COMMISSION OF THE EUROPEAN COMMUNITIES

TENTH REPORT OF THE MINES SAFETY AND HEALTH COMMISSION

YEAR 1972

JUNE 1973

COMMISSION OF THE EUROPEAN COMMUNITIES

TENTH REPORT OF THE MINES SAFETY AND HEALTH COMMISSION

YEAR 1972

JUNE 1973

CONTENTS

LIST OF ANNEXES

SECTION I

GENERALITIES ON THE ACTIVITY OF THE MINES SAFETY AND HEALTH COMMISSION

INTRODUCTION

The year 1972, covered by this report, was the last for the Community of the Six and for the Mines Safety and Health Commission, was marked by the imminent advent of three countries in particular the United Kingdom which brings an important coal production to the Community.

This year was the most difficult for the coal-mining of the Community of the Six. The table below contains some key information.

	D	B	F	I	N	Cty.	U.K.
Production (m. tons)	108.4	10.5	29.8	0.3	2.9	151.9	119.5 (1)
Percentage change for 1971	-7.2	-4.2	-9.9	-2.3	-23.4	-7.9	-18.8
Underground workers on books average 1972 (thousands)	125.5	22.9	53.5	0.6	4.9	207.3	209.5
Percentage change since 1971	-7.2	-4.4	-10.8	-17.6	-17.7	-8.2	-3.9
Output per manshift (kilos)	4250	2620	2709	2750	3240	3659	3381
Percentage change since 1971	+5.3	-0.1	+3.2	+10.9	-3.2	+4.1	±0
Number of working mines in 1972	61	20	43	1	4	129	286
Number of working mines closed in 1972	6	2	5	-	-	13	6
Capacity abandoned in 1972	4.5	0.2	2.0	-	-	6.7	
Undistributed stock end 1972 (m. tons)	0.8	0.4	4.8	0.0	0.6	12.9	11.1
Percentage change since 1971	+41.4	+19.4	+8.5		-9.0	+25.6	+7 %
Stocks of hard coke at coking plants (m. tons)	8.7	0.2	0.7	-	-	10.6	1.9
Percentage change since 1971	+61.6	-4.1	+20.4	-	-	+47.0	+45.2
Mechanization of total production (%)							
Coal getting 1970	90.0	78.7	80.7		84.7	87.1	
1971	92.6	85.6	82.2		84.9	89.8	
1972	95.2	87.2	84.7		87.3	92.4	91.1
Powered roof support 1970	36.1	13.4	20.3		16.8	30.6	
1971	44.9	30.2	28.3		21.3	40.1	
1972	55.4	40.3	37.0		38.9	50.4	86.9

1) 10 797 000 days lost through industrial action (22.4 m. tons)

Sources : National Mine administrations and Statistical Office of the Community

While production and numbers employed continued to fall, by about 8% compared with the previous year, and 13 mines with a capacity of 6.7 m. tons have been closed, output per manshift has continued to rise - by about 4.1 % or double the rate for the previous year. This was due to mechanization which is no doubt nearing maximum and the use of powered supports which increased by 50 % in two years.

In the United Kingdom, the situation was marked by industrial conflict which resulted in the loss of 10 757 000 working days and 22.4 m. tons of coal. Under normal conditions production in the United Kingsom would have been about 141.9 m. tons - approximately that of the Community. The number of mines is higher than on the continent but mechanization and the use of powered supports are as far if not further developed.

The figures for accidents in the coal mines of the six Community countries in 1972, can be broken down as follows :

1. Accidents involving 4 to 20 days' absence from work :

   40 376 in a total of 369.4 million man-hours, i.e. 109.31 per million hours (m.h.). In 1971, there had been 47 203 injured - 113.96 per m.h.

2. Accidents involving 21 to 56 days' absence :

   18 531 - 50.17 per m.h. In 1971 : 21 116 - 50.98 per m.h.

3. Accidents involving more than 56 days' absence :

   5 763 - 15.60 per m.h. In 1971 : 6 250 - 15.09 per m.h.

4. Fatal accidents :

   147 killed (of whom 6 died in the same accident), i.e. 0.399 per m.h. In 1971 : 182 killed (of whom 20 in 3 multiple accidents), i.e. 0.440 per m.h.

5. Total number of victims (injured, with at least 4 days off work, or killed) :

   64 817, i.e. 175.5 per m.h. In 1971 : 74 651, which is 180.2 per m.h.

These figures and the distribution of victims by type of accident, locality and seat of injuries are set out in detail and discussed in Section V.

GENERAL ACTIVITIES OF THE MINES SAFETY AND HEALTH COMMISSION

The Mines Safety and Health Commission continued its study of the collective accidents which occurred in 1971, and in particular the outburst of coal and gas (6 fatalities at Cynheidre, Wales), and the outburst of coal and CO_2 (8 fatalities at the Dauphiné collieries, France) and a rock-burst (6 fatalities at the Ewald mine in Herten, Germany). It began a study of the one collective accident which occurred in 1972 - an outburst of coal and firedamp on 7 November 1972 at Pit No 25 of Monceau-Fontaine, Belgium) which killed 6 workers. An account of these accidents is given in Chapter G. The phenomenon of outbursts, which is becoming less frequent in France and Belgium as mines which were liable to outbursts are being closed down, has nevertheless increased in importance for the Community. The Mines Safety and Health Commission paid particular attention to outbursts - and to the related problem of rock bursts, which are becoming more frequent in Germany - and certain decisions were taken, in the hope that practical conclusions will be reached as soon as possible.

During the year, covered by the Report, the Mines Safety and Health Commission was able to make two recommendations and two reports. These were:

- in the Mines Fires sector, a recommendation amending the Mines Safety and Health Commission's recommendation of 20 April 1960 on extinguishing shaft fires by water spraying;

- in the Electricity sector, a report of the Committee's opinion and conclusions on overvoltage due to lightning, and a report on further developments in the use of electrical equipment produced against firedamps for nominal voltages over 1100 volts.

  This last was followed by conclusions and recommendations.

- in the Rescue sector, the 8th Report of the Working Party on Rescue Arrangements, Mine Fires and Underground Combustion, covering rescue arrangements in 1969 and 1970.

At its meeting on 11 July 1972, the Mines Safety and Health Commission adopted the 9th Annual Report.

This Report was submitted to the Member States for action; a general outline of the proposals made to date by the Mines Safety and Health Commission, and their implementation by governments, appeared in the 9th Report, it is not repeated in this 10th Report, but will be in the 11th.

The Mines Safety and Health Commission has devoted particular attention to two major problems :

(a) The standardization of electricity regulations in the coal mines of Community countries; and more particularly the mutual recognition by governments of certificates of approval for underground use of electrical equipment, in the hope that this will inter alia encourage the testing of automatic equipment for use in mines. Indeed, increased automation and tele control can be an important factor for the profitability of collieries and for health and safety.

(b) The extension of its competence to mines other than coal mines, and to other extraction industries.

At each of the meetings held during the year, the Restricted Committe and the Mines Safety and Health Commission studied this matter and discussed the usefulness and advisability of the extension, and the problems it would present.

The Mines Safety and Health Commission is well aware that there is a special, more serious level of risk in the extraction industries than in other industrial sectors, and that many specific safety problems are common to all the extractive industries. They realize too that many specific safety problems studied by the Mines Safety and Health Commission concern all extractive industries and that if the competence of the Mines Safety and Health Commission were extended, it would benefit them as well as coal mines, which in turn would gain from drawing on recent experience in certain iron ore and potaser mines.

The Mines Safety and Health Commission has also established that, with one exception, these industries are all answerable to a single administrative body at national level. It has accordingly concluded that it would be useful if its nemit was extended to all extractive industries and has considered how this ought to be done.

The extent of this move may be gauged from the number of persons employed in coal mines, which amounts to some 690 000 (including the United Kingdom) - the number of persons employed underground on whom the Mines Safety and Health Commission's interest has been centred so far is about 430 000, including technicians, (220 000 in the EEC and 214 000 in the United Kingdom).

Extractive industries *(1)* other than coal employ 238 000 people in 18 200 undertakings in the EEC and the United Kingdom (this does not include Denmark and Ireland).

The difficulties presented by extending the nemit would be overcome if it were done in two stages : first, if the Mines Safety and Health Commission's activities were extended to cover all underground mining and then, after a short period not exceeding two years, extended to all extractive industries.

5. In spite of the difficult situation facing the Secretariat, arrangements were made for the three new Working Parties set up by the Mines Safety and Health Commission in 1971 (partly in response to the wishes of the European Parliament) to meet for the first time in 1972. These are the Working Parties on "Mechanization", "Roof Control and Support" and "Ventilation and Firedamp". At these meetings the Mines Safety and Health Commission's terms of reference were studied and priorities established for the work to be done, so that they could achieve the necessary results in the shortest possible time. The Working Parties decided on the course they should take to arrive at recommendations, and selected the necessary documents.

In the field of dissemination of information, the Secretariat of the Mines Safety and Health Commission organized a conference for trade union representatives from Community countries and the United Kingdom at Gardanne (France); it was held on 26-28 September 1972. The theme of the conference was the effect on human behaviour of automation and mechanization in collieries; it was attended by approx. 100 trade union delegates. A visit to a face using automatic powered supports showed how automation of this kind could contribute not only to the profitability of mining but also to safety and health, and to making work less arduous.

The Secretariat also helped to organize a conference held in Luxembourg for members of I.G. Bergbau.

---

(1) excluding the oil and natural gas

Lastly, the Mines Safety and Health Commission, together with the members of seven Working Parties, attended the conferences organized by the Commission on sutomation in collieries (May 1972) and on technical measures of dust suppression in mines (October 1972).

On the other hand, due to lack of staff in the Secretariat, it was not possible to act on the section of the Mines Safety and Health Commission's nemit concerning the medical aspects of health which covers conditions of work such as noise, vibration, heat and light.

Work has continued on the preparation of the Community's safety campaigns organised under the aegis of the Mines Safety and Health Commission and studied by its Working Party on "Psychological and Sociological Factors affecting Safety". Four preparatory meetings were devoted to this work. Financial support for these campaigns from the European Communities amounts to a maximum of 500 000 BF per coalfield. The provision made in the budget has proved inadequate because of the number of requests made; the Mines Safety and Health Commission has devoted the unspent part of its operational budget at the end of the year to this subject.

In 1972, the Mines Safety and Health Commission held two meetings preceded by 3 meetings of the Restricted Committee.

The Working Parties and Committees of Experts attached to them met 41 times.

The Secretariat also organized a conference for trade union delegates from the Community and the United Kingsom, and participated in another conference for trade unionists. This brought the total number of meetings to 48.

SECTION II

ACTIVITY OF THE WORKING PARTIES

CHAPTER A : "RESCUE ARRANGEMENTS, MINE FIRES AND UNDERGROUND COMBUSTION"

The working party held one restricted meeting on 10 March 1972 in Luxembourg and two plenary meetings in Dortmund on 26 and 27 October 1972; the sub-committee of experts on the "Stabilisation of ventilation" met four times and the sub-committee on fire-resistant fluids nine times. In all this working party held sixteen meetings.

(a) It was able to complete :

1. The eighth report of the working party for the organisation of rescue arrangements for 1969/1970.

   This report is mentioned by way of a reminder. It is the bi-annual report compiled under nemit A2 of the working Party's terms of reference which are printed in annex III. This report was not approved by the Mines Safety and Health Commission until 25.1.1972. A commentary was devoted to it in the ninth report to which it was attached as annex VII.

2. Necessary amendments to the Mines Safety and Health Commission's recommendation of 20 April 1960 regarding the use of water spraying to fight fires in shafts.

   These amendments were prepared by a group of experts following spraying trials in Belgian mines about to be abandoned. They were approved by the Working Party on 10 March 1972 and adopted by the Mines Safety and Health Commission on 11 July 1972. They are shown in annex VI.

   The amendments relate to the values given by the monograms showing the aeromotor force created by the spraying water. Furthermore, additions were made to the recommendation as regards the positioning of the spray installations at the shaft stations of every main shaft and the siting of air control doors at a suitable point in the main air intake roadways.

