

W.J.W. BOURNE, Chief Mechanization Engineer, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

H.D. JONES, HM Senior Disrict Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

K. OIL AND GAS

GERMANY

M. BEISSNER, Leiter des Oberbergamtes, 3392 CLAUSTHAL- ZELLERFELD, Hindenburgplatz 9

UNITED KINGDOM

P.D. ATKINSON, Department of Energy, Petroleum Production Division, Thames House North, Millbank, London SW1P 4QL

ITALY

P. SCIUTO, Ingegnere, Direzione Generale Miniere, Uffizio Nazionale minerario idrocarburi, Via Molise 2, 00187 Roma

NETHERLANDS

J.W. De KORVER, J.W., Frisolaan 3, Den Haag

L. COMBUSTIBLE DUSTS

GERMANY

F. GROSS, Bergdirektor, Oberbergamt für das Saarland und das Lan Rheinland-Pfalz, 6600 Saarbrücken Am Staden 17

K. REINKE, Bergassessor a.D., Geschäftsführer der Versuchsgrubengesellschaft mbH, 46 Dortmund, Tremoniastrasse 13

E. PROCHNOW, Sachgebeit Arbeitsschutz, IG Bergbau und Energie, 4630 Bochum, Alte Hattingerstrasse 19

M. SCHNIER, Bergassessor a.D., 4618 Kamen-Heeren-Werve, Grafenwald 2

K. ROESGEN, Erster Bergrat a.D., Steinkohlenbergbauverein, Abteilung Grubensicherheit, 43 Essen-Kray, Frillendorfer Strasse 351

D. REEH, Assessor des Bergfachs, Berggewerkschaftliche Versuchsstrecke, 4600 Dortmund-Derne, Beylingstrasse 65

BELGIUM

P. GOFFART, ingénieur en chef-directeur des mines, Administration des mines, Ministère des affaires économiques, rue Montoyer 3, B 1040 Bruxelles

J. BRACKE, Hofdingenieur-directeur der mijnen, Institut national des industries extractives (INIEX), 60 rue Grande, 7260 Pâturages

J. MAYNE, directeur du Centre de coordination des moyens de sauvetage de Campine, 555, Kempische Steenweg, Kiewitt-Hasselt

FRANCE

G. DELACOTE (1), ingénieur des mines, ministère de l'industrie et de la recherche, conseil général des mines, 35 rue Saint-Dominique, 76 Paris 7e

L. KOCH, ingénieur en chef, chef du service des techniques minières, direction des mines, ministère de l'industrie, du commerce et de l'artisanat, 99, rue de Grenelle, 75 Paris 7e

M.M. GILTAIRE, ingénieur, Cerchar, Boîte postale 27, 60103 Creil

M. SCHWEITZER, Directeur du service technique des Charbonnages de France, 9 avenue Percier 75 Paris 8e

L. CHAUVEAU, Fédération nationale des syndicats chrétiens des mineurs, 8 rue de Navarre, 75 Paris 7e

---

(1) Chairman of the Working Party as representative of the Restricted Committee.

St. NOWAK, 4, rue Charcot, 62 Lens

NETHERLANDS

Ir. Th. M. JANSEN, inpsecteur der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

UNITED KINGDOM

J. BLUNT, General Manager of rescue stations, The Lodge, South Parade, Doncaster, Yorkshire

A.J.S. AINSWORTH, HM Senior District Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

Dr. W.L. MURRAY, Senior Principal Scientific Officer, Health and Safety Executive, Field Research Station, Harpur Hill, Buxton, Derbyshire SK17 9JN

M. HEALTH PROTECTION IN COALMINES

GERMANY

Ministerialrat W. SCHNASE, Referat III A 1, Bunderministerium für Wirtschaft und Finanzen, 5300 Bonn

Brubeninspektor A. AUGST, Assessor des Bergfachs, Bergwerksgesellschaft Walsum AG; 4103 Walsum, Dr.-Wilhelm-Roelen-Strasse 129

A. STEBEL, Leiter des Sachgebietes Arbeitsschutz, IG Bergbau und Energie, 4630 Bochum, Alte Hattingerstrasse 19

BELGIUM

J.B. CAZIER, ingénieur principal, administration des mines, Centre Albert, Place Albert Ier, 6000 Charleroi

G. DEGUELDRE, directeur de l'Institut d'hygiène des mines, Havermarkt 22, 3500 Hasselt

FRANCE

L. CHAUVEAU, Fédération nationale des syndicats chrétiens des mineurs, 8, rue de Navarre, 75 Paris 5e

B. SCHNELL, ingénieur général des mines, Conseil général des mines, 35, rue St. Dominique, 75007 Paris

B. GRISARD, ingénieur principal, chef du service "sécurité des mines" des Charbonnages de France, avenue Percier, 75 Paris 8e

ITALY

R. BONAZZA, ispettore generale del corpo delle miniere, via Trieste 1, Grosseto

F. BIAGIOLI, segretario Federestrattive, via Isonzo 42a, Roma

NETHERLANDS

Ir. Th. M. HANSEN, inspecteur der mijnen, Staatstoezicht op de mijnen; Apollolaan 9 Heerlen

UNITED KINGDOM

B. GODDARD, director of Mining Environment, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

L.D. RHYDDERCH, (1), HM Deputy Chief, Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank; London SW1P 4QL

(1) Chairman of the Working Party as representative of the Restricted Committee

N. RESCUE ARRANGEMENTS, MINE FIRES AND UNDERGROUND COMBUSTION

GERMANY

Dipl.-Ing. A. COENDERS, (1), Präsident des Landesoberbergamts Nordrhein-Westfalen, 4600 Dortmund, Goebenstrasse 25-27

Bergassessor a. D. K. REINKE, Geschäftsführer und Direktor der Versuchsgruvengesellschaft mbH Dortmund, 46 Dortmund, Tremoniastr. 13

Dipl.-Ing. A. SCHEWE, Technischer Leiter der Hauptstelle für das Grubenrettungswesen des Steinkohlenbergbauvereins, 4300 Essen-Kray Schönscheidtstrasse, 28

K. PALM, Abteilungsdirektor, Landesberbergampt Nordrhein-Westfalen 4600 Dortmund, Goebenstrasse 25-27

R. MUELLER, Dipl. Ing., Betriebsdirektor, Leiter der Hauptrettungsstelle in Friedrichsthal, 6605 Friedrichsthal

BELGIUM

J. STASSEN, inspecteur général des mines, ministère des affaires économiques, administration des mines, 3 rue Montoyer, 1040 Bruxelles

J. MAYNE, directeur du Centre de coordination de sauvetage du bassin de Campine, Kempische Steenweg, 555 Kiewitt-Hasselt

J. BRACKE, Hofdingenieur-directeur der mijnen, Institut des Industries Extractives (INIEX), 60 rue Grande, B 7260 Pâturages

FRANCE

R. GRISARD, ingénieur principal, chef du service "Sécurité des mines", Charbonnages de France, 9 avenue Percier, 75 Paris 8e

G. ROGEZ, directeur du poste central de secours des Houillères du Nord et du Pas-de-Calais, rue Notre-Dame de Lorette, 62300 Lens

J. CRETIN, ingénieur principal, poste central de secours, Belle-Roche, 57 Merlebach

H. BONARDOT, ingénieur en Chef, Houillères du bassin de al Loire, 9, rue Benoît-Charvet, 42007 Saint-Etienne

---

(1) Chairman of the Working Party as representative of the Restricted Committee

M. CHEVILLARD, chef du service sécurité générale des H.B.L; Poste central de secours, Belle Roche, 57802 Freyming-Merlebach

M.R. KOWALIK, Ingénieur T.P.E., Arrondissement Minéralogique de Metz, 1 rue Eugène Schneider, 57000 Metz

LUXEMBOURG

H. BIEL, ingénieur, chef de service, Arbed-Mines, Esch-sur-Alzette

ITALY

Dr. Ing; B. ANEDDA, ispettore generale, Via Stampa 26, Interno n° 8, 09100 Cagliari

Dott. Ing. E. ORRU, direttore della miniera di Seruci, casella postale 117, 09013 Carbonia, Cagliari

PROF. Ing. P. PIGA, titolare della cattedra di arte mineraria della facoktà di ingegneria di Roma, via Eusossiana, 00100 Roma

NETHERLANDS

Ir. Th. M. JANSEN, inspecteur der mijnen, Staatstoezicht op de mijnen, Apollolaan, 9 Heerlen, (L)

UNITED KINGDOM

R.T. PURVIS, HM Principal Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

J. BLUNT, general manager of rescue stations, National Coal Board, South Parade, Doncaster, Yorkshire

L. MURRAY, Senior Principal Scientific Officer, Safety in Mines Research Establishment, Field Research Station, Harpur Hill, Buxton, Derbyshire SK17 9JN

Dr. E.A.C. CHAMBERLAIN, Scientific Control Director, National Coal Board, Coal House, Lyon Road, Harrow, Middlesex, HA1 2 EX

Dr. A.G. JOHNSTON, HM Inspector of Mines and Quarries, Health and Safety Executive, Silver House, Silver Street, Doncaster, Yorkshire

EXPERTS ON FIRE-RESISTANT FLUIDS

GERMANY

Dipl.-Ing. A. SCHEWE, Bergbau-Forschung GmbH, Hauptstelle für das Brubenrettungswesen, 4300 Essen-Kray, Schönscheidtstrasse 28

Dr. rer.nat. H.W. THOENES, Direktor, Technischer Ueberwachungs-verein e.V., 4300 Essen, Steubenstrasse 43

Prof. Dr. med. MALORNY, Direktor des Pharmakologischen Instituts der Universität Hamburg, 2 Hamburg, Martinistrasse 52

Prof. Dr. med. C.A. PRIMAVESI, Hygiene-Institut des Ruhrgebiets, 4650 Gelsenkirchen, Rotthauserstrasse 19

Prof. Dr. med. BENTHE, Pharmakologisches Institut des Universität Hamburg, 2000 Hamburg, Martinistrasse 52

BELGIUM

Ch. FRENAY, Directeur divisionnaire des mines, administration des mines, division du Hainaut, Centre Albert, Place Albert Ier, Charleroi

J.BRACKE, Hofdingenieur-directeur der mijnen, Institut National des Industries Extractives (INIEX), 60 rue Grande, B 7260 Pâturages

Dr. J. CRISPOUX, 2, rue Potresse, 7200 Wasmes

FRANCE

G. BLANPAIN, ingénieur, Centre d'études et de recherches des Charbonnages de France, Verneuil-en-Halatte,BP 27, 60 Creil

R. PLOUCHARD, ingénieur, chef du laboratoire lubrifiant, 59, Sin-le-Noble

Dr. AMOUDRU, médecin-chef des Charbonnages de France 9, avenue Percier, 75 Paris 8e

M. GANIER, Ingénieur, centre d'études et de recherched des Charbonagges de France, Verneuil-en-Halatte, BP 27, 60 Creil

NETHERLANDS

Ir. VAN BLARICUM, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L)

UNITED KINGDOM

I.A. HOWIESON, HM Deputy Principal Inspector of Mechanical Engineering in Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London SW1P 4QL

D.G. WILDE, Principal Scientific Officer, Safety in Mines Research Establishment, Field Research Station, Harpur Hill, Buxton, Derbyshire; SK179JN

J.B. HALL, Deputy Chief Mechanical Engineer, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

Dr; J.S. McLINTOCK, Chief Medical Officer, National Coal Board, Hobart House, London, SW1

Dr. M. SHARRATT, Senior Medical Officer, Department of Health and Social Security, Alexander Fleming House, Elephant and Castle, London, SE1 6BY

EXPERTS ON STABILIZATION OF VENTILATION

GERMANY

Dipl.-Ing. W. BOTH, Hauptstelle für das Grubenrettungswesen des Steinkohlenbergbauvereins, 4300 Essen-Kray, Schönscheidtstrasse 28

Dipl.-Ing. E. SCHUBERT, Leiter der Prüfstelle für Grubenbewetterung der Westfälischen Berggewerkschaftskasse, 4630 Bochum, Alte Hattingerstrasse 19

BELGIUM

R. STENUIT, 66, avenue de la Libération, 6640 Rhodes St. Genèse

E. JACQUES, départment de thermodynamique, Place du Levant 2, Louvain la Neuve

FRANCE

J. CRETIN, ingénieur principal, poste central de secours, Belle-Roche, 57 Merlebach

E. SIMODE, ingénieur en chef, Houilères du bassin de Lorraine, direction de l'Economie et de l'Information, 57 Freyming-Merlebach

UNITED KINGDOM

P. THORP, National Coal Board, Hobart House, Grosvenor Place, London, SW1X 7AE

H. DAVEY, HM District Inspector of Mines and Quarries, Health and Safety Executive, Meldrum House, 15 Drumsheugh Gardens, Edinburgh EH3 7 QG

Dr. A.F. ROBERTS, Health and Safety Executive, Safety in Mines Research Establishment, Red Hill, Sheffield S3 7HQ

EXPERTS ON LONG-DISTANCE FLAME-RESISTANT CONVEYOR INSTALLATIONS

GERMANY

K. PALM, Abteilungsdirektor, Landesoberbergamt Nordrhein-Westfalen, 4600 Dortmund, Giebenstrasse 25-27

W. BOTH, Dipl.-Ing. Hauptstelle für Grubenrettungswesen des Steinkohmenbergbauvereins, 4300 Essen-Kray, Schönscheidtstrasse 28

K. GRUMBRECHT, Dipl.-Ing. Versuchsgrubengesellschaft, 4600 Dortlund, Tremoniastrasse 13

H. KOEHNE, Ing., Bergbau-Forschung, 4300 Essen-Kray, Frillendorfer Strasse 351

BELGIUM

J. MAYNE, directeur du Centre de coordination de sauvetage du bassin de Campine, Kempische Steenweg 555, Hasselt

J. BRACKE, Hofdingenieur-directeur der mijnen, Institut national des industries extractives, rue Grande 60, B 7260 Pâturages

FRANCE

M. TCHOULAKIAN, chef du service Matériel et approvisionnements, Charbonnages de France, 9 avenue Percier, 75 Paris 8e

N. GOUTIER, 5, avenue H. Martin, 62800 Liévin

LUXEMBOURG

H. BIEL, Ing. chef de service Arbed-Mines, Esch-sur-Alzette

UNITED KINGDOM

D.G. WILDE, Principal Scientific Officer, Safety in Mines Research Establishùent, Field Research Station, Harpur Hill, Buxton, Derbyshire, SK17 9JN

F.N. SANDERS, Mining Research and Development Establishment, National Coal Board, Ashby Road, Stanhope Bretby, Burton-on-Trent, Staffordshire

O. COMMON STATISTICS OF ACCIDENTS IN COALMINES

GERMANY

K. PALM, Abteilungsdirektor, Landesoberbergamt Nortrhein-Westfalen, 4600 Dortmund, Goebenstrasse 25-27

K. ROESGEN, Erster Bergrat a.D., Steinkkhlenbergbauverein, 43 Essen, Frillendorfer Strasse 351

BELGIUM

J. DE BACKER, ingénieur principal des mines, Administration des mines, 3, rue Montoyer, 1040 Bruxelles

FRANCE

L. KOCH (1), ingénieur en chef, service de l'hygiène et de la sécurité minière, direction des mines, ministère de l'industrie, du commerce et de l'artisanat, 99 rue de Grenelle, 75 Paris 7e

R. RIVIERE, chef de la division des statistiques, bureau de documentation minière, 4, rue Las-Cases, 75 Paris 7e

R. GRISARD, ingénieur principal, chef du service "sécurité des mines", Charbonnages de France, 9 avenue Percier, 75 Paris 8e

M. LANDIER, ingénieur principal aux Charbonnages de France, 9 avenue Percier, 75 Paris 8e

ITALY

Dott. Ing. M. PERSOD, Ingegnere Capo delle Miniere, distretto minerario di I glesias, via Gramsci, 09016 Iglesias (Cagliari)

Ing. G.B. NARBONE, Ministero dell'Industria, del Commercio e dell 'Artigianato, Serv. Sicurezza M ineraria, via Veneto 33, 00100 Roma

---

(1) Chairman of the Working Party as representative of the Restricted Committee

NETHERLANDS

J. VAN LOO, NV Nederlandse Staatsmijnen, Postbus 65 Heerlen (L)

Ir. Th. M. JANSEN, inspecteur der mijnen, Staatstoezicht op de Mijnen, Apollolaan 9, Heerlen (L)

UNITED KINGDOM

J.S. MARSHALL, HM Principal Inspector of Mines and Quarries, Health and Safety Executive, Thames House North, Millbank, London, SW1P 4QL

ANNEX V

IMPLEMENTATION OF RECOMMENDATIONS OF THE MINES SAFETY AND HEALTH COMMISSION AS AT 1.1.1976

The recommendations, assessments, principles and reports prepared by the Mines Safety and Health Commission since the beginning of its activities and distributed to the Governments and other interested bodies for further action or for information, are published every other year in its annual report.

They have been classified chronologically by subject.

The situation with regard to implementation of the above-mentioned recommendations and proposals is indicated, with explanatory notes, in the following tables.

The following symbols are used in the tables:

C : national regulations which are already in accordance with the recommendations

C' : recommendations which have not been embodied in regulations, but which have been implemented de facto

NRC : recommendations for which new regulations implementing them have been issued

NRP : recommendations for which new regulations implementing them are being drawn up

E : the preparation of new regulations is being studied

? : there is uncertainty regarding the steps to be taken

A : the national authorities have decided not to bring their regulations into line with the recommendations.

A - RESCUE

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
I - Recommendation regarding the consulting of foreign experts in the case of rescue operations connected with major mining accidents In certain serious mining accidents advice requested by the leaders of the rescue operation from qualified foreign experts in mine-rescue matters. The heads of Mine Rescue Stations are provided for this purpose with a plan containing the most important addresses and information needed.	C' 1)	C' 1)	C' 1)	C' 1)	C'	C'
This plan should be constantly kept up-tp-date.	C' 1)	C' 1)	C' 1)	C'	C'	?

1) The main First-Aid Stations are in touch with the main Rescue Stations in the Community countries.

B - FIRES AND UNDERGROUND COMBUSTION

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
I - Recommendations regarding equipment for shafts in connection with the prevention of fires (First Report of the Safety Commission, p. 11 (German text)						
1. Steps to prevent any accumulation of grease and coaldust (First Report of the Mines Safety Commission, p. 15 (German text) and Report of the Conference, p. 54, No. 2, para. C.)						
- Skip-winding installations should as far as possible be sited only in upcast shafts;	C'	A 1)	A	A	C'	A
- Equipment in new shafts should be of aerodynamic form;	C'	C'	E	E	C	A
- all suitable steps should be taken to avoid in every case any accumulation of dust to ensure that any such accumulation is removed	C	C	C	C	C	E
2. Preferred siting of methane-drainage lines in upcast shafts (First Report of the Mines Safety Commission, p. 16 (German text) and Report of the Conference, p. 54, No. 3, Par. d)						
- This recommendation of the Conference applies particularly to pressure lines	C	C	C	E	- 2)	C
3. Siting electric cables, compressed-air mains and gas-drainage pipes (First Report of the Mines Safety Commission, p. 16 (German text) and Report of the Conference, p. 54, No. 3, par. e)						
- electric cables and leads, compressed-air drains and gas-drainage pipes should not be sited in the haulage compartment :	C	C	C	E	C'	- 3)
- electric cables should not all be sited in the same shaft	C	C	C	E	C'	C'
II - Guiding principles for fighting mine fires by sending down water (Second Report of the Mines Safety Commission, p. 26) supplemented 5.2.1973 (10th Report of the MSCH, annex VI)						
1. Installation						
a) At the top of every shaft reaching to the surface there must be a device which can send down at least 50 litres of water per minute and per square metre of shaft cross-section	C	C	C'	E	E	A 4)
b) This device must be installed in such a way that the supply of water can at no time be seriously affected by drawing-off or flowing-away of water at other points	C	C	C'	E	E	A 4)
c) The water pipes and the spray jets must be set in such a way that they are protected from frost	C	C	C'	E	E	A 4)
d) The damming device or devices must be set outside the shaft-top building in such a way that they can be operated at any time. They must be marked by means of an instruction plate.	C	C	C'	E	E	A 4)

1) All skip-winding equipment still in use is installed in downcast shafts;
2) No methane-drainage lines in service;
3) Recommendation does not apply; there is no multiple compartment shaft;
4) There are doubts as to the practicability of the recommendation; minimum water quantities are laid down

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
e) At each filling station of every main shaft a fire point should be provided such as spraying ramps, hoses, or equivalent apparatus	C	C	C	E	C	A
f) This apparatus should be operated either from the filling station or the shaft outlet	C	C	yes	E	E	A
g) A device should be installed at each level to restrict the air flow in the galleries coming from the air intake shaft, if it should be necessary, when the air flow is reversed accidentally or on purpose	A 1)	C	E	E	E	A
(This device should not necessarily be installed close to the shaft; the most important point is that it should be up-wind of the first bifurcation from the filling station. Nevertheless, since each mine is different, the effects of using this device should be evaluated beforehand by the use of a simulator or some equivalent method). 2. Fires in down-cast shafts a) Immediate measures - it is essential to indicate in the fire-fighting plan the maximum amount of water which can be sent down each of the downcast shafts, without creating additional dangers for the workers by its effects on the ventilation.	A 2)	A 3)	A	E	E	A 2)
- the damming device which can be operated at this stage must not release more than this prescribed quantity of water.	A 4)	A 3)	A	E	E	A 2)
- until the leader of the rescue operations has issued his instructions and as long as there has been no reversal of ventilation, water may be sent down only by opening the damming device prescribed for this purpose.	A 4)	A 3)	A	E	E	A 2)
b) Measures to be taken on the instructions of the leader of rescue operations - the leader of the rescue operations must therefore decide - taking into account all the circumstances - either to send down an increased quantity of water - or must he give orders that reversal of the ventilation be brought about or encouraged.	A 3)	A 3)	A 3)	E	E	A 5)
- to facilitate the reversal of the ventilation in the burning downcast shaft, once this has been opened and the main fan stopped, water can be sent down the upcast shaft.	C	C'	C'	E	E	A 5)
- if reversal of the ventilation has already occurred - either as a result of the upward current produced by the heat of the fire or deliberately - downcast shafts should be treated as though they were upcast shafts.	C	C'	C'	E	E	A 5)

1) Fireproof doors to restrict the airflow are required in all mines in the intakes close to the shaft.
2) There are doubts as to the practicability of the Recommendation; minimum water quantities are laid down.
3) Not suitable for inclusion in regulations.
4) There are doubts as to the practicability of the Recommendation.
5) Not suitable for inclusion in regulations; must be decided separately in each case.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
- if the calculated water quantiy appears to be too small to extinguish the fire immediately, or to hinder its spread, additional precautions must be worked out and laid down in the fire-fighting plan:						
- simultaneous supply of water down all downcast shafts,	A 1)	A 1)	A 1)	E	E	A 2)
- partial shutting-off of the burning shaft at surface level,	A 2)	A 2)	A 2)	E	E	A 2)
- shut underground fire-doors, etc..	A 2)	C	A 2)	E	E	A 2)
3. <u>Fires in upcast shafts</u>						
- in upcast shafts, water may be sent down only on the instructions of the leader of the rescue operation	C	C	E	E	E	A 2)
- as long as there are still any workers in the pit, only so much water may be sent down as will alow the fumes of the fire to continue to be extracted whilst the water is falling	C	C	E	E	E	A 2)
<u>Note.</u> A commentary and examples (with diagrams), regarding the calculation of the effect of falling water on the ventilation are given in the Second Report of the Mines Safety Commission pp. 29-50						
III - <u>Recommendations for the sealing-off by dams of mine fires and underground combustion (Second Report of the Mines Safety Commission, p. 53)</u>						
<u>Introductory remark</u>						
The following Recommendations are not binding. They are not intended to give Inspectorates "ready-made" regulations; on the contrary, it remains for the competent authorities to decide how these Recommendations are to be applied as regulations, circulars or service instructions.						
These Recommendations refer only to the actual fighting of the fire or combustion; they do not refer to the measures to be taken as a matter of priority to rescue men following the outbreak.						
A - When a mine fire has broken out or underground combustion developed, it is indispensable to take the necessary preparatory steps for any later sealing-off by dams which may be necessary while the direct firefighting operations are still going on	C	C	C'	C'	C'	C'
- In the event of sealing-off by dam becoming necessary, as a general rule the first stoppings to be erected must be advance dams.	C	C	C'	C'	C'	?
These advance dams are in fact the real subject of the present Recommendations.						
B - <u>Structure and erection of the advance dams</u>						
1. <u>If there is no risk of explosion</u> 3) :						
a) to make the advance dams themselves as air-tight as possible and to create the closest possible seal between the dam and the surrounding walls;	C	C	C'	C'	C'	C'
b) there is nothing against shutting off first of all the intake air.	C	C	C'	C'	E	C'

1) Not suitable for inclusion in regulations.
2) There are doubts as to the practicability of the Recommendation.
3) For the assessment of the risk, see chapter A - II a), p. 52

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
2. If there is a risk of explosion:						
a) to have at all times the most precise information possible regarding the degree of explosion risks in the fire zone;	C	C	C'	C'	E	C'
it may be necessary to provide the men constructing the advance dams with fireproof clothing;	C	C	E	C'	C'	A 1)
b) to ensure that the advance dams are as air-tight as possible; to ensure that they are strong enough to resist an explosion:	C	C	C'	C'	C'	C'
c) to ensure that for the entire period during which the stopping is being erected, there is sufficient ventilation of the fire zone to counter as far as absolutely possible the formation of an explosive gas mixture;	C	C	C'	C'	C'	C'
d) to ensure that all suitable measures are taken to reduce as far as possible the effects of any explosion which may occur; (dust barriers, stone-dusting or water through barriers);	C	C	C'	C'	C'	C'
e) to the greatest possible extent, the dams on the intake and return sides should be sealed simultaneously;	C	C	C'	C'	C'	C'
only the number of workers and members of the staff strictly necessary for this work should stay behind;	C	C	C'	C'	C'	C'
as soon as the dams have been sealed, the danger area must be completely evacuated.	C	C	C'	C'	C'	C'
C - The final dams must be durable, built of brick or concrete under the protection offered by the advance dams.	C	C	C'	C'	C'	A
Note: Additional details to the foregoing Recommendations are given in a Commentary (Second Report of the Mines Safety Commission, pp. 53/58) IV - General guidelines for the opening-up of sealed-off fire areas (Doc 1304/3/64) 1. GENERAL				2)		
Special reasons for opening-up a district sealed-off after a fire: - recovery of bodies - salvage of material - recovery of roadways and workings - reduction of the sealed-off area - inspection of the district, and, if necessary, - direct fire-fighting						

1) Not necessary.
2) The opening-up of fire areas is carried out on the responsibility of the manager, who prepares a reopening plan - taking into account the scale and type of fire and the ventilation situation in the fire area - in collaboration with the Main Rescue Station. The action plans of the Main Rescue Stations very largely embody the guidelines laid down in Doc. 1304/3/64.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
The following hazards can arise from reopening a sealed-off district: - release of CO, foul air and hot damp air, - explosion of firedamp or fire gas, where the fire is not yet extinguished, - recrudescence of the fire, which need not necessarily occur immediately, but even after some time has elapsed. Recrudescense of the fire can occur only when fresh air reaches the seat of the fire, so that with all operations involved in reopening a fire area it is of prime importance to inspect the individual air currents constantly.	C	C	C	C'	C'	C'
All places suspected of having been seats of fire or heatings must be ascertained with the utmost speed.	C'	C'	C'	C'	C'	C'
2. BASIC RULES						
2.1 Sealed-off districts may be reopened only after the competent authorities have been notified or have given their permission.	C	C	C	C 1)	C 1)	C'
2.2 Before opening commences, gas samples must be taken from the fire area, at each stopping and from all sampling pipes.	C	C	C	C'	C	C'
2.3 The gas samples are analysed and the results assessed from the point of view of explosion risk in the sealed-off area and the state of the seat of the fire.	C	C	C	C'	C	C'
2.4 The cooling-off time of the seat of the fire must be taken into account.	C	C	C'	C'	C'	C'
2.5 If possible, the sealed-off district should be inspected before any air is circulated or any operations are started.	A	C'	C'	C'	C'	C'
2.6 Before opening commences, a plan should be drawn up jointly with the Main Rescue Centre.	C	C	C'	C'	C'	C'
2.7 This plan must cover the following points: - the method, - nature, scope and order of operations, - direction and supervision, - checking of the ventilation system and of the composition of the air, - communications, - preparation of material, - evacuation, prohibition of access to and remanning of endangered workings, - deployment of the Rescue Team, - connection and disconnection of electrical equipment and cutting-off the supply of electricity in both equipment and part of network concerned, - opening and closing of the compressed air, water and methan-drainage pipeline valves, - re-sealing of the fire area in emergency.	C	C	C'	C'	C'	C'
2.8 The method to be adopted for eopening sealed-off districts depends on the presence or otherwise of - non explosive gaseous mixtures which remain non-explosive on dilution with air, - non-explosive gaseous mixtures which may become explosive on dilution with air, or - explosive gaseous mixtures.						

1) Applies only to the opening-up of fire areas after particularly large fires.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
Fire areas may be opened at one point or at several points. In the latter case, a continuous direct circulation of air is automatically established and the fire area is permeated with fresh air. An examination should be made of the effects of the opening of the area on the ventilation system of the pit as a whole and within the fire area.	C	C'+C	C'	C'	C'	C'
2.9 A sealed-off district may be reopned by - breaching one or more stoppings (with or without the use of an air-lock), or - cutting a new entry into the fire-area. Before opening a sealed.off area, provision should be made for immediate reclosure if necessary.	C	C	C	C'	C'	C'
2.10 Stoppings may be opened only on the instructions of the manager underground and under the constant supervision of personnel appointed by him.	C	C	C'	C	C	C'
2.11 Workings, into which the opening of a stopping may release toxic gases or foul air, or where there is a risk of explosion, must be evacuated and put out of bounds to personnel before opening.	C	C	C'	C	C'	C'
2.12 Since conditions in the district, the state of the seat of the fire and the risk of gas explosion may change during the opening operation the composition of the fire gases or fumes must be checked at regular intervals.	C	C	C	C	C'	C'
2.13 The kind and number of samples and the points at which they are to be taken should be fixed in advance.	C	C	C'	C'	C'	C'
2.14 In doing so, the possibility of gas accumulations forming should be allowed for. (In general, the formation of gas layers is fostered by low air velocities and differences in temperature).	C	C	C'	C'	C	C'
2.15 Where a stopping is opened in the knowledge that a fire is not yet extinguished, or where the fire is revived as a result, the area in question must be resealed at once, if the composition of the fire gases or fumes changes in such a way that an explosion hazard might arise.	C	C	C'	C'	C'	A' 1)
2.16 With non-explosive gas mixtures in the fire area, this is necessary only if extinguishing operations seem unlikely to succeed.	A 2)	C'	C'	C'	C'	A 1)
2.17 It is the responsibility of the Rescue Team to open and inspect fire areas, even after they have been ventilated.	C	C	C'	C'	C'	C'
2.18 On the intake side, breaching of stoppings need not be carried out by the Rescue Team provided that no gas hazard is to be reckoned with.	C	C'	C'	C'	C'	C'
2.19 When deploying the Rescue Team, allowance should be made for the adverse climatic conditions which are likely to obtain at any point where they may be employed.	C	C	C'	C'	C'	C'

1) Reopening of an area where a known fire exists is not normally considered.
2) Opening of sealed off areas is prohibited while there is known to be an explosive mixture behind.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
V - OPENING-UP SEALED-OFF DISTRICTS CONTAINING NON-EXPLOSIVE GAS MIXTURES 1. Opening-up one side only Asealed-off district containing non-explosive gas mixtures may be opened on one side even if the fire is not yet extinguished. It must first be extablishe whether the remaining stoppings and seals are sufficiently air-tight and that there is no risk of releasing fire gases, in particular carbon monoxide in other parts of the working, which may be connected with the fire area.	A 1)	C	C'	C'	C'	C'
If the stopping to be opened is on the return side, special attention should be paid to the release of CO or of other toxic or dangerous gases or foul air.	A 1)	C	C'	C	C'	C'
The decision as to whether to carry out operations in the fire area without ventilation air or with auxiliary ventilation depends on the purpose of the reopening of the area, the expected duration of the Rescue Team's operations and the possible hazards involved. Auxiliary ventilation is especially desirable for extended operations within the fire area. a) Working without ventilation air, especially behind an airlock, has the advantage of eliminating the risk of reviving the fire. When carrying out extinguishing operations without ventilation air and under unfavourable air conditions, it is advisable first to set up water sprinklers or nozzles and to put these into operation only after the Rescue Team has left the fire area.	A 1)	C	C'	C'	C'	?
b) If auxiliary ventilation is used, it should preferably be by suction.	A 1)	A 2)	C'	C'	3)	A 4)
It is advisable to isolate the fire area ventilated by an auxiliary fan from the non-ventilated section by means of an auxiliary stopping if the seat of the fire is situated in the non-ventilated section.	A 1)	C	C'	C'	C'	?
2. Opening on two sides to establish a circulation of air round the sealed-off area Asealed-off area containing non-explosive gas mixtures may be ventilated only if it is likely that the fire is extinct.	C	C	C'	C'	C'	C'
While ventilation is being extablished, a Rescue Team wearing breathing apparatus may enter the fire area to examine conditions within it and to extinguish any fires.	C	C	C'	C'	C'	C'

1) It is forbidden to start opening sealed off areas, either from one point or from two places, while there is known to be an explosive mixture behind the stoppings.
2) Experience hitherto has shown that blowing auxiliary ventilation is preferable, to ensure that no explosive gases are sucked in by the auxiliary fan.
3) The use of blowing auxiliary ventilation is preferred.
4) Not suitable for inclusion in regulations; the use of forcing or auxiliary fans would depend on individual circumstances.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
VI - REOPENING OF SEALED-OFF DISTRICTS CONTAINING GAS MIXTURES WHICH MAY BECOME EXPLOSIVE ON DILUTION WITH AIR						
1. Opening on one side only						
1.1 A sealed-off area containing gas mixtures which may become explosive on dilution with air may be opened on one side only, even if the fire is not yet extinguished:	C	C	C'	C'	C'	A
1.2 It must first be checked whether the remaining stoppings and seals are sufficiently air-tight and that there is no risk of releasing fire gases, in particular carbon monoxide, into other parts of the workings which may be connected with the fire area.	C	C	C'	C'	C'	A
1.3 If the stopping to be opened is on the return side, particular attention must be paid to the possibility of releasing CO,CH_4 or foul air	C	C	C'	C	C'	A
1.4 All operations must be carried out without ventilation air.	C	C	C'	C	C'	A
1.5 There must be continuous sampling and evaluation of the results of analysis to check whether the gas mixture remains non-explosive.	C	C	C'	C	C'	A
1.6 For extinguishing operations, see section III.I. If the size of the sealed-off area is to be reduced, a new explosion-proof stopping must be erected. In order to be able to erect this stopping under tolerable climatic conditions and possibly without wearing breathing apparatus, auxiliary ventilation may have to be provided.	C	C	C'	C'	C'	A
1.7 For this purpose, an auxiliary stopping must first be erecred and sealed in an unventilated atmosphere. (Before constructing the main stopping, it should be considered whether to erect several successive auxiliary stoppings, according to the possible hazards).	C	C	C'	C'	C'	A
1.8 The section of roadway thus recovered must then be ventilated by an auxiliary fan so as to create suitable air conditions for the erection of the main stopping.	C	C	C'	C'	C'	A
1.9 When starting up the auxiliary ventilation, it must be remembered that the gas mixture becomes explosive on dilution with air. It is therefore essential to ensure that there is no source of ignition in the workings to be ventilated.	C	C'	C'	C'	C'	A
1.10 In addition, it is essential to make certain that the fan used cannot cause any risk of ignition.	C	C	C'	C'	C'	A
1.11 Before starting up the auxiliary ventilation, all workings likely to be exposed to the hazards of fire gases or explosions must first be evacuated and access thereto prohibited.	C	C	C'	C'	C'	A

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
1.12 Electrical equipment must be cut off from the power supply	C	C	C'	C'	C' 1)	A
1.13 In addition, the ventilation must, as far as possible, be regulated so that no explosive gas mixtures can be released over long distances.	C	C	C'	C'	C'	A
1.14 For this purpose, the quantity of air circulated should, if necessary, be increased.	C	C'	C'	C'	C'	A
2. <u>Opening on two sides to extablish a circulation of air through the fire area</u>.						
2.1 This method of opening automatically results in the formation of a through air-current in the open district, but not necessarily in other parts of the district. The method can be used only if there are no remaining signs of fire in the district.	C	C	C'	C'	C'	C'
2.2 In addition, a period long enough for the seat of the fire to cool off must have elapsed since the estimated time of extinction.	C	C	C'	C'	C'	C'
2.3 If possible, the Rescue Team should carry out an inspection in an unventilated atmosphere.	A	C	C'	C'	C'	C'
2.4 Failing this, the results of the snuffle pipe tests should be used to determine the condition of the seat of the fire.	C	C	C'	C'	C'	C'
2.5 Furthermore, it should be considered in such cases whether the method described in section IV.1 might not be preferable.	NRP	C'	C'	C'	C'	C'
2.6 In each case, it is essential to check the likelihood of a recrudescence of the fire during ventilation, by means of fire gas samples.	C	C	C'	C'	C'	C'
2.7 This applied particularly in the case of a much-branched district.	C	C'	C'	C'	C'	C'
2.8 Before ventilating the fire area, all working exposed to the hazards of fire gases or explosions of fire gases or fire-damp when the stopping is opened must be evacuated.	C	C	C'	C'	C'	C'
2.9 All electrical installations in these workings must be cut off from the power supply.	C	C	C	C'	C'	C'
2.10 On safety grounds, it is advisable to open the return stopping first.	NRP	C	C'	C'	C'	C'
2.11 After the Rescue Team has withdrawn to less dangerous zones, the intake stopping should be opened.	NRP	C	C'	C'	C'	C'
2.12 When ventilating the fire area, the quantity of air and the content of inflammable gases in the air-current circulation through the fire areas, and in the current into which it subsequently flows, should be checked.	C	C	C'	C'	C'	C'

1) Special attention is drawn to the fact that the fan must be switched off.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
2.13 The two air-currents should be mutually adjusted in such a manner as to ensure that no explosive mixture of gases is present over long distances after their junction.	C	C	C'	C'	C'	C'
2.14 Access to the fire area is prohibited until it has been ventilated.	C	C	C'	C'	C'	C'
VII- OPENING OF FIRE AREAS CONTAINING EXPLOSIVE GAS MIXTURES Sealed-off districts may not be reopended, either on one side or on two sides, if the presence of explosive gas mixtures behind the stoppings is established.	C	C	C'	C'	C'	C'
VIII- OPENING OF FLOODED FIRE AREAS The composition of the air in fire areas flooded to extinguish the fire must be checked after draining.	C	C'	C'	C'	C'	C'
In workings with solid coal, allowance must be made for the increased hazard of spontaneous ignition after drainage. Where fire areas have been isolated by local flooding instead of by stoppings, the rules mentioned in section I to V should be observed, insofar as applicable, when opening a district.	C	C'	C'	C'	C'	C'
IX- REMANNING OF FIRE AREAS After ventilating a fire area, workings may not be manned until a Rescue Team has established that all workings are free of noxious gases.	C	C	C'	C'	C'	C
If the fire area is merely being reduced in size, workings free of noxious gases may be manned only when the remainder of the fire area has been sealed-off by permanent stoppings.	C	C	C'	C'	C'	C
X- GUIDELINES FOR THE CONSTRUCTION OF ADVANCE FIRE STOPPINGS FROM PLASTER (doc. 4928/63/2). In all cases where it is possible and advantageous, the erection of plaster stoppings to seal off fires and heatings is recommended. Is this process applied in practice as laid down in the guidelines contained in the report?	NRP 1)	C	yes	yes 2)	E	C'
Is the application of this process prescribed by regulations?	NRP	C	no	no	no	no
Is this process applied in practice in a manner differing from the principles laid down?	NRP	yes	no	no	no	no
Is the application of this modified process prescrived by regulations?	NRP	yes	no	no	no	no

1) The construction of advance stoppings against will be the subject of new regulations when the fire-fighting directives are revised.
2) The choice of means is, however, left to the mine-manager.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
XI- USE FOR FOAMED URETHANE						
Opinion on the use underground of foamed urethane in coal mines (7th Report of the Mines Safety and Health Commission, annex VI)						
The Mines Safety and Health Commission considers it desirable that the producers of the foamed urethane plastic should further develop the compound at present available in such a way that, while retaining unchanged the positive properties which it now has, it satisfies the requirement set out in the Commission's opinion.						
Are there any regulations governing the use underground of foamed urethane?	yes 1)	C'	no	no	no	no
XII- PLASTER STOPPINGS						
Opinion on the construction of plaster stoppings using the hydromechanical process (doc.3481/3/69); instructions for construction (8th Report of the Mines Safety and Health Commission, annex V)						
Is this recently developed process in use?	yes	C	yes	yes	E	yes
Is its use governed by any regulation?	yes 2)	C	no	no	no	no
XIII- FOURTH REPORT ON SPECIFICATIONS AND TESTING CONDITIONS RELATING TO FIRE-RESISTANT FLUIDS USED FOR POWER TRANSMISSION						
Part II - Specifications and test conditions (pp. 19 onwards)						
1. Fire-resistant fluids for hydraulic power transmission and hydraulic control, before being used in mine workings must be given a certificate of approval.	C	C	C'	C'	E	C
This certificate must indicate that the product has been subjected to the following tests:						
a) Laboratory tests (articles 3 -7)						
aa) to determine criteria of flammability (article 3, p.22)	C	C	C'	C'	E	C
bb) to determine health criteria (article 4, p.23)	C	C	C'	C'	E	C
cc) to determine technical criteria (article 5, p.23	C	C	C'	C'	E	C
b) Long-term tests during normal operations (article 8, p.27)	C	C'	C'	C'	E	C'
2. These tests are carried out under an authorised body.	C	C	C'	C'	E	C'
3. Authorisation for use underground should be dependent on presentation of the certificate mentioned in 1. above.	C	C	C'	C'	E	C'

1) The use underground of liquid plastic products requires the approval of the Obergamt. Approval has so far only been granted for its use in rock consolidation. Its use for coating surfaces is not permitted.
2) Directives for the construction of stoppings of 21.4.71 - 18.13.1 II - 1.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
XIV- FIRST REPORT ON TESTS AND CRITERIA OF FLAMMABILITY FOR TEXTILE CARCASS CONVEYOR BELTS USED IN COAL MINES (12th Report of the Mines Saftey and Health Commission, annex VI)						
Is account taken of the tests and criteria of flammability for textile carcass conveyor belts defined in this report, i.e.						
- drum friction test?		C	C	E	no 1)	yes
- flame test?	yes	C	C	E	no	yes
Article 9 - Withdrawal of approval At the request of the authorised body, the permitting authority may withdraw the approval for the fluid to be used in mine workings.	C	C	C'	C'	E	C

1) Currently no coal mine in operation.

C. ELECTRIFICATION

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
I- RECOMMENDATIONS REGARDING ELIMINATION OF OIL FROM UNDERGROUND ELECTRICAL EQUIPMENT (1st REPORT OF MINES SAFETY COMMISSION, p.7 - German text)						
1. a) Resistances installed underground should not contain any combustible oil. (Exceptions are allowed for the starting-up resistances of large motors driving water pumps).	C	C	C	C	C'	C'
b) Condensers and transformers installed underground must not contain either combustible oil or didectric substances which can give off noxious gases.	C	C	C	C	C'	C' 1)
- Otherwise effective measures should be taken against the dangers to workers caused by the use of these devices.	C	C	C	C	C'	C'
c) Switches and relays, used underground and operation on voltages below 1,100 v, must not contain any flammable oils.	C	C	C	C	C	C
2. Recommendation to begin detailed investigation into the degree of increased safety which can be achieved, when prescribing an explosion-proof housing for normally spark-producing components only, and a design of the "increased safety" type for all other equipment.	A 2)	- 3)	C	E 4)	C	- 5)
3. Is the policy followed of reducing the use of oil in cut-off devices by reason of the potential dangers of explosion and fire?	yes	C	yes	yes	yes	C'
4. Are new purchases restricted to apparatus using no oil or, if this is not possible, only small quantities of oil?	yes	C	E	yes	no+ yes	C'
II- RECOMMENDATIONS FOR SHOTFIRING LEADS (2nd Report of Mines Safety Commission, p.10)						
1. Recommendations for all shotfiring leads						
- Every conductor must be provided with at least one good-quality insulation.	C	C	C	C	C'	C
- All connections must be properly insulated.	C	C	C	C	C'	C
- Every shotfiring lead must have the appropriate degree of flexibility	C	C	C	C'	C'	C
- The conductors must be of such cross-sectional area that thy do not occasion an excessive voltage drop.	C	C	C	C'	C'	C
- The shotfiring leads must be made up and laid so that the risk of any fault current, resulting from contact with metal objects, is reduced.	C'	C	C	C	C	C
- Before any shotfiring operation in particular workings and before the simultaneous firing of a fairly large number of shots, the ohmic resistance of the circuit must be measured.	C	C	C	C	C	C

1) In hazardous zones only.
2) Cannot be laid down in inspectorate regulations.
3) Not applicable.
4) Approval regulations have been issued for equipment in the "increased safety" category, but the type of protection is left to the individual firms.
5) A British Standard for "increased safety" apparatus has been published.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
a) <u>Temporary shotfiring leads</u>						
- Careful inspection before each firing.	C	C	C	C	C'	C
- Regular and thorough testing by an expert either at the surface or in an underground workshop.	C'	C	C	C	C'	A 1)
A thorough checking must consist of at least:						
- a careful inspection of the lead over its whole length.	C'	C	C	C	C	C
- measurement of the insulation between the two conductors, if the lead consists of a cable or rubber-covered lead.	C 2)	C	C	C	C	A 1)
- measurement of the ohmic resistance of the lead.	C'	C	C	C	C	A 1)
b) <u>Permanent shotfiring leads</u>						
- Regular and thorough checks by an expert.	C	C	C	C	- 2)	C
- Written record of every thorough check, with the date.	A 3)	C	C	C	C'	C
2. <u>Further recommendations for permanent and temporary shotfiring leads used in gassy mines</u>						
The shotfiring leads must fulfil conditions which ensure sufficient safety with regard to:						
a) mechanical strength and in particular tensile, bending and abrasion strength.	C	C	C	C'	NRP	C
b) electrical insulation.	C	C	C	C'	NRP	C
c) impermeability (to moisture) of the insulation and the sheathing.	C	C	C	C'	NRP	C
Recommendation that checking standards which correspond to the conditions be laid down.	C	C	C	2)	NRP	C
3. <u>Supplementary recommendations for permanent shotfiring leads used in gassy pits</u>						
- Permanent leads shojld be so arranged that, as far as possible, damage during firing of the shots or from other causes is avoided.	C'	C	C	C'	C'	C
- If the shotfiring lead consists of two separate conductors, these should be arranged sufficiently far apart and in such a way that inspection is possible.	C'	C	C	C'	C'	C
- In shafts and dipping roads, the leads must have an adequate mechanical strength.	C'	C	C	C	C	C

1) Safety is ensured py proper insulation; leads must not be used if there is any visual evidence of damage to the insulation.
2) Not applicable.
3) Seems unnecessary and would increase administrative work.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
III- RECOMMENDATIONS REGARDING THE PROTECTION OF UNDERGROUND DISTRIBUTION NETWORKS AGAINST THE DANGER OF CAUSING ELECTRIC SHOCKS (2nd Report of the Mines Safety Commission, p.13) I. The following recommendations refer only to the MT networks defined below; Medium Tension (MT) : the normal voltage range for working equipment used underground with three-phase A.C. (between 380 and 1.100 V). These networks should fulfil all the recommendations set out below. These recommendations refer neither to the HT networks, nor to voltages which are lower than the medium-tension range and are used for particular purposes (lighting, drilling apparatus, telephone installations, etc...) for which some easing of the restrictions may be allowed. Overhead wire networks with bare trolley wires are also excluded. II. Protection against the risk of electric shocks A - First order precautions (Protection against direct contact with a live phase) 1. Every chance contact with a live phase should be avoided as far as possible by laying the conductor out of the workmen's reach, by interposing effective barriers, by sheathing the phase or by insulating it.	C	C	C	C	C	C
2. The cables and leads used in medium-tension underground networks should be mechanically protected either by means of a metal armouring connected to the pilot lead, or by a flexible envelope of the best possible design.	C	C	C	C	C	C
- Leads without metal armouring must be electrically protected by separate or common protective screens, which trip safety devices in the event of a fault.	C	C	C	C	C	C
3. Only trained men should be allowed to open the housings of accessible live parts (medium-tension voltage range) and this only under conditions which have been clearly laid down in advance.	C	C	C	C	C	C
4. The repair and maintenance of the electrical equipment should be entrusted only to trained personnel.	C	C	C	C	C	C
B - Second order precautions (Equipotential connection between conductive parts of the installation) 1. All underground networks must be provided with an equipotential connection between the conductive (not live in normal operation) components of the installation and the other metal elements connected thereto, such that its conductance is sufficient to prevent the occurrence, between any two points accessible to a workman simultaneously, ofa voltage higher than the weak voltage.	C	C	C	C	C	C
2. This equipotential connection (protective lead) must ensure electric connection between the conductive elements of the installation over the whole length of the network. It must be						

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
maintained in satisfactory condition and must be inspected as often as is necessary to ensure this.	C	C	C	C	C	C
3. The above-mentioned equipotential connection (protective lead) must be earthed to at least one point of the network via an earth connection of the lowest possible resistance.	C	C	C	C	C	C
4. This earth connection must be combined with the star-point earth connection, if a star-point is employed.	C	C	C	C	C'	C
C - Third order precautions (Reduction of fault duration) 1. Any fault current must be considered dangerous in underground medium-tension networks if, when the fault current flows through the protective lead and connected conductive component of the installation of earth, there is produced between any two points accessible to a workman simultaneously a voltage exceeding the level of a weak voltage, regardless of whether it occurs between parts of the installation or between such parts and earth.	C	C	C	C	C'	C
2. If the star-point of a network is earthed via a weak impedance or without any impedance, so that the presumed fault current is not restricted to a low value, then the network must be provided with safety devices which can at any time automatically isolate the damaged section of the networkfrom the current source (or render it completely dead) before the fault flowing through the protective components of the installation or earth reach a dangerous value	-[1]	-[1]	-[1]	C	E	C
- Since the complete or partial cutting-off of a line voltage can have serious effects on the current supply to important equipment, appropriate preventive measures should be taken. - Only when the line has been repaired or the fault eliminated, or at the direction of a specialist who has taken all necessary precautions, may that section of the network be brought under voltage again.	C	C	C	C	E	C
3. If the star-point of a network is insulated or earthed via some impedance, which restricts fault currents to a low value, the network must be fitted with supervising devices which are always in a state of readiness and which are capable: a)- either of checking the insulation of the various parts of the network and of indicating any damage they may have suffered or	C	C	C	C	E	C
- of automatically cutting off the damaged section of the network from its source of current (or rendering the entire network dead).	C[2]	C	C	C	E	C
- If no automatic cut-off device is installed, the responsibility for cutting-off should be entrusted to an expert who can intervene as soon as the warning signal of the supervisory system is tripped or if the fault assumes major dimensions.	C	C	C	C	C'	-[1]

1) Not applicable, as only isolated ciruits are used.
2) Was carried out in workings where there is a risk of firedamp.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
- If cutting-off has been necessitated by one of the two cases cited above, the restoration of current may be accepted only after repair of the line or elimination of the fault, or only at the direction of an expert official, who has tken all necessary precautions.	C	C	C	C	C'	C'
- If no automatic cut-off device is installed, the rubber-covered leads of mobile machines should be fitted with an automatic device which renders them dead as soon as there occurs a fault current which is caused by damage to the insulation of an individual phase.	C	C	C	C	C	C
b) - or of automatically cutting off the the damaged section of the network from its source of current (or rendering the entire network dead) as soon as a double fault occurs leading to a dangerous fault current in the protective lead and connected parts of the installation. - In this instance, the current may be switched on again only after the line has been repaired or the fault eliminated.	-1)	-1)	C	C	C'	-2)
N.B. The comments on this Recommendation are given in the Second Report of the Mines Safety Commission, pp. 15/22. IV - RECOMMENDATIONS REGARDING THE PROTECTION OF UNDERGROUND ELECTRICAL NETWORKS AGAINST FIRE AND FIREDAMP-EXPLOSION RISKS (Doc. 1156/61/4) 1. Recommendations regarding the protection of underground electrical networks against fire risk A - First order precautions - avoidance of fire risk 1) Avoidance of excessive heating of cables in normal use by providing adequate conductivity. Avoidance of unforeseen local heatings by the use of suitable designs and by proper supervision.	C	C	C	C	C	C
2) Reduce the possibility of faults and short-circuits occurring between conductors, or between conductors and earth, by adequate insulation or proper spacing of the conductors.	C	C	C	C	C'	C
B - Second-order precautions - protection against the effects of a heating or a fault 1) Use of heat- stable insulations.	C	C	C	C	C'	C'
2) Use of protective sheathing for equipment and for cables, made of flame-resistent and non-propagating material.	C	C	C	C	C'	C'
- Use of oil as a non-conductor only if no fire risk for the workers is involved.	C	C	C	C	C'	C'
3) Accumulations of flammable or combustible materials and pipelines for combustible gases should be sited well away from electrical equipment.	C	C	C	C	C'	C'

1) Not applicable
2) Not suitable for inclusion in regulations.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
C - Third-order precautions - measures regarding the network						
1) Automatic protection of networks against abnormal overloads.	C	C	C	C	C	C
2) Automatic protection of networks against short-circuit; these protective devices must be capable of handling the maximum short-circuit current at their point of installation.	C	C	C	C	C	C
Selecting and regulating of these devices in relation to the minimum short-circuit current which can occur at the end of the section they protect	C	C	C	C	C'	C
3) Steps to give effective protection against low-current faults, which might get past the above-named protective devices and cause dangerous heating.	C 1)	C	C	C	C'	C'
2. Recommendations for the protection of underground electrical networks against firedamp-explosion risks						
A. First-order precautions - prevention of accumulations of firedamp						
1) The firedamp content at the site of the electrical apparatus must be kept whithin the limits prescribed by the Inspectorate.	C	C	C	C	C	C
2) The ventilation situation must be checked before any new installation or extension of electrical equipment.	C	C	C	C	C'	C
3) There must be a thorough investigation of the possible consequences of any alterations in working method, of ventilation or gas omission, which might cause problems in the vicinity of electrical equipment.	C	C	C	C	C'	C'
B. Second-order precautions - protection against ignition						
1) In gassy workings: use of electrical equipment which is permitted by the Inspectorate only under its own specified conditions.	C	C	C	C	C	C 2)
2) The electrical equipment must be installed, used, supervised and maintained in such a way as to keep it flameproof.	C	C	C	C	C	C
All cables must be of adequate mechanical strength.	C	C	C	C	C	C
All cables must be installed and maintained without damage.	C	C	C	C	C	C
C. Third-order precautions - cutting off the circuit						
1) Networks must be designed and installed in such a way that any fault current which may arise between phase and earth is reduced to a low value or quickly cut off.	C	C	C	C	C	C

1) Was carried out in workings where there is a risk of firedamp.
2) In such mines where CH_4 is a hazard, all apparatus must be designed to prevent open sparking and must be so certified.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
2) A protective relay, preferable automatic, must be provided against between-phase faults and earth faults.	C	C	C	C	C	C
3) Precautions must be taken to avoid accidents when faults are being sought or dealt with.	C	C	C	C	C	C
4) Protection must be given to leads without metallic sheathing, and to those which supply movable machines, by means of individual or collective screens which bring a protective device into operation if a fault occurs.	C	C	C	C	C	C'
5) If the firedamp content rises above the prescribed limit, all the sections of the network involved must be cut off.	C	C	C	C	C	C
Issuing instructions to maintain in operation certain machines which provide ventilation.	C	C	C	C	C	C
Restarting only when the firedamp content has fallen below the permissible value, and only on the orders of a trained person.	C	C	C	C	C	C
<u>Supplementary precautions for pits liable to sudden outbursts of gas</u>						
1. <u>Risk of damage by particles projected by an outburst of gas</u>						
- The threatened zones in which projection can occur should not be electrified.	A	C	C	C 1)	C 2)	C'
- The electrical equipment and cables should be protected against heavy blows.	A	C	C	C	C 2)	C
- The electrical equipment should be designed to give adequate robustness.	A	C	C	C	C 2)	C
2. <u>The risk of firedamp concentrations</u>						
- Increased ventilation	C'	C'	C'	C	C 2)	C'
- Use of remote-indicating methano-meters or ventilation-fault detectors which can cut off the threatened section of the network.	C'	C'	C	C	C 2)	E 3)

1) The use of electricity is forbidden in pits liable to sudden outbursts of gas, excepting for lighting and shot-firing. Exceptions can, however, be approved by the senior mining engineers: when using armoured cables, telephone installations and methanometers in intake airways-provided that no damage is likely to occur as a result of a gas outburst - and also in main return airways.

2) No pits liable to sudden outbursts of gas. However, in pits or parts of mines which are considered to be liable to sudden outbursts of gas, the use of electricity, excepting for lighting purposes and portable lamps, must be authorized by a senior mining engineer, subject to the observance of all other measures, precautions or restrictions which might be included in the authorization such as for example the above-mentioned recommendations.

3) Introduced recently in some individual mines which are not necessarily subject to outbursts, but have high quantities of firedamp.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
- Relaxation shot-firing only after all equipment has been switched off.	C'	C'	C	C	C 1)	C
3. - Supplementary electrical precautions a) Preferable use of a starpoint earthed via a strong impedance, e.g. by means of an insulation detector.	C	C	C	C'	C 1)	C'
b) Quickest possible automatic protection of the network against all insulation faults, even if formed by resistances between phase and earth.	C	C	C	C	C 1)	C'
V - CONCLUSIONS AND RECOMMENDATION CONCERNING THE USE OF EXPLOSION-PROOF ELECTRICAL APPARATUS FOR NOMINAL VOLTAGE ABOVE 1100 VOLTS (10th Report MSHC, annex VIII, June 1973) In respect of the circuit-breakers, it will be observed that the conclusions contained in the Report of 1964 (see third report of The Mines Safety and Health Commission, annex VIII, pages 391-404) are now out-of-date, since considerable efforts have been made in all the Member States to eliminate or reduce the quantities of oil used. Different types of oil-less apparatus can be found (using sulphur hexafluoride, air or water) and all have given satisfaction and their utilization has made considerable advances. During the reporting period, the design of circuit breakers of the "increased safety" category with additional protection of the contacts has been accepted in different Member States, and the new purchases of circuit-breakers containing a large quantity of oil have been either restricted or forbidden. In the contactors without oil, considerable progress has been achieved, particularly as a result of the introduction of vacuum-break contactors. In these circumstances, the Mines Safety and Health Commission considers it necessary to recommend to the Member States to continue their policy of reducing the use of oil in cut-off devices by reason of the potential dangers of explosion and fire resulting from the presence of an appreciable quantity of oil in such devices. Consequently, the Mines Safety and Health Commission recommends that new purchases be restricted to apparatus using no oil or, if this is not possible, only small quantities of oil. 1) Is the policy followed of reducing the use of oil in cut-off devices by reason of the potential dangers of explosion and fire?	yes	C	yes	yes	yes	C'
2) Are new purchases restricted to apparatus using no oil or, if this is not possible, only small quantities of oil?	yes	C	E	yes	no+ yes	C'

1) No pits liable to sudden outbursts of gas. However, in pits or parts of mines which are considered to be liable to sudden outbursts of gas, the use of electricity, excepting for lighting purposes and portable lamps, must be authorized by a senior mining engineer, subject to the observance of all other measures, precautions or restrictions which might be included in the authorization such as for example the above-mentioned recommendations.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
VI - CABLES SUPPLYING MOBILE MACHINES AND THEIR ELECTRICAL PROTECTION						
Recommendations arising out of the "Report adopted by the Mines Safety and Health Commission on 20th June 1969 on the characteristics and electrical protection of cables supplying mobile machines (coal cutters, loading machines, etc.) used underground in coal mines in the various Community countries" 1) (8th Report of the Mines Safety and Health Commission, Annex IX)						
The Mines Safety and Health Commission recommends that electrical equipment supplying current to mobile machines should meet the following minimum requirements:						
A. Power should automatically be cut off from cables supplying mobile machines in the following cases:						
a) phase to phase faults	C	C'	C	C	C'	C
b) faults between phase and earth	C	C'	C	C	C'	C
c) faults between phase and polarised screen	C'	C'	C	C	C'	2)
d) faults between conductor or polarised screen and earth	C	C	C	C	C'	2)
e) breaking of the monitoring circuit	C	C	C	C	C'	C'
B. The electrical installations defined above should be designed in such a way that any fault arising in the cable cannot result in unintentional starting of machines connected to the supply.	C'	C'	C	C	C'	C'
C. CI or CB insulation monitors and BS safety blocks not automatically monitored should incorporate a device which monitors their operation and integrity. They should also have a fault-indicating device.	C'	C'	C	C	E	C'+E
D. The BS safety block should be arranged so that the supply cable cannot become live again after power has been cut off due to a fault.	C'	C'	C	C	E	C' 3)
E. The monitoring circuit should not give rise to any risk of igniting firedamp.	C'	C'	C	C	C	C'
F. The earth conductors should be symmetrically arranged.	C	C	A 4)	A 4)	E	?
G. Finally, the Mines Safety and Health Commission recommends that:						
1. The power to a cable supplying a mobile machine should be cut off when the first fault between phase and screen (polarised screen or earth conductor) appears and,	C	C	C	C'+ NRP	C'	C

1) See 7th Report of the Mines Safety and Health Commission, Annex V.
2) There is no polarised screen.
3) There are precautions additional to BS.
4) Yes, but on condition that this measure is extended to the whole network which is practically impossible.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
2. In view of the present state of the art it suggests the use of cables provided with screens (polarised screens or earth conductors) of one of the types described in annex V, page 13 of the 7th Report of the Mines Safety and Health Commission except types A^2, B^2, D^2.	C	C	C	C	E	C'
3. These cables should be used in conjunction with the following devices: - protection by means of current intensity appropriate to the length and cross-section of the cables,	C	C	C	C	E	?
- a permanent insulation monitor (CI or CB),	C	C	C	C	E	C'
- a safety block incorporated in the gate-end box.	C	C	C	C	E	C

D. WINDING ROPES AND SHAFT GUIDES

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
I - REPORT ON THE ELECTRO MAGNETIC EXAMINATION OF WINDING ROPE (doc. nr. 8470/64/2). Steps taken to develop electro-magnetic testing methods and results obtained.	C' 1)	C'	C' 2)	C' 2)	C' 3)	C' 2)
II - REPORT ON THE USE OF ACCELEROMETERS TO TEST WINDING INSTALLATIONS doc. 3725/1/61, p. 9 (German text). Tests with accelerometers should be continued on a large scale.	C'	C'	-	-	E	C'
Use of accelerometers should be extended.	NRP	E	-	-	E	C'

1) Electromagnetic monitoring is required in the special case of cables consisting of flat wires in multiple layers and other winding ropes which are heavily loaded.
2) Trials to improve electro-magnetic testing methods are underway.
3) Electromagnetic examination of cables is not compulsory.

E. VENTILATION AND MINE GAS

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
I - PRACTICAL CONCLUSIONS ON THE APPLICATION OF THE THEORY OF STABILISATION OF VENTILATION (sixth report of the Mines Safety and Health Commission - Annex III)						
1. Supervision of ventilation The supervision of ventilation in a mining system requires an overall view, and should therefore be entrusted to a single man specially appointed, having at his disposal all the necessary means for carrying out his task.	C'+ NRP	C	C'	C 1)	C	A 2)
2. Fundamental factors in ventilation Apart from a regular inspection and anlysis of ventilation conditions in mines, ventilation officials require to have data on: - the actual characteristics of the main and auxiliary ventilation fans,	C	C	C'	C' 3)	C'	C'
- the order of magnitude of the aerodynamic effect of natural ventilation in summer and winter,	C+ NRP	C	C'	C'	C'	C'
- the potentials of the intersections (at least the main ones).	C	C	C'	C' 4)	C'	C'
3. Additional representations of ventilation systems In order to obtain a precise picture of the overall structure of ventilation systems and to reveal possible instabilities, it would be advisable when necessary to have, in addition to the regulation diagrams, representations of other types, such as, for example: a) a representation of the whole of the mine workings in perspective (isometric or any other equivalent system).	C	C	E	C' 5)	C'	C
b) a diagram without any topographical information.	C'	C' 6)	C'	C' 4)	C'	C
4. Characteristics of ventilation The representations mentioned in conclusion No. 3 should make available all the data necessary for the understanding of analysis of ventilation, particularly: a) at the measuring points - the air quantities	C	C	C'	C	C	C
- the direction of the airflow	C	C	C'	C	C	C
- the methane content	C	C	C'	C	C	C
- the temperatures	C	C	C'	7)	C	A 7)
- the pressures (at least at the principal intersections)	C	C	E	C'	E	A 7)

1) In every colliery with over 500 workers the engineer responsible is also assisted by a supervisor who ensures application of the ventilation measures. In each coalfield an engineer has been specially entrusted with studying the application of the ventilation stabilisation theory adopted by the Mines Safety and Health Commission.
2) It is a statutory duty of the undermanager or, in some cases, the manager of a mine to verigy the sufficiency of the ventilation.
3) Applies to recent ventilators, but not to old ones.
4) These are being carried out.
5) Applicable to some coalfields, but not all.
6) Carried out by means of network plans in ventilation calculations made by electronic computers.
7) Not systematically recorded.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
b) in addition - the lengths and average cross-sections of the roadway	C+C'	C	E	C'	C	C'
- the calculated resistances	C'	C	E	C'	E	C'
- the angles of inclination, particularly at the ends of the inclined and vertical section	C	C	E	C'	C'	C'
- the positions of the air doors and control doors, and of the barriers	C	C	E	C	C	C'
5. Inspection of ventilation conditions In each mine, there should be a systematic analysis of the ventilation system, at least once a year and after any major modification of the system, in order to detect any probable cases of instability under the normal operating conditions	C	C	C'	E 1)	C'	C
In addition, cases of instability which may be caused by the introduction of additional aeromotive sources, or the changing or elimination of the existing aeromotive sources, should also be examined	C	C'	C'	E 1)	E	C
6. Informing the personnel Taking into account the importance of ventilation for the whole of the underground workings, each responsible person should be informed of ventilation conditions within his own field.	C	C	C'	C	C'	A
Furthermore it is essential that separate meetings should be held once a year at least, as well as after any major modification in the ventilation system, at which the colliery ventilation engineer will explain the ventilation conditions obtaining at the pit, together with any modifications which have recently been made, in the presence of: a) the management officials, the technical departments, the chief of the rescue team and the officials responsible for ventilation;	C'	C	C'	C'	C'	C'
b) the local officials, each in respect of his own speciality.	C'	C 3)	C'	C	C'	C'
On these occasions, attention should be drawn to districts where instabilities are already likely in normal conditions and, in particular cases of instability which make the occurrence of a fire likely.	C'	C'	C'	C'	E	C'
7. Exercises on plans Once a year at least, the management or the competent mining authority should organise an exercise on plans covering measures to be taken in the event of an underground fire. This should be attended by the mine owner or his representative, the ventilation engineer and the competent officials responsible for the organisation of fire fighting and rescue operations.	C' 4)	E	E	5)	E	A

1) Now being studied by the users.
2) Headlines for the evaluation of pressure measurements are now being drafted.
3) This instruction is not usually given at separate meetings.
4) Will be regulated by the fire-fighting plan.
5) These will be organised after implementation of the Budryk plan, but the ventilation officials and the rescue centres already contact each other from time to time.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
8. Position of regulation doors When doors are necessary for regulating ventilation they should be placed as near as possible to roadway junctions, taking into account other requirements, in order to facilitate access in smoky conditions.	A 1)	A 2)	E	3)	C'	A 1)
9. Measures and equipment for slowing-down ventilation In all collieries, devices for rapidly slowing-down ventilation in order to stabilise it shall be installed in all intake airways, subject to exceptions to be previously determined, after each roadway junction or branch, and as near as possible to it.	A 4)	C	E	5)	C'	A
10. Instructions to officials in the event of underground fire Apart from the usual provisions regarding the obligation to attack any seat of a fire in order to extinguish it as soon as possible, and to inform the officials and managementwithout delay, there should be instructions to officials laying down the other measures to be taken in the event of a mine fire in order to slow down ventilation so as to avoid an increase in the air supply to the seat of the fire.	A 6)	A 7)	E	8)	C'	A 6)
11. Instructions to management officials in the event of underground fire No decision to modify the ventilation is to be taken by the management staff without a study being made of the consequences, by means of application of the theory of the stabilisation of ventilation, and without the help of plans and ventilation schemes which have previously been prepared in respect of all the possible causes result from the fire or from the structure of the mine (ventilation by multiple fans etc..).	C'	A 7)	E	C' 9)	C	C'

1) Owing to the different local conditions a uniform regulation would be unsuitable.
2) The decision is to be taken by the head of the fire-fighting unit.
3) As soon as possible, but not automatically.
4) Experience has shown that it is more convenient to have a central store of materials for constructing regulation doors.
5) Now being studied by the users.
6) The ventilation must not be modified except on the express order of the officials in charge.
7) The decision is to be taken by the leader of the fire-fighting unit.
8) Not supervisors level but thechiefs of rescue teams and the rescue centres.
9) To be specified after implementation of the Budryk plan.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph.	Germany Saar	Belgium	France	Italy	United Kingdom
II - CONDITIONS UNDER WHICH EXEMPTION MIGHT BE GRANTED TO RAISE MAXIMUM PERMITTED CH_4 LIMITS (12th Report of the Mines Safety and Health Commission, Annex V)						
2) Prerequisites for granting exemptions to maximum permitted CH_4 limits						A
2.1. A reasoned application from the producer						
2.2. Documents to be enclosed:						
a) a forecast on the emission of firedamp (2.2.1)						
b) a ventilation forecast (2.2.2)						
c) firedamp capture (2.2.3)						
d) other methods of reducing firedamp emission (2.2.4)	C+NRP	C	C	C	A 2)	
3) General conditions for raising maximum permissible CH_4 levels						1)
The conditions under which an exemption is granted are to be specified by the Mines Inspectorate. The regulations laid down by the Inspectorate, as they apply in normal cases, remain in force unless otherwise expressly stated in the exemption.						
In particular, it should be pointed out that CH_4 monitoring with hand-held instruments prescribed by national regulations is not to be discontinued where automatic CH_4 monitoring is used and will have to be carried out in accordance with the provisions in force.						
3.1. Automatic monitoring of CH_4 content in the airflow, alarms.						
3.1.1. Monitoring of CH_4 content in the airflow is obligatory if an exemption is to be granted. Monitoring must be carried out:						
- automatically and						
- continuously and with sufficient frequency by means of reliable and accurate equipment.	C+NRP	C	C	C	2)	1)
3.1.2. Depending on local requirements, readings should be monitored either centrally or locally. It should be specified whether all readings or only some are to be recorded, e.g. whether recording is required in the case of readings from a measuring head or installation located at a point where the full amount of firedamp emitted from the working area is mixed with the air current (in principle at the end of the return airway).	C+NRP	C	C	C	2)	1)
3.1.3. The way in which firedamp content is to be monitored (mean content in the airflow or local content) must be clearly specified.	C+NRP	C	C	C	2)	1)
The following points should also be specified:						
3.1.4. The location of the points at which CH_4 content is to be monitored, as these points may vary according to the type of working areas and to the wording of the exemption.	C+NRP	C	C	C	2)	1)
A CH_4 recorder may, in particular, be required at the return end of the face, at right angles to the electricity supply devices in the return airway if such devices exist and at the far end of the return airway as indicated in p.p 3.1.2.	C+NRP	C	C	C	2)	1)

1) not applicable
2) the regulations do not envisage exemptions.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
3.1.5. The frequency of the checks and calibration of the measuring heads of the automatic monitoring equipment.	C+NRP	C	C	C	2)	1)
3.1.6. In the case of failure of the automatic monitoring equipment the exemption should be lapsed. However, if such failure affects only one measuring head and lasts less than 24 hours, the exemption may be maintained under special conditions, including in particular intensified monitoring and measurements taken with hand-held instruments.	C+NRP	C	C	C	2)	1)
3.1.7. A visual and/or a acoustic alarm must be triggered off at a continuously manned location, if the permissible CH_4 limits are exceeded.		C	C	C	2)	1)
3.2. Additional monitoring of CH_4 content using hand-held instruments. Additional monitoring (supplementing the routine monitoring prescribed in the regulations) using hand-held instruments may be required in places where an increase in CH_4 is feared likely.	C+NRP	C	C	C	2)	1)
3.3. Switching on and off of electrical equipment. 3.3.1. When the maximum permitted CH_4 levels are exceeded, the electrical installations in the area in question should, if not intrinsically safe, cut out immediately and preferably automatically. Multi-powered (by electricity or compressed air) auxiliary fans might be recommended.	C+NRP	C	C	C	2)	1)
3.3.2. Resumption of power should be by manual operation only, by a specially appointed person or another person answerable to him and carrying out his instructions.	C+NRP	C	C	C	2)	C
3.4. Ventilation measures. 3.4.1. Care must be taken to ensure that the quantity of air and the minimum air speed are such that the mixture of firedamp with air prevents the formation of CH_4 roof layers.	C+NRP	C	C	C	2)	C'
3.4.2. Where there is a risk of CH_4 roof layers, the air speed must be subject to continuous automatic monitoring accompanied by warning lights and/or acoustic signals at a continuously manned control point.	C+NRP	C	C	C'	2)	A
3.5. Shotfiring operations. Shotfiring operations will remain subject to the regulations in force in the various countries.	C+NRP	C	C	C	yes	C
3.6. Use of light alloys. No light alloys may be used where the use of such components would present an ignition hazard.	C+NRP	C	C	C		C'
3.7. Use of diesel engines. In areas for which exemption is granted in respect of admissible CH_4 content, diesel engines may be used only if suitable precautions are taken to ensure that such use does not create additional hazards or increase existing ones.	C+NRP	C	C	E	2)	1)
3.8. Evacuation of workings. Should the maximum CH_4 content in the general body of the air or localized areas be exceeded by a specific amount the working areas must be						

1) (See previous page)
2) (" " ")

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
evacuated. An evacuation procedure must be drawn up in advance, and the procedure for alerting personnel laid down. The importance of a suitable, intrinsically safe communications network, or of other warning devices should be stressed.	C+NRP	C	C	C'	2)	C
3.9. Informing and instructing personnel. A procedure should be laid down whereby personnel and possibly their representatives working in areas subject to an increase in CH_4 limits are informed. Specific instructions should be given to supervisory officials and officials authorized to take action where maximum permissible limits are exceeded or where evacuation is required.	C+NRP	C	C	C'	2)	C'
3.10. Control by the Inspectorate. The various information documents concerning working operations in areas for which an increase in maximum CH_4 levels has been authorized must at all times be available to the officials of the local Inspectorate.	C+NRP	C	C	C	2)	1)
4. Measures relating to the granting of exemptions to increase maximum permissible CH_4 levels in special cases. In special cases, measures must be laid down in addition to those mentioned in Chapter 3.	C+NRP	C	C	C'	2)	1)

1) (See previous page)
2) " " "

F. MECHANISATION

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
I - RECOMMENDATIONS REGARDING LOCOMOTIVE EQUIPMENT (First Report of the Safety Commission, p.20 - German Text - April 1959)						
1. New locomotives must be equipped with fixed, rigid cabins which at all times give the driver a clear view along the roadway, ahead and behind, without any need for him to put his head out of the cabin. (Fixed cabins are understood to cover those forming a part of the structure or which can be removed only laboriously with special tools).	C 1)	C 1)		C 3)		
	A 2)	A 2)	C	E 4)	C	NRP
2. The locomotives in service must be modified to meet this requirement,	C 1)	C	A	E	C	A
- locomotives which cannot be modified should gradually be withdrawn from service, within a period to be fixed by the responsible inspectorate, or	C	C	A	E	C	A
- only be used in roadways which are wide and high enough to eliminate accident risk	C	C	C'	E	A	C
3. For particular types of locomotive, or in certain circumstances, the responsible Inspectorate can grant exceptions from the above regulations, provided that safety regulations of equal stringency are laid down.	C	C	NRC	E	A	5)
II - RECOMMENDATIONS REGARDING THE NEUTRALISATION OF DIESEL-ENGINE EXHAUST FUMES (First Report of the Safety Commission, p. 23 - German text - April 1959)						
- General use of better starters	C'	E	?	?	?	A 7)
- Intensified research into improving combustion by the use of catalysts	E	A 6)	?	?	6)	A 7)
- Draw attention to the existence of this process	– 5)	– 5)	– 5)	– 5)	–	– 5)
- Continuation of the research into an automatic transmission system, which would make it possible to give Diesel engines a constant rpm.						
. Subsequent resumption of trials with the Houdry carbon monoxide purification process.	?	A 6)	?	?	6)	A 7)

1) In the case of main-road locomotives, with the exception of "a clear view behind", which is difficult technically.
2) No application made to gateroad locomotives, because the risk of accident is increased.
3) For trolley locomotives.
4) For other than trolley locomotives.
5) Not applicable.
6) The problem of the low CO content of Diesel engine exhaust fumes is solved by blocking the injection pump at a pumping capacity at which the CO content shows a marked rise.
7) Not suitable for inclusion in regulations.