(b) In addition, the working party stated work on the new results given by the Mines Safety and Health Commission on 26 March 1971. These particular results are shown in annex III under B2; a group of experts was set up under nemit (d) - fires in long plant.

Work in progress continued under the working party's old terms of reference, particularly in the sub-committees on "Fire-resistant fluids" (B2f) and "Stabilisation of ventilation in the event of a fire" (D).

These activities may be summed up as follows :

1. Work was started on :

   - Exchange of experience and knowledge acquired in the early detection of combustion, heatings and fires in mines.

     On the basis of a memorandum (doc. 2286/71) on the use of measuring instruments for CO monitoring in the Ruhr coalfield, the working party held a first exchange of views in order to make comparisons and select the most suitable methods and apparatus. For the German, French, Belgian and United Kingdom coalfields, it examined the characteristics of CO detectors and recorders with ranges of 0-300 ppm, 0-100 ppm and 0-10 ppm and with accuracies down to 1-2 ppm which being with them the weaknesses associated with high sensitivity.

     It also acquainted itself with the principle of the British system of continuous and automatic monitoring by nests of tubes, with the "Twists-wire-five" method using a thermo-sensitive wire detector and an electronic control mechanism which has been tried out in the German and French testing stations.

The exchange of views will continue when documentation on these systems is received.

- Exchanging of experience and practical knowledge of CO filter self-rescuers.

The working party familiarised itself with British experience which began on the national scale in 1967. From the beginning of 1972, all miners should carry self-rescuers with an endurance of at least one hour; the latest models are fitted with a cooler.

This question will be taken up again in 1973, when a British film used to instruct miners in the use of the apparatus and German and British accounts are available showing the circumstances in which self-rescuers were worn underground and particularly how far they saved human lives.

- Exchanging of experience and practical knowledge on the closure of abandoned workings.

The construction of plaster stoppings has already been examined by the Mines Safety and Health Commission : in 1964 it approved directives of the Essen-Kray Hauptstelle for the construction of dry plaster stoppings and in 1970 it approved instructions from the Hauptstelle der Saarbergwerke for the hydro-mechanical method of constructing plaster stoppings.

The working party began a comparison of statutory regulations on the closing of abandoned workings in order to ascertain possible new requirements with methods of closure and the materials to be used. It took note of the directives of the Landesoberbergamt Nordrhein-Westfalen dated 27 April 1971 (doc. 49/72) : a very marked decrease in the number of fires caused by spontaneous combustion is attributed in the Ruhr and Saarland to the implementation of these closure rules, the first of which were issued in 1964.

In 1973, the working party will continue to examine the regulations of other countries.

- Fires in long plant.

"Plant" is understood principally to mean belt conveyors, but also covers air ducts, guide rails and flexible pipes.

Particular importance was given to this nemit following an examination by the working party of the re-opening of a fire-damaged district in the Gneisenau mine at Dortmund where a conveyor belt had propagated the fire over a long distance. The belt satisfied fire safety standards complying with the international ISO standards (1962). Other underground fires and experimental fires on the scale 1/1 in the Dortmund experimental mine have confirmed that these standards are not suitable for conditions underground. The working party decided to compare current flammability standards in the countries of the Community and the United Kingdom and to define new and common flammability criteria adapted to conditions underground. It nominated a committee of experts to deal with this.

The working party visited Dortmund and was present at the Tremonia experimental mine for tests which the group of experts has expressed a desire to watch:

- on the scale 1/1, in the 8 m^2 cross-section experimental roadway on a S.B.R. rubber belt (with chlorine incorporated), 40 m long, placed 2 m below the roadway roof, a fire of 360 kg. of wood, an air speed of 1.2 m/sec. The belt burned along its entire length at a relatively low speed;

- on a small-scale model, a belt 1.20 m long using a propane flame.

The working party then examined the approval tests conducted in each country and the relevant thinking or philosophy of each country. No belt of organic material can be completely fireproof, but tests should be carried out with certain objectives in mind so as to guarantee a degree of fire resistance.

In the Netherlands, Belgium and the United Kingdom, a drum friction test, scale 1/1 is intended to prevent as far as possible the conveyor belt from itself being a source of fire.

In Belgium and the Netherlands, a flammability test is also conducted on a semi-industrial scale.

Laboratory flammability tests of the ISO type exist in France and Germany, where they are the only statutory ones; in the United Kingdom, this test is used to complement the friction test.

The working party also took note of detailed statistics on all fires since 1960 in which a conveyor belt was involved and which give details of the behaviour of these belts.

It was finally decided that a common approach and common testing standards should be agreed and that each of the national institutes should conduct tests on belts from each of the countries, in order to select the most appropriate testing method.

2. Continuing work in progress.

- Fire-resistant fluids.

In 1972 the group of experts met nine times.

As regards the "Thermal Decomposition" toxicology test in which animals are exposed for 3 hours to aerosols of anhydrous fluid (D) projected on to a hot surface at 700°, considerable discrepancies appeared as between the results in Germany and in France. The experts visited the CERCHAR laboratories at Verneuil and the Pharmacological Institute at the University of Hamburg and compared testing equipment and methods in order to investigate these discrepancies, found mainly in the size and concentration of the aerosols produced, since no decomposition product was identified in significant quantities under these conditions. They attempted to standardise testing conditions completely and will carry out comparative tests in 1973 to chack that the same product gives the same results.

This test seems to be too strict since,

- the questionnaire survey completed in 1971 has shown that although fire-resistant fluids are being used more and more widely in mines there is no problem of acute toxicity when elementary health precautions are respected;
- trials at Tremonia Dortmund have shown that the exposure time of 3 hours does not correspond to real conditions for emptying couplings.

The testing conditions will therefore be revised.

The experts' attention was called to the question of chronic toxicity by a decision by manufacturers of highly chlorinated diphenyl products to cease manufacturing these products for reasons of environmental protection. The only anhydrous fluids which meet the flammability criterion in the Fourth Report are precisely these highly chlorinated diphenyls. Experiments were requested and carried out in the main roadway at Tremonia-Dortmund to determine, during emptying of a coupling to ascertain the maximum concentration of aerosols and the average concentration at varying distances which a miner would probably inhale. When the average frequency of these emptying operations was taken into account, it was apparent that there was no need to fear acute toxicity. As regards chronic toxicity, the impression gained was favourable but the results of similar experiments conducted at CERCHAR are awaited.

A chronic toxicity test was conducted by one of the experts at the pharmacology laboratories at the University of Hamburg . This consisted in analysing the residues of the product in the organism to measure its accumulation and ability to decompose. The experts acknowledged that this is a step forward in determining chronic toxicity but are not agreed on whether the criterion of decomposability is the only one to be taken into consideration. Tests will be made at CERCHAR to develop an experimental method with a view to determining the effects on the respiratory organs of aerosols containing organic chlorides, in conjunction with inhaled dusts.

British experts took part for the first time in the work of the group of experts and briefed the group on the tests used in Britain and the ideas on which they were based.

The British tests tally with those of the Mines Safety and Health Commission as regards technology and health but have different objectives as regards flammability : the British are less strict as far as ignition capacity and propagation of the flame are concerned and accept the possibility of the fluid igniting, arguing that all organic material will burn if subjected to a sufficiently intense source of heat, but check to see that the fluid will not make an existing fire worse and above all that the fumes should not be toxic and opaque.

80% of fluids used in the United Kingdom are water-in-oil emulsions, 10% are phosphate esters used in 8 000 couplers (3 500 couplers operate on water) and 1% are glycol aqueous solutions. The most widely used fluids have been tested in the German, Belgian and French laboratories; they do not meet the flammability criterion set out in the Fourth Report.

The health criteria have also been examined.

In over 10 years, use of fluids which met the flammability and health criteria of the NCB, no fire underground has been attributable to them and miners have not suffered from poisoning.

The British and ECSC points of view on the objectives to be pursued will have to be reconciled in the next few years if agreement is to be reached on the approval of products.

- Stabilisation of ventilation in the event of a fire.

  The group of experts met four times.

  It concluded its examination of the question of stabilising ventilation in the event of a fire in a descensionally ventilated airway but decided to restructure the scientific part and the conclusions of its report by re-drafting the conclusions on ascensional ventilation and adding those on descensional ventilation. It was also decided to append to the conclusions a concise table of the technical measures to be applied in the case of fire in ascensional and descensional airways in order to facilitate their use in the mine. The group of experts were informed of and studied a research project undertaken in Italy, which took account of the study on the stabilisation of ventilation in the event of fire in an ascensional airway approved by the Mines Safety and Health Commission in 1968. The research was done in the Niccioleta pyrite mine owned by Montecatini Edison A.G. on fluctuations in ventilation caused by the action of aero-motive forces or resistance due not to the presence of an underground fire but to the movement of stopping of locomotives in certain roadways, as well as natural ventilation and fluctuations in secondary ventilation. The group of experts awaits the results of similar studies in other metal ore mines and hopes to draw general conclusions which will be valid for the entire mining industry, an action which fits in well with preparations to extend the competence of the Mines Safety and Health Commission to the other mining industries.

  Finally, the committee of experts, under nemit D1, extent of instability of diagonal ventilation roadways, took note of a study by one of the experts in the group on "structure of the ventilation network, theory of stability". This study is based on the theory of graphs and, unlike familiar procedures, makes it possible to identify all diagonally ventilated roadways either manually or by computer, as appropriate, and makes it possible to understand the structure of the network.

  Once these unstable branches are detected it is necessary, by means of quantitative research, to find the diagonals in which considerable changes in the air flow rate or even reversals of the air flow may occur. Study of these questions was begun at the end of 1972.

CHAPTER B : "WINDING ROPES AND SHAFT GUIDES"

The working party held two restricted meetings and two plenary meetings : in Doncaster Sheffield on 14 and 15 March 1972 and Bretby on 19 and 20 September 1972.

These meetings included :

- a visit to the ropeworks of British Ropes Limited in Doncaster where it watched the socketing with hot white metal and the pre-stretching of suspension bridge cables and shaft winding and balance repes.
- a visit to the Safety in Mines Research Establishment in Sheffield and Buxton, and in particular to an industrial scale testing rig, unique of its kind, for the impact testing of ropes and cables and which records force and energy absorption during impact.

At the installations of the Mining Research and Development Establishment of the National Coal Board at Bretby, the working party was shown safety devices for winding and rope haulage such as detaching hooks, cage speed recorders, slack rope detectors, automatic control of rope haulage which is stopped if the rope is overloaded, moving too fast or slipping, on the friction wheel and rope slip detector for friction winders.

These comparisons between winding and haulage technique and protective devices will be processed in 1973.

CHAPTER C : "ELECTRIFICATION"

The working party held three restricted meetings and four plenary meetings, one of these being held in the Houillères de Provence at Gardanne.

(a) It completed its "Report on the use of electrical equipment protected against firedamp for nominal voltages over 1 100 Volts - Conclusions and recommendation".

This report, called for by nemit No 6 (annex III), was completed in 1972 but was not approved by the Mines Safety and Health Commission until 6 February 1973. Nevertheless it is annexed to this report (annex VIII) for quicker dissemination.

The working party was instructed from the outset to follow developments in the matter of eliminating oil from electrical equipment used underground in mines, which prompted the Mines Safety and Health Commission's resolution of 9 December 1958 and then its report of 16 October 1964 concerning equipment of over 1 100 volts, in which it was found that total elimination of oil was not yet possible in all equipment, particularly in contactors operating at over 1 100 volts in gassy mines.

The report notes that from 1964 to 1971 oil-filled circuit breakers and contactors increasingly gave way in the Community countries and the United Kingdom to air and even vacuum contactors, and that progress is satisfactory.

The Mines Safety and Health Commission recommends Member States to follow this policy of cutting down the use of oil in electrical equipment and of limiting new purchases to equipment not using oil or, alternatively, using a very small volume of oil.

(b) Work in progress :

1. The working party also began work under nemit No 7 (annex III). "To follow the development of techniques designed to eliminate entirely the production of sparks on electrical contact lines (battery motors excluded) and in particular to take note of the new technique of traction by linear motors".

   The working party visited the Houillère de Gardanne on 22 and 23 June 1972 to observe the first application of linear motors to haulage in mines (pan trains). Having ascertained that it is very probable if not absolutely certain that no electrical sparks were formed in this mode of transport, which does not present fire hazard, the working party has begun to draft a report to the Mines Safety and Health Commission to make known and encourage this method of traction.