G - HEALTH IN COAL MINES AND MEDICAL

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
I - DUST CONTROL						
RECOMMENDATION EMBODYING DIRECTIVES OF SUPPRESSING DUST CONCENTRATIONS IN UNDERGROUND WORKINGS (8th Report of the Mines Safety and Health Commission, Annex VI)						
With due regard to the basic principles set out and, in particular, to the need for the different dust control processes to be combined to suit locally prevailing conditions, the dust control methods should be applied in accordance with the directives of the recommendation, namely:						
A. FACES						
1) Coal winning						
1.1. - Seam injection	C	C	C'	C	E	C
- Is any attention paid to the degree of efficiency of the different processes suggested?	C	C'	C'	C'	C'	NRP
1.2. - Spraying	C	C	C'	C	C	C
2) Stowing						
a) In general:						
2.1. Prior sprinkling of the soil	C'	C	?	C	C	C
2.2. Prior sprinkling of the site to be stowed	C'	C	?	C	C'	C
b) When hydraulic stowing is employed:						
2.3. Specific consumption of ventilated air maintained at the lowest possible level	C'	C	C'	C'	C'	?
2.4. Use of soil of fine mechanical composition and sufficiently humid to prevent subsequent fissuring during transport and forced ventilation	C'	C	C'	C'	C'	?
2.5. Prevention of air stagnation in the stowage zone when tipping the goaf	C'	C'	C'	C'	C'	?
3) Caving						
3.1. Seam injection	C	C	C'	C	E	C
3.2. Spraying	C	C	?	C	C'	C
B. SHAFTS AND ROADWAYS						
4) Drilling of mine chambers (shot holes)						
4.1. Wet drilling, dry dust extraction	C	C	C'	C	C'+C	C
5) Shotfiring						
5.1. Use of wet tamps or gelatine pastes, supplemented by previous sprinkling of the floor and sides of the roadways and the dirt resulting from previous shots.	C 1)	C	C'	C	C	C
5.2. Use of water screen where wet tamps cannot be used	C 1)	C	E	C	E	C
6) Loading of excavated material						
6.1. Abundant and systematic sprinkling of excavated material	C'	C	C'	C	C	C

1) Only wet tamps are used.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
7) Machine drivers						
7.1. Suitable distribution of the dust extraction and ventilation flow rates so as to keep the dust against the drivage front at the maximum distance away from the machine operators	C'	C'	E	C'	C'	C
7.2. Purification of the dusty air before it is diluted in the general ventilation system	C'	C'	E	-	C'	C
8) Various rock working operations						
8.1. Use of wet mechanical picks	C'	A	C'	-	C'	C
9) Various material handling operations						
9.1. Arrangements for withdrawal, transfer, tipping and loading (e.g. determining the minimum height of fall, ensuring that meterials are completely tipped out at loading and unloading points)	C'	C	E	C	C	C
9.2. Use of additional products ensuring or maintaining surface wetting	C'	C'	E	-	C	C
II - ORGANISATION OF SERVICES						
RECOMMENDATION ON THE ORGANISATION OF SPECIAL SERVICES RESPONSIBLE FOR THE INSPECTION OF DUST CONDITIONS IN UNDERGROUND WORKINGS (8th Report of the Mines Safety and Health Commission, Annex VII)						
The Commission recommends the following methods of operating:						
1. The managementof each pit shall appoint from among its staff a person who shall be responsible for dust control and is not directly concerned with production and output.	C	C	C'	C'	C'	C
2. The said person, and any assistants, shall be responsible for dust control operations, any improvements required, and dust sampling.	C	C	C'	C'	C'	C
3. Dust is to be sampled in all working places. The frequency and location of sampling or measurements are to be recorded in accordance with the standards laid down in the various countries and made available to the appropriate administrations and the mine's medical department.	C	C	C	C'	C	C
4. A department belonging to the company or coalfield shall assemble the results of measurements, be responsible for training persons in charge of dust control operations in each mine, and work out and co-ordinate instructions for use by the latter.	C	C	C'	C'	C'	C
5. The special services belonging to the company or coalfield shall keep in touch with the relevant technical and medical departments so as to take any precautions needed for reducing inadmissible dust concentrations or moving staff following the results obtained during the periodical medical examinations.	C	C	C'	C'	C'	C

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
III - RECOMMENDATIONS ON THE FIXING OF CLIMATIC LIMITS (The unabridged text is reproduced in doc. 3034/4/62)						
1.1. The basis is the American effective temperature (° eff basic scale).	C	C	C'	E 1)	NRP	C
Air velocities above 3 metres/sec should be considered as only 3 metres/sec in determining the American effective temperature.	C 2)	C	C'	-	NRP	C
1.2. The temperature data must be given so as to make possible a comparison on the basis indicated under 1.1.	C	C	C'	-	NRP	C
1.3. The climatic limits determined shall be maximum values.	C	C	-	-	NRP	C
More favourable climatic values for the workers shall remain unchanged.	C	C	-	-	NRP	C
1.4. There will be further investigation into the effectiveness and accuracy of the various climatic indices.	-	-	-	-	NRP	C
2. Determination of a maximum climatic value						
2.2. Work on location is forbidden in working places where the temperature exceeds 32° eff A (basic scale), excepting the cases named in 2.3. and 2.4.	C	C	-	E 3)	NRP	C
2.3. An exception can be made to the ban on working on location in temperatures above 32° eff A (basic scale) if the competent authority has given permission and the workers in question have been medically examined. In this case the following conditions must also be fulfilled:	C 4)	C	-	A	NRP	C
2.3.1. The responsible authority can only issue permission for a fixed period and for given working operations.	C	C	-	-	NRP	C
2.3.2. The work must be carried out under medical supervision.	C	C 5)	-	-	NRP	C
Guidelines must be worked out, in collaboration with medical experts, covering the medical examination envisaged under 2.3.	C	-	-	-	NRP	C
2.3.3. Work must not continue uninterrupted for more than one hour. A suitable break must then be arranged in a better 'climate'.	C	C	-	-	NRP	E

1) Climatic values only have to be determined in certain very exceptional cases.
2) 3,5 metres/sec.
3) Working points where the temperature reaches 28°C are considered as particularly hot (without this being an absolute maximum value).
4) For mine rescue personnel.
5) Medical supervision obligatory.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
The duration of uninterrupted working time, as well as the duration and frequency of the breaks and the climatic range in which this break is spent, as also all other necessary provisions are to be laid down in writing by the competent authority together with the responsible doctor before the work begins.	C 1)	C	-	-	NRP	E
2.3.4. Acclimatised persons must be chosen. Persons over 40 years of age should not be put to this work.	C	C 2)	-	-	NRP	E
Persons under 21 and over 45 years of age must not be put to this work.	C	C 3)	-	-	NRP	E
2.4. An exception can also be made to the ban on working on location in temperatures above 32° eff A (basic scale) if danger threatens or in special circumstances calling for immediate action.	C	C	C'	C 4)	NRP	E
In such case, however: 2.4.1. The competent authority and the responsible doctor must be immediately informed.	C	C	C'	-	NRP	E
2.4.2. This work must be performed as soon as possible under the conditions listed in 2.3.1. to 2.3.4.	C	C	C'	C'	NRP	E
3. Climatic range between 32° eff A and 28° eff A (basic scale) 3.1.1. Only persons shown by medical examination to be suitable can be employed in this climatic range.	E	C'	-	C	NRP	E
The medical examination must pay particular attention to the heart and to blood circulation.	E	C'	-	C	NRP	E
Persons continually employed in this climatic range must be examined medically at least once a year.	E	-	-	C	NRP	. E
In addition, the following provisions apply: 3.1.2. As soon as a working-point reaches a temperature above 28° eff A (basic scale) the competent authority must be informed in writing.	E	C 5)	-	-	NRP	E
3.1.3. The length of stay in the climatic range between 30° and 32° eff A (basic scale) is restricted to 5 hours, and in the range between 28° and 30° eff A (basic scale) to 6 hours.	C	C 6)	C'	-	NRP	E
3.1.4. For work in a climatic range between 28° and 32° eff A (basic scale) a method of payment corresonding to these conditions must be applied to eliminate any overloading.	E 7)	A 7)	-	C	NRP	A 7)
3.1.5. The provisions quoted in 3.1.3 and 2.1.4 apply to all persons who, during one shift, have to work more than half the time of that shift in one of the climatic ranges mentioned above.	A	C	-	-	NRP	E

1) Laid down generally in the mine rescue plans.
2) Only required for rescue work.
3) No provision made for excluding persons below 21 years of age from exceptional hot work.
4) ... ban on work on location in excessively high temperatures ...
5) If 30° eff A (basic scale) is reached or exceeded, the Mines Inspectorate must be informed.
6) Six hours.
7) Must be arranged by tariff, outside the intervention of the Mines Inspectorate.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph.	Germany Saar	Belgium	France	Italy	United Kingdom
IV - RECOMMENDATIONS REGARDING MEDICAL EXAMINATION (Second Report of the Mines Safety Commission, p. 79)						
1. Pre-Entry Medical Examinations						
- All applicants for employment at collieries should undergo a pre-entry medical examination.	C	C	C	C	C	C' 1)
- This must establish that the applicant shows no symptoms rendering him unfit for such employment.	C	C	C	C	C	C
The pre-entry medical examination must include: - a general examination - such special examination as may be deemed necessary for the purpose.	C	C	C	C	C	C
- The examinations effected must include, as regards the chest, a radiograph or radiophotograph of format not smaller than 70 x 70 mm.	C	C	C	C	C	C'
- The latter to be supplemented if need be by a standard-format (1 : 1) radiophotograph.	C	C	C	C	C'	C'
- The nature of these examinations and	C	C	C	C	C'	C'
- the practical details, together with	C	C	C	C	C'	C'
- the criteria on which the doctor should base his findings,	C	C	C	C	C'	C'
- should be defined by medical experts.	C	C	C	C	C'	C'
- In the case of recruitment for work, whether below or above ground, where the worker will be exposed to a dust hazard, the examination must show a normal pulmonary image.	C	C	C	C'	C'	C'
- The concept of normal pulmonary image must be defined by medical experts.	C	C	C	C'	C'	C'
- These are to be regarded as minimum medical recommendations. - The points concerning the number and type of examinations to be carried out, - the effecting of radiological examinations - the definition of the normal pulmonary image - are subject to review in each country - whenever this is felt to be appropriate in the light of progress in medical and radiological knowledge - working conditions, and - preventive measures.						
2. Special Examinations						
a) The object of special medical examinations should be to establish - taking into account, according to circumstances, the opinions of: - the training - vocational-guidance and applied psychology	C	C	NRP	C'	E	C'
- and other services concerned a worker's fitness for certain specific occupations	C	C	NRP	C	C	C'

1) Statutory regulations require all persons under 18 years of age to undergo such an examination. In practice extensive medical facilities are available to all miners free of charge and at any time.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph.	Germany Saar	Belgium	France	Italy	United Kingdom
b) Such examinations are essential in the case of jobs:						
- Which, either in themselves or owing to the conditions under which they are performed, involve a special hazard to the worker himself or to others as regards health and/or safety.	C	C	C	C	C	C'
- which involve special health or safety requirements, - or which demand particular physical aptitutes or characterological qualities.	C	C	C	C	C	C'
c) No attempt has been made here to list in full the cases in which special examinations are necessary this being left to the competent authorities in each country. Examples include:						
- winding enginemen,	C	C				
- staple pit enginemen,	NRP	E				
- motormen (drivers of locomotives, mobile haulers and surface vehicles),	NRP	E				
- workers assigned to hot workings,	NRP	C				
- all those employed on cage handling.	NRP					
3. Routine examinations during employment						
a) Periodic health checks						
- The object here is to establish whether the subject is still fit for duty,	C	C	C	C	C	C
- to detect any symptoms of occupational disease at the earliest possible stage,	C	C	C	C	C'	C
- where appropriate to help supervise the subject's health generally.	C	C	C	C	C'	C
- All personnel should undergo such check-ups at intervals.	C	C	C	C	C	A 4)
- The interval is fixed at two years.	C	C	C	C 1)	C 2)	C 4)
- The interval is reduced for workers under 21.	C	C	C	C 3)	C	- 4)

1) The interval is one year;
2) Article 648 of Inspectorate Regulations provides for an interval of one year.
3) For workers under 18 years.
4) Compulsory for persons under 18 years of age at annual intervals; other miners can consult their local doctors or an industrial medical officer.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
- The interval should be considered as a maximum figure.	C	- 1)	C	C	C	- 2)
This interval can also be reduced:						
- if the state of health of a worker indicates that such a reduction is desirable;	C	C	C	C	E	C'
- in relations to the type of work performed;	C	C	C	C	E	C'
- because of the nature of the place at which the work is being done.	C	C	C	C	E	C'
b) Medical examinations on specific occasions						
1. In the case of reassignment						
- Workers whom it is proposed to assign to jobs involving hazards not previously taken into account for the man concerned should be re-examined.	C	C	C	C	E	C'
2. Medical examination following absence from work						
- Where a man's return to work after an illness or accident involves risk to the safety of himself or others, he may be subjected to a special examination,	C	C'	C	C	E	C'
- the type and extent of which should be fixed in each case according to the circumstances.	C	C'	C	C'	E	C'
V - GUIDELINES CONCERNING THE DESIGN AND USE OF COAL-GETTING AND HEADING MACHINES RELATING TO THE REDUCTION OF AIRBORNE DUST (11th Report of the Mines Safety and Health Commission, annex XI)						
Coal-getting machines (8)						
- General observations on the quality of air entering working areas, water infusion where possible; maintenance of cutting horizons.	C	C	C'	C'	E	C
Directives for coal producers on the use of drum power-loaders (9)						
- water spraying on power loaders (9.1)	C'	C	C'	C'	E	C
- location of sprays (9.2)						
a) internal	C'	C	C'	C'	E	C
b) external		C	-	C'	E	C
- avoidance of jet blockage by adequate pressure and outflow of water (9.3)	C'		C'	C'	E	C
- minimizing coal fragmentation by adequate travel speed of power loaders, by suitable drum speed and by maintaining picks in good condition (9.4)	C'	C'	C'	C'	E	C'
Directives for constructors on the construction of drum power loaders (10)						
To ensure minimal breakage of coal:						

1) Not applicable.
2) Compulsory for persons under 18 years of age at annual intervals; other miners can consult their local doctors or an industrial medical officer.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
1. picks should be as few as possible; their shape and distribution on the drum should be such that the coal is not broken unnecessarily;	yes	A 1)	C'	C'	E	C'
2. the body of the drum should be designed to transfer the cut coal continuously to the conveyor to avoid build-up, the need for clearing up and consequent secondary breakage of the product, as well as projection into the air stream;	yes	A 1)	C'	C'	E	C'
3. the drum should be capable of removing more coal than it cuts;	yes	A 1)	C'	C'	E	C'
4. the speed of travel of the power loader should be variable while in motion;	yes	A 1)	E	C'	E	C'
5. the drum speed should be variable; a maximum pick speed of 4 m/sec is suggested;	yes	A 1)	E	C'	E	C'
6. provision should be made for adjusting the height if the drum to avoid cutting in the roof and floor; it is an advantage to provide facilities for automatic control by suitable sensing devices wherever these can be used.	yes	A 1)	E	C'	E	C'
To ensure effective spraying, machines should be provided with (11):						
1. a water filtering arrangement;	C'	A 1)	C'	C'	E	C'
2. piping to take the water to the inside of the drum; the junction between the body of the machine and the drum should be made by a gland designed for pressure well above the working pressure;	C'	A 1)	C'	C'	E	C'
3. distribution channels in the drum to take the water to the picks;	C'	A 1)	C'	C'	E	C'
4. pipes with a sufficiently large internal diameter to allow an adequate supply of water without excessive loss of pressure; account must be taken of the fact that already or in the near future production methods may call for water supplies of, for example, 200 l/min at a pressure of 15 atm;	C'	A 1)	C'	C'	E	C'
5. one or more systems to feed the external sprays; the position of the jets (for example on the body of the machine and/or on the cowl), the direction of projection, the diameter and operating angle of the jets should all be adaptable to operating conditions.	C'	A 1)		C'	E	C'
To complete the dust suppression arrangements, particularly in view of the use of more and more powerful machines, it is advisable (12):						
a) to provide an automatic water control system to ensure that water is flowing before the drum can rotate; an "override" system should be provided for use by fitting staff only;	C'	A 1)		C'	E	E
b) to design the machine to permit the fitting of a cowl.	C'	A 1)		C'	E	E
The possibility of fitting a dust extractor to the machine should be allowed for in case the systems already described prove inadequate.	C'	A 1)		C'	E	E
Coal ploughs (13)						
a) it is essential that seams be infused correctly on ploughed faces	C	A 1)	C'	C'	E	?
b) where infusion is impossible or insufficient, plough runs should be sprayed either continuously or during the passage of the plough only; alternatively, sprays should be fitted on the plough itself.	C	A 1)	-	C'	E	C'

1) The mines inspectorate cannot (legally) prescribe conditions to the constructors of machiniery. However, the mine owners can only use machiniery which complies with the above requirements.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
c) the methods outlined for external spraying on the drum power loaders apply equally to ploughs.	C	A 1)	-	C'	E	E
d) in addition, spraying must be adequate on the plough runs and at the discharge points between faces and transport roads.	C	A 1)	C'	C'	E	E
- Directives on road heading machines						
General observations on working conditions						
a) in the seam (14);						
b) the importance of dust: the need for de-dusters (15);						
c) the need for cooperation between coal producers and the makers of machines and of de-dusting equipment (16).	C'	A 1)	C'	C'	E	C'
- Technical measures relating to ventilation and the filtration of dust						
a) in general, the forcing of ventilation through ducts (17a);	NRP	A 1)	C'	C'	E	C'
b) the particular case of auxiliary extraction ventilation (17b);	NRP	A 1)	C'	C'	E	C'
c) air filtration (18).	C	A 1)	C'	C'	E	C'
Recommendations on the construction of heading machines						
19. The number of cutting picks on a heading machine should be reduced to the minimum; they should be of such shape and so arranged on their mountings as to reduce fragmentation as far as possible.	C'	A 1)	C'	C'		C'
20. A water supply should be provided on the machine to give sufficient output and pressure for each cutting tool; the arrangements are similar to those for power loaders.	C	A 1)	C'	C'		C'

1) (See previous page)

H - PSYCHOLOGICAL AND SOCIALOGICAL FACTORS AFFECTING SAFETY

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	**Germany**		**Belgium**	**France**	**Italy**	**United Kingdom**
	N.R./Wph	**Saar**				
I - RECOMMENDATIONS ON THE PSYCHOLOGICAL AND SOCIOLOGICAL FACTORS AFFECTING SAFETY (3rd report of the Mines and Safety Commission, p. 425)						
1. Measures which will make it possible for workmen to recognise dangers and to carry out their work in such a way that these dangers are avoided.						
1.1. Recognising dangers						
1.1.1. Before starting work in a district, a section of a working or a workingpoint and before any planned major change in the manpower deployment or in working conditions it is important to check all the safety precautions tomeet any dangers to be encountered.	C	C	C'	C	C'	C
1.1.2. During the work, regular reports on the following points must be prepared on the basis of the safety conditions which have to be observed under continuous supervision: a) changes in operating conditions					C' 2)	
b) accidents or incidents			C		C'	
c) dangerous situation encountered during work	C+C'	C+C'	3)	C'	C'	C
The data brought together in these reports should be systematically assessed with a view to improving or adapting the safety precautions in force.	C+C'	C'	C'	C'	C'	C
1.1.3. After the work has been finished, the data assembled on the basis of daily experience should be used to prepare a report of experience which should at least include information	C'	C'	4)	C'	5)	C
regarding the winning methods used,	C'	C'	4)	C'	C'	C
the dangers which have arisen and the precautions taken to deal with them,	C'	C	4)	C'	C'	C
together with any accidents, incidents and dangerous situations which have occurred during the working operations	C'	C	4)	C'	C'	C
1.2. Making known the dangers to all concerned						
1.2.1. Before starting work in a district, a section of a working or a workingpoint or in the event of a major change in the operating conditions, it is advisable to arrange a discussion between representatives of the management, supervisory staff and members of the safety sevices as well as the workers concerned or their representatives, in order: - to inform each individual with regard to the work envisaged - to study in detail the work to be carried out.						

1) No report is drawn up, verbal or written instructions given to the personnel concerned.
2) As regards the pattern of work and not actual operations as mentioned in the text.
3) Such situations are discussed at management or supervisor level, no report is drawn up.
4) No report is drawn up although account is taken of experience gained.
5) Not only when work is finished but in any case either weekly, monthly or annually.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
- to settle upon the method of work	C'	C'	1)	C' 2)	C'	C'
1.2.2. The workers concerned should be informed by the most appropriate means of the method of work chosen.	C	C	C'	C	C'	C'
1.2.3. During the execution of the work, the management and the supervisory staff should refer to the regulations and instructions to be observed as often as necessary to counteract the effects of habit.	C	C	C'	C	C'	C'
1.2.4. If it is considered necessary to issue new safety instructions, these should be brought regularly to the notice of every worker concerned.	C	C	C'	C	C' 3)	C'
1.2.5. Reports made by each of the workmen regarding dangerous situations which arise during the work should be brought to the notice of the management staff.	C'	C	C'+C	C'	C'+C	C
1.3. Instruction in the manner in which the work is to be carried out without danger						
1.3.1. Every worker assigned to underground work must be able to show that he has:						
- a general training as an underground worker;	C	C	C' 4)	C'	5)	C
- a special training for the work to which he is to be assigned;	C	C	C'	C'	5)	C
- the necessary additional training to cover the special working conditions at the point where he will work.	C	C	C'	C'	5)	C
1.3.2. Should there be a change in the work or in the working conditions, the necessary additional training must be provided.	C' 6)	C	C'	C'	C'	C
1.3.3. Instruction in safety precautions is to be considered as an integral part of vocational training	C	C	C'	C'	C'	C
1.4. Supervision to check that safety regulations are observed during work						
1.4.1. During the work, the safety conditions must be subject to continual supervision.	C	C	C	C	C'	C
1.4.2. The duty to see that safety regulations are observed, and the responsibilities resulting from this duty, fall upon the management and supervisory staff.	C	C	C	C	C	C
1.4.3. The supervision, which must be exercised with authority, should in its ever-day action seek to improve the training and education of the workmen on the basis of daily experience, and should give rise to fines or penalties only in very serious or repeated cases of infringement.	C'	C'	C' 7)	C'	C'	C

1) This takes place at engineer or supervisor level, or even at Safety Committee level, but not at meetings where all the people mentioned are present.
2) Workers' safety representatives may give their opinion and submit their observations in the form provided for in the labour legislation.
3) By means of service instructions issued by the management of the mine, or of service notes issued by departmental heads and supervisors.
4) Convention of the Joint National Mines Commission.
5) Systematic training courses are provided up to 1963. After 1963, no new staff were engaged and therefore apprenticeship and training are only provided where new machinery and equipment is introduced.
6) Laid down by the responsible authorities for particular cases, otherwise generally included in the enterprises manual.
7) Concerns the last part of the sentence: '... and should give rise ...'.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
2. Training the management and supervisory staff in the matter of safety						
2.1. General						
2.1.1. Steps must be taken to ensure that the supervisory staff does not change posts frequently	C'	C'	C'	C'	C'	C'
2.1.2. The vocational training should be adapted to the particular features of the staff member's task and his responsibilities, and in particular to the requirements of his place in the hierarchy of management or supervisory staff.	C'	C	C+C' 1)	C'	C+C'	C'
2.1.3. The transition from one grade to another should be possible for a given person ly after he has actually proved to have the required knowledge and skill.	C'	C	C'	C'	C' 2)	C'
2.2. Guidelines for the vocational training of the management or supervisory staff						
2.2.1. The management and supervisory staff must have an adequate knowledge of:						
- the safety regulations;	C	C	C'	C	C'	C
- the safety precautions to be taken;	C	C	C'	C	C'	C
- the available safety equipment and its use;	C	C	C'	C	C'	C
- the instructions in force for the different vocational groups whose work they are called upon to supervise, and the instructions for the exercise of activities at the working points for which they are responsible.	C	C	C'	C	C'	C
2.2.2. The management and supervisory staff must be able:						
- to point out in a suitable way to the workers under their orders the dangers associated with their work;	C'	C	C'	C	C'	C
- to instruct these workers as to how best to carry out the work in order to avoid these dangers.	C'	C	C'	C'	C'	C
2.2.3. The management and supervisory staff should be trained in how to issue instructions.	C'	C'	C' 3)	C'	C' 4)	C'
2.2.4. Special attention must be apid to the continual further training of all management and supervisory staff.	C'	C'	C'	C'	C'	C'
2.2.5. The management and supervisory staff must both:						
- account for and report on the execution of their work, and	C'	C'	C'	C'	C'	C'
- account for and report on all accidents and other notable incidents which have occurred during the working period at the points for which they are responsible.	C	C'	C'	C'	C	C'
2.2.6. The management and supervisory staff must be able:						
- to draw up accident reports correctly;	C	C'	C' 5)	C'	C'	C'
- to assess and use the data in these report;	C'	C'	C' 5)	C'	C'	C'
- to study and establish the causes of accidents;	C'	C'	C' 5)	C'	C'	C'

1) For the shotfirer.
2) By limited competition in the E.N.E.L. (Ente Nazionale per l'Energia Elettrica).
3) For the management staff. No systematic training in management for other grades.
4) This is not considered as a subject for training. Preference is given to constant supervision of the staff.
5) For the management staff. For supervision staff in certain cases only.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
- to work out means to aboid accidents;	C'	C'	C' 1)	C'	C'	C'
- to receive the training necessary to this end.	C	C'	C' 1)	C'	C'	C'
2.3. Staff responsible for training						
2.3.1. The staff responsible for the training activities set out in paragraphs 1.3 and 2 must be numerous enough and must have available the necessary means and time to carry out their task properly.	C	C	C'	C'	2)	C
2.4. Drawing up of an accident report; training of staff responsible for filling in such reports						
2.4.1. The accident report must, taking into account all the appropriate human and technical factors, give all necessary information and in particular:						A 5)
- the circumstances, the consequences of the accident, the causes,	C	C	C	C'	C'	C'
- the precautions proposed to avoid similar accidents.	C	C	C	C'	C'	C'
2.4.2. Each of these items of information referred to in point 2.4.1 must be capable of formulation as an answer to a clear and precise question.	C	C	C	C'	C'	C'
2.4.3. The breakdown and layout of the form used for accident reports must clearly show which questions have to be answered by each of the members of the staff contributing to the preparation of the reports.	C'	C' 3)	C	C'	C'	A
2.4.4. There must be suffcient room on the form for supplementary remarks or sketches which may be provided by the person or persons concerned.	C'	C' 3)	C'	C'	C'	C'
2.4.5. Each of the persons contributing to the preparation of the report must be informed with regard to:						
- the importance of each question,	C	C'	C'	C'	C'	A
- the way to provide correct answers to the questions.	C	C'	C'	C'	C'	A
2.4.6. Practical instruction should be provided to draw the attention of the employees concerned to the consequences of omissions, neglectful or unclear answers to the questions.	C'	C'	4)	C'	2)	A
2.4.7. Systematic attention should be paid to ensure that the answers are complete, aacurate and precise.	C	C'	C	C'	C'	C'
2.4.8. The accidents reports referred to in this cahpter are to be drawn up for the sole purpose of accident prevention.	C'	C'	C'	C'	C'	C'
2.5. Appointment and promotion of management or supervisory staff						
2.5.1. Care should be taken to ensure that there is available an adequate number of management or supervisory staff possessed of the requisite skills both in the technical and safety fields.	C	C	C+C'	C'	C+C'	C

1) For the management staff. For supervision staff in certain cases only.
2) Systematic training courses were given up to 1963. After 1963, no new staff were engaged and therefore apprenticeship and training are only provided where new machinery and equipment is introduced.
3) The form used by the professional mining organisation does not comply entirely with this provision
4) Does not exist.
5) It is not considered necessary to provide such training.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany N.R./Wph	Germany Saar	Belgium	France	Italy	United Kingdom
2.5.2. The election of this staff is the responsibility of the employer, who must at least inform the competent authority of the persons entrusted with supervision of working operations, together with the necessary data justifying the selection.	C	C	C	C 1)	C+C' A 2)	C
2.5.3. To ensure a selection which promises success, there should be laid down the minimum requirements for appointment to a post in one of these categories, either by direct appointment or by promotion, together with the certificates and other documents which are the necessary requisite for such an appointment.	C'	C	3)	C'	C 4)	C
2.5.4. The competent authority should be in a position to check the knowledge and skills of the management or supervisory staff - both from the human and technical points of view - should this authority consider it necessary, at least in the case of a major failure or of repeated failures in the performance of duties.	C	C	C 5)	A	A	C
3. <u>Usefulness of psycho-technical examinations</u>						
3.1. <u>On assignment</u>						
3.1.1. It is recommended that the application of a relatively simple psycho-technical examination upon assignment should be developed as far as possible, in order to: - determine the general intellectual level of the candidate;	C'	C	C' 6)	C'	C+C' 7)	A
- to exclude those candidates whose intellectual level lies below a pre-determined minimum.	C'	C	C' 6)	C'	C' 7)	A
3.2. <u>Before the exercises of specific duties</u>						
3.2.1. In every instance, the workmen who are to be amde responsible for the execution of particular working operations - with which there is associated a particular responsibility in respect of collective safety or - which call for particular intellectual or personality characteristics should be subjected to a special psycho-technical examination to determine whether they have the capacities required for this activity.	C 5)	C+E 8)	C' 9)	C'	E	A
3.2.2. The competent authority must, in co-operation with the representatives of the employers and employees, keep up to date the list of work for which those special examinations are to be prescribed and, to this end, should list the duties which have been shown by experience to call for such tests and for which such tests can inpractice be carried out.	C 5)	E 3)	3)	A	E	A

1) The managing director of the mine informs his chief engineer of the name of the departmental head in charge of technical matters.
2) As regards the reasons for the choice.
3) Does not exist in practice.
4) The law lays down a provision concerning the academic qualifications of directors and departmental heads.
5) Psycho-technical examinations are required for certain duties only (winding-enginemen, locomotive drivers).
6) This ceased when recruitment was discontinued.
7) Cf. 2) on previous page.
8) For winding-enginemen and locomotive drivers.
9) Ceased when recruitment was discontinued.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
3.3. Before any promotion of a worker to a supervisory post						
3.3.1. Before the promotion of any workman to a supervisory post, a suitable psycho-technical examination must be carried out.	A 1)	A 1)	C 2)	C'	E	A
3.4. Principles underlying the various psycho-technical examinations						
3.4.1. The psycho-technical examinations listed under 3.2 and 3.3 should, as far as possible, aid the vocational specialisation of the worker in question.	C	C	C'	C'	C'	A
3.4.2. The management must lay down the criteria which have to be met by the candidate on assignment, or later, when directed to special tasks,	C' 3)	C+E	C'	C'	C'	A
and must seek the advice of psychologists when so doing.	C' 3)	C+E	C'	C'	C'	A
3.4.3. The psychologist's assessment will be valid only for a restricted period and must be compared with the assessments of the vocational behaviour of the person in question.	C' 3)	C+E	C' 2)	C'	E	A

1) Eligibility for promotion within the supervisor grade is determined during the vocational training laid-down by the responsible authorities.
2) Where there was in fact a psychological department.
3) Psycho-technical examinations are required for certain duties only (winding-enginemen, locomotive drivers). Other enterprises have these types of examination for other duties.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
II - RECOMMENDATIONS AS TO PRINCIPLES TO BE OBSERVED IN VIEW OF THE POSSIBLE INFLUENCE OF PAYMENT AT PIECE RATES ON SAFETY IN COALMINES (4th report of the Mines Safety and Health Commission, Annex IV).						- 1)
1. Piecework arrangements	2)					
1.1. Minimum age; medical examinations						
1.1.1. To be assigned to piecework, a miner must						
- be not less than 18 years of age	C	C	C	C	C 3)	-
- have underground a medical examination to establish his fitness for such work.	C	C	C	C	C 3)	-
1.1.2. Similar examinations must follow at regular intervals.	C'	C 4)	C	C	C 3)	-
1.2. Make-up of piece rates						
1.2.1. Written particulars of the operations to be performed must be given to the men concerned, including such information as is needed to calculate the amount payable therefor.	C' 5)	C'	C'	C	C'	-
1.2.2. In the interests of safety, the piecework arrangement employed must either						
- provide that operations of importance to safety shall be paid on a separate basis, or	-	-	C'	-	C'	-
- contain equivalent financial safeguards for the proper execution of such operations.	C' 5)	C'	C'	C'	C'	-
1.3. Fixing of norms and of rates payable therefor						
1.3.1. The men must have the right to discuss the fixing of piecework norms and rates with the employer.	C' 5)	C'	C'	C	C	-
1.3.2. If agreement is not reached, the men or their representatives must have the right to start conciliation proceedings under 4 below.	C' 5)	C'	C'	C	7)	-
1.4. Form of piecework						
1.4.1. One-man piecework should preferably be permitted only where the operations concerned are not of a nutre to allow any other form of piecework.	A 6)	C'	?	C'	C'	-
1.5. Determination of the norm						
1.5.1. The norm must be determined in accordance with:						
- the amount of time actually available during a normal shift;	C' 5)	C'	C'	C	C'	-

1) Recommendations not applicable; miners are not paid on piece rates.
2) Questions relating to pay cannot be dealt with by the responsible authorities. Such questions are settled by means of collective agreements.
3) Pursuant to the Mining Regulation and to the provisions relating to young workers.
4) Periodic X-ray examinations (every 15 months at most). Periodic clinical examination only where signs of pneumoconiosis are detected or on medical advice.
5) Settled by collective agreement.
6) For certain operations, one-man piecework is considered by both sides to the agreement as the most appropriate type of remuneration.
7) The collective agreement does not provide for conciliation procedures, although such procedure exists and the Ministry of Labour and Social Security acts as an arbitrator (whose decisions are not binding).

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
the amount of work the men can fairly be expected to perform during this time, having regard to the working conditions;	C' 1)	C'	C'	C	E	-
the amount of time required to perform the operations properly.	C' 1)	C'	C'	C	C'	-
1.6. Calculation of the end wage						
1.6.1. The basis and mode of calculation must be sufficiently simple for any worker to be able to work out for himself the sum due to him for a given period.	C' 1)	C'	C'	C	C'	-
1.7. Performance in piecework						
1.7.1. Regulations should be laid down requiring that periodic checks be carried out on the amounts of workperformed for the purpose of determining the wages payable therefor.	C' 1)	C'	C'	C	C'	-
and that the findings be duly notified to the men concerned	C' 1)	C'	C'	C	C'	-
1.7.2. Particulars must be supplied to the men of all additions and deductions affecting the amount of the end wage, together with details as to how these were calculated.	C' 1)	C'	C'	C	C'	-
2. Changes in conditions at the workplace						
2.1. A piecework arrangement my be terminated or amended if the employer and the men are agreed that genuine difficulties warranting this course have been objectively found to exist.	C' 1)	C'	C'	C	C'	-
Failing such agreement, the men must have the right to ask nevertheless that the arrangement be terminated or amended forthwith.	C' 1)	C'	C'	C	C'	-
2.1.1. If the men cannot be paid at piece rates for so long as the difficulties persist, they must be paid a proper wage appropriate to their grade.	C' 1)	C'	C'	C	C 2)	-
3. Managerial and supervisory staff						
3.1. In the interests of safety, extra supervision must be provided in workings where men are employed on piecework.	C'	C'	?	C'	C'	-
3.1.1. Since failure to carry out safety operations in good time can result in particular hazards, the supervisory personnel must give the men strict and relevant instructions to this effect, and check regularly to see that these are carried out	C'	C'	C	C	C'	-
3.2. Payment of managerial and supervisory staff						
3.2.1. Since managerial and supervisory staff are responsible not only for the organisation and smooth running of operations, but also for the safety of the men engaged in them, they should as a rule be paid out						

1) Settled by collective agreement.
2) The collective agreement guarantees minimum pay and ancillary allowances.
3) Cannot be subject of Mines Authority prescriptions. Settled according to area.

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph	Saar				
on a basis independent of the ups and down of production.	A 1)	C'	C	C	C	-
They may be granted production or output bonuses provided they have at the same time a sufficient financial incentive to devote the necessary attention to safety.	A 1)	C'	C'	C	C	-
4. Settlement of disputes						
4.1. There should be a conciliation system for dealing with any disputes arising between management's and men's representatives with regard to piecework arrangements or their implementation.	C' 2)	C'	C'	C	2)	-
4.1.1. The conciliation system should operate by means of a board on which employers and workers are equally represented, and which should approach disputes in the light of the present recommendations.	C' 2)	C'	C'	C	2)	-
4.1.2. The fact that proceedings of this kind are pending must not affect the terms of employment of the men concerned,	C' 2)	C'	C'	C	C'	-
who must continue to be entitled to a fair wage appropriate to their grade.	C' 2)	C'	C'	C	C	-

1) Cannot be subject of Mines Authority prescriptions. Settled according to area.
2) Settled by collective agreement.

I - INFLAMMABLE DUST

Proposals from the Mines Safety Commission for the improvement of safety and health conditions in coalmines	Germany		Belgium	France	Italy	United Kingdom
	N.R./Wph.	Saar				
Memorandum on information necessary for the examination of coal-dust explosions on ignitions of firedamp in mines (adopted by the Mines Safety and Health Commission, 6.2.73, 10th Report, Annex VII) In this memorandum used by the mines inspectors when investigating accidents?	yes	C	yes	yes	C	C'
- Information on the procedure for binding dust by means of hygroscopic salts, another effective technique for neutralizing inflammable dust (11th report of the Mines Safety and Health Commission, annex VI) Is any further information available?	C	C	E	NRP	no 1)	no
- Information report on water barriers for containing dust explosions underground (11th report ofthe Mines Safety and Health Commission, annex VII) Is any further information available?	C	C	E	NRP	no 1)	no
- Triggered barriers and recommendation for their use underground (11th report of the Mines Safety and Health Commission, annex VIII) At the present stage of research the Mines Safety and Health Commission feels that triggered barriers may be more effective than conventional methods of suppressing explosions at certain points in the mine such as headings, gallery and face junctions, gateroads, the boundaries of ventilation districts and at particular danger points. The Mines Safety and Health Commission has recommended that barriers already available should be installed so that their behaviour under working conditions may be tested. Has this recommendation been implemented?	2)	C	E	E	no 1)	yes

1) Currently, no coal mine in operation.
2) Tests are envisaged during 1976

GENERAL REMARKS ON STEPS TAKEN IN ITALY

It should be noted that pursuant to Article 23 of the Mining Regulations in force, the subject referred to in Section II, page V, 43 has been included in the collective agreements.

The Italian coal mines, of course, comprise only the Sulcis coalfield in Sardinia and are currently not being worked.

The Italian Government only recently decided to consider reopening this coalfield and then crrying out an extensive survey to determine its potential.

It should also be noted that from page IX, 45 onwards of the questionnaire concerned, the symbol 'C' and other symbols used in the answer refer to clauses in the collective agreement in force and not to provisions codified in laws or regulations.

ANNEX NO. VI

LIST OF SPECIALISTS FOR BOREHOLE RESCUE WORK AND EQUIPMENT AVAILABLE IN COMMUNITY COUNTRIES

Position on 1st January, 1976

CONTENTS

1. Introduction

The present list is intended to supply all the centres concerned in the coal industry with information on the appliances available in the countries of the Community for drilling rescue holes from underground and from the surface as well as organisations and specialists in this field.

The drilling appliances with their accessories shown in this list can in an emergency be placed at the disposal of any coalfield in the Community.

The rescue services in each country should be contacted direct, or through the Secretariat of the Mines Safety and Health Commission, The Commission of the European Communities, Floor A.2, Jean Monnet Building, the Kirchberg, Luxembourg, Telephone, Luxembourg 43011. During the night the following telephone numbers may be obtained: Luxembourg, 3.15.05; 310.325; 31.90.48.

2. SPECIALISTS AND APPARATUS FOR RESCUE DRILLING FROM UNDERGROUND

2.1 GERMANY (FEDERAL REPUBLIC)

Ruhr

2.1 1. Note

The availability of the apparatus below together with accessories depends on the rescue centre at Essen. The apparatus is available in fairly large numbers in the Ruhr collieries or at the depot of the rescue centre at Essen and can be dispatched immediately when required.

2.1 2. Addresses of organisations and specialists

2.1 2.1 Hauptstelle für das Grubenrettungswesen, 43, Essen-Krey, Schönscheidtstr. 28, Telephone: Essen 2-18-66
(The switchboard is continuously manned)

Director of the rescue centre: Herr A. Schewe (member of the Rescue Working Party).

Private address: 4640 Wattenscheid-Höntröp, Langacker 11; Telephone Wattenscheid 7-12-13

Technical Director of the rescue centre: Herr F.J. Koch (member of the Rescue Working Party)

Private address: 4100 Duisbourg 1, Gneisenausstrasse 270; Telephone (02131) Duisberg 35-03-57.

The following experts are at the disposal of the rescue centre:

Mining engineers, W. Both, M. Funkenmeyer

2.1 2.2 For drilling rescue holes from underground, the assistance of the following specialists from the drilling division of SKBV can be obtained by applying to the Essen rescue centre:

Herr K. Trösken, 4300 Essen Haarzopf am Wünnesberg 37; Telephone: Essen 71-33-21 and

Mining engineers, B. Schafeld, V. Mertens, B. Gatman

2.1 3. Appliances and accessories available for drilling rescue holes from underground

2.1 3.1 Drilling machines

1. Turmag P 30, 1220 mm. dia.
2. Turmag P VI/12-120, 610 mm. dia.
3. Turmag P 1200, 1200 mm. dia.

All the above machines for drilling large diameter holes are compressed-air driven.

/3.2

2.1 3.2 Drill rods

1. $4\frac{1}{2}$" dia. regular
   - P VI/12-120

2. $5\frac{1}{2}$" dia. regular
   - P 30 -

3. $5\frac{1}{4}$" dia. regular
   special - HG 170 -

With the rods, there is a sufficient number of guide rods for oriented drill holes.

2.1 3.3 Roller bits

1. Non-removable roller bits 98 to 216 mm. dia.

2. Enlarging roller bits up to 1400 mm. dia.

2.1 3.4 Valves and "preventors"

2.1 4. Auxiliary apparatus (communication)

2.1 4.1 Location apparatus

2.1 4.2 Sound location apparatus for mines

2.1 4.3 Telephones for drill holes

2.1 4.4 Intrinsic safety telephones with loudspeaker

2.1 4.5 Radio apparatus for use underground

2.1 4.6 Television apparatus

2.1 5. Auxiliary apparatus (supply and rescue)

2.1 5.1 Containers

2.1 5.2 Rescue cages

1. Dahlbusch apparatus 370 mm. dia.

2. Dahlbusch apparatus 430 mm. dia.

2.1 5.3 Pressurised chambers

2.1 6. Auxiliary apparatus (miscellaneous)
Saar coalfield

2.1 6.1 Note

Requests for the apparatus below should be addressed to the following departments of Saarberg: Interplan GmbH
Safety underground, surveying and mine damage
Rescue Centre at Friedrichsthal (Saar)

2.1 6.2 Addresses of services and experts

2.1 6.2.1 Safety

Director, R. Muller (member of the Rescue Working Party),
6605 Friedrichstal (Ostschachtanlage)
Telephone: Sulzbach: (06897) 8100 and 88182

2.1 6.2.2 Saarberg Interplan GmbH

Director: Bergassessor H.J. Ertle
66, Saarbrucken, Stengelstr.; Telephone (0681) - 54030

2.1 6.2.2.1 Drilling service: Director: Drilling engineer Pitz
Telephone: Saarbrucken (0681) 54030

2.1 6.2.3 Rescue centre, Friedrichsthal (Saar)

Director: Bergassessor F. Antweiler
6605 Friedrichsthal (Saar)
Telephone: Sulzbach (06897) 8100 and 88182. (The rescue centre is permanently manned by a full-time rescue team).

2.1 6.3. Apparatus and accessories available for drilling rescue holes from underground

2.1 6.3.1 Drills

1. Turmag P 30 up to 1220 mm. dia.

2. Turmag P 1200 up to 1200 mm. dia.

3. Turmag P VI/12-120 up to 610 mm. dia.

4. Wirth HG 170 up to 2000 mm. dia.

All the drilling machines for large diameter holes are operated by compressed air. The Wirth drill can also be operated electrically and can therefore be used at the surface. The time required for transport is very variable. In unfavourable local conditions, it may be two or three days before the apparatus is ready to operate.

/6.3.2

2.1 6.3.2 Drill rods

1. 4½" dia. regular - P VI/12-120 -

2. 5½" dia. regular - P 30 + P 1200

3. 5½" dia. H 2/90 special - HG 170 -

Each set of drill rods is accompanied by a sufficient number of guide rods for oriented drilling.

2.1 6.3.3 Roller bits

1. Non-detachable roller bits, 98 to 216 mm. dia.

2. Enlarging bits up to 2000 mm. dia.

2.1 6.3.4 Valves and "preventors"

100 mm. dia.

2.2 BELGIUM

2.2 1. Note

The Belgian coal industry has two machines specially designed for drilling large diameter rescue holes. Each colliery has the material for making holes for first contact. They have contracted out to Messrs. Foraky, specialising in large diameter drilling. The necessary operations for detection and first contact, and arrangements on the spot for drilling will be carried out while awaiting the arrival of the equipment and the specialists from Messrs. Foraky, which will be prompt, in accordance with the agreements. In addition, an agreement has been made with the Central Rescue Station, Belle Roche, Merlebach, France, for the provision of necessary facilities in emergencies.

2.2 2. Addresses of the firm and the organisations concerned

2.2 2.1 Address of the firm :

Foraky, 13, Place des Barricades, Bruxelles 1000 ;
Telephone: Bruxelles (02) 218-53-06 and (02) 218-20-53

2.2 2.2 In order to obtain the equipment when required, contact the rescue centre: Centre de coordination et de sauvetage, Hasselt, Kempische Steenweg 555
Telephone: Hasselt (011) 22-28-87 (The telephone exchange is continuously manned by full-time rescue teams)
or outside office hours : Hasselt (011) 22-50-00

/2.2

- Director: Monsieur Mayné (member of the Rescue Working Party)
  Telephone: Hasselt (011) 22-77-58
  Private address: Europalaan 10, B 3500, Hasselt

- Secretary of the centre: Monsieur A. Sikivie
  Telephone: Hasselt (011) 22-28-87

2.2 2.3 Apparatus and accessories available for drilling rescue holes from underground

Material for detecting trapped miners would be supplied from the Lorraine coalfield, France, but apparatus for fixing the geophones etc. is available locally.

Holes used for first contact: Drilling machines, rods and all personnel required to drill such holes, are available. The machines are of the type Cable-o-Matic supplied by Diamant Boart. If needed, supply containers and apparatus for communication would come from the Lorraine.

Holes for rescuing trapped miners: Two P 1200 machines and the crews to operate them are available. These machines can bore holes up to 610 mm. in diameter. However the chassis of the machines are fixed, and as a result, casing of the holes would be difficult. As with other items, the requisite chassis and tubing, and escape cage, would be supplied from the Belle Roche Central Rescue Station, Lorraine, France; Telephone: Merlebach 04-19-95.

2.3 FRANCE

2.3 1. Note

The availability of the apparatus below together with accessories will be authorised by the Central Rescue Station, Belle Roche, Merlebach. The apparatus is mainly located in the Lorraine, Nord and Pas-de-Calais coalfields, and with the specialist firm "LONGYEAR".

2.3 2. Addresses of organisations and specialists

2.3 2.1 Belle Roche Rescue Centre in the Lorraine coalfield at F 57 Merlebach, Telephone: Merlebach 04-19-95

The switchboard at the rescue centre is manned continuously.

Director:
Monsieur J. Cretin, Divisional Mining Engineer (member of the Rescue Working Party).

/2.2

2.3 2.2 Rescue Centre of Nord and Pas-de-Calais coalfield,
Rue Notre-Dame de Lorette, F 62 Lens (Pas-de-Calais)
Telephone: Lens 28-24-31.

(The switchboard at the rescue centre is continuously manned).

Director:
Monsieur G. Rogez, Mining Engineer (member of the Rescue Working Party).

2.3 2.3 Monsieur R. Grisard, Mining Engineer, Head of the Safety Service of CdF (member of the Rescue Working Party)
9, Av. Percier, F 75 Paris 8e , Telephone: Paris 225-95-00

2.3 3. <u>Apparatus and accessories available for drilling rescue holes from underground</u>

2.3 3.1 <u>Drills</u>

1. 1 Turmag P 30 up to 610 mm. dia., complete with

   1 Swivelling support, flittable and telescopic
   1 Turmag prop
   1 winch

2. Equipment for 508 mm. tubing with the P 30 drill, with

   1 plate for screwing and unscrewing 486 x 508 mm tubes
   1 appliance for guiding and retaining tubes
   1 hydraulic brake for tubes of 508 mm. dia.
   70 m. tubes of 486 x 508 mm. in lengths of
   0.50 m - 0.75 m - 1.00 m - 1.20 m and
   1 of 3 m with the handling pulley.

2.3 3.2 <u>Drill rods</u>

1. 100 drill rods 1.50 m. in length

2. 6 guide rods of 193 mm. dia. and 1.50 m. length

3. 25 guides of 600 mm. dia.

2.3 3.3 <u>Roller bits</u>

1. 4 tricone bits of 193 mm. dia.

2.3 4. <u>Auxiliary apparatus (communication)</u>

2.3 4.1 <u>Detection apparatus</u>

/4.2

2.3 4.2 Sound location apparatus

1. 8 genephones consisting of Hall Sears receivers, types HS-J, model 12

2. 8 pre-amplifiers, type VBI-Grundig, built-in battery.

3. 8 amplifiers type E. OMY 3-Hartmann and Braun, supplied from mains 200 V - 5VA

2.3 4.3 1 lumiscript type 151-8, Hartmann and Braun(8 tracks).

2.3 5. Auxiliary equipment (supply and rescue)

2.3 5.1 Containers

1 container 0.30 m, 1 of 0.60 m, 1 of 0.90 m and 1 of 1.50 m, for rods NQ and BQ

2.3 5.2 Rescue cages

2 Dahlbusch cages, (370 and 430 mm. dia.)

2.3 6. Auxiliary equipment (miscellaneous)

2.3 6.1 1 friction winch for fitting the rope to the rescue cage

1 return end

1 tension and control device, with pull-lift and dynanometer

1 Westphalia winch, model 1033, equipped with Güldner HW hydrostatic transmission.

2.4 UNITED KINGDOM

2.4 1. Note

The apparatus listed below is held in stock by the National Coal Board and can be made available upon request.

2.4 2. Addresses of organisations and specialists

2.4 2.1 Mr. R.B. Dunn, Director General Mining, National Coal Board, Hobart House, Grosvenor Place, London SW1X 7AE.
Tel: London 01 235-2020.

2.4 2.2 Mr. B. Goddard, Director of Environment, National Coal Board, 17 South Parade, Doncaster, South Yorkshire.
Tel: Doncaster 66611

2.4 2.3 Mr. J. Blunt, General Manager Rescue Stations, National Coal Board, 17 South Parade, Doncaster, South Yorkshire.
Tel: Doncaster 66611.

2.4 2.4 Mr. K. Shaw, Chief Exploration Engineer, National Coal Board, Huthwaite, Sutton-in-Ashfield.
Tel: 06-235-2161.

2.4 3. Apparatus and accessories available for drilling rescue holes from underground

2.4 3.1 Drills

1. Hausherr Box drills, model HBM, electric, capacity 180 metres, 800 mm dia.
2. 1 Dresser Raise drill, model 300, electric, capacity 180 metres, 1,2 m dia.
3. 1 Turmag Box drill, model P 30, compressed air, capacity 180 metres, 800 mm dia.
4. 1 Nusse & Grafer Box drill, model P 30, compressed air, capacity 180 metres, 800 mm dia.
5. 1 Nusse & Grafer Box drill, model P VI/12, compressed air, capacity 60 metres, 800 mm dia.
6. Wirth Box Raise drill, model HG 100, electric, capacity 275 metres, 1,4 metres dia.
7. Turmag Box drill, model P 1200, compressed air, capacity 180 metres, 800 mm dia.

2.4 4 Auxiliary Equipment

2.4 4.1 Communication equipment

2.4 4.2 Rescue cage 450 mm dia.

3. SPECIALISTS AND APPARATUS FOR DRILLING RESCUE HOLES FROM THE SURFACE

3.1 GENERAL REMARKS (1)

The possibility of saving emtombed men by drilling from the surface depends essentially on the depth. For rescue purposes, the maximum depth is considered to be about 500 m. On the other hand, in certain conditions drill holes for searching and supply purposes can be successfully carried out to a depth of about 1000 m.

A distinction should be made between holes for searching and supply purposes on the one hand and rescue holes on the other.

Holes for search and supply purposes should be of a minimum diameter of 6 inches, remembering that the smallest turbine has a diameter of 5 inches. In the looser overburdens, a sufficiently large diameter should be chosen for an intermediate tubing of 7 inches.

Rescue drilling can be carried out using normal clay flushing, at a diameter of 26 inches down to a safety zone above the objective. The extent of the safety zone should be determined according to the circumstances, taking into account the local conditions. When the safety zone is reached, the flushing liquid should be removed and drilling continued with air flushing. It is also possible to carry out preliminary drilling with a coring bit (8½ inches) and air flushing, and then to enlarge it with water flushing.

Drilling for search and rescue purposes requires a considerable time as is shown by the following example giving the estimated times for each operation.

3.1 1. Drilling for search and supply purposes

3.1 1.1 Depth of 500 metres

Transport (300 km) and setting up equipment (including 12 hours to mark out, level and strengthen a drilling base of 50 x 50 metres)	24 hrs.
Drilling including direction and tubing work	
0 - 300 m (8 5/8 ")	48 hrs.
300 - 500 m (8")	48 hrs.
Total time	5 days

/1.2

3.1 1.2 Depth of 1000 m

Transport and assembly	24 hrs.
Drilling	
0 - 300 m	48 hrs.
300 - 1000 m (400 m carboniferous)	240 hrs.
Total time	13 days

3.1 2. Drilling and rescue holes

Depth up to 500 m

Drilling and sealing off with cement	
0 - 300 m (drilling pilot hole of 17½ " diameter and enlarging to 26")	5 days
300 - 500 m (17½ ")	5 days
(23")	5 days
Setting tubes	1 day
Drilling in safety zone	2 days
Total time	18 days
+ search drilling	23 days

3.2 GERMANY (FEDERAL REPUBLIC)

Ruhr

3.2 1. Note

Coordination of specialists and use of equipment for drilling rescue holes from the surface are the responsibility of the Rescue Centre at Essen. This centre should be informed in case of emergency. Addresses for the firms listed under paras. 3.2.3.1 and 3.2.3.2, on pages 14 and 15, can be obtained from this centre, whose telephone number is Essen 2-18-66.

3.2 2. Addresses of organisations and specialists

The institutions and specialists quoted for drilling holes from underground are also available for drilling from the surface. These are given on page 16 in section 3.2.3.2.3 . Additional equipment and personnel can be supplied from specialist drilling firms.

3.2 3. Specialised drilling firms

3.2 3.1 The following companies have equipment for drilling pilot holes up to 6" in dia.:

Name of Company	Type of drilling machinery available		
	0-500 m	- 1000 m	- 1500 m
Aufschläger	2 Itag 500		
Deutsche Schachtbau			SMG FS 291
Deutsche Texaco AG			Ideco H 30 Ideco H 525
Deutsche Tiefbohr AG			1 Ideco H 30 1 Ideco H 525
Etschel & Meyer	UH 1, E&M U 1, E&M Long Year 21 L34 + L38 Craelius D 2000	6 UMA 2, E&M	
Göttker		3 Göttker G 63 5 " G 200 11 " G 250 9 " G 300 3 " G 400 1 " G 450 10 " G 500 2 " G 750	
Itag		Wilson Mogul 42/ Winchmobile	Wilson Mogul 42/ Winchmobile
Mobil Oil		SMG 61100/30	
Preussag AG	SMG ZA 292	SMG ZA 292	SMG ZA 292
Rheinbraun	1 Wirth L10 1 Wirth L15		
Thiele	3 BOMAG 300	2 Failing 2500	
FOREX		Ideco H 25	Ideco H 40 Ideco H 525
Osterr. Mineralölverw.			Ideco SBS-DIR 700

3.2 3.2 The companies listed below have equipment for drilling rescue boreholes of at least 18 5/8 inches in diameter.

Name of Company	Type of drilling machinery available	
	0-500 m	- 1000 m
Deutsche Schachtbau	SMG FS 291	Franks Explorer III
Deutsche Texaco AG	Ideco H 30 Ideco H 525	2 NSCO 80-B
Deutsche Tiefbohr AG	1 Ideco H 525	3 NSCO 80-B 1 EMSCO A-800
Etschel & Meyer	7 SB 1, E&M	
Göttker	3 Göttker G 63 3 Göttker G 400 1 Göttker G 450 10 Göttker G 500 2 Göttker G 750	
Preussag AG	2 Franks Explorer III	
Rheinbraun	1 Wirth L 10 1 Wirth L 15	
Wintershall AG		CABOT Explorer 900 (fahrbare Bohranlage)
FOREX	Ideco H 40 Ideco H 525	
Osterr. Mineralölverw.	Ideco SBS-DIR 700	

<u>Note on drilling equipment and accessories</u>

3.2 3.2.1 <u>Drilling for search and supply purposes</u>

Nearly all the firms listed have the required tools and tubes for drilling holes for search and supply purposes at a diameter of 6 to 8 inches.

3.2 3.2.2 Tubes

For tubing rescue holes, tubes up to 24" diameter are required. The stocks of tubes of this size vary according to the firm. However, it can be assumed that the total length required can be obtained from all the firms listed.

3.2 3.2.3 Air compressors

To carry out search drilling with air flushing, the appropriate compressors will be found at the following firms:

ATLAS COPCO Deutschland GmbH

4300 Essen-Frillendorf, Ernestinenstrasse 155
Telephone (0201) 2-47-1
(0201) 24-72-01 - after office hours

Etschel & Meyer
8670 Hof/Saale, August-Mohl-Strasse 38, Postfach 3309
Telephone: (09281) 99 21

and

8000 München 82, Rofanstrasse 47a
Telephone: (089) 42-27-03 or 42-55-80

Rheinische Braunkohlenwerke AG, Gruppe Nord,
Bohrbetrieb und Wasserwirtschaft
5151 Niederaubem, Postfach 40
Telephone: (02271) 8-11

FOREX Forages & Exploitations Pétrolières
20, Avenue Rapp, Paris (7e)
Telephone: 5-55-14-00

3.2 4. Saar

3.2 4.1 Preliminary note

In order to request the following equipment, the following services of Saarberg Interplan GmbH should be contacted:

Safety underground surveying and mine damage and the rescue centre at Friedrichsthal (Saar).

3.2 4.2 Addresses of organisations and experts

The same organisations and specialists for drilling work from underground are also competent for carrying out drilling work from the surface. The addresses are shown in paragraphs 3.2.3.1. and 3.2.3.2. , on pages 14 or 15.

3.2 4.3 Drilling organisations

Saarbergwerke AG has the following equipment and accessories:

3.2 4.3.1 Drills including carriages

1. Salzgitter SG 750, for directed drilling up to 159 mm, with enlargement possible, up to 270 mm dia.: sufficient for up to 100 metres deep.

2. Salzgitter FB 298 for directed drilling up to 216 mm, with enlargement possible up to 270 mm dia.: sufficient for up to 1300 metres deep.

All the drilling machines are operated by a diesel engine and are mobile. The Salzgitter SG 750 machine can be transported in a few hours but the machine FB 298 is more powerful and takes several days to transport and erect.

3.2 4.3.2 Drill rods

2 3/8 inches Regular N - ACME + 3½ " IF
can be used with the 2 types of drill listed under 3.1.

3.2 4.3.3 Bits

The roller bits up to 216 mm have already been mentioned in connection with machines for underground.

3.2 4.3.4 Valves (complete locking)

Type Wirth 6 5/8 inches for pressure up to 140 kg/cm^2.

3.2 5. General

It should be noted that the drilling machines belonging to the service for drilling at great depths are in continuous use, except when being moved from one place to another. Allowance should be made for the transport times required, as indicated above.

3.3. BELGIUM

3.3 1. Note

The remarks on page 8 on drilling from underground, also apply for drilling from the surface.

Requests for experts and for equipment are made by the Rescue Centre, Hasselt, who will be responsible for the coordination of drilling work.

3.3 2. Addresses of organisations and experts

Relevant addresses are given on pages 6 and 7, paragraphs 2.2.2.1 and 2.2.2.2.

3.4. FRANCE

3.4 1. Note

Requests for drilling equipment and experts, as well as for coordination of drilling work, are dealt with by the services listed on pages 7 and 8, paragraphs 2.3.2.1, 2 & 3 .

3.4 2. Addresses of organisations and experts

The addresses are on pages 7 and 8 .

3.4 3. Drilling firms

3.4 3.1 FOREX Forages & Exploitations Pétrolières
35, rue St. Dominique, Paris 7e
Telephone: 70595-00 (Lignes groupées)

3.4 4. Drilling Experts

Requests for experts and equipment to be addressed to:

M. Maurice Lepreux
24, rue Boissières, Paris 16e
Telephone: 704-59-06.

3.4 5. Drilling Equipment

3.4 5.1 Drilling Equipment available at the Rescue Centre Belle-Roche

1 Joy oleo-hydraulic drill - 22 HD (400 metres in NQ.U).

3.4 5.2 Drilling Equipment available at FOREX

3.4 5.2.1 Drilling Equipment for search and supply (6 inch dia.)

For depths up to 1000 metres:
Ideco H 25

For depths up to 1500 metres:
Ideco H 40
Ideco H 525

3.4 5.2.2 Drilling Equipment for rescue work (18 5/8 inch dia.)

For depths up to 500 metres
Ideco H 40
Ideco H 525

3.4 6. Note on drilling equipment and accessories

The information given on page 9, paragraphs 2.3.5 and 2.3.6 is also applicable here.

3.5. UNITED KINGDOM

3.5 1. Note

The National Coalboard own one Wirth L.4 drill rig (details given below) for large diameter borehole rescue purposes which is capable of drilling to a depth of 360 metres. However, the Board has a contract with Foraky Ltd to maintain and ensure that this L.4 rig, together with its associated equipment, is always available for use. The contract also includes for Foraky to make available as many of their own rigs as may be required for drilling location holes. In addition the Board themselves hold a considerable number of rigs suitable for location hole drilling purposes.

3.5 2. Addresses of organisations and specialists

3.5 2.1 See paragraph 2.4.2 (same as underground equipment) on page 10.

3.5 3. Apparatus and accessories available for drilling rescue holes from the surface

3.5 3.1 Drill

Wirth L.4 drill rig, trailer mounted and powered by a 12 cylinder 4 stroke Deutz Diesel engine; air cooled two stage high pressure compressor mounted on the rig and racking platform in the mast; a two drum type draw works is mounted on the chassis.

3.5 3.2 Drill rods

Seamless steel drill pipe, 4½ " dia., total length = 370 metres, approx.

3.5 3.3 Hole casings

Total length of approximately 2500 metres of internal diameters varying from 534 mm to 915 mm.

3.5 3.4 Drill bits

Range of drill bits varying from 670 mm to 1016 mm in diameter.

3.5 4. Auxiliary apparatus

3.5 4.1 Communication equipment.

3.5 4.2 Rescue cage - 450 mm dia.

ANNEX VII

Minimum safety requirements for winding and balance rope suspension gear, for shaft winding and sinking installations

(adopted by the Mines Safety and Health Commission on 2nd December 1975 and submitted to the Governments of Member States as a proposal following Article 1 of its Terms of Reference and for implementation and follow-up in accordance with Article 4 of those Terms of Reference).

1. Field of application

1.1 These requirements apply to winding and balance rope suspension gear in shaft winding installations designed for manriding, and/or mineral and materials, winding or sinking installations.

1.2 The provisions of items 3.1 to 3.8 and 3.15 and 3.16 shall apply to winding and balance rope suspension gear in other installations not included in item 1.1.

1.3 The following shall not be considered as winding rope suspension gear[1] or balance rope suspension gear[2] :

1.3.1 the ends of the winding or balance rope attached to the suspension gear

1.3.2 the main load-bearing elements of the conveyance[3], the attachment points on the conveyance for the bridle chains and winding rope suspension gear and the suspension beams and attachment points for the balance rope suspension gear

1 see item 2.4

2 see item 2.5

3 see item S.4

2. Definitions

2.1 Examination (German: 'Ueberprüfung', French: 'contrôle')

Examinations are to be carried out by a competant person nominated by the Manager of the Mine. They are made to determine externally visible damage or defects.

2.2 Inspection is to be carried out by a competant person who has received appropriate engineering training (e.g. overman mechanic). Inspections are made to determine damage or defects requiring detailed examination, if necessary after the cleaning of indiviual components.

2.3 Testing (German: 'Untersuchung', French: 'examen')

Testing shall be carried out by an independent expert authorized by the Mining Authorities to perform such duties. Testing comprises:

2.3.1 detailed exmaination of components, after they have been dismantled and cleaned, to determine damage or defects,

2.3.2 where necessary, application of special testing or measuring methods permitting detection of damage to the load-bearing components e.g. incipient cracks.

2.4 **Suspension gear**

Suspension gear (see Figs 1-9) is taken to mean the connecting elements between winding rope and winding cage, skip or counter-weight (herein after referred to as 'conveyance').

2.5 **Balance rope suspension gear**

Balance rope suspension gear (see Figs 10-13) is taken to mean the connecting elements between the balance rope and conveyance.

3. Standard safety regulations for winding and balance rope suspension gear.

3.1 Mathematical safety factor for suspension gear - at least 10 x

3.2 Test loading of suspension gear - 2.5 x

3.3 Mathematical safety factor for the king post

in the area of the borehole - at least 10 x

in the shaft of the king post - at least 15 x

3.4 Edges of the clamps rounded off - yes

3.5 Marking of the load-bearing components of the suspension gear (see item 4.6) - yes

3.6 Weld seams only on non load-bearing components other than chains (compression and shear loads permissible) - yes

3.7 Wedge-type capels and wedge clamps for conveyance with arresting devices - with the exception of straight friction wedge-type rope capping (type reliance) - not acceptable.

3.8 Items 3.1, 3.4, 3.5 and 3.6 apply to balance rope suspension gear - yes

3.9 In situ examination of suspension gear (for derogation see item 4.7) - every working day

3.10 In situ examination of balance rope suspension gear - at least weekly

3.11 Dismantling and inspection of suspension gear (for derogation see item 4.8) - 6 months

3.12 Dismantling and inspection of balance rope suspension gear (for derogation see item 4.8) - 6 months

3.13 Testing of suspension in the dismantled condition (for derogation see item 4.9) - 12 months

3.14 Testing of balance rope suspension gear in the dismantled condition (for derogation see item 4.9) - 12 months

3.15 Service life of winding and balance rope suspension gear (for derogation see item 4.10) - 10 years

3.16 Overall life of winding and balance rope suspension gear in calendar years (for derogation see item 4.10) - 20 years

4. General

Supplementary provisions applicable to the standard safety requirements for winding and balance rope suspension gear

4.1 Winding and balance rope suspension gear must be manufactured from non-aging materials (i.e; materials resistant to strain age embrittlement) or from materials which are specifically permitted under national regulations

Tests must be conducted to determine the mechanical properties of the materials of which suspension gear is made - apart from capel wedges or thimbles and clamps.

The tests must be carried out on surplus lengths having the same cross-section and having undergone the same heat treatment as the individual ropes in question or on test pieces from the same batch, the shape and dimensions to be agreed with the user. These test pieces must have undergone the same heat treatment as the individual components.

4.2 The requisite mathematical safety factor for winding rope suspension gear (item 3.1) and balance rope suspension gear (item 3.8) is based on the ex-works condition and on subsequent replacement of bushes. It shall be determined by simple static load calculations based solely on the load, the strength of the material and dimensions, taking into account the limits of permitted wear (Code of Practice). (The safety factors have been selected so that there is an adequate safety margin even if complicated theoretical strength calculations are used). The lowest tensile strength guaranteed for the material selected shall be used for the calculation.

4.3 In the calculation of safety factors for all suspension gear components the load shall be taken as the net weight of the conveyance, the weights of the mine cars, the payload and the balance rope suspension gear as well as that of the balance rope from the topmost operating condition of the conveyance down to the loop of the balance rope and shall cover at least the proportionate weights of the winding rope suspension gear. The payload to be included in the calculation is that most frequently encountered in material winding under normal conditions. The manwinding weight should be used if this is greater than the material winding weight.

4.4 In calculating the safety factors for the balance rope suspension gear, the load shall be taken as the weight of the balance rope suspension gear and of the balance rope from the topmost operating position of the conveyance down to the loop of the balance rope.

4.5 Test loading of the suspension gear shall be carried out at 2.5 times the design load.

Test loading of ordinary thimbles and clamps is not necessary.

4.6 The load-bearing suspension gear components must be marked - e.g. by stainless steel plaques attached with adhesive - so that the surface of the material is not damaged, unless national standards permit this at certain points on the components.

4.7 Examination of suspension gear (item 3.9) need only be carried out weekly if manriding and material winding take place only occasionally and involve not more than thirty winding operations per working day.

4.8 Dismantling of the winding rope suspension gear components (item 3.11) and of the balance rope suspension gear components (item 3.12) need only be carried out at intervals of 12 months (maximum) if winding and balance rope suspension gear is inspected in situ at intervals of not more than two months.

4.9 Except in the case of winding installations subjected to heavy usage, e.g. over 500 winding operations per working day, testing (items 3.13 and 3.14) need only be carried out at intervals of up to two years if winding and balance rope suspension gear components subjected to tensile and bending stresses are tested for incipient cracks by means of suitable non-destructive methods.

4.10 The service life of winding and balance rope suspension gear (see item 3.15) mqy be set at a maximum of 15 years and the overall life (see item 3.16) at a maximum of 30 years provided the Mining Authorities grant exceptional authorization.

4.11 In the case of material winding installations not contained in the same shaft as manriding systems, other time intervals may be laid down by national authorities for the examination and inspection of winding and balance rope suspension gear covered by items 3.9, 3.10, 3.11 and 3.12.

Vokabular	Zwischengeschirre
Vocabulaire	Attelages
Vocabulary	Suspension gears

Zwischengeschirr mit "Gallscher Kette" und konischer Hülse für Vergußkopf
Suspension gear with "Chaîne Galle" and socket for white metal capping
Attelage avec "Chaîne Galle" et douille conique pour culot coulé

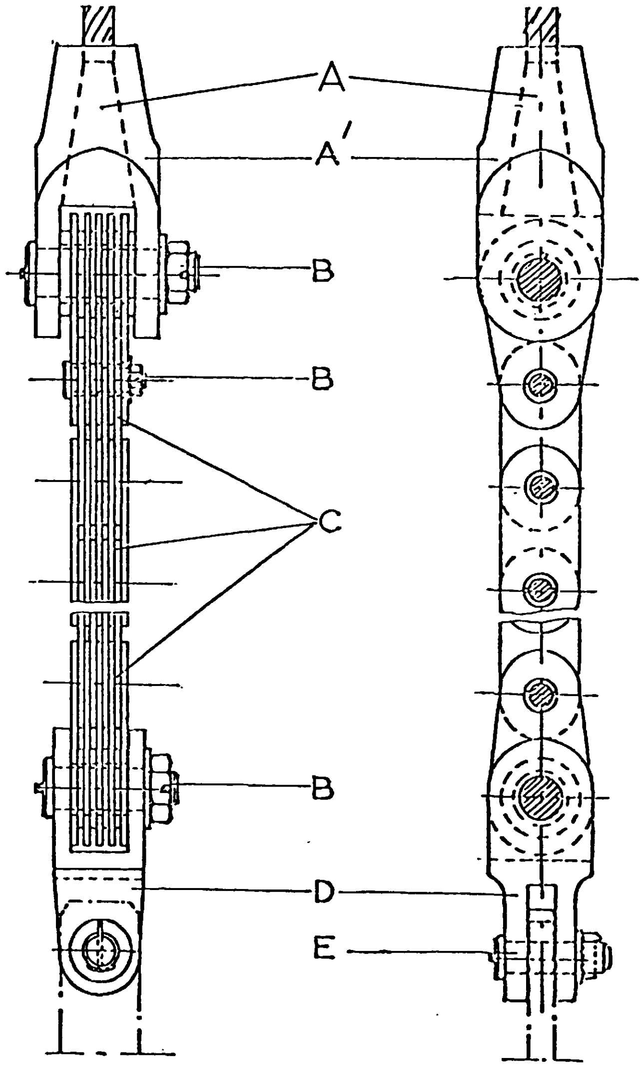


Fig. 1

	deutsch	english	français
A'	Hülse für konischen Verguß-kopf	Socket for white metal capping	Douille conique pour culot coulé
A	Vergußkopf	White metal capping	Culot coulé
B	Bolzen mit Mutter und Splint	Pin with nut and cotter	Axe avec écrou et goupille
C	Kettenglied	Flat link	Maillon
D	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
E	Bolzen mit Spaltkeil	Pin with wedge	Axe avec clavette

Zwischengeschirr "Pince - Câble"
Suspension gear "Pince - Câble"
Attelage "Pince - Câble"

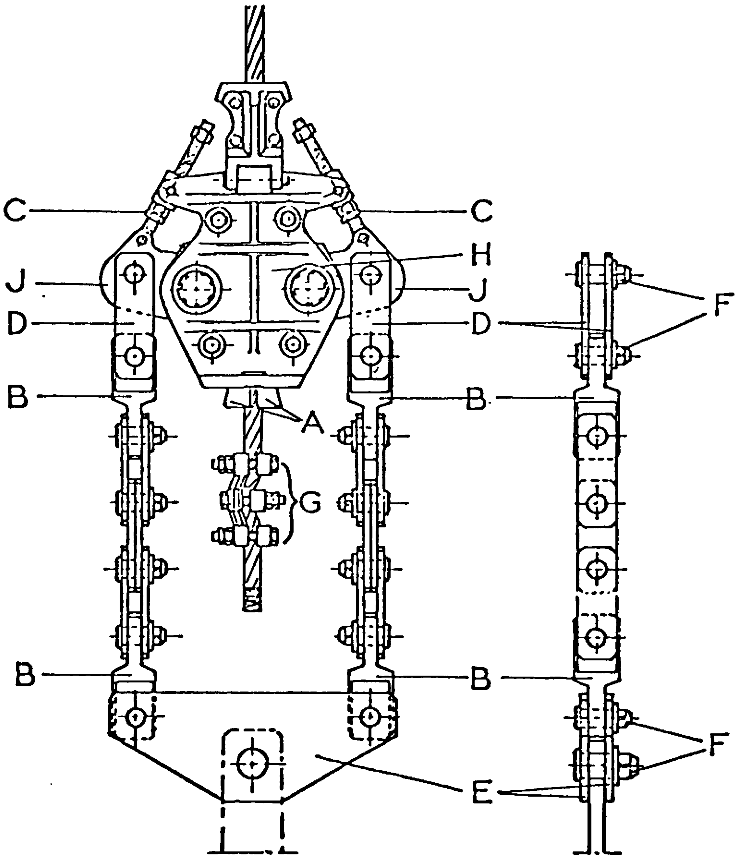


Fig. 2

	deutsch	english	français
A	Keil	Wedge	Coin
B	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
C	Vorspann-Spindel	wedge clamping screw	Vis de préserrage
D	Lasche	Flat link	Eclisse ou maillon
E	Anschlußblech	Reverse spreader plate	Palonnier
F	Bolzen mit Spaltkeil	Pin with wedge	Axe avec clavette
G	Sicherheitsklemmbügel	Safety clamp	Bride de sécurité
H	Klemmgehäuse	Capel body	Bâti pour coins de serrage
J	Klemmhebel	Clamping lever	Bras de serrage

Zwischengeschirr mit Keilen und Klemmringen
Suspension gear with straight friction capel
Attelage à coins à serrage par frettes