2. The Working Party continued preparing, but could not complete, its report on the manufacture of high-tension cables (up to 6 000 volts) used underground, and protective equipment (nemit 4, annex III).

3. The Working Party has been given a nemit by the Mines Safety and Health Commission on the standardisation of electrification regulations in Community coalmines. As shown on page 3, the mutual recognition of approval certificates would greatly assist trade in equipment for mechanization and automation within the Community. This should complement mechanization, being a factor not only in profitability but also in safety and health, as the working party observed at the time of its June visit to the Charbonnages de Provence, to a face with automated powered supports.

CHAPTER D : "FLAMMABLE DUST"

The Working Party was only able to hold one meeting. It took note of two draft reports, one on "water through barriers for protection against dust explosions underground" and the other on "directives on the application of pastes, powders and saline flakes to neutralise dust". As these processes are only used to any extent in Germany and the Netherlands, other delegations were asked to provide details of the situation in their own countries.

CHAPTER E : "JOINT ACCIDENT STATISTICS"

The Working Party's terms of reference were re-drafted (see annex III) and a number of experts asked to provide material so that appropriate statistical methods could be arrived at for evaluating differences in accident rates, time, and from one country to another.

The Working Party was not able to meet.

CHAPTER F : "HEALTH"

As pointed out on page 23 of the Ninth Report, a group of experts prepared a draft specification in 1971 of requirements to be imposed on the manufacturers of winning and heading machines, which would provide from the design stage, the means of limiting the amount of dust produced by these machines. To date there are no existing regulations governing this.

It was not possible to organise a meeting in 1972 to approve this specification or to embark on the numerous tasks of this Working Party under its new terms of reference (annex III), despite their priority.

CHAPTER G : "SOCIOLOGICAL AND PSYCHOLOGICAL FACTORS AFFECTING SAFETY"

Community Safety Campaigns

The Working Party met on 5 October 1972 at the Centre de Coordination des centrales de sauvetage de la Campine in Hasselt, to exchange recent experience in this field. The Working Party took note of a pilot safety campaign conducted in the Campine coalfield on continuous transport systems, on the basis of the seminars for managing and supervisory staff which the Centre de Coordination had been organising for four years to provide them with safety training. As the experiment proved conclusive, the Charbonnages de Campine proposed to launch a campaign on rock falls when drawing roadways and cutting stable holes.

The other delegations outlined their experience and it was ascertained that while methods differed, the philosophy based on technical considerations and motivation of the staff were the same.

The Charbonnages de Campine have applied for financial assistance for their safety campaign : 200 000 Belgian francs were provided in 1972 and 300 000 will be paid in 1973.

The preparation of a safety campaign on continuous transport in the Ruhr coalfield was completed with the help of representatives from the Aachen and Saar coalfields who also applied in 1972 for financial assistance to take part in the campaign. This will be provided in the 1973 budget which earmarks a sum of 1 500 000 Belgian francs for the purpose.

The Charbonnages de France will conduct a campaign on the handling of materials a subject considered to be of greatest urgency because of the frequency of accidents. Assistance will be given in 1973 and 1974, as the subject of the Mines Safety and Health Commission permits.

At a meeting on 9 November, the Working Party received reports from delegations as regards the recruitment of foreign labour and its terms of appointment, reception, housing, food, vocational training, language courses and the solutions devised for particular problems. This information and in particular its safety and health aspects, was assembled by the Secretariat in a summary report which was examined by the Working Party.

This draft report will be developed by the various delegations in order to arrive at a view on ways in which the conditions under which foreign labour is employed can be further improved.

The Working Party also re-examined the question of accident statistics, distinguishing between foreign and native labour in order to determine the relative extent of accidents suffered by foreigners. The Working Party considers that the incidence of accidents suffered by foreigners and natives should be compared in truly comparable conditions : length of time spent in the job, place and type of work, age. Most countries cannot provide such data, more particularly as foreign recruitment has been cut back or even stopped altogether. However, a start has been made in the Ruhr and Aachen coalfields on gathering elements of statistics of this kind which will cover a period of one year. These statistics will be processed as soon as they are available.

CHAPTER H : "VENTILATION AND FIREDAMP"

The Working Party held two plenary meetings and a sub-group on outbursts met once.

The new Working Party took note of its new terms of reference (annex III) and discussed the best way of getting its activities under way.

The terms of reference call for priority to be given to the examination of procedures for a possible rise, either local or general, in the maximum permissible firedamp level in ventilation air streams from 1 to 1.5 or 2% of measures necessary in that event to ensure at least equivalent safety. A first exchange of views yielded the following conclusions:

(1) Maximum firedamp levels generally fixed by the various countries' regulations are no longer realistic in current mining conditions, since the increase to over 2 000 tons production per district creates levels which are higher;

(2) Modern technology makes it possible to reduce these levels, in particular by firedamp drainage and by deep hole water infusion before the coal is worked. This infusion expels a certain amount of the firedamp before the face is started but more importantly, by wetting the coal, it delays desorption of the firedamp long enough to prevent its release during winning. These methods are two of the most important, but there are also others.

(3) There are also remotely operated firedamp recorders which indicate not only the level of firedamp in normal conditions but also anomalies in the release of firedamp which earlier manual controls generally failed to detect. The introduction of a remotely operated firedamp monitoring centre thus enables most abnormal levels to be controlled because they are systematically detected and their causes systematically studied;

(4) For a number of years now mining authorities have granted exemptions in certain specific cases to permit the level of firedamp of 1 to 2% to be exceeded under special circumstances. These exemptions are permitted under conditions which statistically provide a greater degree of safety in such faces than in normal faces. These measures generally include the use of recorders to measure the firedamp level in airstreams where it has been found to be highest and special surveillance, the requirements for which are described in detail.

The Working Party proposes to lay down the general conditions in which increases in certain maximum levels of CH_4, at present laid down in regulations, might be exceeded whilst at the same time maintaining a level of safety at least equivalent to that resulting from the implementation of current regulations and the requirements for application of these general conditions.

To this end it has collected the legal texts of the various countries on the permissible level of firedamp in air flows, within the context of the general ventilation regulations. It also completed a questionnaire survey on the circumstances in which exemptions were granted in the last 5 years from the regulations governing the maximum CH_4 level, the terms of these exemptions and the experience acquired from their application.

The Working Party has processed this documentation and drawn up the broad outlines of the report which it will present to the Mines Safety and Health Commission during 1972.

As part of this new Working Party's activities, a meeting was held in Luxembourg of French, Belgium, German and British specialists on the problem of sudden outbursts of firedamp. The Mines Safety and Health Commission had expressed a wish for this subject to be considered on 25 January 1972, following examination of a sudden outburst of firedamp in the Cynheidre colliery in Wales. This phenomenon is attracting increased attention in the Community. During the meeting, the British delegates were briefed on the

results of research undertaken with Community assistance in Belgium and France, and on the practice of preventive reserves. The British delegates in turn gave details of measures taken in their own country. Considerable divergences were found in the conception of these measures and will be studied by these specialists.

CHAPTER I : "MECHANIZATION"

The new Working Party began work on 18 October 1972. It took note of its terms of reference, which are deliberately wide and which state priorities in order that decisions be obtained rapidly for those sectors where the most hazards exist. It is not easy to decide on the basis of statistics, which sector is the most dangerous, because a number of factors are at work, only one of which is recorded in the statistics. Moreover, the accident rates are given in relation to the total number of hours worked whereas conclusions can only be drawn if these rates relate to the number of hours worked per sector.

In most coalfields, with the exception of the Campine, it appears that priority should be given to the study of machines on the face under their normal operating conditions, i.e. including stopping and starting. It also appears that the construction of the equipment should aim at maximum reliability in order to prevent breakdowns which are an important source of accidents. To prevent accidents, workmen must be trained to act properly when breakdowns occur.

The Working Party decided:

- to collect and compare regulations and instructions on mechanization;

- to begin a study of mechanization in winning areas, choosing its topics on the basis of typical accidents occurring in the various countries over the last few years; these accidents will be chosen by delegations according to their frequency and the potential lessons to be drawn from them;

- to compile, after examining, these topics, a specification to be used by mine owners in their dealing with manufacturers.

CHAPTER J : "ROOF CONTROL"

The new Working Party met on 30 June 1972 to begin work. It took note of the terms of reference given to it by the Mines Safety and Health Commission (annex III) and of the background. In 1969 the statistics of Mines Safety and Health Commission showed that 40% of fatalities and 29% of serious accidents were due to falls of roof. Most of these accidents were isolated and individual, but a large number of group accidents also occurred in recent years as a result of bumps : since 1967, 41 German workers have been killed by 6 rock bursts and in France 2 roof falls caused the death of 10 miners in 1969.

The following activities were agreed on :

- studies already completed, particularly in France, and statistics, particularly German and British statistics on the main causes of falls would be interpreted;

- in parallel with this study, a small group of rock mechanics experts will collect studies on stress accumulations in the rock mass and will endeavour to draw practical lessons from them;

- a comparison will be made of existing regulations;

- practical measures for face and roadway support will be studied after processing of a questionnaire to be compiled by the Secretariat.

CHAPTER K : "EFFECTS OF WORKING TIME ON SAFETY AT WORK"

This Working Party has not met since the beginning of the year.

In adopting this report, the Mines Safety and Health Commission wished to resume its work and to study the effect on safety of the work timetable; if necessary, it would propose a change in the timetable.

SECTION III

STUDY OF COLLECTIVE ACCIDENTS

During 1972, only one collective accident was notified to the Mines Safety and Health Commission. This was :

- Accident at Pit No 25 of the Monceau-Fontaine collieries, in Couillet (Belgium) - outburst of firedamp - 7 November 1972 (6 killed).

Financial aid amounting to Bfr. 210 000 was given to the families of the victims, who left three widows and 16 orphans.

A preliminary statement of this accident was given by the Belgian Delegation at the meeting of the Select Committee on 30 November 1972. It happened in the intake airway of the 5 Paumes working, on face 12 rising, at a depth of 960 metres.

This mine is classed in the 3rd category for firedamp (liable to outbursts) but the area where the accident took place was not considered at all dangerous, as there had been no incidents there during earlier winning in the section which has been worked since 1961, particularly above the face, in 1969 and 1970, when it extended under a leasing agreement into the Bourbier concession which is classed in the 2nd category for firedamp (not liable to outbursts).

The 200 m - long face was worked conventionally by ploughing, using an armoured conveyor and cantilevered metal beams. The ventilation stream was slightly descentional at the face. The normal thickness of the seam was 1.6 m with an irregularity near the intake airway; in places the thickness was up to 2.7 m.

The intake airway (also used for removing material) was advanced to 7 m beyond the face; the drivage had been preceded by 3 bore holes for exploration release some 4 m long, the face was advancing at a rate of 1.5 m per day. The overseer of the working had visited the bottom of the face a few minutes before the accident took place and had noticed nothing unusual.

The coal dislodged by the outburst buried the five men who were working on the drift and one face worker. The ventilation barely escaped interruption; the airflow was 20 m^3/sec because of the firedamp in the working.

The outburst dislodged 80 metric tons of coal and approximately 8 300 m^3 of firedamp. The preventive measures taken by the Mines Inspectorate after the accident consisted of increasing the length of the bore holes and relaxation holes to 15 m and extending the drift further ahead of the face, to prevent the entry to the face being blocked in the case of an outburst, and to take the head of this drift beyond the overpressure zone in front of the working face.

In discussion, the alternate merits and disadvantages of the offensive method (using shotfiring to provoke outbursts) and the defensive method (using long relaxation holes) were reviewed; general conclusions were formed once members had been informed of the findings relating to the outburst at the Dauphiné collieries.

x

x x

The Mines Safety and Health Commission also discussed the provisional or final reports on two other outbursts and one rock-burst which took place in 1971. These were:

- Accident at Cynheidre mine - Peutremaw (Wales) - outburst of firedamp - 6 April 1971 - 6 fatalities and 69 affected in varying degrees by gas

A report of this accident was presented by the British government delegation at the meeting of the Mines Safety and Health Commission on 25 January 1972. The outburst took place in a coal heading which had just been started up, at a depth of 620 m, in a seam which is now found to be disturbed at the place of the outburst.

The accident occurred 24 hours after valley firing, using delay action detonators and normal explosive; there was no advance warning of the outburst. The alarm system, including loud speakers, functioned correctly and the evacuation of miners was carried out according to instructions.

Outbursts in West Wales have been frequent since the beginning of the century; there have been 67 in Cynheidre mine since 1962, though none caused any fatalities. A joint Consultative Committee has been in existence since 1945; in its most recent code of precautions which date from 1959, it recommends inducer firing to provoke outbursts where imminent outbursts are suspected. Using this method, it has been possible to provoke 3/4 of the outbursts that have occurred.

It would probably have been possible to provoke this outburst in the same way had a more violent inducer sound been used.

The report of the Divisional Inspector of Mines and Quarries recommended that the Consultative Committee should review its methods of inducer shotfiring.

British and Continental points of view have been compared. It would appear that, in Britain, knowledge of the susceptibility of seams to sudden outbursts is based on practical experience the main factors being deep or irregular deposits of very soft coal; the imminence of an outburst may be estimated by the degree of resistance of soft coal and its gas content.

On the continent where outbursts have been very frequent in the Borinage and Centre coalfields in Belgium and in the Centre-Midi coalfields in France; here the offensive method of prevention, using inducer shotfiring, has been used since the beginning of the century. Using Community aid, theoretical and applied research projects have been conducted there and in the Netherlands, to study the characteristics of seams liable to outbursts, measuring Δp, V_1 (speed of gas desorption) and certain warning signs, e.g. the amount of gas released, and seismography after inducer shotfiring. However, no test has yet been devised which can accurately detect the imminence of an outburst. A defensive method using long relaxation holes has also been developed.

After this discussion, members decided to organise a restricted meeting of British delegates with Belgian, French and German experts (this took place on 10 October 1972; see Section H - Ventilation and Firedamp) and to ask the Working Party on Ventilation and Firedamp to study the report of this accident.

- Accident at Ewald 1-7 colliery at the Ruhrkohle AG. at Herten - rock burst - 14 December 1971 - 6 fatalities

A provisional report of this accident was presented on 25 January 1972 by the German government delegation. The rock burst (Gebirgschlug), dislodging coal into the free space, occurred in a rise drift of a flat seam 2 metres thick, at a depth of 950 m. The circumstances of this accident have already been described in the 9th Report (page 22). This also gives the presumed causes - the presence in the roof of a bed of sandstone some 20 m thick and the accumulation of stresses caused by the ribside of a working in the same seam and stresses from workings in other seams 25 and 69 m above this.

The Mines Safety and Health Commission instructed the new Working Party on "Roof Control" to invite several specialists on rock and soil mechanics to meet, to collate the results of studies on stress accumulation and to draw practical lessons from them. (See chapter I - Roof Control).

- Accident at the Dauphiné collieries - outburst of coal and CO_2 - 4 May 1971 - 8 dead

At the Restricted Committee's meeting on 30 November 1972, the French government delegation presented the conclusions of the inquiry carried out by the Service des Mines.

The circumstances of this accident have already been described on page 21 of the 9th Report. The outburst dislodged 650 metric tons of coal and 1 300 m^3 of CO_2. It happened shortly after the cutting of a thick, steep seam which was being worked with bunker-withdrawal. The seam had already been opened up by 9 roadways, using a conventional method which had been approved by the chief mining engineer : heading in the rock, preceded by exploratory boreholes to determine the position of the seam; a separating wall of rock of adequate strength, the seam finally exposed by a special shotfiring method, comprising one round to bring down the rock wall and an inducer round in the seam. After opening up the seam, the coal is got either by free shotfiring, or by inducer shotfiring, depending on whether the seam is or is not classified as dangerous by the special research department (Service d'Etudes) of the Dauphiné collieries. During the 9 earlier cuttings, six outbursts had followed shotfiring, five during exposure of the seam and one when winning the seam.

The fatal outburst occurred 4 days after the seam had been opened (without any outbursts or noticeable seismic disturbance) and three hours after the first shotfiring, a free round to bring down the coal (using half-second delay detonators); this was done with the approval of the Service d'Etudes, which had decided that the working was not dangerous.

The Mines Inspectorate recommended that there should be certain improvements to the information provided for the Service d'Etudes - which is unable to make use of objective criteria such as Δp and V_1, as these are not valid for outbursts of CO_2. If there is any doubt whatsoever, the Service d'Etudes should index the working as dangerous.

x
x x

At the same meeting, the Mines Safety and Health Commission reviewed the conclusions it had formed on outbursts and rock bursts reported in Germany, as both these phenomena have certain features in common.

The phenomenon of outbursts used to seem less important, because the Borinage and Centre coal fields in Belgium and the Netherlands had been closed down, and the Dauphiné and Cévennes collieries in France would be closed down in the near future. However, the problem of outbursts had once again come to the fore, because of the outburst which had occurred at Couillet, in an area which was not considered to be liable to outbursts, those which had occurred at Cynheidre, and the appearance of this phenomenon at Ibbenbüren in the Ruhr.

It had been decided that the study of these two phenomena - outbursts and rock bursts - should be entrusted to the Working Parties on "Ventilation and Firedamp" and "Roof Control"; the latter should study mechanical interreactions between the two phenomena.

This should not be a study in depth, but rather a collation of the knowledge available both in the Community and in the countries of the Eastern Bloc; here, the synthesis of research into both these fields would be entrusted to a small group.

In February 1973, the Mines Safety and Health Commission decided that it would not wait for the result of these exchanges of experience, but would send a small delegation to visit the locations of recent outbursts and to hold discussions with the engineers concerned; a visit would be made, in the next few months, to the mines of Monceau-Fontaine (No 25) in Belgium, Ibbenbüren in Germany, Cynheidre in Great Britain and Cévennes in France.

x
x x

SECTION IV

OFFICIAL REGULATIONS DRAWN UP IN 1971 AND 1972

In 1971 and 1972, the various Community countries issued the following official regulations with regard to safety and health in coalmines. It should be noted that, in some countries, these regulations also apply to surface mines and quarries.

FEDERAL REPUBLIC OF GERMANY

I. Rhineland-Westphalia

1971

1.	Demolition works	2. 2.
2.	Training plan for ambulance men	9. 2.
3.	Firedamp seeping from a filled in shaft	24. 2.
4.	Safety distances between filled in shafts and proposed buildings	4. 3.
5.	Application of coal infusion processes (guidelines)	19. 3.
6.	Falls of rock and coal; New edition of "Investigation of incidents caused by falls of rock, collapsing coal and packing, falls in cross headings and galleries and rock-bursts"	22. 3.
7.	Storage of dangerous industrial waste	13. 8.
8.	Information for the press on measures to reduce environmental pollution in mining areas	16. 8.
9.	Removal of harmful waste; here: storage in deep mineworkings	17. 8.
10.	Raising CH_4 limits downstream from winning operations	21. 9.
11.	The employment of foreign labour; model accident report	19.10.
12.	Work on gas pipes in coking plants; non-sparking tools	9.12.
13.	Protection of the vicinity when storing coal and coke at collieries.	

1.	A 1	Mining regulation on electrical installations	15.10.	86 S.
2.	A 2. 6.	Rock dust (Test regulations)	14. 9.	24 S.
3.	A 2. 7.	Arc-welding and cutting (welded cables for return current)	27. 8.	2 S.
4.	A 2. 7.	Welding	9. 2.	2 S.
5.	A 2. 9.	Notes on implementing the mining regulation on electrical plant	29.11.	45 S.
6.	A 2. 9.	Electric and compressed air driver fans (Combi fans)	17. 8.	2 S.
7.	A 2.10.	Intermediate gear for main-rope haulage and winding equipment	23. 9.	2 S.
8.	A 2.11.	Overhead monorails with mechanical drive (Regulations)	15. 7.	27 S.
9.	A 2.11.	Overhead monorail transport in galleries	27. 7.	5 S.
10.	A 2.15.	Closing and sealing underground workings in coal mines (Regulations)	21. 4.	28 S.
11.	A 2.16.	Approval of non-rigid supports (Restructions for testing)	4. 8.	11 S.

12.	A 2.21	Conveyor belts in lignite (brown coal) mining (Restructions for installation)	19. 4.	4 S.
13.	A 2.16	Use of light metal supports and steel/light metal supports	16. 7.	1 S.
14.	A 2.22	Pressure vessels (Regulations)	17. 3.	28 S.
15.	A 2.30	Mines survey practice (accuracy of underground surveys)	24. 5.	1 S.
16.	A 3. 8	Hydraulic fluids (approval of mineral oil and synthetic brake fluid for use under pressure)	19. 7.	2 S.
17.	A 3. 8	idem.	21. 6.	2 S.
18.	A 3.16	Approval of steel sections (rail sections)	29. 4.	3 S.
19.	A 4. 3	Plan for training newcomers to the mining industry over the age of 18 for underground work in coal mines	30. 6.	10 S.
20.	A 7	Retrospective conferment of degrees on German mining college graduates	2.11.	6 S.
21.	A 7	Coking plants (Approval procedure in accordance with §§ 16 and 25 paragraph 1 of the Industrial Regulation)	6.10.	2 S.
22.	A 7	Regulations concerning the training of mining students with training and employment syllabus	21. 4.	17 S.
23.	A 7	Regulations concerning the training of mine survey students with training and employment syllabus	21. 4.	17 S.

1972

1.		Light metal alloys for roof supports	4. 2.
2.		Compiling official reports in accordance with the regulations relating to the investigation of accidents, injuries and other incidents and detection by officials of punishable offences (from 1/3/1968); "Immigrant workers"	16. 3.
3.		Procurement of credits from ERP special funds (Regulations for granting credits)	14. 4.
4.		Training of mine management technical staff in the use of recirculatory oxygen respirators	9. 5.
5.		Overhead monorails with trolleys driven hydraulically by Diesel motors (Diesel trolleys)	23. 6.
6.		Regulations of Landesoberbergamt Nordrhein Westfalen on shutting off, opening and reconnecting pipes and apparatus for combustible gases	6. 7.
7.		Protection on surface : regulations regarding the safety precautions to be taken against dangers arising from abandoned mine workings	8. 8.
8.		Fire extinguishing equipment on diesel locomotives underground; fire extinguishing equipment carried by diesel locomotives and diesel driven monorail trolleys with hydraulic gears in coal mines	30. 8.
1.	A 2. 4	Coal infusion processes (Regulations for their application)	1. 9.
2.	A 2. 4	Regulations on protection from noise (formerly regulations on measures to protect workers from deafening noise in work places subject to control by mines inspectors)	28. 6.

3.	A 2. 4	Protective measures against noise (from jack hammers)	22. 3.
4.	A 2. 6	Use of breathing apparatus	6.12.
5.	A 2. 7	Pipes and apparatus for combustible gases (shutting off, opening and reconnecting - regulations)	6. 7.
		Fire precautions in lignite (brown coal) mining (guidelines)	7. 3.
6.	A 2. 9	Electrical installations (extension of secondary circuits of inductive voltage transformers in electric circuits with ratings of over 1 000 V in coal mines	20.10.
7.	A 2.13	Shotfiring (guidelines on precautions against injurious effects of explosive afterdamp)	14.12.
8.	A 2.18	Ventilating air pressure regulations. Instructions for detecting a fall in atmospheric pressure in coal mines)	6.12.
9.	A 2.20	Excavators, overburden removal machines and auxiliary equipment (regulations for the construction and use of brakes and overload safety devices in relation to slowing areas)	9. 2.
10.	A 2.26	Precautions against dangers arising from abandoned mine workings (Safety regulations)	30. 3.
11.	A 2.27	Water purification (removal of calcium sludge containing cyaniden from coking plants)	15. 6.
12.	A 4. 3	Plan for training ventilation inspectors	6.12.
13.	A 6	Winding machinery (new edition of the winding regulation)	19. 9.
14.	A 7	Participation of the works committees (regulations on the role of mine supervisors)	22. 8.
15.	A 7	Organization and methods (Instructions for implementation)	20. 3.