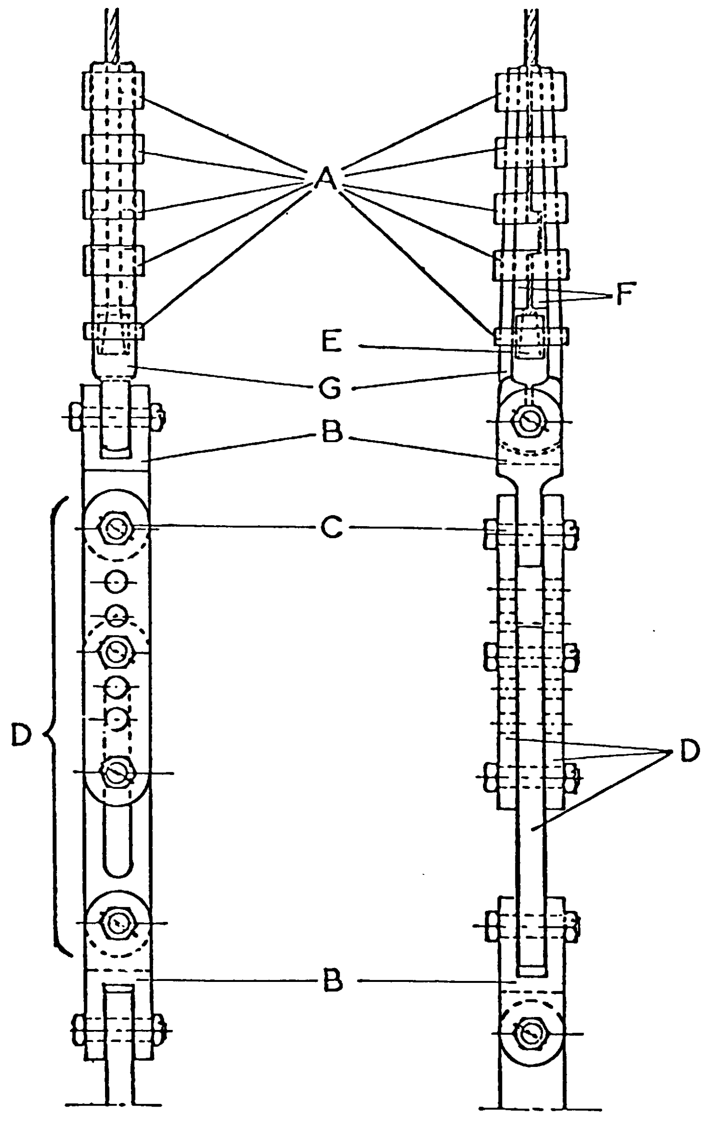


Fig. 3

	deutsch	english	français
A	Klemmring	Band	Frette
B	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
C	Bolzen mit Mutter und Splint	Pin with nut and cotter	Axe avec écrou et goupille
D	Versteck1asche	Adjusting link	Eclisse de réglage
E	Sicherheitsblock	Safety block	Culot coulé de sécurité
F	Keil	Wedge	Coin
G	Klemmkörper	Hoop	Fourche

Zwischengeschirr für Trommelmaschine (Einseil)
Drum winder suspension gear (single line)
Attelage de tête pour machine à tambour (monocâble)

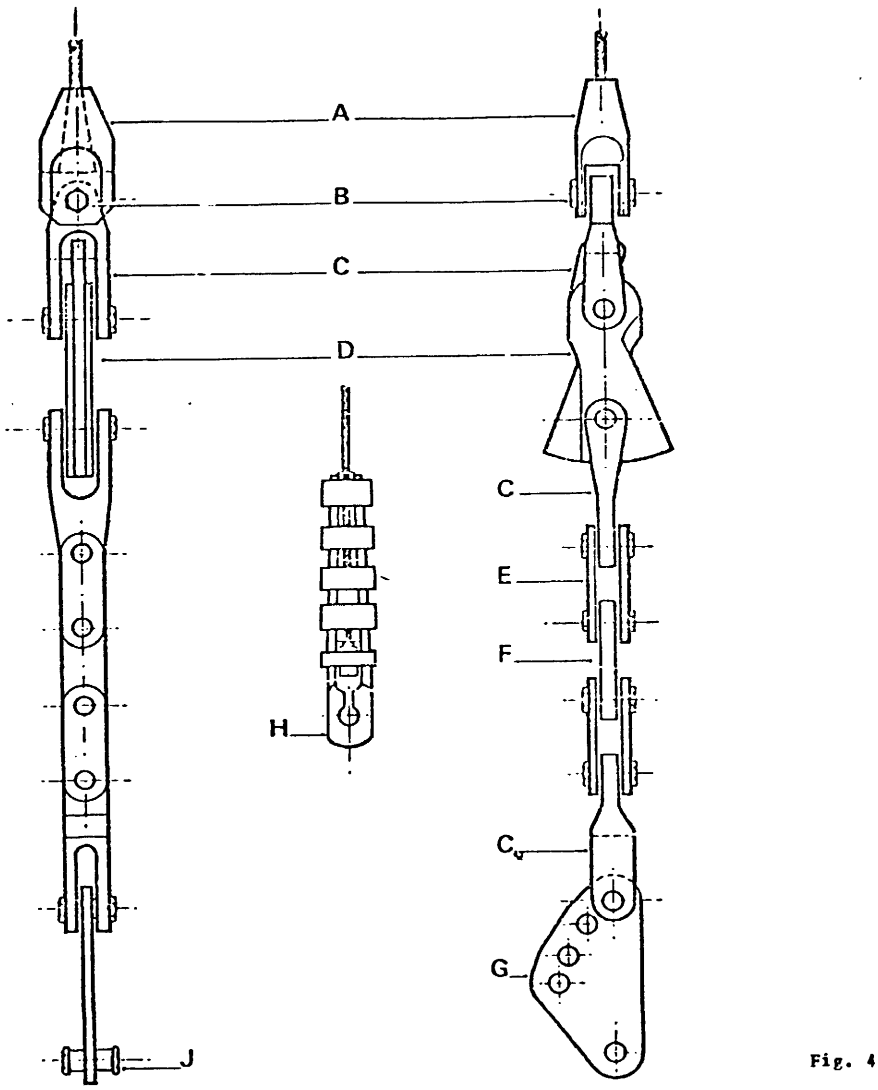


Fig. 4

	deutsch	english	français
A	Hülse für konischen Verguß-kopf	Socket for white metal capping	Douille conique pour culot coulé
B	Hülsenbolzen	Socket pin	Axe de douille
C	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
D	Auslösehaken	Detaching hook	Système de décrochage
E	Außenlasche	Flat link	Eclisse ou maillon extérieur
F	Innenlasche	Connecting link	Eclisse ou maillon intérieur
G	Versteckblech	Adjusting link	Pièce de réglage
H	Klemmkörper mit Keilen und Klemmringen	straight friction capel	Attache à coins à serrage par frettes
J	Verbindungsbolzen zum Korb oder Skip	Connecting pin to cage or skip	Axe de liaison avec cage ou skip

Kettenzwischengeschirr für Trommelmaschine
Drum winder chain suspension gear
Attelage à chaînes pour machine à tambour

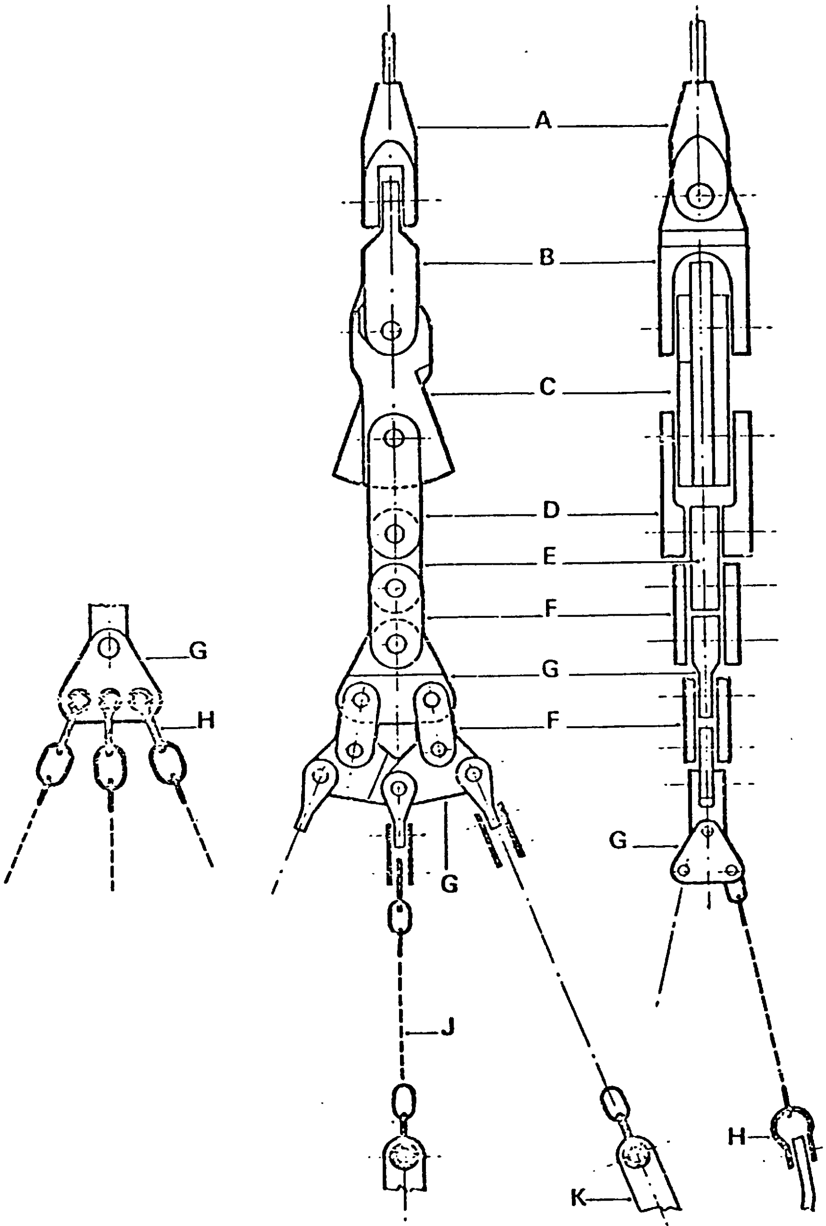


Fig. 5

	deutsch	english	français
A	Hülse für konischen Vergußkopf	Socket for white metal capping	Douille conique pour culot coulé
B	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
C	Auslösehaken	Detaching hook	Système de décrochage
D	Kauschenlasche	Bossed link	Eclisse avec bossage
E	Innenlasche	Connecting link	Eclisse ou maillon intérieur
F	Außenlasche	Flat link	Eclisse ou maillon extérieur
G	Anschlußblech	Spreader plate	Palonnier
H	Schäkel	Shackle	Manille
J	Kette	Chain	Chaîne
K	Kettenaufhängeblech	Cage hanger	Fer plat d'accrochage

Zwischengeschirr für Koepemaschine (Ein- und Mehrseil)
Friction winder suspension gear (single or multi rope)
Attelage de tête pour machine à friction (monocâble ou multicâble)

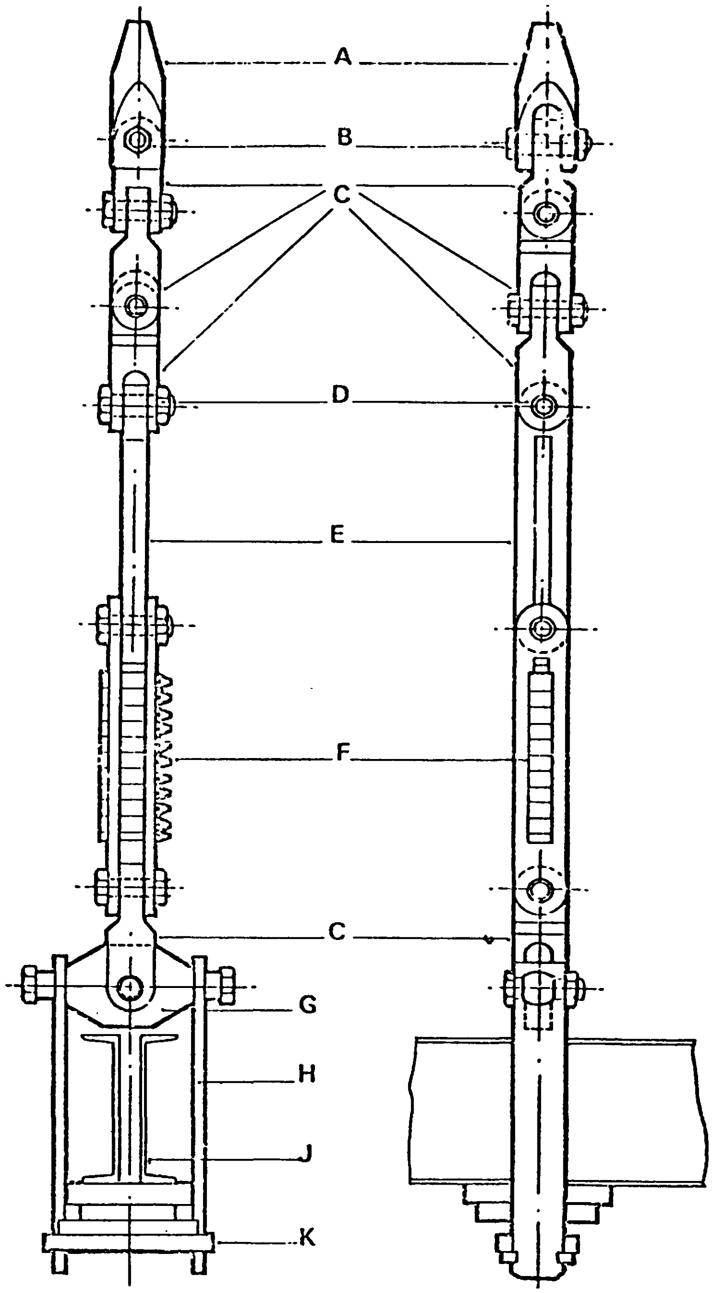


Fig. 6

	deutsch	english	français
A	Hülse für konischen Verguß-kopf	Socket for white metal capping	Douille conique pour culot coulé
B	Hülsenbolzen	Socket pin	Axe de douille
C	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
D	Bolzen	Pin	Axe
E	Versteckl asche	Adjusting link	Eclisse de réglage
F	Versteckklotz	Adjusting block	Cale de réglage
G	Kreuzkopfstück	Crosshead	Pièce de liaison en croix
H	Seitliche Aufhängelasche	Side plate link	Eclisse latérale de suspension
J	Korb oder Skip Aufhängeträger	Cage or skip suspension beam	Poutre de suspension de la cage ou du skip
K	Feststellplatte	Bottom adaptor block	Plaque de fixation

Zwischengeschirr mit Klemmkausche
Suspension gear with wedge capel
Attelage à cosse autoserrante

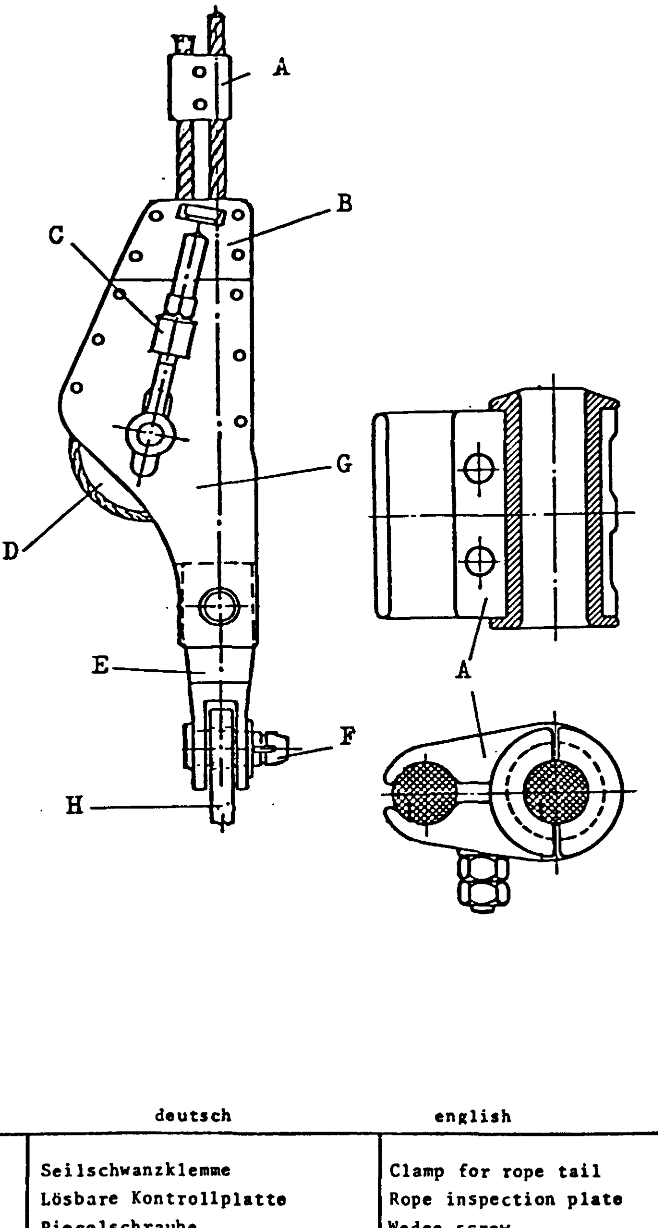


Fig. 7

	deutsch	english	français
A	Seilschwanzklemme	Clamp for rope tail	Pince de brin libre
B	Lösbare Kontrollplatte	Rope inspection plate	Flasque démontable
C	Riegelschraube	Wedge screw	Vis de déblocage
D	Kauschenherz	Capel wedge	Coeur de cosse
E	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
F	Bolzen mit Sicherung	Fork link pin	Axe avec clavette
G	Klemmkauschengehäuse	Wedge capel body	Bâti pour cosse autoserrante
H	Königstange	King post	Tige maîtresse

Zwischengeschirr mit Kausche, Seilklemmen und Einfach-Kreuzgelenk·
Suspension gear with thimble, rope clamps and fork link
Attelage à cosse, brides et croisillon simple

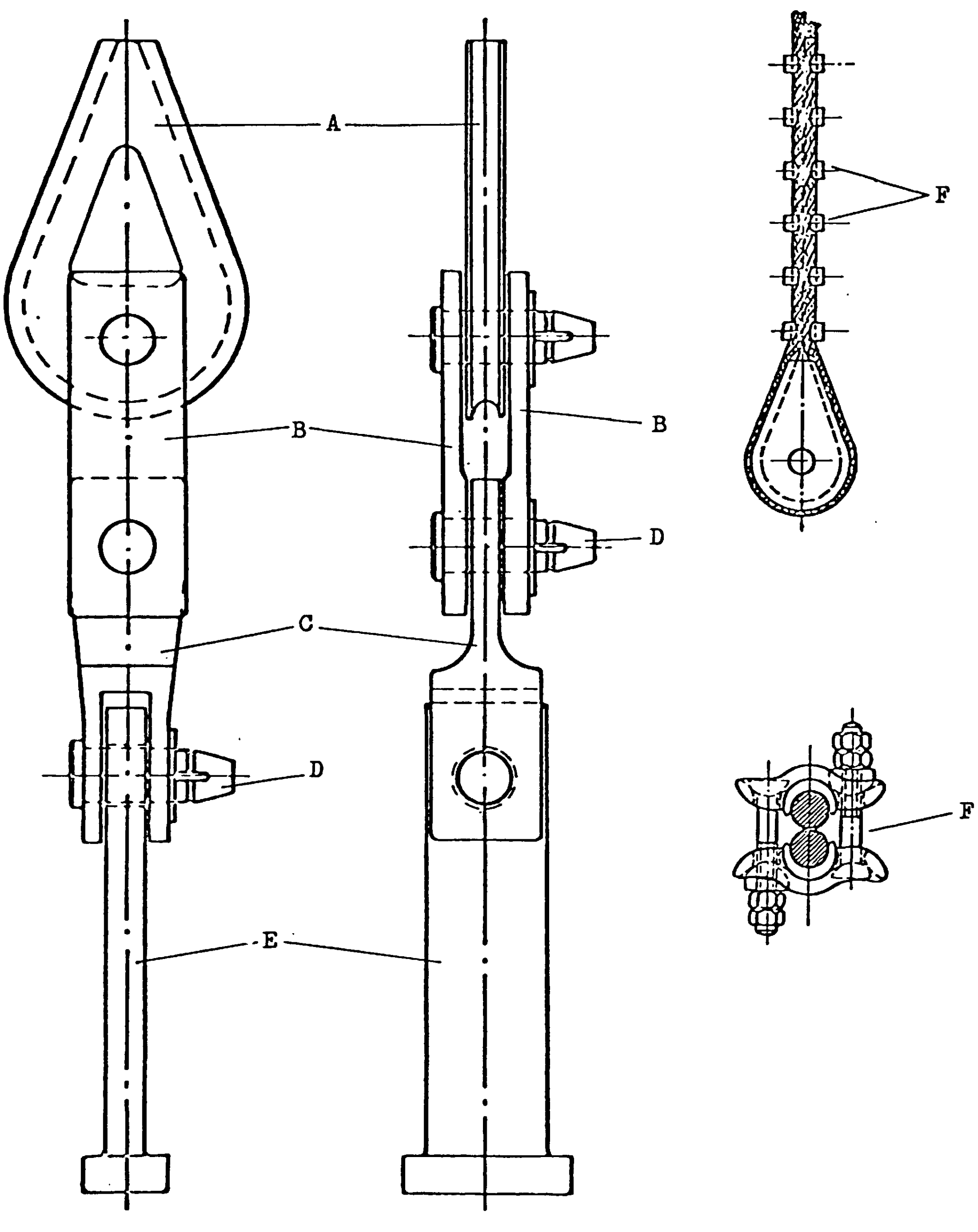


Fig. 8

	deutsch	english	français
A	Kausche für Rundseil	Thimble for round winding rope	Cosse pour câble rond
B	Kauschenlasche	Bossed link	Eclisse avec bossage
C	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
D	Bolzen mit Kopf und Loch für Splint	Pin with head and hole for cotter	Axe avec clavette
E	Königstange	King post	Tige maîtresse
F	Seilklemme	Rope clamp	Bride ou collier de serrage

Mehrseil-Zwischengeschirr mit Paßstück-Schnellversteckeinrichtung
Multi rope suspension gear with hydraulic adjusting link
Attelage pour multicâble avec dispositif de réglage rapide

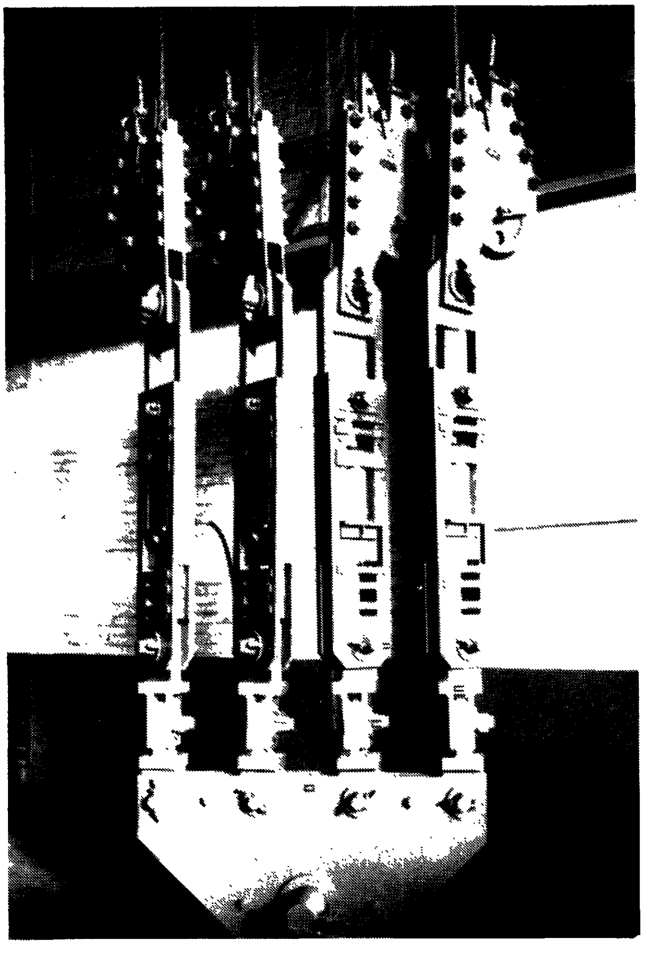


Fig. 9

	deutsch	english	français
A	Klemmkausche	Wedge capel	Attache à cosse autoserrante
B	Paßstück-Schnellversteck-einrichtung	Hydraulic adjusting link	Dispositif de réglage rapide
C	Kreuzgelenkstück	Fork link	Croisillon ou chape en croix
D	Anschlußblech	Reverse spreader plate	Palonnier

Aufhängung für Flachunterseil

Suspension gear for flat balance rope

Attelage pour câble d' équilibre plat

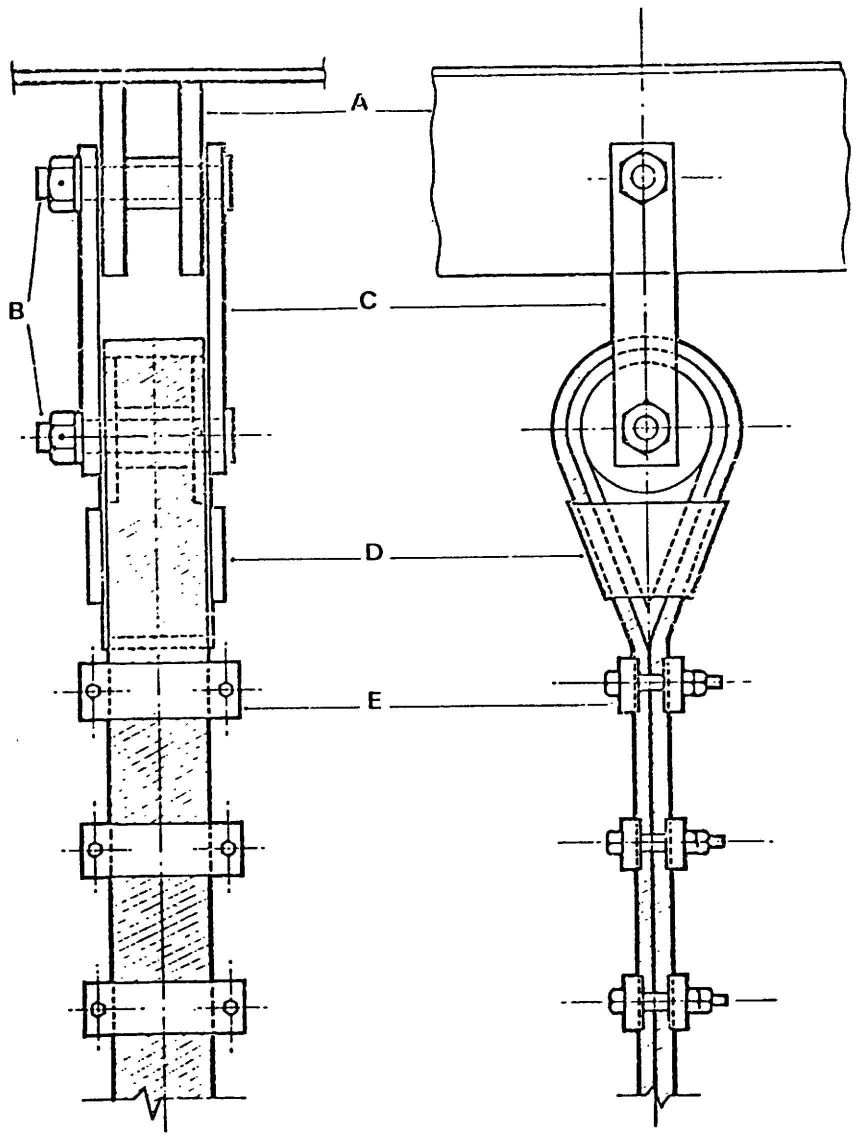


Fig. 1o

	deutsch	english	français
A	Träger für Unterseilaufhängung	Balance rope suspension beam	Traverse de suspension pour câble d'équilibre
B	Bolzen	Pin	Axe
C	Lasche	Flat link	Eclisse ou maillon
D	Flachseilkausche	Thimble for flat rope	Cosse pour câble plat
E	Seilklemme	Rope clamp	Bride ou clame

Aufhängung für Rundunterseil
Suspension gear for round balance rope
Attelage pour câble d'équilibre rond

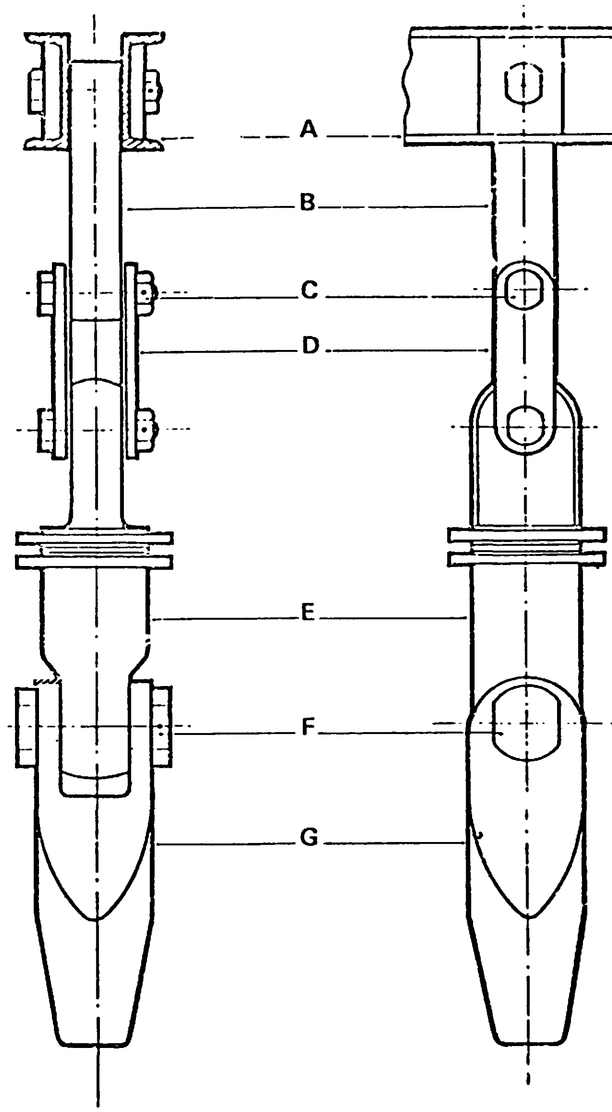


Fig. 11

	deutsch	english	français
A	Träger für Unterseilaufhängung	Balance rope suspension beam	Traverse de suspension pour câble d'équilibre
B	Verbindungslasche	Connecting link	Eclisse ou maillon intérieur
C	Bolzen	Pin	Axe
D	Außenlasche	Flat link	Eclisse ou maillon extérieur
E	Wirbel	Swivel	Tourillon ou émerillon
F	Hülsenbolzen	Socket pin	Axe de douille
G	Hülse für konischen Vergußkopf	Socket for white metal capping	Douille conique pour culot coulé

Unterseilaufhängung für Rundunterseil
Round balance rope suspension gear
Attelage de câble d'équilibre pour câble rond

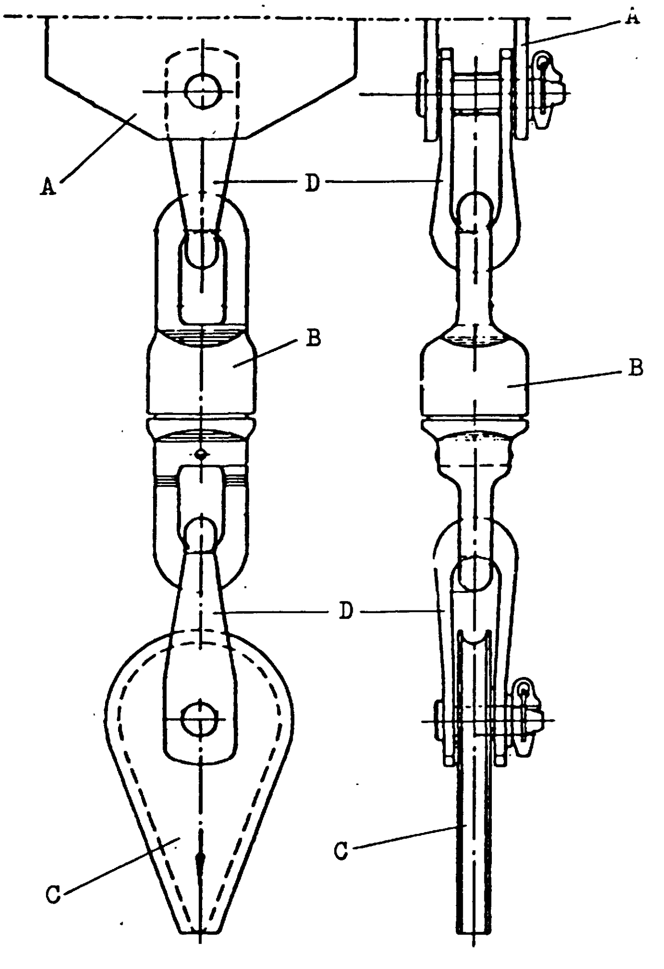


Fig. 12

	deutsch	english	français
A	Unterseilaufhängeblech	Balance rope suspension lugs	Tôle de suspension pour câble d'équilibre
B	Wirbel	Swivel	Tourillon ou émerillon
C	Rundseilkausche	Thimble for round rope	Cosse pour câble rond
D	Schäkel	Shackle	Manille

Abteuf-Zwischengeschirr
Kibble suspension gear
Attelage de cuffat

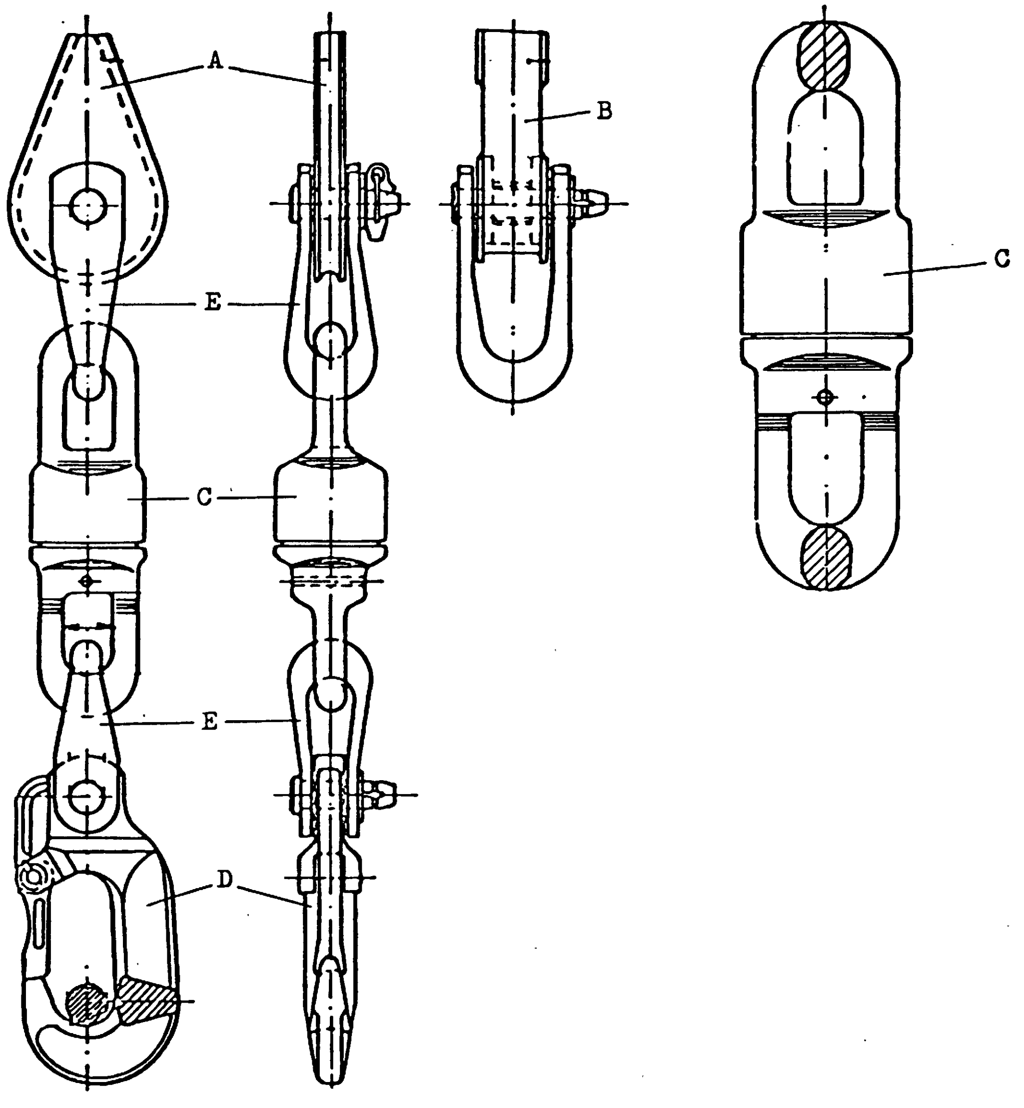


Fig. 13

	deutsch	english	français
A	Rundseilkausche	Thimble for round rope	Cosse pour câble rond
B	Flachseilkausche	Thimble for flat rope	Cosse pour câble plat
C	Wirbel	Swivel	Tourillon ou émerillon
D	Lasthaken mit Sperrklinke	Clivvy hook	Mousqueton ou crochet avec linguet
E	Schäkel	Shackle	Manille

ANNEX VIII

INFORMATION REPORT

"New aspects of the testing of ropes in winding installations subject to high and maximum stress"

By Dr. Ing. H. ARNOLD, Seilprüfstelle der Westfälischen Berggewerksschaftskasse, Bochum.

During the last two decades, shaft winding in the Ruhr area has been concentrated on the central shafts which have a high hoisting capacity. This continuing trend makes new ideas of safety control necessary. This applies particularly to winding ropes, suspension gear, braking systems and speed regulators or safety devices.

Of the items in the above list, winding ropes are especially important; they cannot be designed as durable parts of the installation because of their construction and the geometrical and dynamic stresses involved. This unfortunate characteristic often makes it difficult to determine the residual breaking strength and remaining service life of winding ropes, particularly in installations subject to high and maximum stress. Data from investigations, and methods for testing and measuring, which ensure that the onset of failure is recognised in time, are outlined below. The minimum fatigue-strength requirements for wire, strand and rope for winding ropes subject to high and maximum stress are also indicated.

1. Fresh data allowing more accurate determination of the renewal schedule for winding ropes subject to high and maximum stress.

1.1 Relationship between rope stress and wire fractures.

Fig. 1 gives the curves for the loss of breaking strength under various rope loads. The tests - with the geometric facture kept constant - are carried out on three-layer flat strand ropes with a nominal diameter of 55 mm. The wire fracture figures at renewal time were established for four different rope loads in the appropriate test galleries.

The curves showing the loss of breaking strength in the rope tested under loads of 33.3%, 20%, 10% and 5% of the established rope breaking strength give a very clear indication of the working capacity which remains at rope renewal time. The curves for the loss of breaking strength in ropes subject to high and maximum stress come within 15 and 20% of the loads referred to the established rope breaking strength.

In the small inset diagram "Changes in length as a function of the number of rolling operations", the area representing the onset of failure for the criterion "change in length" is shaded. The wire-fracture figures corresponding to the curves for loss of breaking strength demonstrate the increase in wire fracture with decreasing rope load. This means that the use of wire-fracture figures as a criterion for the renewal schedule for highly stressed winding installations may be totally misleading because, when the tensile forces in the rope shortly before renewal time are high, only a few wire fractures are to be found despite considerable wire fatigue, whereas, when the tensile forces in the rope are lower, there may well be many wire fractures as a result of the large number of rolling operations. In the latter cases, moreover, there can still be considerable residual rolling up to the rupture point of the rope. (Fig. 2 and 3).

1.2 Information acquired from operating tests.

So far, in the majority of cases in which three-layer flat strand ropes have failed, considerable residual torsion has been found, even in the good segment of the rope. Torsion in the outer layer causes the onset of failure through the constitution of the two inner strand layers. The investigations also showed that the direction of lay (right or left) caused considerable variations in residual torsion in both winding directions.

1.3 Findings relating to the functional relationship between the change in rope length and the evolution of torsion in the rope.

Tests were first carried out on a three-layer flat strand rope of 55 mm diameter.

The first set of results is from the fatigue tests carried out on the three-roller test stand (Fig. 4) under the following test conditions:

Diameter ration: $\dfrac{\text{Driving and rope pulleys } \varnothing}{\text{Rope diameter}} = 17{,}3$

Rope stresses: $\sigma_1 = 0{,}33 \,.\, \sigma_B$; $\sigma_2 = 0{,}2 \,.\, \sigma_B$

$\sigma_3 = 0{,}1 \,.\, \sigma_B$; $\sigma_4 = 0{,}05 \,.\, \sigma_B$

Here, σ_B is the established ultimate breaking stress.

In the diagram (Fig. 5 and Fig. 6) for rope stresses

$\sigma_3 = 0{,}1 \,.\, \sigma_B$ and $\sigma_2 = 0{,}2 \,.\, \sigma_B$,

the changes in rope length and rope torsion are shown as a function of the rolling. The working range of the winding ropes comes between the stress values shown above. The diagrams show clearly that the changing length and torsion of the rope subject to less stress stabilize after a time. The onset of rope failure is then shown by a sharp rise in each curve. In a highly-stressed rope, the transition from the running-in period to the failure point is so indistinct that the rope renewal time is difficult to assess. The rope tension is the residual momentum occurring as a result of the tension of the two inner strand layers and the counterrotation of the outer strand. Ideally, these two types of tension should be more or less counter-balanced so that the twisting action of the rope during winding remains as low as possible. The greater the twisting effect of the rope, the more danger there is of constant constriction and slackening in the second and third strand layers caused by the first strand layer.

The tests show clearly that the residual tension increases to a greater or lesser extent depending on the work the rope performs, which in turn is dependent on the geometrical and static stresses. The rope length gradient increases at the same time so that daily measurement of the rope length allows any dangerous increase in residual tension to be established (Fig. 7). For checking purposes it is advisable to count the rope revolutions during one winding cycle by means of a 'notch' test and to compare this with previous measurements. This simple test method provides an effective additional criterion for the recognition of the onset of failure in highly-stressed winding ropes.

2. Establishment of a quantitative basis of the dynamic and geometric effects on the service life of the rope.

2.1 Rope-durability diagram

The durability of three-layer flat strand ropes tested under various bending loads and rope stresses is illustrated in the diagram (Fig. 8). The set of curves give a clear picture of the relationship between rope stress and rolling with various D/d ratios. The continuous curve represents the durability of three-layer flat strand ropes of 55 mm Ø and a D/d ratio of 17.3. The dotted curve shows the evolution for larger D/d ratios. In order to keep both expenditure on test equipment for three-roller tests and the testing time within reasonable limits, the D/d ratios are between about 15 and 30, while the main shaft winding installations have D/d ratios of about 100. The results for the various parameters obtained with the test equipment are supplemented by statistical operating values, so that they can be related to users' working specifications (Fig. 9).

2.2 Coordination of important partial results from bench tests and in situ investigations on summary sheets.

By means of a comprehensive representation of some of the important functional relationships for the determination of the rope renewal schedule and a comparison of the state of wear of the strands and wires after a varied number of rolling operations, a new standard for the evaluation of highly-stressed qinding ropes has been established (Fig. 10).

The representation shows clearly that it is essential to supplement sime of the existing criteria for the renewal schedule in order to avoid serious mistakes.

3. Requirements concerning the fatigue strength of wires and reduced fatigue strength (2,000 000 load cycle) of strands and ropes.

In order to establish the fatigue strength of winding rope wires, a large number of stress-N graphs are produced. In this method, oscillations are gradually reduced in amplitude in a series of individual tests until the amplitude which the wire will withstand indefinitely (i.e. a load cycle of over 3 000 000) is established (Fig.11).

The fatigue-strength coefficient of a wire, for a particular amplitude of oscillation and a given basic stress, then gives a pair of points on the Smith fatigue-strength graph (Fig.12).

The same method is applied to the reduced fatigue-strength ranges of strands and ropes shown in the Smith diagram. The stress-N graphs are discontinued at a load cycle of 2 000 000 in the determination of these values.

The Smith graph for wires, strands and ropes then indicates the minimum wire, strand and rope requirements in relation to fatigue strength or reduced fatigue strength, for the winding rope load range (Fig.13).

This diagram gives the minimum requirements by comparing the test conditions of the testing machine with the actual stresses on the ropes in winding installations subject to high and maximum stress.

4. Studies of the effects of the variations in wire strength in multi-strand and multi-rope constructions.

Precise measurements of the stresses in steel wires of differing strengths often reveal considerable variation in the tensile behaviour of these wires. For example, some wires or groups of wires in one and the same rope can very quickly reach the plastic stage, whilst others are still withstanding stress in their elastic range. This in turn leads to excess length in the wires with the result that the rope construction is affected and the load on the wires is uneven .

In this way ropes composed of individual wires with the same tensile behaviour can as a result of stresses causing only slight plastic deformation, be understressed so that the limit of elasticity and thus the fatigue strength improves. In ropes where the tensile behaviour of the individual wires differ, however, a very variable and uneven distribution of stress can arise.

Under stress, the load on some of the wires disappears as a result of permanent deformation, while other wires continue to stretch in their elastic range and are therefore subject to a higher degree of strain. In this respect no understressing effect can be expected. It is far more likely that the fatigue strength of individual wires will be exceeded. This fact demonstrates the need to use wires of the same strength as far as possible, so that it is fairly certain that the tensile behaviour of winding ropes which are constantly subject to alternating bending while running over pulleys - i.e. winding ropes in the broad sense - is even.

In highly-stressed installations, it is quite possible that the stresses induced in individual wires today by high starting acceleration and quasi-static undulating loads will lie within the range of the proportional limit, causing damage to winding roppes composed of individual wires of very varying tensile behaviour.

5. The new regulations A 2.10 of the North Rhine-Westphalia Mining Authority for the monitoring of winding ropes in highly-stressed winding and man-riding installations.

   Because of various cases of defective winding ropes in highly-stressed installations and the increased difficulty of determining renewal schedules, regulations have been issued governing additional monitoring procedures. These regulations are given in the appendix.

6. This document attempts to set out in concise form some of the discoveries and measures which might help in the difficult task of determining the renewal schedule for highly-stressed widning ropes. The tests were carried out on low-twist winding installations which are used in West Germany particularly for ropes with large diameters. Studies of winding ropes for highly-stressed installations of other types have not yet been completed.

Bild 1	Fig.1
Vergleich der Bruchkraftabfallwerte mit den entsprechenden Drahtbruchzahlen	Comparison between loss of breaking strength and corresponding wire-fracture figures
Drahtbrüche	Wire fractures
ermittelte Bruchkraft	Established breaking strength
Bruch	Fracture
Belastungsbereich hichbeanspruchter Förderanlagen	Range of load on highly-stressed winding installations
Bereich des Versagensbeginns	Onset of failure
Rest-BW	Residual alternate bending
Anzahl der Fahrten	Number of runs
Biegewechsel	Alternate bending
Bild 2	**Fig. 2**
Anzahl der Biegewechsel je Fahrt	Number of alternate bends per run
Restbruchkraft in % der ermittelten Bruchkraft	Residual breaking strength as a % of the established breaking strength
Anzahl der Drahbrüche	Number of wire fractures
Restbruchkräfte u. Drahtbrüche des Seiles Nr. 1 nach Versuchen auf dem grossen eigenangetriebenen Dreirollenapparat	Residual breaking strength and wire fractures for rope No. 1 after tests on the large self-driven 3-roller apparatus
Gesamtzahl der Fahrten: 14 110 statische Seilbelastung = 10% der ermittelten Bruchkraft	Total number of runs: 14110 Static rope load = 10% of the established breaking strength
Seillänge	Rope length
Bild 3	**Fig.3**
Siehe Bild 2	See Fig. 2
Bild 4	**Fig. 4**
Grosse Dreirollenprüfbahn	Large Three-roller test rig
Prüfmöglichkeiten	Test methods

<u>Bild 4</u> (Fortsetzung)	<u>Fig. 4</u> (Continued)
Eigenantrieb mit statischer Seilbelastung	Self-contained drive with static rope load
Eigenantrieb mit dynamischer Seilbelastung	Self-contained drive with dynamic rope load
<u>Bild 5</u>	<u>Fig. 5</u>
Seillängung u. Seildrehmomente bei Versuchen auf dem grossen eigenangetriebenen Dreirollenapparat	Rope elongation and torsion during tests on a large self-driven three-roller apparatus
Seil Nr. 1 (3-lagiges Flachlitzenseil 55 mm Ø)	Rope No. 1 (3-layer flat strand rope 55 mm Ø)
Belastung: 10% der ermittelten Bruchkraft	Load: 10% of the established breaking strength
Längung des Seiles in mm	Elongation of rope in mm
Seillängung	Rope elongation
Drehmomente	Torsion
Dreirollenapparat befindet sich an der Spannstation	3-roller apparatus at the tensioning point
Dreirollenapparat befindet sich an der Drehmoment-MeBeinrichtung	3-roller apparatus at the torsion - measuring installation
Anzahl der Fahrten	Number of runs
Seildrehmoment in kNm	Rope torsion in KNm
rechtsdrehend	right rotating
Linksdrehend	left rotating
<u>Bild 6</u>	<u>Fig. 6</u>
Siehe Bild 5	See Fig. 5
<u>Bild 7</u>	<u>Fig. 7</u>
Füllertbereich	Underground landing area
Hängebankbereich	Pit-head area
Aus Richtlinie des LOBA-NW vom 7.8.1974	LOBA-NW regulations 7.8.1974
Seillängenberprüfung bei Hauptschachtanlagen mit hoher arbeitstäglicher Zügezahl	Rope-length monitoring in main shaft installations with a heavy daily work load

Bild 7 (Fortsetzung)	Fig. 7 (Continued)
bei Turmförderanlagen	with tower-type winders
bei Flurförderanlagen	with ground-mounted winders
oder	or
bis	to
in Verbindung mit einem oder mehreren festgelegten Anlagenmerkmalen	associated with one or more established installation properties
Bewährund des Seiles Nr. 1 (3-lagiges Flachlitzenseil) bei Versuchen auf dem grossen eigenangetriebenen Dreirollenapparat bei statischer Seilbelastung	Durability of rope No.1 (3-layer flat-strand rope) in tests on the large self-driven 3-roller apparatus with a static rope load
statische Seilbelastund in % der ermittelten Bruchkraft	Static rope load as % of the established breaking strength
Verlauf bei grösser werdendem D/d-Verhältnis	Evolution with increasing D/d ratio
Seilburchmesser	Rope diameter
Scheibendurchmesser	Pulley diameter
Anzahl der Ueberrollungen	Number of rolling operations
Bild 9	Fig.9
Kombination von Prüfmaschinenergebnissen mit statistisch ermittelten Anlagenwerten. Seillbebensdauer als Funktion des D/d-Verhältnisses	Combination of testing machine results and statistical values. Rope service life as a function of the D/d ratio
Parameter: Schwellspannung	Parameter: fluctuating stress
Durchmesserverhältnis D/d	Diameter D/d ratio
statistisch ermittelte Förderanlagenwerte	Winding installation values established statistically
auf Prüfmaschine ermittelte Werte	Values established by testing machine
Biegewechsel BW durch eigenangetr. 3-Rollenapparat bzw. Förderanlagen	Alternate bending by self-driven 3-roller apparatus or winding installations

Bild 10	**Fig. 10**
Versuchsergebnisse auf grossem Dreirollenapparat für die geometrisch-dynamische Belqstungsart: D/d = ...	Results of test on large 3-roller apparatus for geometrical-dynamic load:
Versuchsseil	Test rope
Bruch	Rupture
Machart	Type of rope
magnet-induktive Seilprüfung	magnetic induction rope testing
Seilzustandsbilder	State of the rope
Litze	Strand
Drähte	Wire
ermittelte Bruchkr.	established breaking strength
Drahbrüche	Wire fractures
Seil	Rope
Draht	Wire
Ablegebereich	Renewal sector
BW	alternate bending
Dehnung	Elongation
Arbeitsbereich	Working range
Bild 11	**Fig. 11**
Kurven zur Ermittlung der Dauerfestigkeit von Drähten und der reduzierten Dauerfestigkeit von litzen u. Seilen	Curves establishing the fatigue strength of wires and the reduced fatigue strength of strands and ropes
Spannungsausschlag O_a in kp/mm^2	Alternating stress amplitude in kp/mm^2
Mittelspannung	Mean stress
Draht	Wire
Litze	Strand
Seil	Rope

Bild 11 (Fortsetzung)	**Fig. 11** (Continued)
reduzierte Dauerfestigkeit	reduced fatigue strength
Lastwechsel	Load cycle
Bild 12	**Fig. 12**
Mittelspannung	Mean stress
Dauergestigkeitsschaubilder nach Smith für: unverseilten Draht	Smith fatigue strength graph for: unstranded wire
Litze vor der Verseilung zum Seil	Strands before stranding for rope
das fertige Seil	completed rope
Machart	Type of rope
Kreuzschlag	Cross-lay
Seilhersteller	Manufacturer
Unter- u. Oberspannung und in	Minimum and maximum stress and in
Bild 13	**Fig. 13**
Anforderungen an die Dauerfestigkeit von hochbeanspruchten Förderseilen	Fatigue strength requirements for highly-stressed winding ropes
Spannungsausschalg O_a in	Alternating stress amplitude in
Dauerfestigkeit	Fatigue strength
red. Dauerfestigkeit	Reduced fatigue strength
Soll	Requirement
Ist Seil A	Actual condition rope A
z.Zeit normal	at the time normal
Schlecht	bad
Draht	Wire
Litze	Strand
Seil	Rope

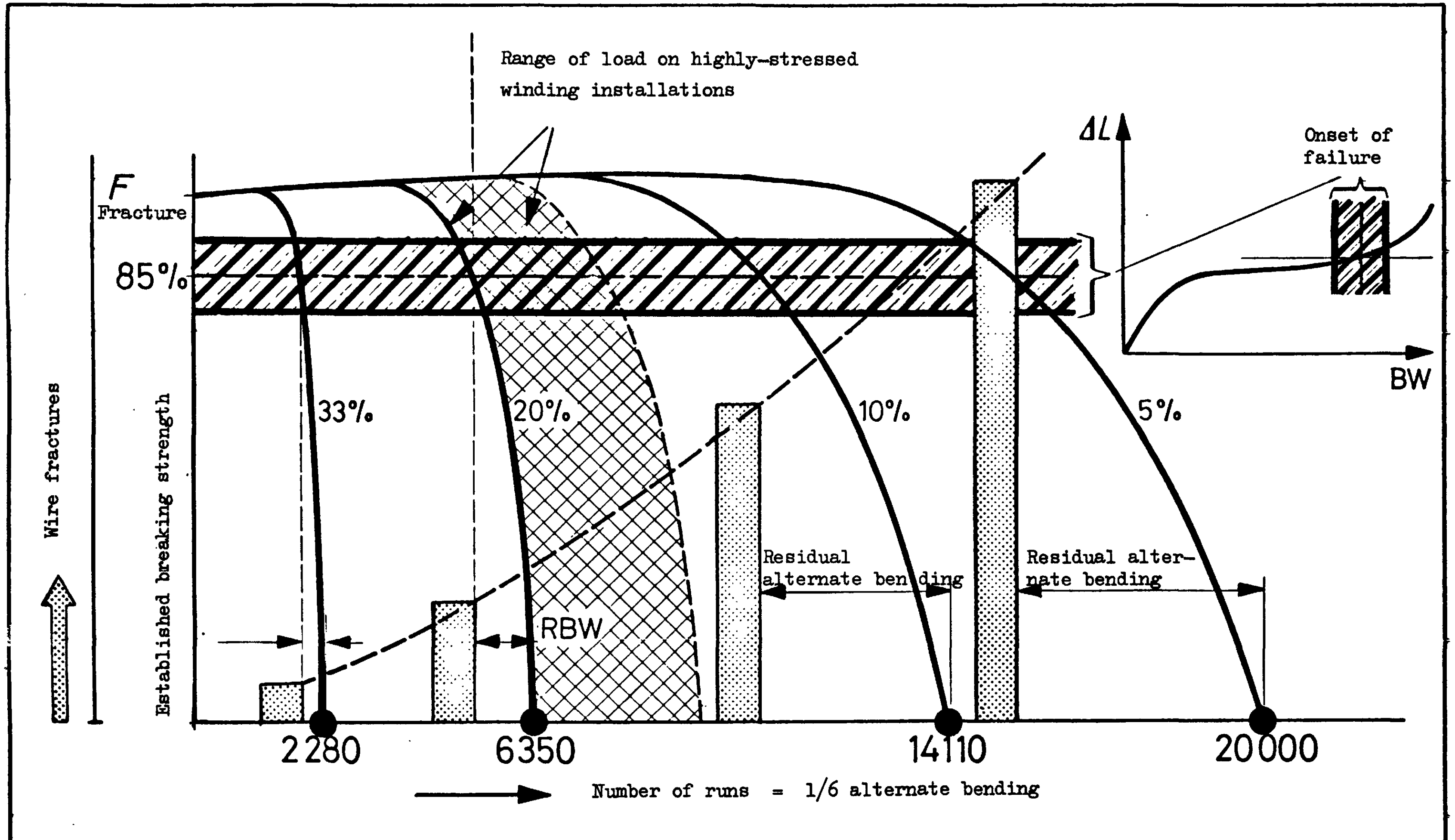
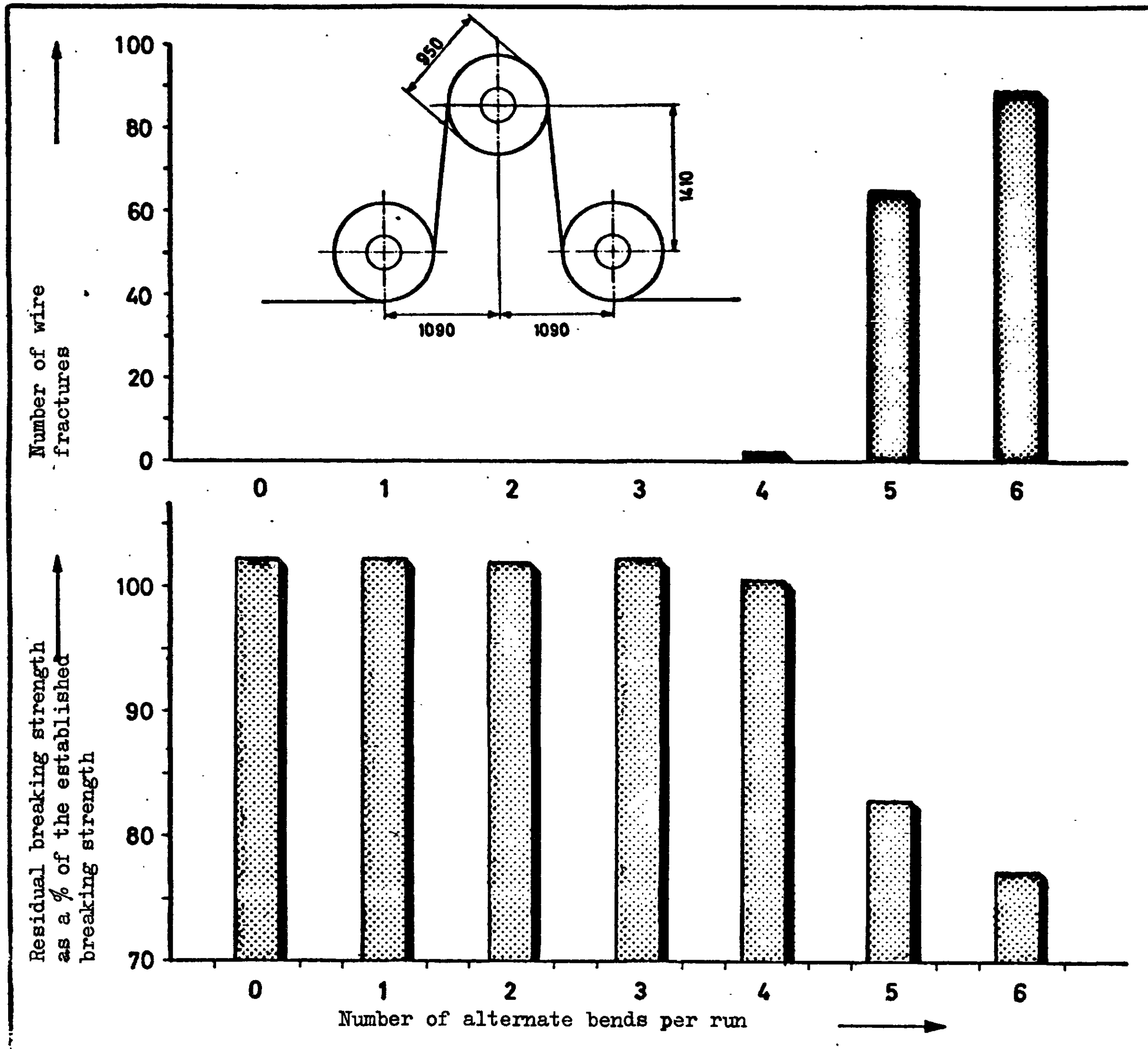


Fig. 1	Comparison between loss of breaking strength and corresponding wire-fracture figures	Seilprüfstelle Institut für Fördertechnik und Werkstoffprüfung



Residual breaking strength and wire fractures for rope no. 1 after tests on the large self-driven 3-roller apparatus

Total number of runs : 14 110

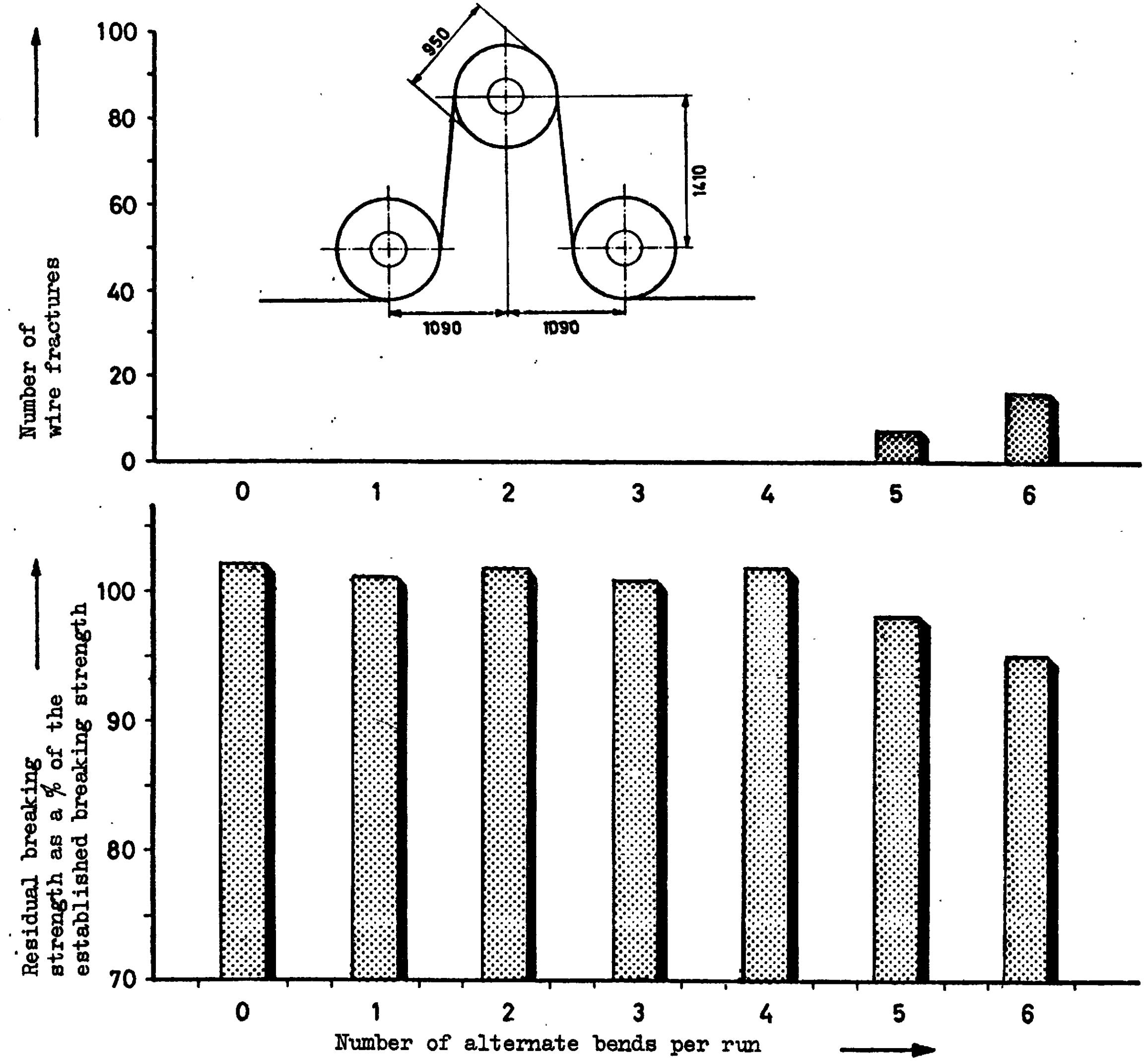
Static rope load = 10 % of the established breaking strength

D/d = 17,3

Rope length = 23 850 mm

Fig. 2

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung



Residual breaking strength and wire fractures for rope nó. 1 after tests on the large self-driven 3-roller apparatus

Total number of runs : 14 110

Static rope load = 10 % of the established breaking strength

D/d = 17,3

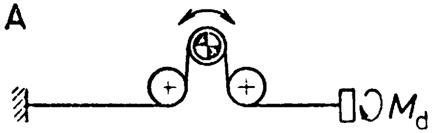
Rope length = 23 850 mm

Fig. 3

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung

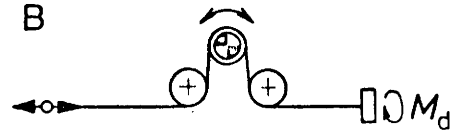
Test methods

A



Self-contained drive
with static rope load

B



Self-contained drive
with dynamic rope load

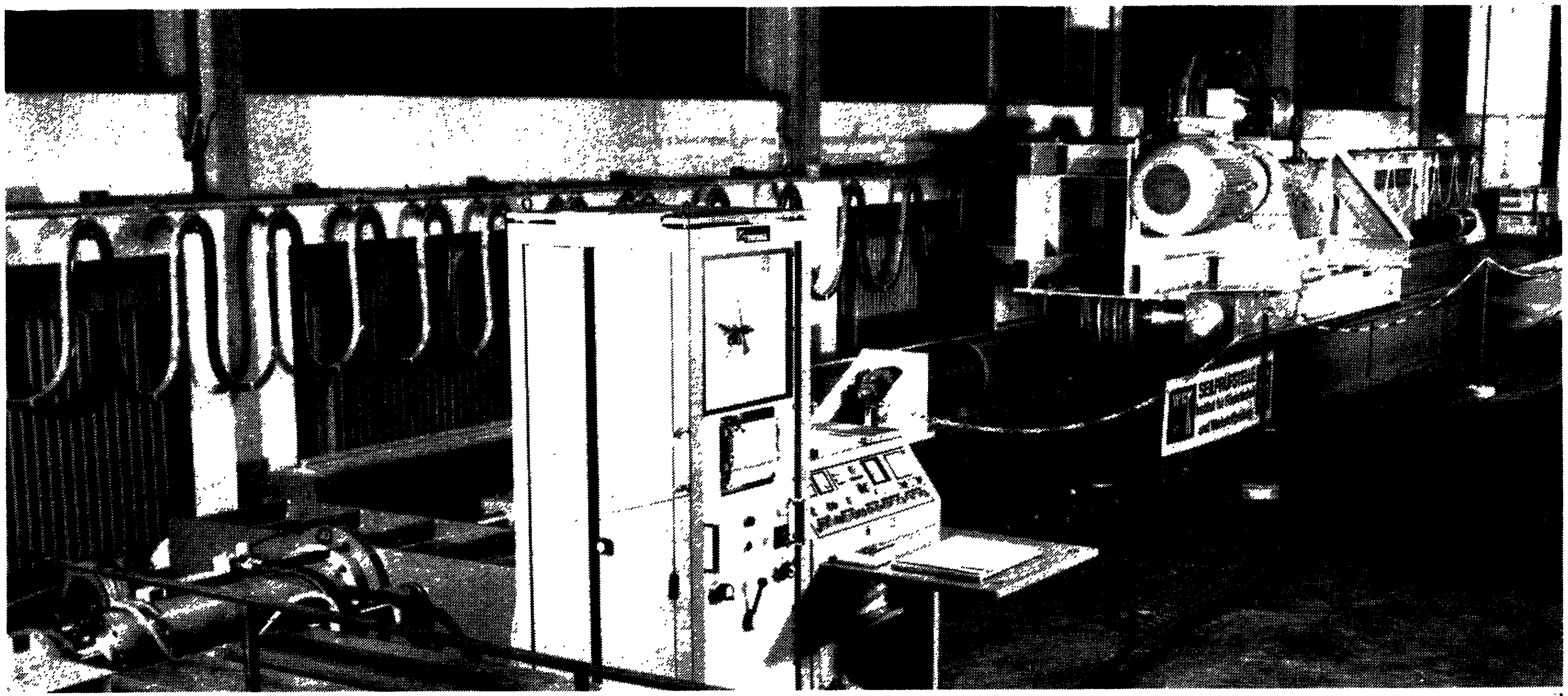


Fig. 4

Large Three-roller test rig

Seilprüfstelle
Institut für Fördertechnik
und Werkstoffprüfung

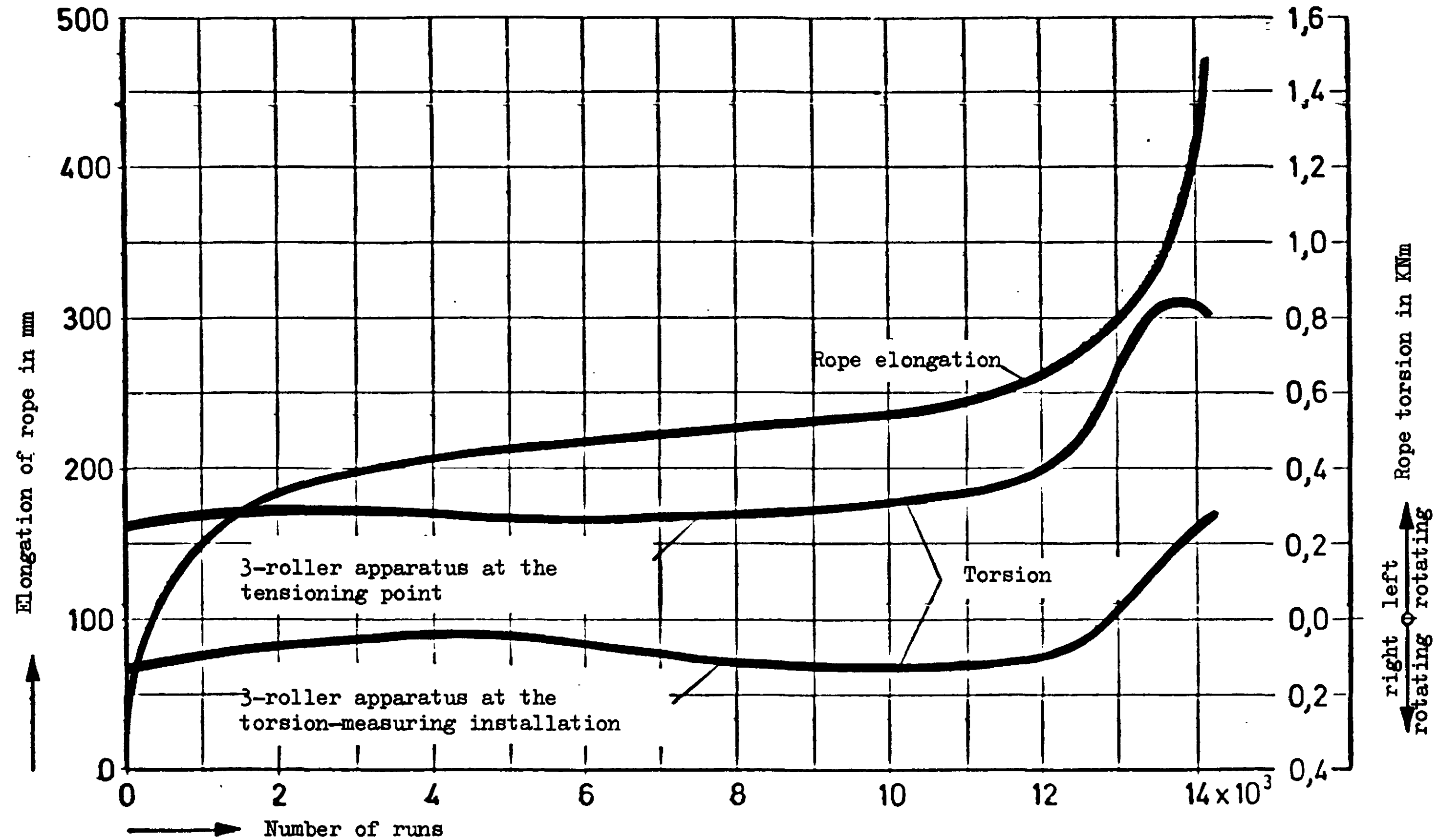


Fig. 5	Rope elongation and torsion during tests on a large self-driven three-roller apparatus Rope No. 1 (3-layer flat strand rope 55 mm ∅) Load : 10 % of the established breaking strength D/d = 17,3

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung

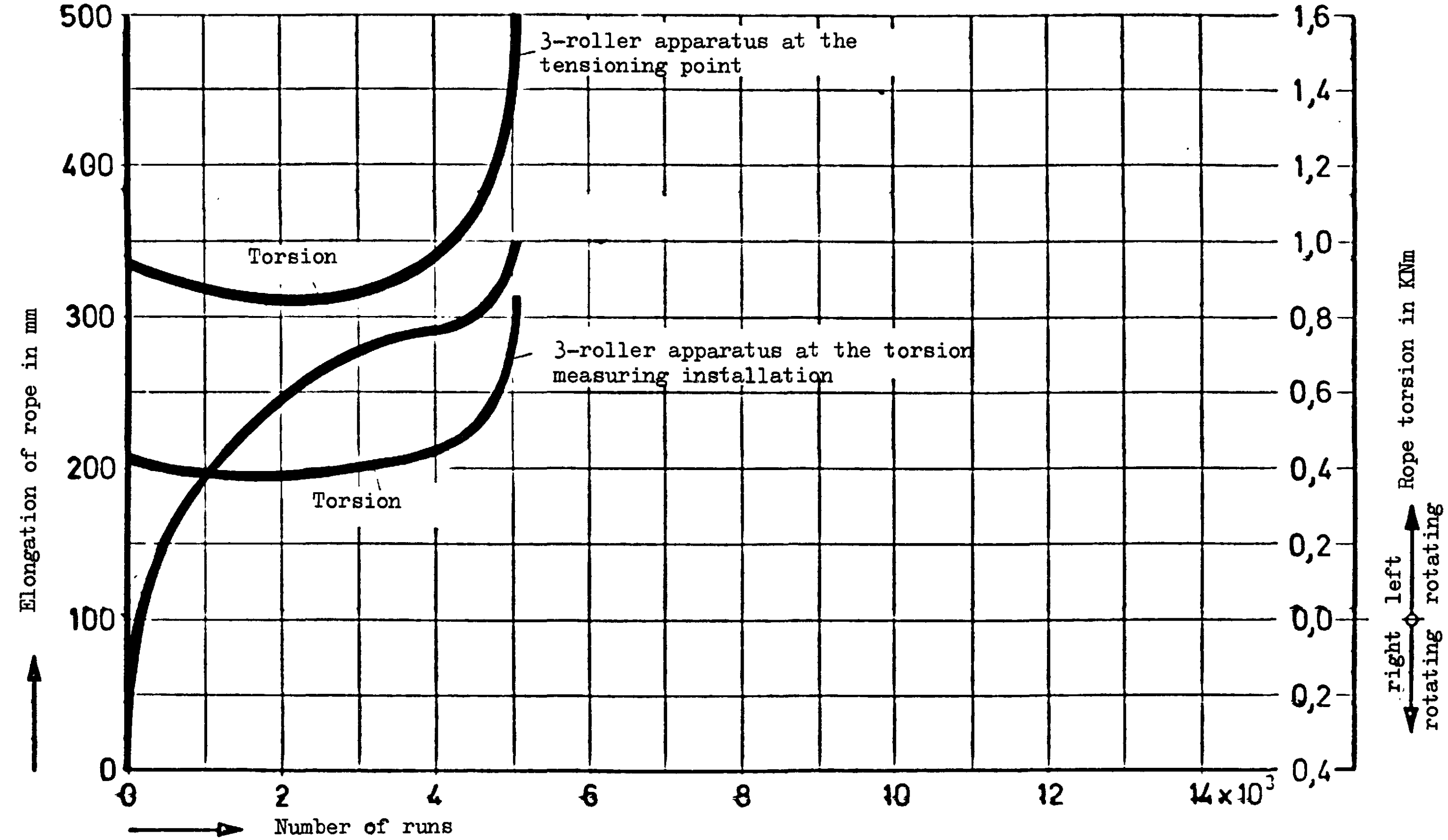
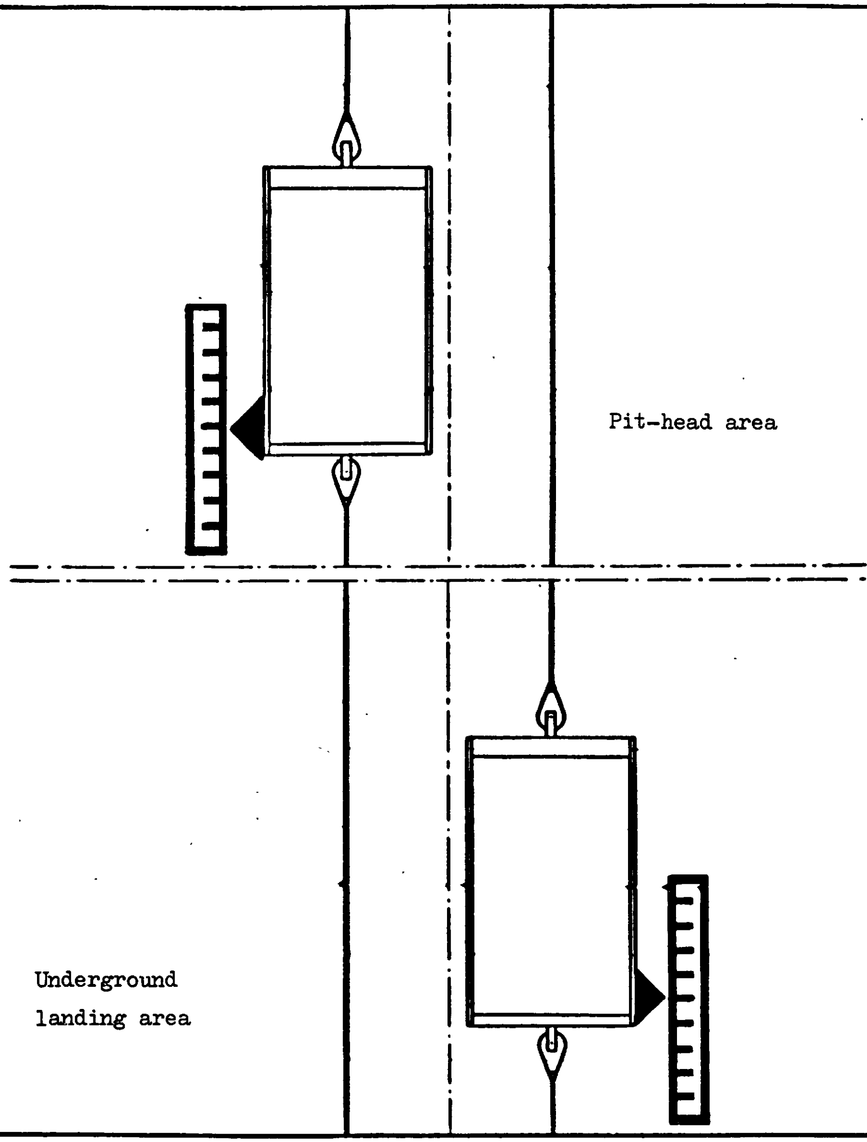