II. Saar

1972

1. Provisional guidelines issued by the Mines Inspection for the Länder of Saar and Rheinland-Pfalz on measures for protecting personnel from noise at the place of work liable to impair the hearing in workings in their area (Guidelines on Noise at the Place of Work) on 14 August 1972.
2. Supplementary guidelines issued by the Mines Inspection for the Länder of Saar and Rheinland-Pfalz on the transport of persons in mechanised cars running on rails attached to the floor, on 14 August 1972.

BELGIUM

1971

1. Law of 16 March 1971 concerning work amending article 54 of the Mining Laws (cf. p. 11 of Mines Code in your possession - issued 30.6.1971).
2. Royal Decree of 25 March 1971 amending the Royal Decree of 29 April 1958 relating to organisation for safety, health and improvement of places of work connected with mines, workings and underground quarries (amendments : art. 11 p. 45 of the Mines Code - art. 50 and 51 p. 53, art. 59 p. 54, art. 72 p. 57/1, art. 94 p. 59 - issued 30 June 1971).

3. Royal Decree of 24 August 1971 amending the Regent's Decree of 25 September 1947 giving general regulations on hygiene and health measures for workers in mines, workings and underground quarries, amended by the Royal Decree of 16 April 1965 (amendments : art. 33-34-35-36-37-38-40-44-48-49-52-56-62-63a-63b-63c-64-64a-64d-64h - pages 288 et seq. - issued 30 June 1971 and 31 December 1971).

4. Royal Decree of 21 December 1971 amending the section on industrial medical officers attached to industrial medical services in the Regent's Decree of 25 September 1947 giving general regulations on hygiene and health measures for workers in mines, workings and underground quarries (amendments to art. 40, 44, 44a, 44b - pages 293 et seq. and issued 31 December 1971).

1972

1. Ministerial Decree of 25 October 1971 laying down conditions and procedures for approving laboratories and departments responsible for samplings, analyses and checks required by the industrial medical departments, amended by the Royal Decree of 17 February 1972 (pages 303-304 of the Mines Code - issued 30 June 1972).

2. Royal Decree of 17th April 1972 forbidding workers under the age of 21 to do certain jobs underground (pages 203 - 2 and 3 of the Mines Code - issued 30 June 1972).

3. Royal Decree of 10 July 1972 concerning rescue work in coal mines (Excerpt from the "Moniteur Belge" of 21 July 1972 attached).

FRANCE

1971

1-19 July 1971 (DM-HZ No 95)	Decree amending article 14 of the Decree of 30 October 1961 relating to electrical equipment, safety lamps and flameproof liquid-fuelled locomotives (screws on flameproof apparatus).
2-25 November 1971 (DM-HZ No 96)	Decree relating to the use of the earth as part of certain electrical circuits (waiver to article 28 § 1) of General Regulation of 4 May 1951).
3-25 November 1971 (DM-HZ No 97)	Decree concerning the use of cables without lead sheathing in fuel mines (waiver to article 36 § 2 and 276 (2nd paragraph) of general regulation of 4 May 1951).
4-22 December 1971 (DM-H No 393)	Circular concerning water main barriers.
5-6 April 1971 (DM-HZ No 101)	Decree authorizing the use of charges exceeding 2 000 g per shot hole in certain rock faces in fuel mines (waiver to article 14 of decree of 16 May 1963).

1972

6-6 April 1972 (DM-HZ No 102)	Decree concerning shot-firing with reduced stemming in fuel mines (waiver to article 224 (§2) of General Regulation of 4 May 1951).
2-4 July 1972 (72-645)	Decree containing desciplinary and supervisory measures concerning tracings and winning in mines and quarries.
3-10 August 1972 (DM-HZ No 103)	Decree amending decree of 30 October 1961 relating to electrical equipment, safety lamps and flameproof liquid-fuelled locomotives (inductances).

4-19 September 1972 (DM-H No 907)	Instruction amending instruction of 30 November 1956 concerning medical preventative measures against silicosis in mines, workings and quarries (silica measurements).
5-12 December 1972 (72-1157)	Decree amending articles 181, 182 and 303 of general regulation of 4 May 1951 (permitted firedamp levels).
6-15 December 1972	Decree concerning plans and registers to be drawn up and kept up-to-date in mines and quarries.
7-22 December 1972 (DM-H No 1102)	Instruction implementing decree No 72-645 of 4 July 1972 containing disciplinary and supervisory measures concerning tracings and winning in mines and quarries.
8-29 December 1972 (DM-H No 1109)	Circular concerning the raising of permitted firedamp levels (implementation of decree No 72-1157 of 12 December 1972).

SECTION V

JOINT ACCIDENT STATISTICS

The purpose of this section is to provide some comment on the figures for underground accidents in mines, as summarised in the introduction. Firstly, we should point out that the statistics refer only to coalfields in the Community of Six, as United Kingdom accident figures are not based on Community criteria.

As in previous years, the following tables refer to fatal accidents and to "serious" casualties (i.e. those causing more than 56 days'absence) and, for the Community of Six, give figures for accidents causing 4 or more days' incapacity (Tables 1a, 1b, 2a and 2b). This last return was made on a trial basis for 1971, and on a complete basis in 1972. It gives the distribution of underground accident victims according to the technical cause of the injury (12 categories) : for each coalfield falls of ground, haulage and transport, etc., the site of the accident (4 categories), and the period of incapacity : 4 to 20 days, 21 to 56 days, over 56 days, and killed. Table 1a gives these data in absolute figures and Table 1b in rates of frequency per million hours. Tables 2a and 2b give, in absolute figures and frequency rates (per million hours) respectively, the distribution of accident victims according to the seat of the injuries, their nature and the period of incapacity, in this case divided into two categories : over 56 days and killed. Details of these tables, for each coalfield, are given in Appendix I.

x
x x

Any analysis of the chronological development of these accidents should be read with the same reservations as previously; the rates should not be compared in terms of their actual magnitude, but a certain margin or confidence interval should be allowed. As mentioned in Chapter E, the Statistics Working Party has not yet been able to resume work on the mathematical and statistical study which it was instructed to prepare in order to assess the significance of the variations observed.

As mentioned in the introduction, and shown in Table D below, production by the Community of Six fell in 1971 - 1972 by 7.9 % (from 164.9 m/t to 151.9 m/t). The number of hours worked decreased by 10.7 % (from 414 to 369 m), while productivity underground increased by 4.1 % (from 3 514 to 3 659 kg/manshift).

The number of fatalities dropped from 182 to 147, and the number of serious casualities (over 56 days' incapacity) fell from 6 249 to 5 763.

In some countries, these absolute figures are related to millions of tonnes produced. By way of comparison, these rates per million tonnes moved from 1.104 in 1971 to 1.033 in 1972 for fatalities, and from 37.89 to 37.91 for serious casualities. This trend is in line with the increase in yield and Table D shows the trend since 1958 : 3.052 for fatalities, or a drop of 61 % in 1972, and 67.68 for serious casualities, or a drop of 66 %, whereas productivity underground rose by 123 % over the same period.

x
x x

An examination of the number of accident victims per million hours worked (Tables A, B, D, 1b and 2b) shows a drop in the rates for the following categories : incapacity of 4 to 20 days, 21 to 56 days, fatalities and total figures; an increase occurred in the rate of casualities causing over 56 days' incapacity.

Let us examine these variations.

The frequency rate of fatal accidents per million hours was 0.399 as opposed to 0.440, a drop of 10 %. However, the influence of collective accidents (Table C) should be taken into account : there were 6 fatalities in 1972 and 20 in 1971. If these collective accidents are not taken into account when examining variations in safety levels, the rates are 0.382 for 1972 and 0.391 for 1971, that is, a drop of 2.3 %. In view of the relatively low number of fatalities, from the statistical point of view, and the large margin of confidence interval which should be allowed (at 95 % : approx. $\pm$ 12 %), we cannot really conclude that this is a significant drop, and the frequency rate of fatalities can therefore be considered as decreasing or at least levelling out after the constant and significant decline observed since 1958.

The frequency rate for serious casualties (over 56 days) moved from 15.09 to 15.60, representing an increase of 3.4 % which, once the margin has been allowed is not highly significant; after rising until 1969, the rate of serious accidents can now be considered as levelling off since that time.

The rates of other accidents can only be compared over a period of two years, which means that any interpretation of these figures should be subject to certain reservations. The number of casualties causing incapacity of 31 to 56 days fell from 21 116 to 18 531 and the rate per million hours fell from 50.98 to 50.17 : this represents a drop of 1.59 %, but its significance is uncertain. The number of casualties causing 4 to 20 days absence fell from 47 203 to 40 376 and the rate per million hours fell from 113.96 to 109.31, a drop of 4 % which is definitely significant. However, it should be remember that the Statistics Working Party expressed certain reservations shared by the Mines Safety and Health Commission (page 20 of the 9th Report), on the subject of accidents causing less than 21 days incapacity, as the frequency may be greatly influenced by factors outside the field of safety and accident prevention. Finally, the total number of accident victims, which was strongly influenced by the total number of casualties causing between 4 and 20 days absence, dropped from 74 651 to 64 817, and the frequency rate fell from 180.2 to 175.5, a decrease of 2.6 %.

With certain reservations, given below, on the subject of safety levels, this shows that the frequency rate for all accidents, as well as the rate of fatal accidents, went down in 1971 - 1972.

x
x x

Let us exmine the distribution of casualties by technical causes. For causes I to V, this is shown by the following percentages :

	4 to 20 days %	21 to 56 days %	56 days %	Fatalities %	Total %
I Falls of Ground	32.6	26.4	26.2	23.1	30.3
II Haulage and Transport	5.2	7.2	12.4	35.4	6.4
III Falls by Accident Victim	20.0	24.5	22.2	10.9	21.4
IV Machinery, Tools	15.7	14.1	11.2	4.8	14.8
V Falling objects	21.6	23.8	23.2	9.5	22.2
Total I to V	95.1	96.0	95.2	83.7	95.1

Categories I to V account for 95 % of casualties and 83.7 % of fatalities; These figures are comparable with last year's. The total number of accident victims in categories I to V can be broken down into three roughly equal parts : falls of ground (30 %), haulage and transport and falls by accident victims (27.8 %), and machinery and falling objects (37 %). Accidents caused by haulage and transport, though forming a relatively small part of the whole (6.4 % of accident victims) are often fatal (35.4 % of fatalities) whereas accidents caused by machinery and falling objects, which account for 37 % of accident victims, are less frequently fatal (14.3 % of fatalities).

These comments bear out the remarks made in previous years, which led the Mines Safety and Health Commission to set up two new Working Parties two years ago (the "Roof Control and supports" Working Party to deal with cause I, and the "Mechanisation" Working Party to cover causes II, IV and V), and to give financial and technical supports to Community safety campaigns which, in Germany, had continuous haulage and transport as their theme.

An analysis of the data given in Tables 2a and 2b on the seat and nature of injuries will be completed some time this year. However, it may be noted from Table 2b that, for the total number of accident victims, injuries to the hands caused most casualties : 36 %, followed by injuries to the lower limbs (VI) : 14.8 %, feet (III) : 12.3 %, upper limbs (IV) : 10.8 %, trunk (III) and head (I) : 8.5 %, eyes (II) : 3.8 %, and multiple locations (VIII) : 3.4 %. In the case of fatal accidents, injuries to the head and neck formed the largest group, (35.5 %) followed by multiple locations (29 %), the trunk (22.5 %), not specified (7.5 %), lower limbs (3.5 %) and upper limbs (2 %).

For serious casualties, the order was : hands (34 %), lower limbs (21.5 %), feet (17.2 %), lower limbs (9.2 %), trunk (8.2 %), the head (4.9 %) and multiple locations (3.8 %).

x
x x

Examining the nature of the injuries (for fatalities and serious casualties), we find that the order is :

- for fatalities : fractures (51.5 %), concussion and internal injuries (15 %), wounds and contusions (10.8 %), multiple injuries (9.5 %), intoxication and asphyxiation (7.5 %)

- for serious casualties : fractures (51.5 %), wounds and contusions (35 %), concussion and internal injuries (1 %).