Fig. 6	Rope elongation and torsion during tests on a large self-driven three-roller apparatus Rope No. 1 (3-layer flat strand rope 55 mm Ø) Load : 10 % of the established breaking strength D/d = 17,3

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung



LOBA-NW regulations 7.8.1974

Rope-length monitoring in main shaft installations with a heavy daily work load

1. 750 with tower-type winders
   500 with ground-mounted winders

   or

2. 600 to 750
   with tower-type winders

   400 to 500
   with ground-mounted winders

associated with one or more established installation properties

Fig. 7

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung

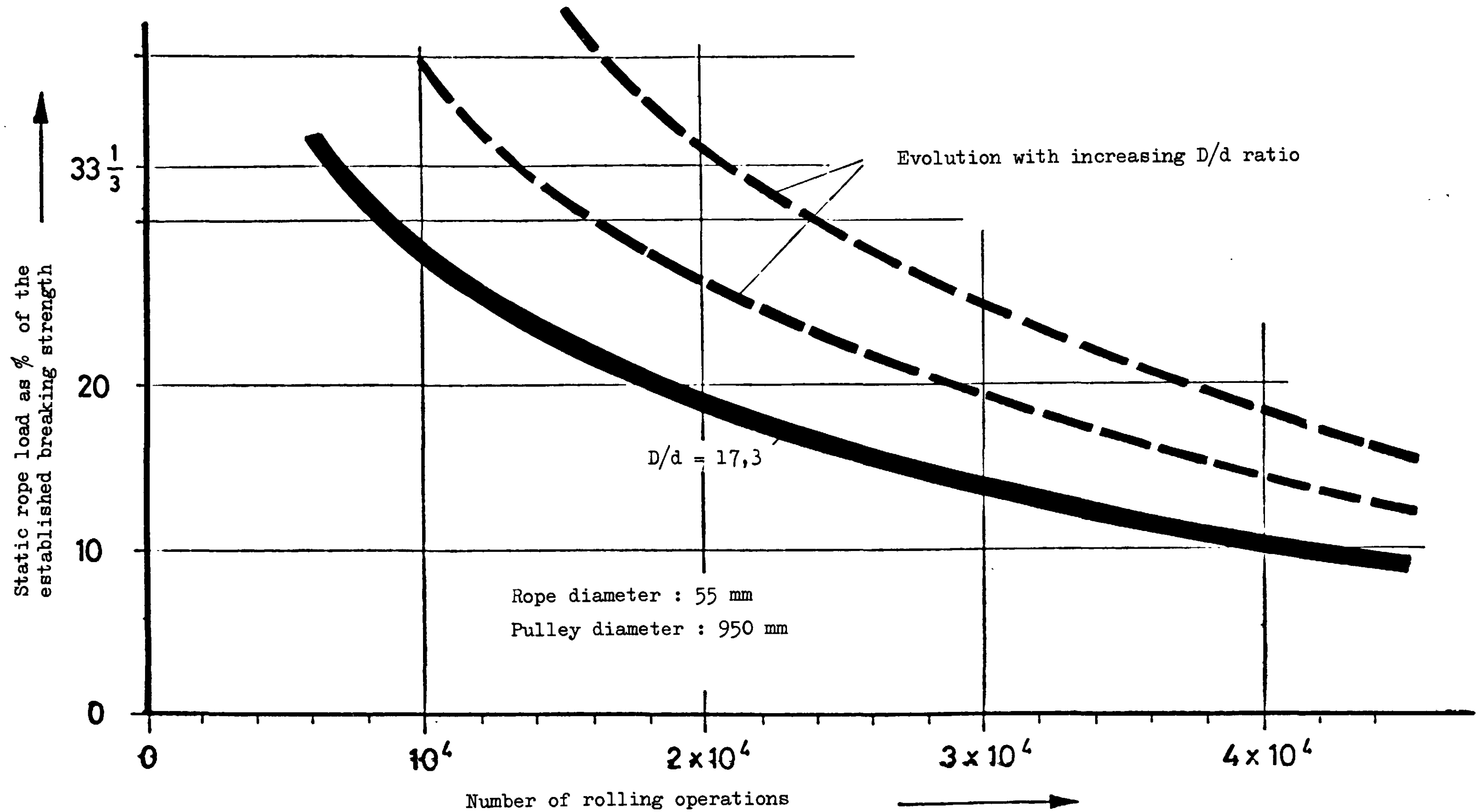


Fig.
8

Durability of rope No. 1 (3-layer flat-strand rope) in tests on the large self-driven 3-roller apparatus with a static tope load

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung

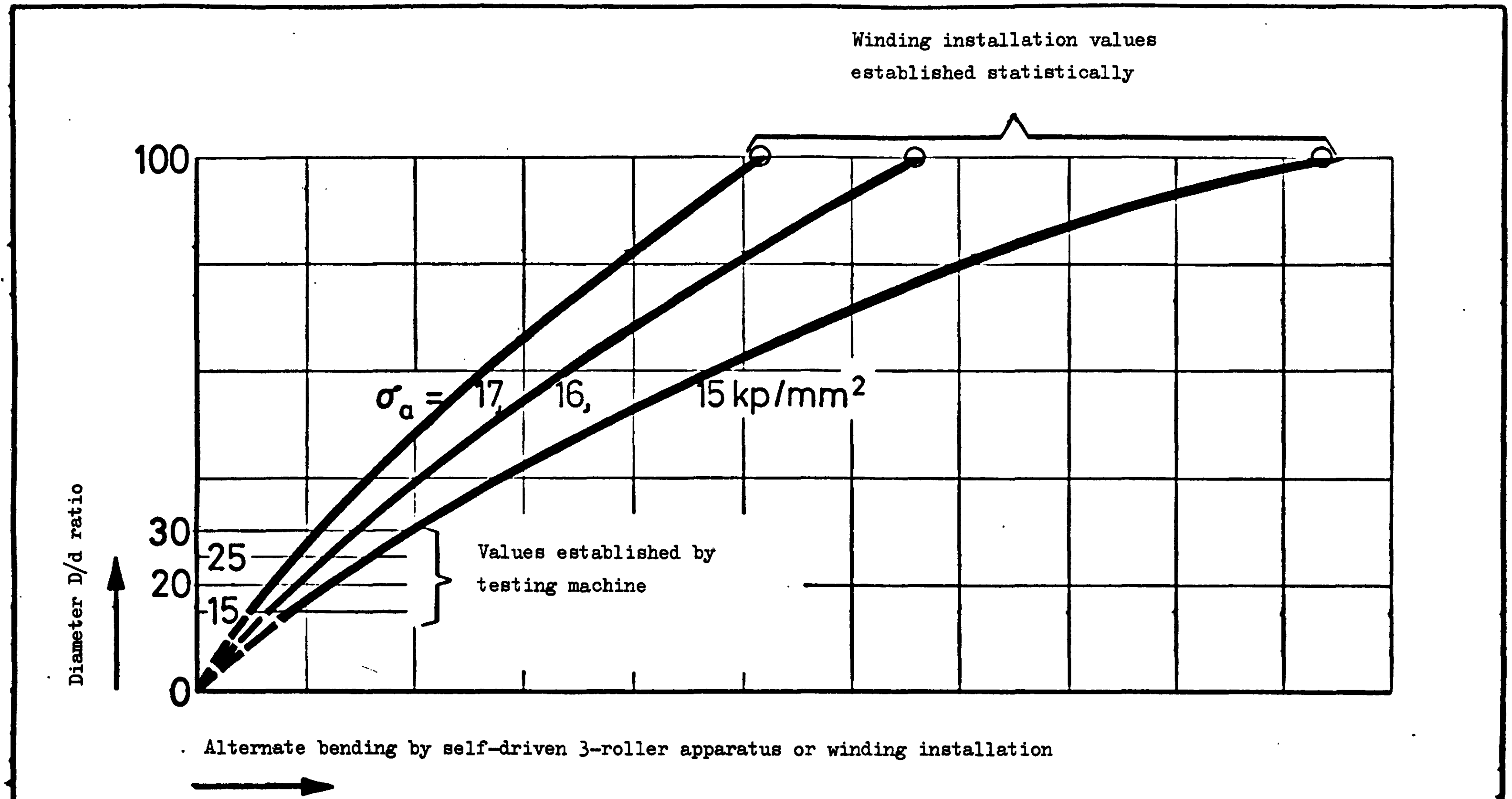


Fig.
9

Combination of testing machine results and statistical values
Rope service life as a function of the D/d ratio
Parameter : fluctuating stress

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung

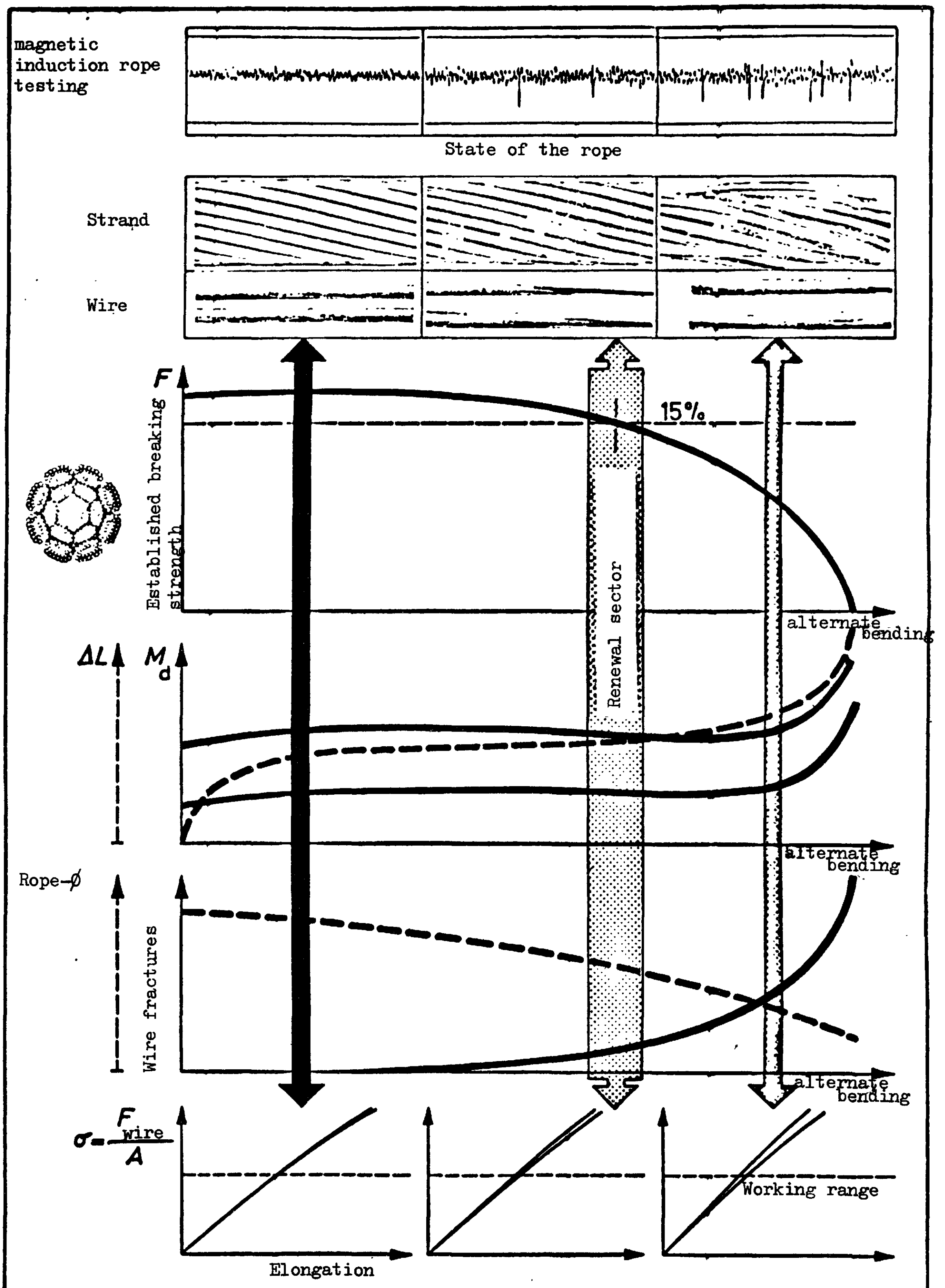


Fig. 10	Results of test on large 3-roller apparatus for geometrical-dynamic load : D/d = ..., = ... Test rope No. ..., Type of rope : rupture	Seilprüfstelle Institut für Fördertechnik und Werkstoffprüfung

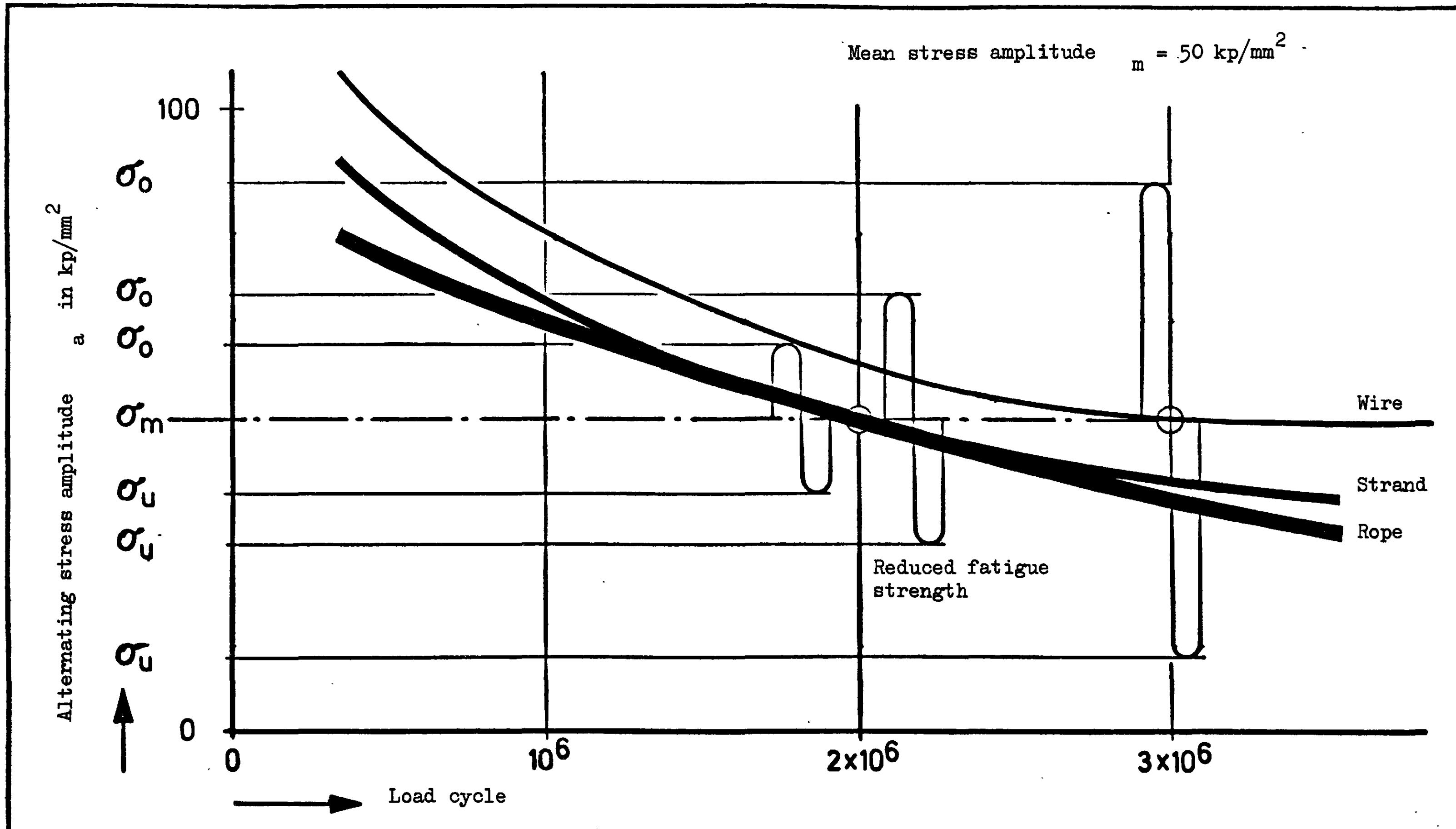
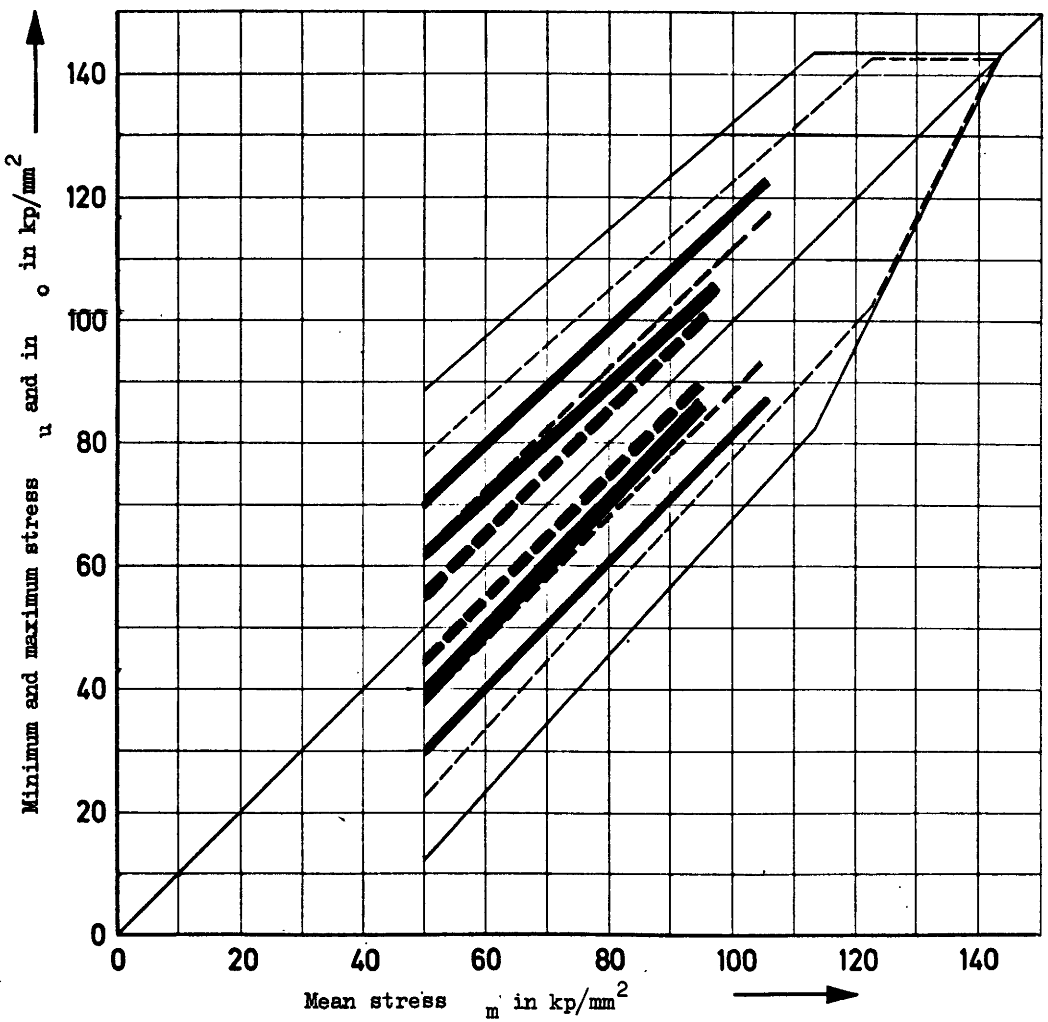


Fig. 11

Curves establishing the fatigue strength of wires and the reduced fatigue strength of strands and ropes

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung



Smith fatigue strength graph for :
unstranded wire
strands before stranding for rope
completed rope

Wire
Strand
Rope
Rope 1

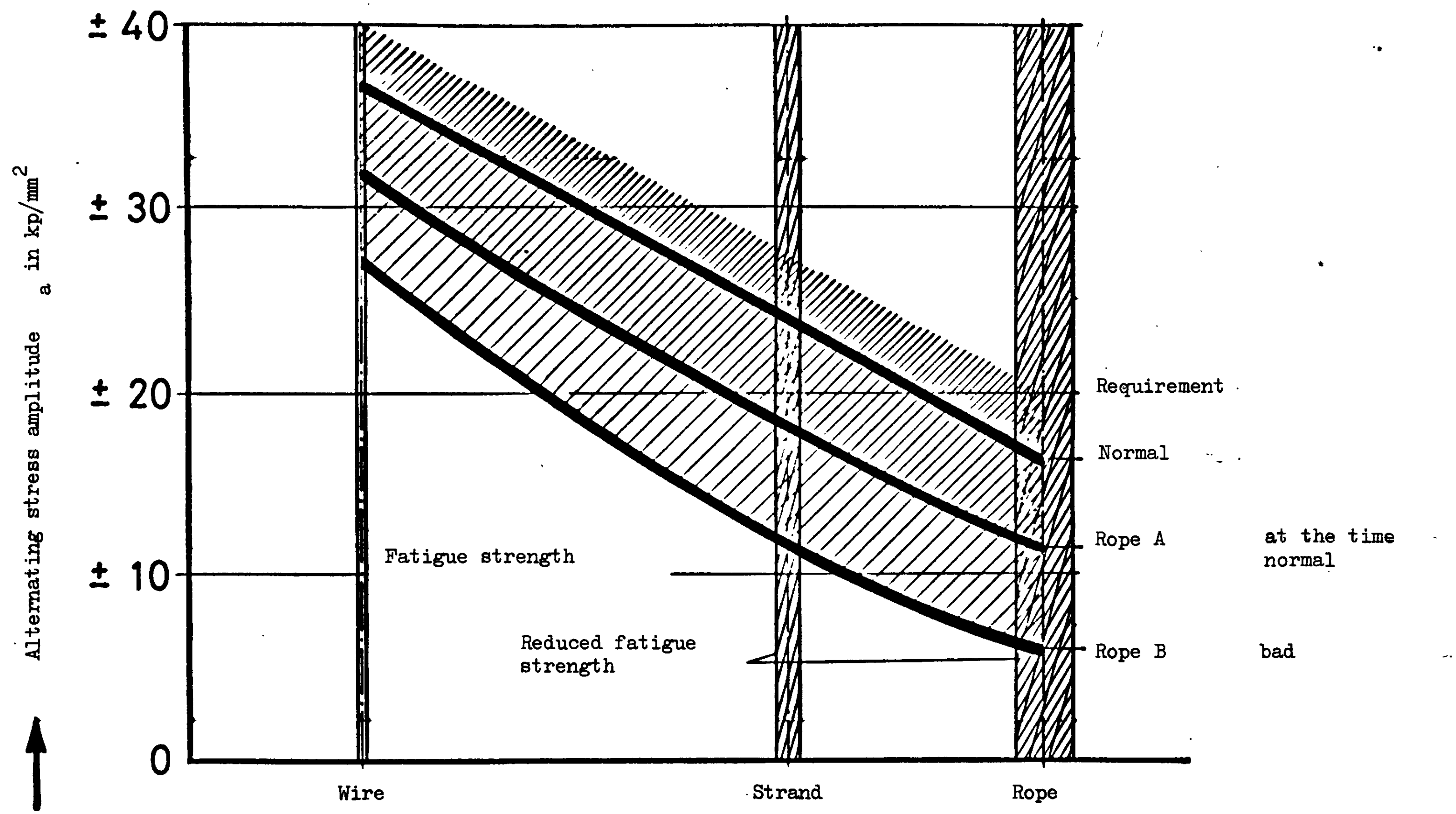
Type of rope : Warrington-Seale
Rope- Ø : 38 mm, cross-lay
Manufacturer A

Wire
Strand
Rope
Rope 2

Type of rope : Warrington-Seale
Rope - Ø : 38 mm, cross-lay
Manufacturer B

Fig. 12

Seilprüfstelle
Institut für Fördertechnik und Werkstoffprüfung



VIII/23

Fig. 13

Fatigue strength requirements for highly-stressed winding ropes

Seilprüfstelle
Institut für Fordertechnik und Werkstoffprufung

ANNEX IX

DECISION OF THE MINES SAFETY AND HEALTH COMMISSION CONCERNING USE OF LIGHT ALLOYS FOR THE CONSTRUCTION OF ELECTRICAL APPARATUS FOR USE IN MINES FIREDAMP

The Mines Safety and Health Commission at its meeting on 11th. July 1975, decided as follows in reply to a question posed by CENELEC (European Committee for Electrotechnical Standardisation;

Concerning the enclosures of electrical apparatus of equipment of the types "Group I" (which is for mines subject to firedamp), and which are likely to be affected by the Draft Standard EN 50 014 - (General Regulations concerning electrical apparatus for use in potentially explosible atmospheres (para. 7.1.)

The alloys used in the construction of enclosures of electrical apparatus for use in mines subject to firedamp should contain by weight:

a) not more than 15 % in total of aluminium, titanum and magnesium;

and

b) not more than 6 % in total of magnesium and titanum

The stand taken by the Mines Safety and Health Commission will not prejudge in any way the advice which might be given concerning the general use of light alloys especially for certain apparatus where a reduction in weight may be an important factor affecting safety.

Clearly the national authorities remain competant to authorise the use of non specified materials.

ANNEX X

A FIRST REPORT ON FILTER SELF-RESCUERS FOR

USE IN COAL MINES IN THE EUROPEAN COMMUNITY COUNTRIES

PART I : MINIMUM DESIGN REQUIREMENTS AND TESTING PROCEDURES;

(Adopted by the Mines Safety and Health Commission on 6 May 1976 and submitted to the Governments of Member States as a proposal following Article 1 of its terms of Reference, and for implementation and follow up in accordance with Article 4 of those terms of reference)

FOREWORD

1. Part I of the attached report deals only with the specification and testing of self resucers. Part II will deal with the Maintenance facilities. Neither Part argues the case for or against the provision and use of this type of apparatus in mines.

2. Filter self-rescuers are provided for use in the majority of coal mines in member states of the Community of Europe. The design of the rescuers does not vary greatly between states or coalfields, and it has generally proved to be satisfactory in service.

3. To achieve improvement in the design and the economics of production of such self-rescuers common specifications and testing procedure are essential.

4. The Committee of Experts has included general comments in the Introduction to Part I. They briefly describe the historical development of self rescuers,and the possibilities and limits of their effectiveness.

5. For the successful use of self rescuers, further provisions must be made for routine maintenance and for the training of workmen in their use. These provisions will be covered in Part II of this report.

6. Such provisions may vary very considerably depending on local circumstances. Therefore only general recommendations have been made in Part II and the Committee of Experts has decided to submit only an information report on the different existing arrangements.

7. To expedite publication Part I was submitted to the Mines Safety and Health Commission on 6 May 1976 and Part II will follow later.

FILTER SELF-RESCUERS IN EUROPEAN COMMUNITY

PART I: MINIMUM DESIGN REQUIREMENTS AND TESTING PROCEDURES

1. INTRODUCTION

1.1. The development of self-rescuers began in the second half on the 1920's, utilising experience gained with gas masks in the first world war. They were first introduced on a large scale in German mines in the 1950's (following the 1946 disaster at Grimberg Colliery) and made compulsory in 1957 for all personnel underground.

In Britain trials with self-rescuers were started in 1953, large scale introduction began in 1967 and the carrying of rescuers for all underground workers became a condition of employment in 1968.

Self-rescuers were also introduced in Belgium in 1957.

1.2. It can be said that the general introduction of filter self-rescuers in the mines was delayed by the endeavours of early research workers to provide the miner with an escape apparatus that would give protection in any circumstances. The filter self-rescuer - as the name implies - "filters" out the carbon monoxide by converting it to carbon dioxide in a catalyst layer. It is also effective against certain other toxic gases but it cannot prevent asphyxiation in oxygen deficient surroundings.

It must always be remembered, therefore, that the self-rescuer is to serve as an escape apparatus only and that it can only be effective when there is enough oxygen to support life.

Research into the fundamental physico-chemical characteristics of suitable reagents, carried out over the las 20 years, indicates that the limitations of the present self-rescuers are unlikely to be overcome. In future only comparatively minor improvements are likely to be achieved and this fact must be borne in mind when considering future developments.

Research into a fully alternative self-contained breathing apparatus to replace the filter self-rescuer has not so far proved wholly successful (because of weight, size and operational life) but should be encouraged.

1.3. Oxidation of CO to CO_2 is an exothermic reaction and the heat produced raises the temperature of the inhaled air when a rescuer is in use. The temperature rise depends on the concentration of CO. The air passing through the rescuer in dried and it has been shown that men can breathe dry air at fairly high temperatures without undue discomfort.

The heat-exchanger built into the current self-rescuer ensures that even at CO contents of up to 1·5% by volume in the ambient atmosphere the temperature of the inhaled air, although uncomfortable, can be tolerated. It is generally assumed that post-explosion or fire gases with CO concentrations much in excess of 1·5% are likely to be too deficient in oxygen to support life.

1.4. Investigations at the National Coal Board's Institute of Occupational Medicine in Edinburgh have shown that - because of the intense respiratory drive produced by excess CO_2 in inhaled air - many men find the rescuer unwearable in atmospheres with a high CO_2 content. It follows that the wearability of a rescuer is also determined by the CO_2 content in addition to the limitations imposed by the O_2 and CO.

The filter self-rescuer is mainly intended for use in cases of mine <u>fires</u> when there is sufficient oxygen, some carbon dioxide and a dangerous level of carbon monoxide. Similar conditions can exist after gas or dust explosions, especially in airways remote from the seat of the blast. In such circumstances the protection afforded by a self-rescuer is invaluable.

1.5. The useful life on a self-rescuer cannot be defined by a single figure. It depends on the humidity of the surrounding atmosphere, the CO content and the rate of breathing of the wearer, which is in turn dictated by the effort involved in the escape.

The mention of the "life" of a rescuer in official documents refers to the Test Life, determined under specified test conditions in a laboratory. (See 2.2.1.)

2. DESIGN AND SPECIFICATION

2.1. General

All filter self-rescuers are of the same basic design and consist of a head-harness, nose-clip and a filter canister with a mouthpiece, housed in a metal or plastic case. To prevent ingress of moisture the case is hermetically sealed either mechanically at atmospheric pressure or under vacuum. In a vacuum-sealed case the container and its lid are held together by the ambient overpressure and fall apart if the vacuum is lost. The tightness of a case sealed at atmospheric pressure is checked by regular weighing or by another suitable method to detect any pick-up of moisture.

The actual self-rescuer itself is fitted with an exhalation valve and may also have an inhalation valve. The filter canister contains a layer of a drying agent and hopcalite catalyst. Since the catalyst is deactivated by water vapour the effective life of a rescuer is determined by the saturation of the drier. It follows that in a given set of conditions the rescuer could be made to function longer by increasing its moisture absorption capacity. In practice this means using more drying agent. i.e. making the rescuer bigger, as the efficiency of the existing reagent cannot be improved significantly, in spite of intensive research.

From the efficiency standpoint it would be highly desirable to develop a catalyst not affected by moisture.

2.2. Physiological Requirements

The following minimum physiological requirements should be met by filter self-rescuers:

2.2.1. Protection against Carbon Monoxide

Using a test gas with up to 1·5% by volume of CO and with 20·7 mg/l of water vapour the volume of carbon monoxide passing through the filter after 75 or 15o minutes * should not exceed 400 cm^3 when tested on a artificial lung set at 1·5 litres per inhalation and 20 inhalations per minute. This requirement determines the time during which a self-rescuer - under standard conditions - will provide protection against carbon monoxide ("physiological test life").

Tests at other lung settings, e.g. 35 l/min (17·5 x 2·0) may be useful as additional tests.

2.2.2. Temperature

When tested as in 2.2.1. with a gas mixture containing 1·5 % CO the temperature of the inhaled air shall not exceed 95°C (when measured by the method in fig. 2). The filter must be so constructed that the user cannot suffer burns from parts that could get hot at high CO concentration.

---

* Specified by individual countries according to their national codes or regulations, which reflect the differences in mining conditions.

2.2.3. Breathing Resistance

2.2.3.1. Inhalation Resistance

The inhalation resistance of the filter must not exceed 12·0 mbar during the test at a constant air flow of 94 l/min or at its equivalent under sinusoidal flow conditions with a minute volume of 30 litres when tested in accordance with 2.2.1. using a test-gas with 0 25% CO. *.

2.2.3.2. Exhalation Resistance

The exhalation resistance when tested as in paragraph 2.2.3.1. above, must not exceed 3·0 mbar.

2.3. Details of Construction

2.3.1. The outer case shall provide adequate protection for the rescuer and shall be constructed so as to permit easy external cleaning.

2.3.2. The case should be fitted either with a belt loop or a shoulder strap. In both cases the attachment shall open or break when subjected to a reasonably strong pull to prevent a man being trapped by his self-rescuer.

2.3.3. The stand-off distance of the rescuer from the body when worn on a belt shall not exceed 12·0 cm, with a maximum horizontal cross-section area of 100 cm^2.

2.3.4. The weight of the complete self-rescuer shall not exceed 1300 g.

---

* **Note:** The CEN Working Group 79 is studying the question of resistance of breathing apparatus; liason will be maintained with this group to ensure uniformity of standards.

2.3.5. The weight of the respirator (without nose-clip and head-harness) shall not exceed 750 g. when it is worn directly on the head of the user.

2.3.6. All materials used in the construction of the self-rescuer must be able to withstand the maximum test temperatures without generating any harmful, evil-smelling or evil-tasting vapours. They must not deteriorate during prolonged storage. The outer case and the closure device must be corrosion-resistant in underground conditions.

2.3.7. The self-rescuers must be easy to open and simple to put on in an emergency. In the event of difficulty of removing it from the bottom part of its case it shall remain usable in that state.

2.3.8. The mouth-piece, provided with 2 "teeth bites", shall be designed so as not to cause undue discomfort when worn for the rescuer's full effective life. It shall be so made that in use the air inlet cannot be closed.

2.3.9. The head harness shall hold the rescuer securely to the wearer's face. Its design must permit easy fit for different-sized heads.

2.3.10. The nose-clip must seal the nose effectively. It shall be permanently attached to the respirator and have large pressure pads, be comfortable to wear and easy to apply.

2.3.11. A chinguard shall be provided, if necessary, to protect the wearer's chin from the heat generated in the filter canister.

2.3.12. The exhalation and inhalation (where fitted) valves shall function irrespective of the position of the wearer, be reliable and protected against accidental loosening.

2.3.13. A saliva duct shall be provided to ensure that functioning of the filter and valves is not affected by ingress of saliva.

2.3.14. The self-rescuer shall be provided with filters to prevent the entry of dust and soot particles into the reagent layers. It must be ensured that reagent particles do not enter the mouthpiece.

2.3.15. To protect the filter reagents from moisture during carrying the rescuer must be sealed against water vapour to ensure that there is no impairment of the function of the filter even after daily carrying of the rescuer in the pit over a number of years.

2.3.16. The self-rescuer must satisfy all the performance requirements even after subjection to severe shocks and vibration.

2.3.17. The outer case shall be permanently marked with the serial number and weight of the rescuer and the month and year of manufacture. Similar markings may also be made on the filter canister.

3. TESTING

3.1. General Testing Procedures

Normal laboratory methods and apparatus shall be used where no special techniques or instruments are mentioned in the directions given below.

3.2. Testing for Compliance with the Physiological Requirements

3.2.1. Testing of Protection against CO

The test determines whether the filter satisfies the requirements 2.2.1. The test is carried out with CO mixture of 0·25% and 1·5% by volume. (0·25% is the concentration at which the test life of a self-rescuer is shortest. Concentration of 1·5% CO is assumed to be the limiting value above which there is unlikely to be sufficient oxygen in the atmosphere to support life).

The test-rig is depicted in fig. 1 and consists basically of an artificial lung with valves controlled by the lung, humidifiers, the test-chamber, the standard test connector (fig. 2), flow-meters for air and CO, the exhaust fan and test and smpling points.

The test-rig operates on the following principle:

the filter "breathes" through the artificial lung. The filter is placed in a box (chamber) 30 cm long, 30 cm wide and 26 cm high. The air-flow past the filter must be at least 100 l/min.

The admixture of CO is by means of a regulating valve and a flow-meter. The CO concentration must be monitored either with a continuous analyser or by repeated check tests. In order to enrich the test gas with water vapour, it is passed through a humidifier. Psychrometric measurements are carried out to ensure that the prescribed water vapour content of the gas is maintained. The temperature of the test gas (t_t) should be approximately 25-30 °C.