This information is to be used in accident prevention, to help with selecting, developing and applying measures for individual protection.

x
x x

To sum up, it is noted that the numbers and frequency rates of accidents causing incapacity of 4 days or over went down in 1973, as did the number and frequency rate of fatal accidents. The new data available from the enlarged statistics would appear to justify the setting up of the new Working Parties on "Strata Control" and "Mechanisation" and the choice of "continuous haulage and transport" as a theme for Community safety campaigns. We will continue to make use of this new statistical information.

A. Comparative Table of

numbers of persons incapacitated by underground accidents

for eight weeks or longer

years 1958-1972

per '000,000 man-hours

CAUSE (1958-1962)	Germany					Belgium					France *					Italy					Netherlands					Community				
	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962
1) Falls of ground	4,843	4,779	4,886	4,797	4,682	5,911	4,294	4,324	4,071	4,439	5,027	4,665	4,774	4,416	4,222	1,355	1,378	1,808	-	0,792	1,326	1,464	1,305	1,829	2,238	4,846	4,490	4,571	4,434	4,387
2) Haulage and transport	2,550	2,569	2,445	2,458	2,501	4,132	2,979	2,709	2,770	3,331	1,980	1,695	1,920	2,106	2,196	1,335	0,984	1,205	0,676	1,847	1,511	1,562	1,898	1,924	2,590	2,602	2,347	2,310	2,371	2,521
3) Movement of personnel	2,497	2,463	2,348	2,512	2,608	1,354	0,998	1,008	1,062	1,136	1,505	1,118	2,873	2,334	2,458	0,668	0,394	1,005	1,578	1,056	0,324	0,386	0,187	0,514	0,580	2,003	1,823	2,185	2,185	2,282
4) Machinery, handling of tools and supports	0,767	0,914	0,920	0,867	1,046	2,804	2,085	2,386	2,097	2,461	0,914	1,022	1,621	2,523	2,991	1,169	0,984	0,603	0,902	1,584	0,617	0,402	0,780	0,915	1,015	1,098	1,064	1,264	1,423	1,712
5) Falling objects	2,537	2,719	2,738	2,945	3,077	0,414	0,371	0,354	0,301	0,445	1,890	2,187	1,893	2,292	2,073	1,169	1,698	1,808	2,029	2,375	0,401	0,515	0,492	0,819	0,642	1,962	2,161	2,105	2,353	2,375
6) Explosives	0,015	0,011	0,010	0,009	0,008	0,027	0,007	0,032	0,018	-	0,043	0,051	0,031	0,017	0,051	0,167	-	-	0,225	-	-	-	-	-	-	0,023	0,020	0,017	0,012	0,018
7) Explosions of firedamp or coal dust	0,011	0,016	-	0,002	0,123	-	-	-	-	-	0,047	0,088	-	-	0,004	-	-	-	-	-	-	-	-	-	-	0,017	0,030	0,010	0,001	0,071
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	0,011	-	-	-	-	0,004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,002	-	-	-	-
9) Underground combustion and fires	-	-	0,003	0,002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,002	0,001	-
10) Inrushes of water	0,004	-	-	-	-	-	-	-	-	0,010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,002	-	-	-	0,001
11) Electricity	0,010	0,014	0,012	0,014	0,006	0,011	-	0,016	0,018	0,010	0,014	-	0,004	0,029	0,004	-	-	-	-	-	-	-	-	-	0,021	0,010	0,008	0,010	0,018	0,007
12) Other causes	0,487	0,522	0,457	0,503	0,488	0,260	0,255	0,260	0,301	0,351	2,956	2,768	0,793	0,362	0,240	0,334	0,591	0,603	0,451	-	0,262	0,161	0,390	0,210	0,497	0,985	1,012	0,513	0,428	0,404
TOTAL	13,721	14,007	13,819	14,109	14,539	14,924	10,989	11,089	10,638	12,161	14,380	13,594	13,909	14,079	14,239	6,197	6,299	7,032	5,861	7,654	4,441	4,490	5,051	6,212	7,583	13,551	12,954	12,986	13,227	13,781
(1963-1967)	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967
1) Falls of ground	4,663	4,894	4,732	4,721	4,524	4,432	4,417	3,574	3,568	3,850	4,177	4,308	3,941	3,927	3,634	0,366	0,893	5,572	6,360	5,580	1,742	2,017	1,923	1,688	2,466	4,337	4,509	4,215	4,186	4,060
2) Haulage and transport	2,433	2,385	2,411	2,067	1,913	3,565	3,419	2,866	3,269	2,960	2,364	2,278	2,153	1,858	1,918	1,465	1,787	-	0,707	0,797	1,826	1,952	2,808	2,621	1,866	2,520	2,346	2,416	2,173	2,037
3) Movement of personnel	2,646	2,744	3,032	2,852	2,974	1,066	0,961	0,771	0,936	0,903	2,368	2,383	2,087	2,239	2,174	0,732	1,787	-	0,707	1,594	0,630	0,472	0,774	0,605	0,766	2,261	2,326	2,364	2,320	2,354
4) Machinery, handling of tools and supports	1,213	1,242	1,234	1,244	1,124	2,414	2,310	2,126	2,146	2,265	3,096	3,042	2,272	2,639	2,773	1.465	3,127	7,164	7,067	13,552	1,050	1,094	1,282	2,066	0,833	1,818	1,848	1,773	1,815	1,790
5) Falling objects	3,038	3,242	3,344	3,272	3,642	0,547	0,397	0,292	0,349	0,459	2,278	2,074	1,839	1,785	2,114	3,296	3,574	0,796	-	6,377	0,630	0,923	0,862	0,958	0,866	2,406	2,442	2,415	2,362	2,638
6) Explosives	0,006	0,006	0,005	0,005	0,017	0,019	0,018	-	0,013	0,056	0,009	0,013	0,037	0,010	0,011	0,366	-	-	-	-	-	0,021	-	-	-	0,010	0,011	0,013	0,007	0,019
7) Explosions of firedamp of coal dust	0,010	-	0,014	0,013	-	-	0,009	0,031	-	-	-	-	-	0,029	-	-	-	-	-	-	-	-	-	-	-	0,006	0,001	0,011	0,016	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	0,005	-	0,003	-	-	-	0,013	-	-	-	-	-	0,005	-	-	-	-	-	-	-	-	-	-	-	-	0,002	0,001	0,003
9) Underground combustion and fires	-	-	-	-	-	-	-	0,021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,002	-	-
10) Inrushes of water	0,004	-	-	-	-	-	-	-	-	-	-	0,018	-	0,005	-	-	-	-	-	-	-	-	-	-	-	0,002	0,003	-	0,001	-
11) Electricity	0,012	0,009	0,002	0,010	0,006	0,009	-	0,010	0,015	-	0,014	0,009	0,014	-	0,005	-	-	-	-	-	-	0,021	-	-	-	0,012	0,008	0,006	0,007	0,005
12) Other causes	0,473	0,477	0,354	0,414	0,396	0,198	0,268	0,333	0,362	0,278	0,354	0,227	0,174	0,200	0,185	-	-	1,592	3,360	3,189	0,147	0,129	0,088	0,353	0,700	0,390	0,364	0,289	0,354	0,337
TOTAL	14,499	14,999	15,133	14,598	14,599	12,250	11,799	10,024	10,669	10,771	14,660	14,347	12,517	12,692	12,819	7,690	11,168	15,124	18,201	31,089	6,025	6,629	7,737	8,291	7,497	13,781	13,861	13,506	13,242	13,246
(1968-1972)	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972
1) Falls of ground	4,618	4,736	4,321	4,354	4,20	3,676	5,075	4,673	3,989	4,6	4,162	4,044	3,761	3,721	3,79	0,812	3,656	-	5,958	2,20	2,450	2,737	2,634	2,528	2,06	4,261	4,492	4,135	4,109	4,08
2) Haulage and transport	1,994	2,195	2,007	1,724	1,81	3,220	3,169	3,018	3,365	2,8	1,946	1,556	1,666	1,959	1,89	0,812	-	-	3,404	-	2,407	2,562	2,634	1,820	2,19	2,139	2,118	2,016	1,953	1,93
3) Movement of personnel	3,300	3,399	3,370	3,246	3,48	1,122	1,186	1,144	1,496	1,3	2,815	3,226	3,372	3,667	4,51	0,812	1,462	-	1,702	-	1,160	1,165	0,905	0,404	1,03	2,795	3,023	3,084	3,117	3,47
4) Machinery, handling of tools and supports	1,396	1,291	1,382	1,597	1,38	1,903	2,353	1,801	2,469	1,7	3,016	3,070	3,332	2,373	2,63	7,304	8,043	6,896	2,553	-	1,031	1,689	1,894	3,033	1,81	1,945	1,865	2,011	1,876	1,75
5) Falling objects	3,773	4,036	4,166	3,313	3,49	0,358	1,244	1,242	1,870	1,5	2,386	2,537	2,515	4,566	4,96	6,493	3,656	-	1,702	-	1,590	1,106	0,659	1,213	1,55	2,858	3,185	3,308	3,506	3,62
6) Explosives	0,011	0,007	0,008	-	-	0,049	-	-	0,025	0,03	-	0,050	0,016	-	0,02	-	-	-	-	-	-	-	-	-	-	0,015	0,019	0,011	0,002	0,008
7) Explosions of firedamp or coal dust	0,004	0,004	-	0,012	-	-	0,019	-	-	-	-	-	0,087	-	-	-	-	-	-	-	-	-	-	-	-	0,002	0,004	0,025	0,007	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9) Underground combustion	0,004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,002	-	-	-	-
10) Inrushes of water	-	-	-	-	-	-	-	-	0,025	-	0,006	-	0,032	-	0,01	-	-	-	-	-	-	-	-	-	-	0,002	-	0,009	0,002	0,003
11) Electricity	0,011	0,026	0,012	0,008	0,01	0,016	0,019	-	-	-	0,006	0,014	0,024	0,009	0,01	-	-	-	-	-	-	-	-	-	-	0,010	0,021	0,014	0,007	0,008
12) Other causes	0,429	0,402	0,532	0,632	0,96	0,228	0,175	0,195	0,324	0,2	0,233	0,291	0,294	0,314	0,43	0,812	-	5,172	0,851	-	0,301	0,116	0,165	0,202	0,52	0,341	0,333	0,434	0,509	0,73
TOTAL	15,540	16,096	15,798	14,886	15,31	10,572	13,240	12,097	13,563	12,13	14,570	14,788	15,099	16,609	18,24	17,043	16,817	12,068	16,170	2,20	8,939	9,375	8,891	9,201	9,15	14,370	15,160	15,047	15,088	15,60

* Including Provence as from 1970.