The filter is attached to the standard connector. The gas temperature is measured in the connector at the specified point, with a thermocouple.

The exhaled air should have a temperature of 25/30 °C and be saturated with water vapour. This temperature is measured before starting the test (at the same point in the connector as for the inhaled air temperature). The contact thermometer regulating this temperature is adjusted by separating the test-rig from the artificial lung, closing the inhalation path (e.g. with a bung) and passing a constant 30 l/min airstream through the exhaled air line.

The volume of the test-rig- measured between the artificial lung connection and the mouthpiece of the self-rescuer - must not exceed 2 litres. Wherever possible rigid tubing should be used to connect together the different parts of the test rig The setting of the artificial lung to the prescribed breathing volume is made with a gas meter (volume meter) connected into the system in series with a flow restrictor. This restrictor mus have a value of 8.0 mbar in a constant airstream of 94 l/min.

3.2.2. Test of Protection against High Temperatures

This test checks the compliance with the requirements of para 2.2.2. The measurement of inhaled air temperature is made as described in 3.2.1. at a CO content of the mixture of 1.5% and a moisture content of 20.7 mg/l. The thermocouple used for this purpose is as indicated in Figure 2.

To checkthat the rescuer does not cause skin burns a test is carried out in the following way:

When the self-rescuer reaches a constant temperature in the test 3.2.1. with 1.5% CO mixture it is removed from the test rig and worn immediately by one of the testers. This test must be repeated at least 4 times with different self-rescuers and different people. It must not cause any skin burns.

3.2.3. Testing of the Breathing Resistance

The test checks the compliance with para 2.2.3. and is carried out on the apparatus shown in fig. 3.

A steady air stream of 94 l/min is aspirated through the apparatus. The flow is set by means of a standard diaphragm to DIN 1952 and a fine manometer.

The inhalation resistance is measured with a manometer after attaching the mouthpiece of the rescuer (with its exhalation valve sealed) to the apparatus via a suitable connector. Any blank value (arising from the shape of the connector) must be subtracted from the result. The inhalation resistance is determined immediately before the test and not later than 30 seconds after the test carried out in accordance with 2.2.1.

The exhalation resistance is measured in a similar manner on a ready-for-use rescuer connected to the apparatus by means of a suitable connector. The result must be corrected for any zero error arising from the shape of the connector.

A continuous measurement of breathing resistances during the test 3.2.1. may also be used.

3.3. <u>Physical Tests</u>

3.3.1. <u>General</u>

When testing for compliance with the requirements set out in para. 2.3. the normal laboratory practice shall be followed, as wll as any relevant standard specifications of the country concerned.

3.3.2. Individual countries may wish to set a limit to the amount of <u>reagent fines</u> introduced into the self-rescuer during the manufacturing stage. At the moment such a requirement is applied only in Britain.

3.3.3. The adequacy of the resistance to impact of the rescuers is tested in Germany by submitting rescuers to 50,000 impacts in a vibrator and then determining their test lives on the lung machine.

In Britain self-rescuers are tumbled in a cement mixer to determine the amount of reagent fines emitted. A life-test normally follows.

It is desirable to develop - on a European basis - a test that would more closely simulate the conditions the rescuers are exposed to during their daily carrying underground.

3.4. Carrying Trials

New types of rescuers having passed the above tests will have to undergo a field acceptance trial to supplement the laboratory results. A minimum of 20 rescuers should be available for this purpose. They will be carried underground for every working day for a minimum of 150 shifts. The men carrying these rescuers should be chosen to represent a cross-section of underground workers. Their comments and views shall be taken into account when making a final assessment of the practicability of a new self-rescuer for everyday use.

3.5. Routine Acceptance Testing

3.5.1. In Britain the production testing of rescuers is carried out in Scotland on a national basis. Apart from supervision of the manufacturing process by the National Coal Board's Factory Inspectors a 10% sample of daily production is examined by Scientific Control, with a proportion of the sample subjected to the lung-similator test.

In the German Federal Republic the quality control is exercised by the Hauptstelle für das Grubenrettungswesen in Essen. In Belgium the responsible authority is the Institute National de Industrie Extractive (INIEX).

3.5.2. Different industrial practices and conditions in the member countries make it impracticable at this stage to suggest a common routine acceptance testing programme. It is, therefore, recommended that some form of routine quality control of newly-made self-rescuers should be adopted, but that it should be left to the individual member states to specify how this should be done.

FIGURE 1 Installation d'essai	FIGURE 1 Test apparatus
1. Poumon artificiel	1. Artificial Lung
2. Soupapes magnétiques	2. Magnetic valves
3. Humidificateur pour air expiré	3. Humidifier for exhaled air
4. Raccord pour mesure des températures avec le thermocouple	4. Connector with thermocouple
5. Prise pour analyse du CO dans l'air inspiré	5. Sampling Point for CO in inhaled air
6. Régulateur et compteur pour air	6. Motoring and Control Unit for Air
7. Régulateur et compteur de CO	7. Motoring and Control Unit for CO
8. Humidificateur de l'air d'essai	8. Humidifier for test gas
9. Chambre d'essai	9. Test chamber
10. Prise pour analyse du CO dans l'air d'essai	10. Sampling Point for test gas
11. Autosauveteur	11. Self-rescuer
12. Ventilateur aspirant	12. Exhaust fan

FIGURE 2 Raccord de mesure	FIGURE 2 Standard connector
1. tube "1	1. 1" tube
2. endroit de mesure continue de la résistance respiratoire	2. Measuring point for continuous recording of resistance to respiration
3. endroit de mesure supplémentaire (thermomètre)	3. Supplementary measuring point (thermometer)
4. paroi de la chambre d'essai	4. Wall of the testing chamber
5. raccord (à l'intérieur de la chambre d'essai en plastique)	5. Attachment (Plastic piece inside the test chamber)
6. Contre-bride	6. Fixing plate

Figure 2.1. Raccord	Figure 2.1. Connector
couple thermique (10% rhodium/platine 0,125 ∅ 40% palladium/or 0,122 ∅)	Thermocouple (10% Rhodium/Platinum 0,125 mn dia 40% Palladium/Gold 0,122 mn dia)

Figure 2.2.	Figure 2.2.
contre-bride	Fixing plate

Figure 3	Figure 3
Shéma de l'installation de mesure de la résistance respiratoire	Test-Rig for Breathing Resistance
A. Dispositif de mesure	A. General Arrangement
B. Mesure de la résistance à l'inspiration	B. Measuring system for resistance to inspiration
1. Canalisation d'essai	1. Connecting tube
2. Diaphragme standard	2. Standard orifice
3. Manomètre différentiel	3. Differential manometer

4. Manomètre de précision

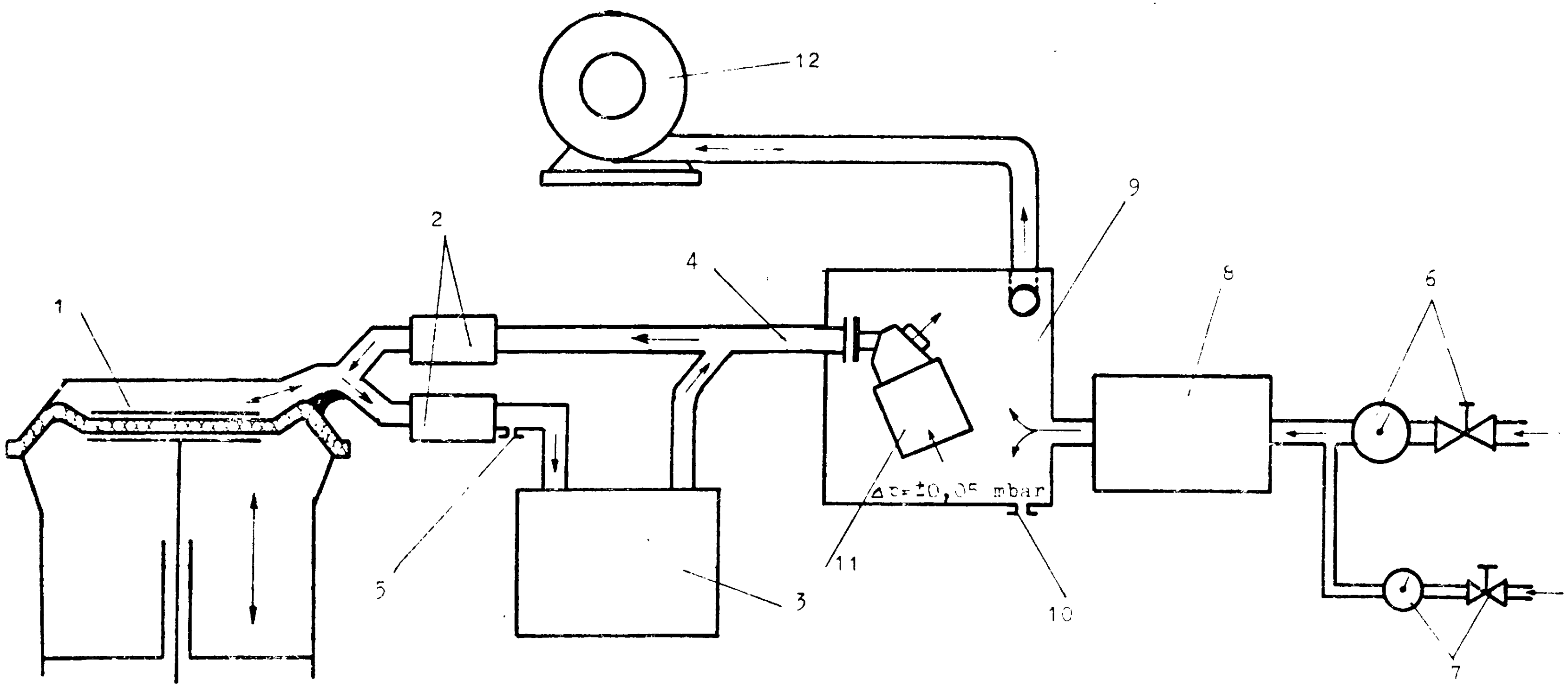
   Mesure de la résistance à l'expiration

5. Filtre
6. Raccord pour mesure de la résistance
7. Fermeture de la soupape d'expiration

4. Precision manometer

   Measuring system for resistance to exhalation

5. Filter
6. Connector containing tappings for the precision manometer
7. Closure of the exhalation valve.



1 künstliche Lunge

2 Magnetventile

3 Befeuchtungsvorrichtung für die Ausatemluft

4 Einheitsmeßstutzen

5 Probenahmestutzen für die CO-Analyse der Einatemluft

6 Meß- und Regeleinrichtung für Luft

7 Meß- und Regeleinrichtung für CO

8 Befeuchtungsvorrichtung für die Prüfluft

9 Testkammer

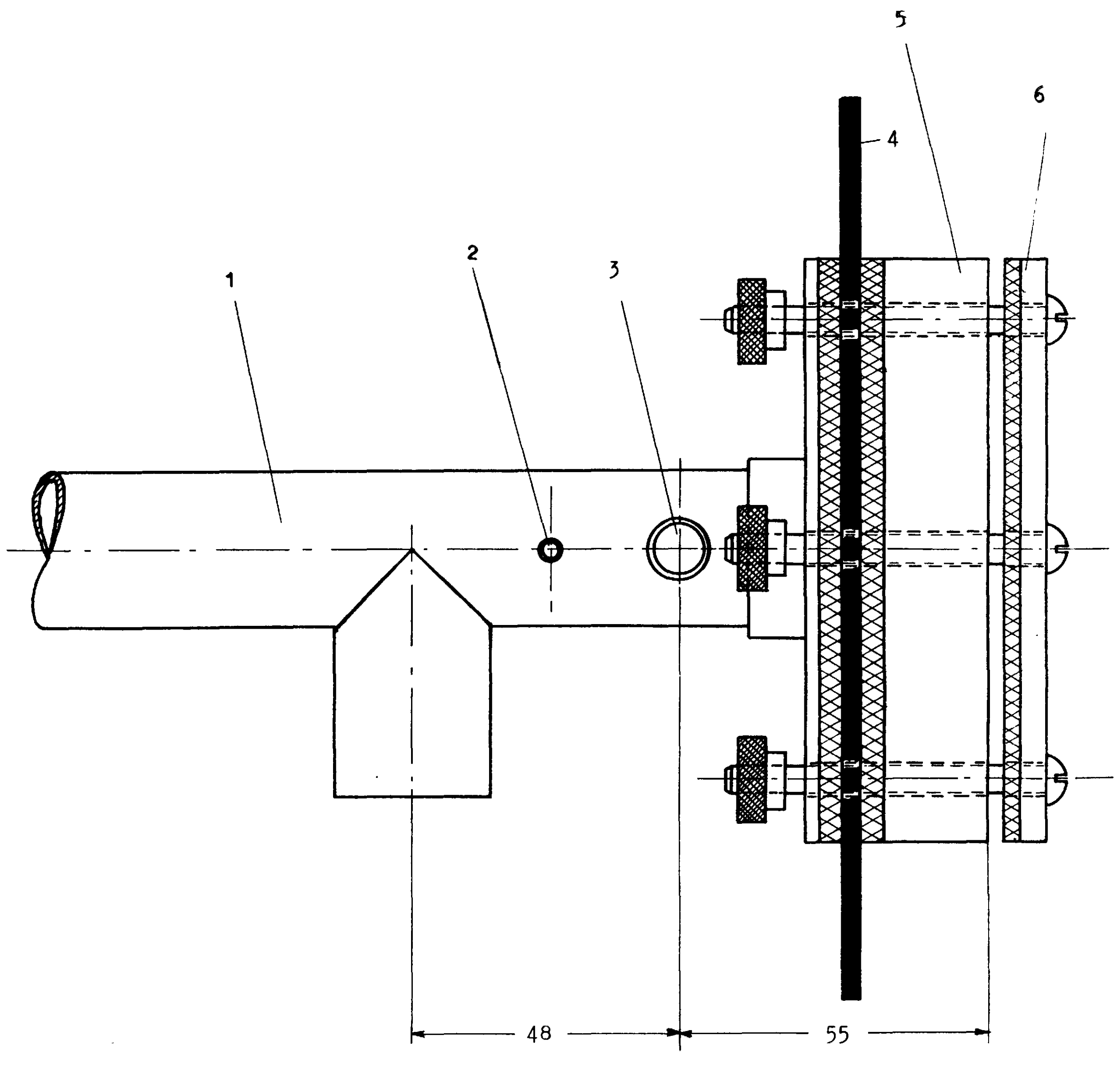
10 Probenahmestutzen für die CO-Analyse der Prüfluft

11 Filtergerät

12 Absaugeventilator

Abbildung 1
Testanordnung

Abbildung 2
Einheitsmeßstutzen



1 **Rohr 1"**

2 **Meßstelle für die kontinuierliche Atemwiderstandsmessung**

3 **Zusätzliche Temperaturmeßstelle (Thermometer)**

4 **Testkammerwand**

5 **Verbindungsstück (innerhalb der Testkammer aus Kunststoff)**

6 **Gegenstück**

Abbildung 2.1
Verbindungsstück

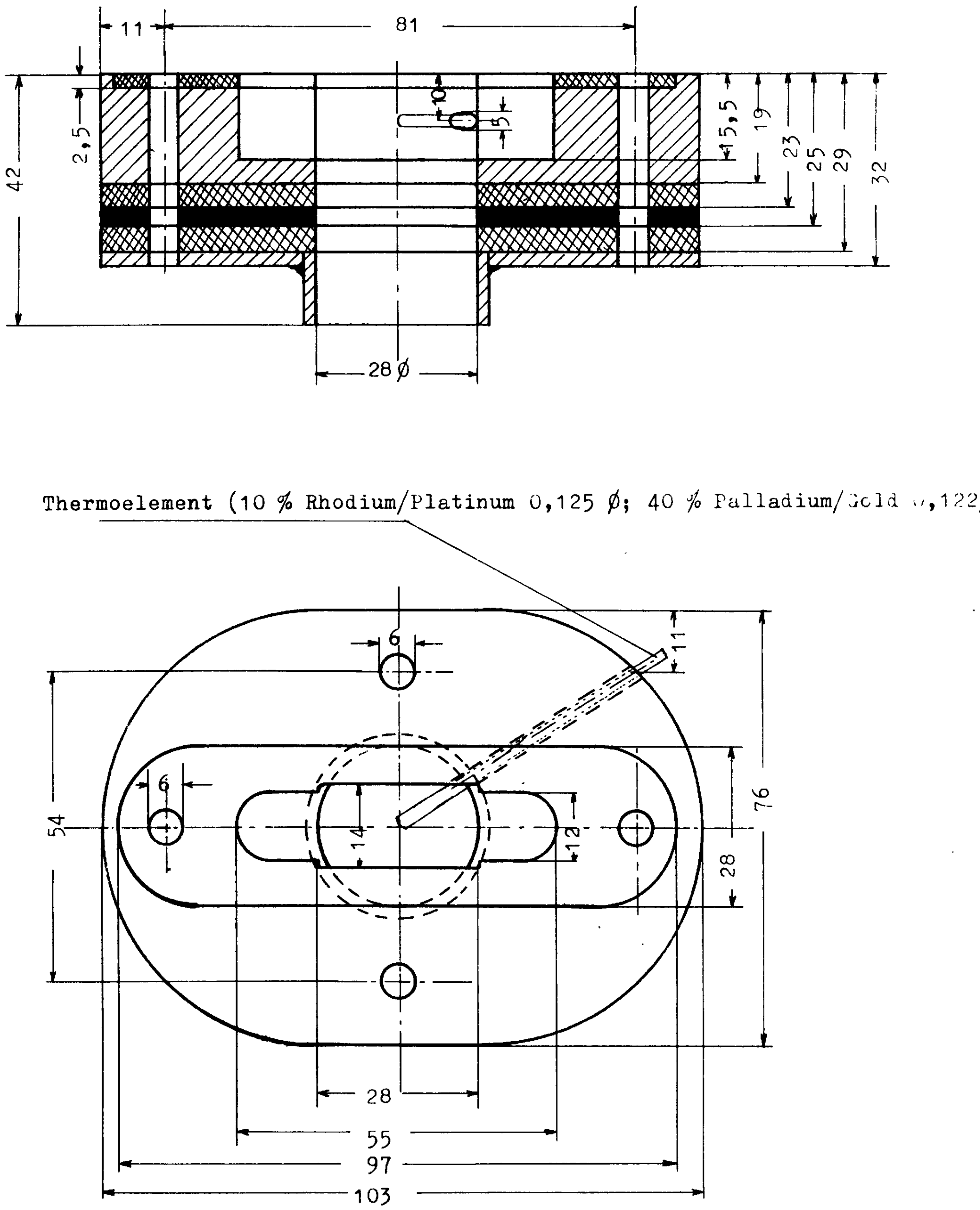


Abbildung 2.2

Gegenstück

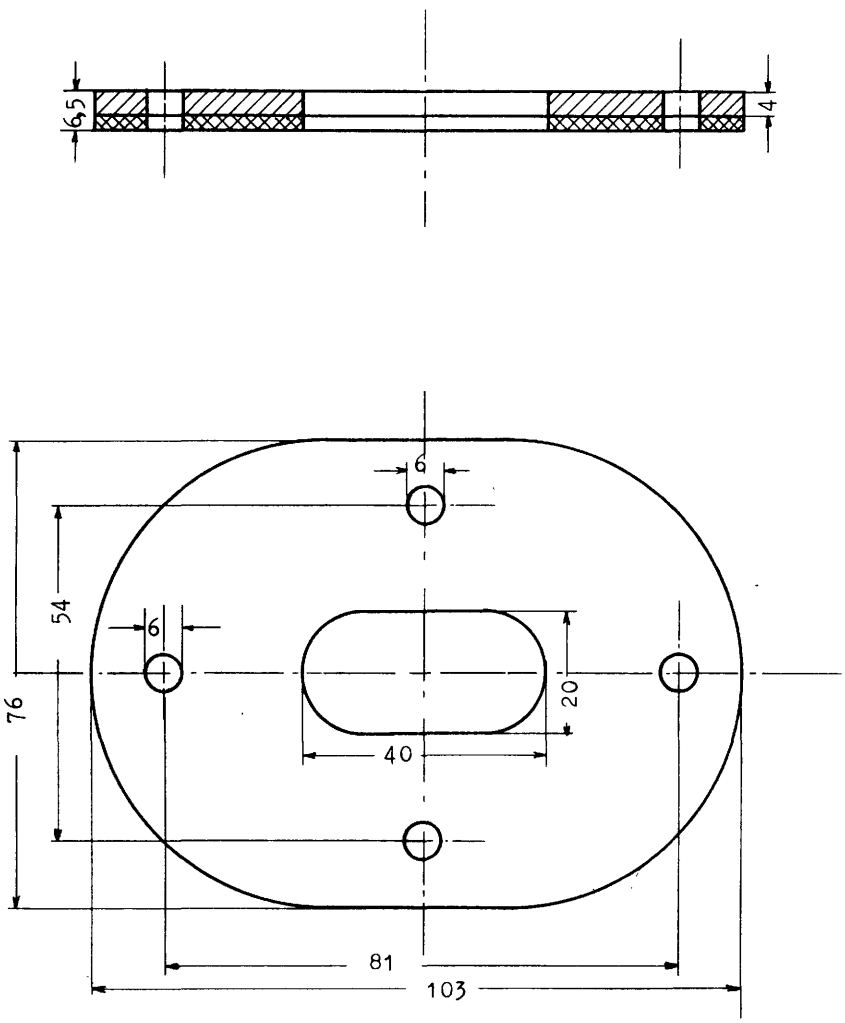
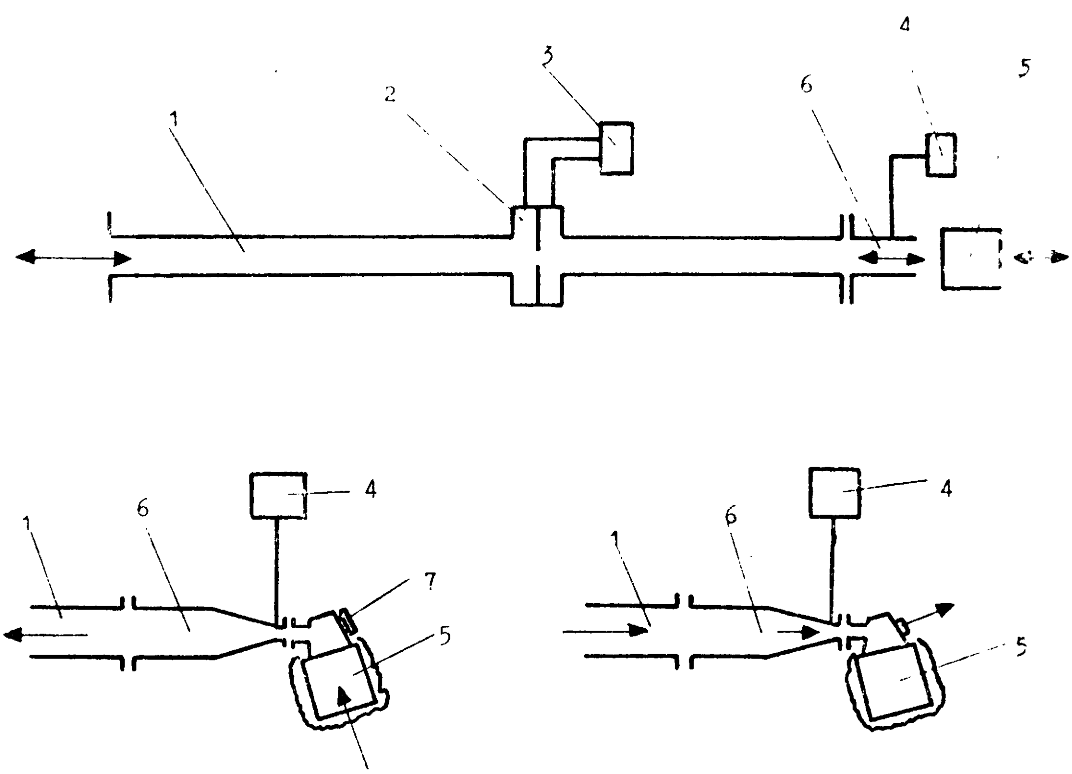


Abbildung 3
Schema der Meßanlage
für den Atemwiderstand

A Allgemeine Meßanordnung



B Einatemwiderstandsmessung

C Ausatemwiderstandsmessung

1 Meßstrecke

2 Standardblende gemäß DIN 1952

3 Differenzdruckmanometer

4 Feindruckmanometer

5 Filtergerät

6 Verbindungsstück

7 Dichtkappe für das Ausatemventil

ANNEX XI

BIBLIOGRAPHY OF THE WORK OF THE MINES SAFETY AND HEALTH COMMISSION

A. MINE RESCUE, FIRES AND UNDERGROUND COMBUSTION

I. - Mine rescue

1. Organization of mine rescue arrangements

- Report on tour of central rescue stations in the Community countries and Great Britain (First Report on the organization of mine rescue services 1958/59) (2nd Report of the Mines Safety and Health Commission, Annex B, June 1961);

- Second Report on the organization of mine rescue services, 1960 (3rd Report of the MSHC, Annex V a, November 1966);

- Third Report on the organization of mine rescue services, 1961 (3rd Report of the MSHC, Annex VI a, November 1966);

- Fourth Report on the organization of mine rescue services, 1962 (3rd Report of the MSHC, Annex VII a, November 1966);

- Fifth Report on the organization of mine rescue services, 1963 and 1964 (3rd Report of the MSHC, Annex VIII a, November 1966);

- Sixth Report on the organization of mine rescue services, 1965/66 (5th Report of the MSHC, Annex V, October 1968);

- Seventh Report on the organization of mine rescue services, 1967/68, (7th Report of the MSHC, Annex IV, September 1970);

- Recommendations regarding the provision of advice from foreign experts in the case of major accidents (3rd Report of the MSHC, Annex III, November 1966);

- Communication links between the rescue base and the rescue team (3rd Report of the MSHC IV, Annex IV, November 1966);

- List of regulations and directives concerning the organization of mine rescue services in the countries of the Community and the United Kingdom (Doc. 3845/1/70; to be published in the 9th Report of the MSHC).

2. Rescue equipment

- Interim report on the continued development of the CO-filter self-rescuer (Doc. 1872/68/1, 10th October 1968);

- Results of the research carried out with financial assistance from the Commission of the European Communities into the improvement of the physiological conditions for the wearing of breathing apparatus (8th Report of the MSHC, Annex IV, June 1971).

- First report on filter self-rescuers for use in coal mines in the European Community countries - Part I : minimum design requirements and testing procedures (13th Report of the MSHC, Annex X, 1976).

A. MINE RESCUE, FIRES AND UNDERGROUND COMBUSTION (cont'd)

3. Research work at high temperatures

- Final report on research into the establishment of simple criteria for the selection of rescue team personnel for heavy work in high temperatures (3rd Report of the MSHC, Annex IX a, November 1966).

4. Rescue with boreholes

- List of specialists for borehole rescue work and equipment available in Community countries (8th Report of the MSHC, Annex III, June 1971, revised giving position as at 1.1.76. (13th Report of the MSHC, Annex VI, 1976).

II. - Fires and underground combustion

1. Shaft fires at great depth

- Recommendation on the equipment having regard to the prevention of open fires (1st Report of the MSHC, April 1959);

- Fighting of fires in shafts by bringing in water (2nd Report of the MSHC, page 24, June 1961); see also modification contained in 10th Report of MSHC, Annex VI, June 1972.

- Final report on experiments with shaft fires carried out by the Experimental Roadway Association in Dortmund, with the financial aid of the High Authority, at Dorstfeld Colliery, Dortmund (3rd Report of the MSHC, Annex III a, November 1966);

- Explanatory notes and views of the Working Parties on Underground Combustion and Fires and Mine Rescue Organization, and their expert sub-committees, concerning the final report of the Experimental Roadway Association, Dortmund, on the shaft fire experiment at Dorstfeld Colliery. (3rd Report of the MSHC, Annex III b, November 1966).

2. Fire stoppings (dams)

- Sealing-off of mine fires and underground combustion by dams (2nd Report of the MSHC, page 51, June 1961);

- Report on trials with explosion-proof dams carried out by the Experimental Roadway Association in Dortmund at the request of the Safety Commission and with financial aid of the High Authority - Statement of policy regarding the erection of advance dams of plaster as a fire fighting measure (3rd Report of the MSHC, Annex I, November 1966);

A. MINE RESCUE, FIRES AND UNDERGROUND COMBUSTION (cont'd)

- Final Report on trials with explosion-proof dams, carried out by the Experimental Roadway Association in Dortmund with the financial aid of the High Authority (3rd Report of the MSHC, Annex I a, November 1966);

- Instructions for the construction of plaster stoppings by the method developed by the Essen-Kray Main Rescue Station (3rd Report of the MSHC, Annex X a, November 1966);

- Instructions for the hydro-mechanical method of constructing plaster stoppings developed from the Central rescue station of the Saarbergwerke AG (8th Report of the MSHC, Annex V, June 1971).

3. Fire-resistant fluids

- Report on the establishment of criteria for fire-resistant fluids for power transmission (Hydraulic fluids) and on the tests to be carried out for that purpose (2nd Report of the MSHC, Annex A, June 1971);

- Second Report on specifications and testing conditions relating to fire-resistant fluids used for power transmission (3rd Report of the MSHC, Annex IV a, November 1966);

- Third Report on specifications and testing conditions relating to fire-resistant fluids for power transmission (pamphlet 10th October, 1967);

- Fourth Report on specifications and testing conditions relating to fire-resistant fluids for power transmission (pamphlet 26th March 1971);

- Fifth Report on specifications and testing conditions relating to fire-resistant fluids for power transmission (pamphlet November 1974).

4. The reopening of fire areas

- Report on the opening of sealed-off fire areas and the rules applicable thereto (3rd Report of the MSHC, Annex II, November 1966);

- Study on the reopening of sealed-off fire areas by Bergassessor a.D.G. Lehmann (3rd Report of the MSHC, Annex II a, November 1966).

5. Use of urethane foam for sealing

- Opinion on the use underground of polyurethane foam in the coal mining industry (7th Report of the MSHC, Annex VI, September 1970).

A. MINE RESCUE, FIRES AND UNDERGROUND COMBUSTION (cont'd)

6. Conveyor belts

- First report on tests and criteria of flammability of conveyor belts with fabric cores used in the coal mines of the European Community (12th Report of the MSHC, Annex VI, July 1975).

B. WINDING ENGINES, WINCHES, ROPES AND SHAFT GUIDES

- Report on the electro-magnetic examination of winding ropes (3rd Report of the MSHC, Annex VI, November 1966);
- Final report on electro-magnetic tests carried out with the financial aid of the High Authority in the Bochum Rope-testing Station (3rd Report of the MSHC, Annex XI a, November 1966);
- Report on the use of accelerometers for testing winding installations (3rd Report of the MSHC, Annex V, November 1966);
- Report on measurement and testing procedures for shaft- and roadway winding ropes and for guides for shaft- and roadway haulage installations (7th Report of the MSHC, Annex VII, September 1970);
- Report of the Rope Testing Office of the Westfälische Berggewerkschaftskasse Bochum on rope testing means and procedures for improving safety in mine shafts and roadways employing rope haulage (10th Report of the MSHC, Annex V, June 1973);
- Summary of current techniques in shaft winding and rope haulage with special reference to the design of winding engines (ARNOLD) (printed separately, July 1975);
- The safety requirements for brakes on winding engines and winches in the shaft winding plant of the German mining industry (HÄUSLER) (printed separately, July 1975);
- Shaft winding and safety (HOISCHEN) (printed separately, July 1975);
- Minimum safety requirements for winding and balance rope suspension gear, for shaft winding and sinking installations (13th Report of the MSHC, Annex VII, 1976);
- Information report "New aspects of the testing of ropes in winding installation subject to high and maximum stress" by Dr Ing. ARNOLD, Seilprüfstelle der Westfälischen Berggewerkschaftskasse, Bochum (13th Report of the MSHC, Annex VII, 1976).

C. ELECTRICITY

- Decision on the removal of oil from resistors, condensers, transformers, switches and relays used underground (1st Report of the MSHC, April 1959);

- The use of non-flammable materials for the manufacture of electric cables and leads for underground use (2nd Report of the MSHC, page 5, June 1961);

- Requirements which must be met by electrical shotfiring leads (2nd Report of the MSHC, page 8, June 1961);

- Protection of the underground electrical network against the danger of electric shocks (2nd Report of the MSHC, page 11, June 1961);

- Report on investigations into the protection of underground electrical network against dangers arising from fires or from firedamp explosions (3rd Report MSHC, Annex VII, November 1966);

- Report on firedamp-proof electrical switchgear for nominal voltages above 1100 volts (3rd Report of the MSHC, Annex VIII, November 1966);

- Notes on the problem of heat transmission in an insulated conductor (3rd Report of the MSHC, Annex IX, November 1966);

- Report on characteristics and the electrical protection of power feed cables for mobile machines (cutters, loaders, etc.) used underground in the coal mines of the countries of the Community (7th Report of the MSHC, Annex V, September 1970);

- Comments and recommendations arising out of the report adopted by the Mines Safety and Health Commission on 20 June 1969 on the characteristics and electrical protection of cables supplying mobile machines (coal cutters, loading machines etc.) used underground in coal mines in the Community countries (8th Report of the MSHC, Annex IX, June 1971);

- Policy statement on the deleterious effects of dust-binding processes using saline pastes and powders upon electrical plant underground (9th Report of the MSHC, Annex IX, July 1972);

- Comparison of safety provisions concerning electric trolley locomotives underground and in particular, possibilities of reducing the incidence of trolley sparks (9th Report of the MSHC, Annex X, July 1972);

- Report and conclusions on overvoltages caused by lightning (9th Report of the MSHC, Annex XI, July 1972);

C. ELECTRICITY (cont'd)

- Report on trends in the use of explosion-proof electrical apparatus for nominal voltages above 1100 volts; conclusions and recommendations (10th Report of the MSHC, Annex VIII, June 1973);

- Report and conclusions on Haulage powered by linear motors (11th Report of the MSHC, Annex IX, May 1974);

- Decisions of the Mines Safety and Health Commission concerning materials to be used, and specifications for the construction of electrical apparatus for use in mines which are liable to be affected by firedamp;
  - Surface temperatures of caseings (See 12th Report, Annex VIII, July 1975)
  - Oil immersed contacts in switchgear (See 12th Report, Annex VIII, July 1975)
  - Provisions for locking off apparatus in the open-circuit condition (See 12th Report, Annex VIII, July 1975)
  - Use of Light Alloys (See 13th Report, Annex IX, 1976)

  which will be taken into account in the preparation of a European Standard by the CENELEC committee (European Committee for Electrotechnical Standardization).

D. INFLAMMABLE DUSTS

- Report on work done on the neutralization of combustible dusts and dust barriers (7th Report of the MSHC, Annex VIII, September 1970);

- Memorandum on information necessary for the examination of coaldust explosions or ignitions of firedamp in mines (10th Report of the MSHC, Annex VII, June 1973);

- Information Report on 'Dust binding by means of salt pastes, powders and flakes' (11th Report of the MSHC, Annex VI, May 1974);

- Information Report on 'Water trough barriers for protection against underground explosions of coal-dust (11th Report of the MSHC, Annex VII, May 1974);

- Report on triggered barriers and recommendations for their use underground (11th Report of the MSHC, Annex VIII, May 1974).

E. MECHANIZATION

- Recommendations concerning the equipment of locomotives (1st Report of the MSHC, April 1959);
- Recommendations concerning the neutralization of exhaust gases from diesel engines (1st Report of the MSHC, April 1959).

F. HEALTH PROTECTION AND ENVIRONMENTAL FACTORS

- Explanatory notes to the recommendation on "Fixing of climatic limits" (3rd Report of the MSHC, Annex X, November 1966);
- Recommendation on "Fixing of climatic limits" (3rd Report of the MSHC, Annex XI, November 1966);
- Recommendation embodying directives on means of suppressing dust concentrations in underground workings (8th Report of the MSHC, Annex VI, June 1971);
- Recommendation on the organization of special services responsible for the inspection of dust conditions in underground working (8th Report of the MSHC, Annex VII, June 1971);
- Statement on the need to reduce the dust concentration resulting from the use of coal-cuttings and getting machinery and roadway drivage (8th Report of the MSHC, Annex VIII, June 1971);
- Guidelines concerning the Design and Use of Coal Getting and Heading Machines, relating to the reduction of airborne dust (11th Report of the MSHC, Annex XI, May 1974);
- Examples of proven and effective methods of installing and operating water sprays on plough faces (Annex to the guide lines concerning the design and use of coal getting and heading machines, relating to the reduction of airborne dust, which were printed as Annex XI to the 11th Report) (12th Report of the MSHC, Annex VII, July 1975).

G. HUMAN FACTORS

1. Psychological and sociological factors in mine safety

- Report on the psychological and sociological factors affecting safety (3rd Report of the MSHC, Annex XII, November 1966);

G. HUMAN FACTORS (cont'd)

- Recommendations on the psychological and sociological factors affecting safety (3rd Report of the MSHC, Annex XIII, November 1966);

2. Effects of remuneration methods on safety

- Report on the implications of payment at piece rates for mine safety (4th Report of the MSHC, Annex III, December 1967);

- Recommendations as to principles to be observed in view of the possible influence of payment at piece rates on safety in coal mines (4th Report of the MSHC, Annex IV, December 1967).

3. Medical Problems

- Report on pre-entry and routine medical examinations and recommendations (2nd Report of the MSHC, page 74, June 1961);

- Colliery medical services in the countries of the Community and the United Kingdom (2nd Report of the MSHC, Annex C, June 1961).

H. VENTILATION AND FIREDAMP

- Study of the Group of Experts on Ventilation Stabilization of Ventilation in Pit Fires - investigation in the light of Prof. Budryk's theory (this study consists of two separate parts: the Report itself and Annex III to the 6th Report of the MSHC, September 1966);

- Practical conclusions of the application of the theory of stabilization of ventilation (6th Report of the MSHC, Annex III, September 1969);

- Circular 181 of the Belgian Ministry of Economic Affairs relating to the prevention of outbursts of Firedamp (11th Report of the MSHC, Annex X, May 1974);

- Conditions under which exemption might be granted to raise maximum permitted CH_4 limits in Member States (Annex V).

J. <u>STRATA CONTROL</u>

- Notes concerning the statistical comparison of serious and fatal accidents due to falls of ground in the bituminous coal mining industry of the European Communities and Great Britain (11th Report of the MSHC, Annex XII, May 1974);

- Notes on operating statistics in the coal mining industry of the European Community countries as established for 1972 (11th Report of the MSHC, Annex XIII, May 1974).

OFFICE FOR OFFICIAL PUBLICATIONS OF THE EUROPEAN COMMUNITIES
Boîte postale 1003 - Luxembourg 7492