B. Underground accidents resulting in death within eight weeks

years 1958-1972

per '000,000 man-hours

CAUSE (1958-1962)	Germany					Belgium					France *					Italy					Netherlands					Community				
	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962
1) Falls of ground	0,268	0,290	0,263	0,216	0,280	0,223	0,213	0,299	0,266	0,246	0,235	0,192	0,186	0,219	0,167	0,167	-	0,201	0,225	-	0,262	0,064	0,034	0,114	0,062	0,253	0,242	0,235	0,217	0,234
2) Haulage and transport	0,179	0,169	0,182	0,196	0,149	0,101	0,124	0,157	0,168	0,142	0,115	0,085	0,082	0,122	0,077	-	0,197	-	-	-	0,077	0,145	0,067	0,095	0,062	0,147	0,141	0,146	0,168	0,124
3) Movement of personnel	0,094	0,097	0,070	0,086	0,059	0,011	0,027	0,008	0,035	0,010	0,007	0,018	0,027	0,008	0,043	-	-	-	-	-	-	-	-	-	-	0,057	0,063	0,047	0,056	0,045
4) Machinery, handling of tools and supports	0,010	0,027	0,012	0,027	0,037	0,005	0,014	0,016	0,027	0,047	0,018	0,040	0,016	0,008	0,030	-	-	-	-	-	0,015	0,016	-	-	0,041	0,011	0,028	0,012	0,021	0,037
5) Falling objects	0,065	0,041	0,039	0,065	0,094	0,016	-	0,008	-	0,010	0,025	0,007	0,004	0,017	0,030	-	0,197	-	-	-	-	0,016	-	-	-	0,045	0,027	0,024	0,041	0,062
6) Objectives	0,009	0,003	0,003	-	0,004	0,011	0,014	-	-	-	-	0,026	-	-	-	0,501	-	-	-	-	-	-	-	-	-	0,009	0,010	0,002	-	0,002
7) Explosives of firedamp or coal dust	0,011	0,012	-	-	0,660	-	-	0,016	-	-	0,115	0,121	-	-	0,004	-	-	-	-	-	-	-	-	-	-	0,032	0,036	0,002	-	0,375
8) Sudden outbursts of firedamp, suffocation by natural gases	0,005	0,003	0,002	0,004	0,002	0,016	0,014	-	-	0,047	0,043	0,026	0,019	0,004	-	0,167	-	-	-	-	-	-	-	-	-	0,016	0,010	0,006	0,003	0,007
9) Underground combustion and fires	-	0,003	-	0,002	-	-	0,007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,003	-	0,001	-
10) Inrushes of water	-	0,003	0,002	-	-	0,011	-	-	0,044	0,047	-	-	-	0,004	-	-	-	-	-	-	-	-	-	-	-	0,002	0,002	0,001	0,006	0,005
11) Electricity	0,022	0,008	0,002	0,005	0,010	0,021	-	0,024	-	-	-	0,011	0,012	-	0,009	-	-	-	-	-	-	-	-	0,019	-	0,016	0,007	0,007	0,004	0,008
12) Other causes	0,025	0,025	0,036	0,049	0,049	0,005	-	0,008	0,009	0,019	0,036	0,029	0,008	-	0,009	-	-	-	-	-	-	-	0,017	-	-	0,023	0,021	0,024	0,029	0,032
TOTAL	0,687	0,680	0,611	0,651	1,344	0,420	0,413	0,536	0,549	0,568	0,594	0,555	0,354	0,382	0,369	0,835	0,394	0,201	0,225	-	0,355	0,241	0,119	0,229	0,166	0,610	0,590	0,507	0,546	0,932
(1963-1967)	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967
1) Falls of ground	0,260	0,200	0,184	0,197	0,206	0,264	0,222	0,239	0,324	0,264	0,120	0,127	0,164	0,214	0,159	0,366	-	-	-	-	0,084	0,043	0,044	0,050	0,100	0,217	0,175	0,177	0,208	0,192
2) Haulage and transport	0,178	0,300	0,191	0,175	0,150	0,245	0,166	0,166	0,187	0,180	0,121	0,141	0,052	0,126	0,088	-	-	-	-	0,797	0,105	0,172	0,177	0,126	-	0,167	0,178	0,149	0,160	0,128
3) Movement of personnel	0,089	0,071	0,070	0,094	0,076	0,057	0,028	0,011	0,025	-	0,009	0,009	0,042	0,024	0,016	-	-	-	-	-	-	-	-	-	-	0,060	0,045	0,051	0,060	0,044
4) Machinery, handling of tools and supports	0,019	0,028	0,025	0,030	0,020	-	0,018	0,052	0,025	0,028	0,009	0,036	0,009	0,015	0,016	-	-	-	-	0,797	-	-	0,022	-	0,067	0,013	0,030	0,024	0,023	0,024
5) Falling objects	0,072	0,054	0,058	0,048	0,063	0,019	0,018	-	-	-	0,009	0,018	0,019	0,015	0,011	-	-	-	-	-	-	0,043	-	-	-	0,046	0,037	0,037	0,030	0,036
6) Explosives	-	0,002	-	-	-	-	-	-	-	-	0,005	0,005	0,009	0,005	0,005	-	-	-	-	-	-	-	-	-	-	0,001	0,002	0,002	0,001	0,002
7) Explosives of firedamp or coal dust	0,002	0,002	0,019	0,056	-	-	-	0,011	-	-	-	-	0,155	-	-	-	-	-	-	-	-	-	-	-	-	0,001	0,001	0,053	0,030	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	0,002	0,002	0,007	-	-	0,041	0,013	-	0,019	0,009	-	0,005	0,027	-	-	-	-	-	-	-	-	-	-	0,005	0,002	0,006	0,004	0,012
9) Underground combustion and fires	0,006	0,009	0,005	-	-	-	-	0,011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,003	0,005	0,005	-	-
10) Inrushes of water	0,004	-	-	-	-	0,019	-	-	-	-	-	-	0,005	-	0,005	-	-	-	-	-	-	-	-	-	-	0,005	-	0,001	-	0,002
11) Electricity	0,002	0,004	0,005	-	0,003	0,009	0,009	0,011	-	0,014	0,024	-	-	0,010	-	-	-	-	-	-	-	-	-	-	-	0,008	0,003	0,004	0,003	0,004
12) Other causes	0,025	0,017	0,023	0,027	0,017	0,028	0,009	-	0,013	0,042	0,014	0,014	-	0,005	0,005	-	-	-	-	-	-	-	-	-	-	0,021	0,014	0,013	0,017	0,015
TOTAL	0,657	0,587	0,582	0,629	0,542	0,641	0,471	0,542	0,587	0,528	0,330	0,359	0,455	0,419	0,332	0,366	-	-	-	1,594	0,189	0,258	0,243	0,176	0,167	0,547	0,492	0,522	0,536	0,457
(1968-1972)	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972
1) Falls of ground	0,148	0,192	0,113	0,147	0,10	0,179	0,214	0,268	0,100	0,08	0,177	0,149	0,143	0,117	0,07	-	-	-	-	2,20	0,172	0,058	0,082	0,101	-	0,160	0,176	0,135	0,133	0,092
2) Haulage and transport	0,126	0,143	0,128	0,103	0,16	0,114	0,097	0,170	0,125	0,18	0,101	0,186	0,127	0,108	0,08	-	-	-	-	-	0,086	-	0,165	-	0,26	0,115	0,145	0,132	0,104	0,141
3) Movement of personnel	0,079	0,056	0,058	0,032	0,06	0,033	-	-	0,049	0,03	0,025	0,014	0,016	0,072	0,01	-	-	-	-	-	-	0,058	-	-	-	0,054	0,038	0,039	0,043	0,043
4) Machinery, handling of tools and supports	0,014	0,034	0,031	0,032	0,03	0,065	-	-	0,025	-	0,006	-	0,032	0,027	-	-	-	-	-	-	-	0,117	-	-	-	0,017	0,023	0,027	0,029	0,019
5) Falling objects	0,051	0,049	0,035	0,047	0,06	0,016	-	-	-	0,03	0,031	0,014	0,016	0,045	-	-	-	-	-	-	0,043	-	-	-	-	0,040	0,031	0,025	0,041	0,038
6) Explosives	0,004	-	-	-	-	0,016	-	-	-	-	0,006	-	0,108	0,018	-	-	-	-	-	-	-	-	-	-	-	0,006	-	0,002	0,005	-
7) Explosives of firedamp or coal dust	0,061	-	-	0,008	-	-	-	-	-	-	0,038	-	0,127	-	-	-	-	-	-	-	-	-	-	-	-	0,044	-	0,037	0,005	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	0,004	-	0,008	0,004	-	-	-	0,025	0,18	0,019	0,007	-	0,072	-	-	-	-	-	-	-	-	-	-	-	0,006	0,004	-	0,027	0,022
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,003
10) Inrushes of water	-	-	0,012	-	-	-	-	-	-	-	-	-	0,016	-	0,01	-	-	-	-	-	-	-	-	-	-	-	-	0,011	-	0,003
11) Electricity	0,004	0,004	0,004	-	0,004	0,033	0,019	0,024	-	-	-	0,007	-	-	-	-	-	-	-	-	-	-	-	-	-	0,006	0,006	0,004	-	0,003
12) Other causes	0,022	0,022	0,027	0,083	0,04	-	-	-	-	0,03	-	0,007	-	0,009	0,03	-	-	-	-	-	-	-	-	-	-	0,012	0,015	0,016	0,053	0,035
TOTAL	0,509	0,504	0,408	0,460	0,46	0,456	0,330	0,462	0,324	0,53	0,403	0,384	0,484	0,468	0,21	0	-	-	-	2,20	0,301	0,233	0,247	0,101	0,26	0,460	0,438	0,429	0,440	0,399

* Including Provence as from 1970.

C. Comparative Table of underground group accidents (see (1) below)
years 1960-1972

CAUSE (1960-1964)	Germany															Belgium															France *													
	1960			1961			1962			1963			1964			1960			1961			1962			1963			1964			1960			1961			1962			1963			1964		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	2	2	10	-	-	-	1	1	6	-	-	-	-	-	-	-	-	-	-	-	-	1	2	6	-	-	-	-	-	-	-	-	-	1	-	7	1	-	6	-	-	-	-	-	-
2) Haulage and transport	-	-	-	-	-	-	-	-	-	-	-	-	2	5	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3) Movement of personnel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4) Machinery, handling 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) Other causes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	2	2	10	-	-	-	3	63	344	-	-	-	2	5	14	-	-	-	-	-	-	1	2	6	-	-	-	-	-	-	-	-	-	1	-	7	1	-	6	-	-	-	-	-	-

(1965-1969)	Germany															Belgium															France *													
	1965			1966			1967			1968			1969			1965			1966			1967			1968			1969			1965			1966			1967			1968			1969		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	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, handling of tools and supports	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5) Falling objects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6) Explosives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7) Explosions of firedamp or coal dust	1	4	8	2	5	21	-	-	-	1	-	17	-	-	-	2	-	33	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10) Inrushes of water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11) Electricity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12) Other causes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	1	4	8	2	5	21	-	-	-	1	-	17	-	-	-	2	-	33	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	11	-	-	-

(1970-1972)	Germany															Belgium															France *													
	1970			1971			1972									1970			1971			1972									1970			1971			1972								
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	-	-	-	2	-	12	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
2) Haulage and transport	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
3) Movement of personnel	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
4) Machinery, handling of tools and supports	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
5) Falling objects	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
6) Explosives	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							1	11	16	-	-	-	-	-	-						
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	1	-	6							-	-	-	1	-	8	-	-	-						
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
10) Inrushes of water	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
11) Electricity	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
12) Other causes	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
TOTAL	-	-	-	2	-	12	-	-	-							-	-	-	-	-	-	1	-	6							1	11	16	1	-	8	-	-	-						

CAUSE (1960-1964)	Italy															Netherlands															Community													
	1960			1961			1962			1963			1964			1960			1961			1962			1963			1964			1960			1961			1962			1963			1964		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	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, handling 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) Other causes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	41	3	11	21	-	-	-	1	-	17	-	-	-

(1965-1969)	Italy															Netherlands															Community													
	1965			1966			1967			1968			1969			1965			1966			1967			1968			1969			1965			1966			1967			1968			1969		
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	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, handling of tools and supports	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5) Falling objects	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6) Explosives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	41	3	11	21	-	-	-	1	-	17	2	-	11
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10) Inrushes of water	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11) Electricity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12) Other causes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	41	3	11	21	-	-	-	1	-	17	2	-	11

(1970-1972)	Italy															Netherlands															Community													
	1970			1971			1972									1970			1971			1972									1970			1971			1972								
	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b	N	a	b
1) Falls of ground	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	2	-	12	-	-	-						
2) Haulage and transport	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
3) Movement of personnel	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
4) Machinery, handling of tools and supports	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
5) Falling objects	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
6) Explosives	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
7) Explosions of firedamp or coal dust	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							1	11	16	-	-	-	-	-	-						
8) Sudden outbursts of firedamp, suffocation by natural gases	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	1	-	8	-	-	-						
9) Underground combustion and fires	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
10) Inrushes of water	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
11) Electricity	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
12) Other causes	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-						
TOTAL	-	-	-	-	-	-	-	-	-							-	-	-	-	-	-	-	-	-							1	11	16	3	-	20	-	-	-						

(1) Accidents involving more than five casualties of type (a).
(N) Number of group accidents
(a) Casualties were unable to resume work below ground for at least eight weeks.
(b) Casualties died within eight weeks.
(*) Including Provence as from 1970

D. RECAPITULATION: COMMUNITY OVERALL

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

(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.

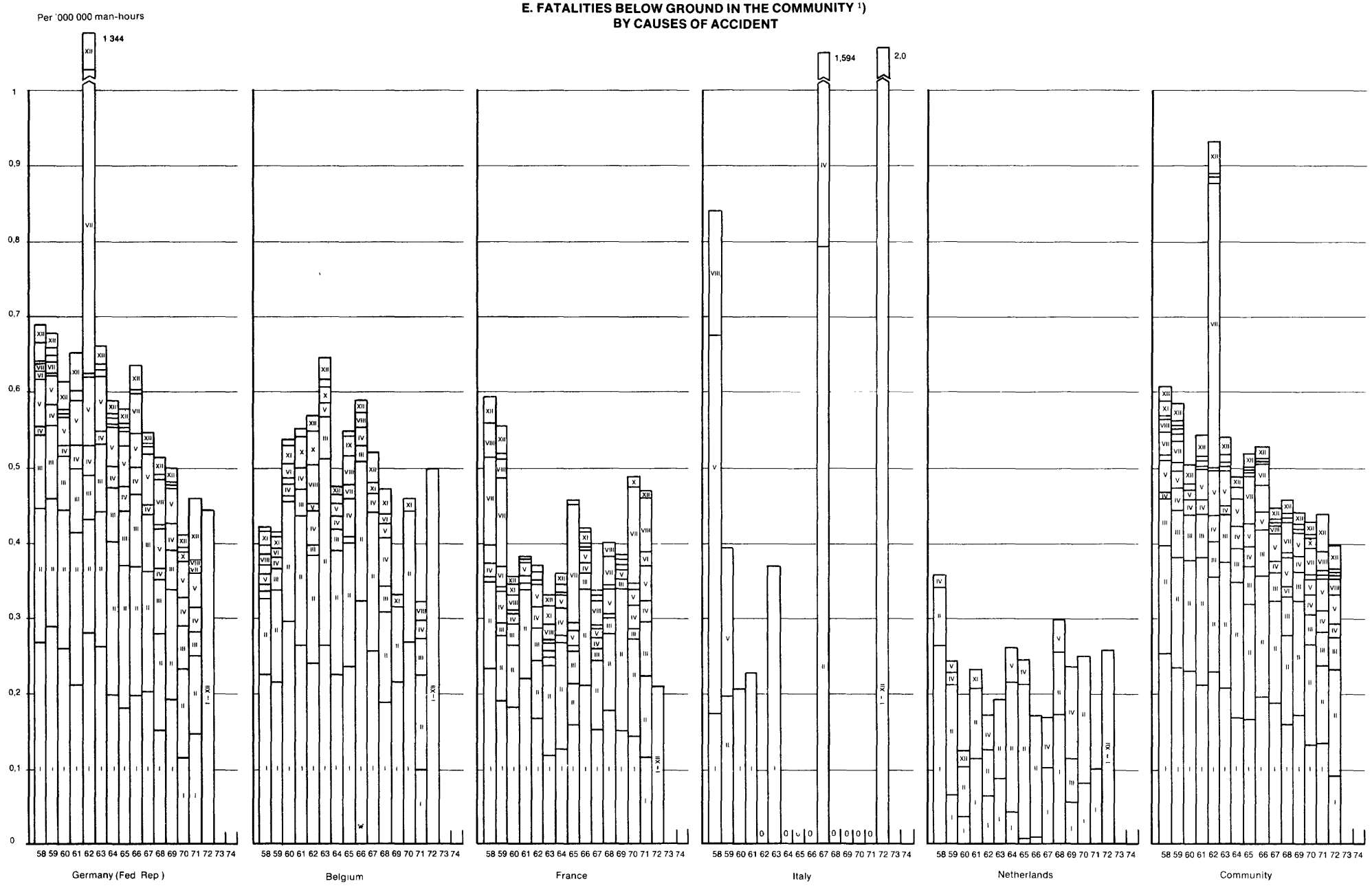
GRAPHS
OF FATAL AND SERIOUS CASUALTIES
IN COMMUNITY COALMINES [1)]

KEY
to Roman figures in Graphs

I	Falls of ground
II	Haulage and transport
III	Movement of personnel
IV	Machinery, handling of tools and supports
V	Falling objects
VI	Explosives
VII	Explosions of firedamp or coal dust
VIII	Sudden outbursts of firedamp, suffocation by natural gases
IX	Fires and uderground combustion
X	Inrushes of water
XI	Electricity
XII	Other causes

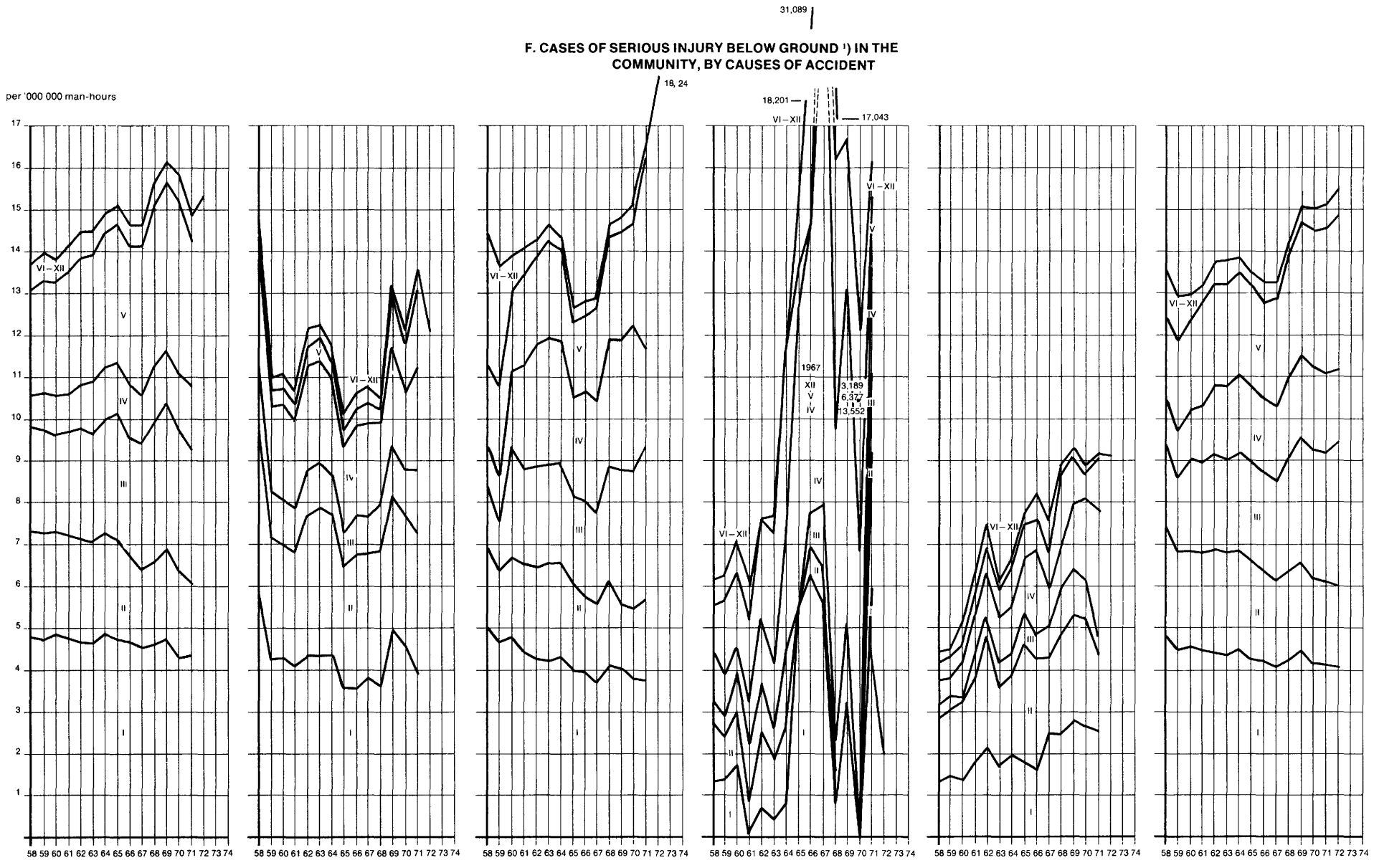
([1]) Casualties were unable to resume work for at least eight weeks.

E. FATALITIES BELOW GROUND IN THE COMMUNITY [1]) BY CAUSES OF ACCIDENT



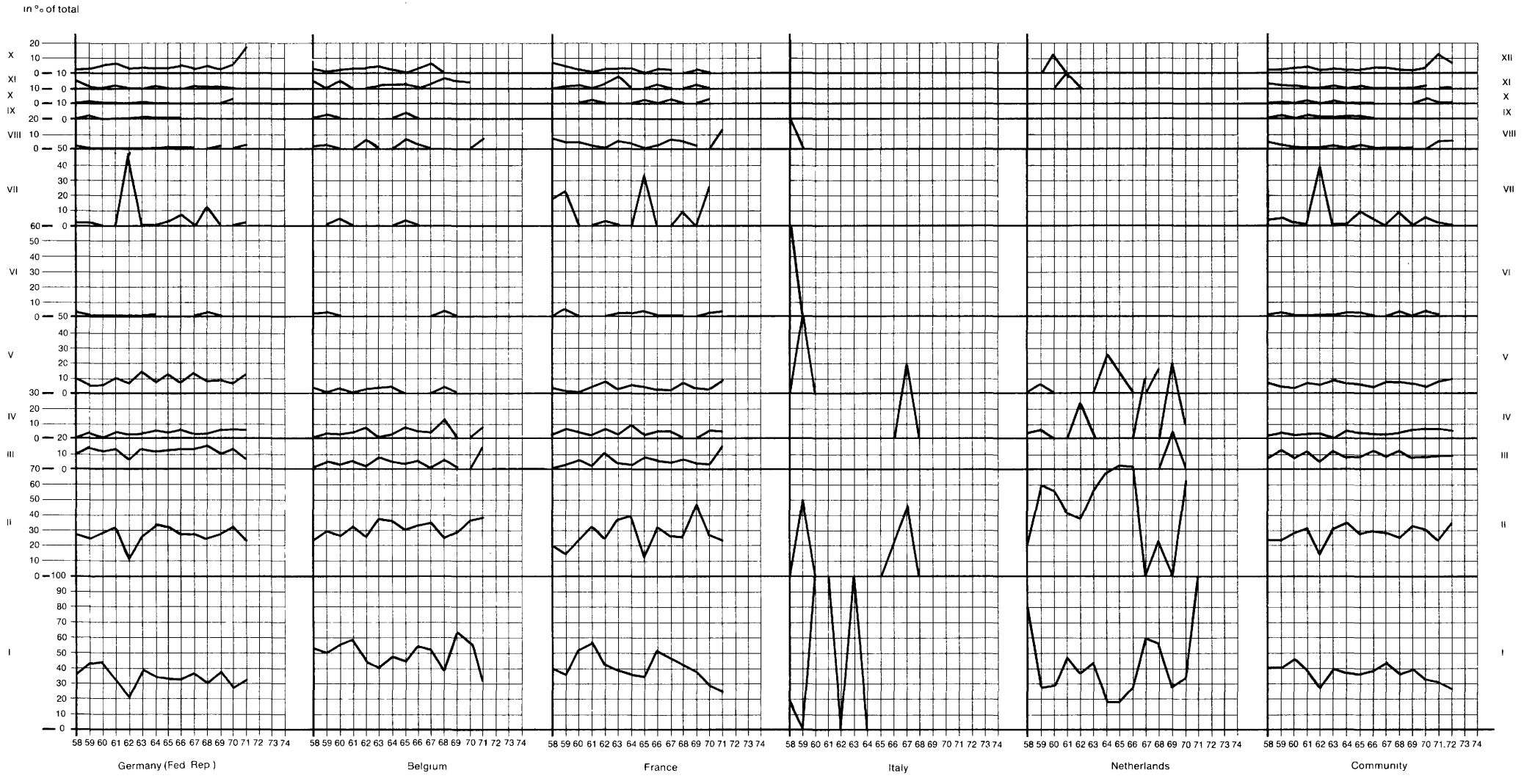
[1]) CASUALTIES DIED WITHIN EIGHT WEEKS

F. CASES OF SERIOUS INJURY BELOW GROUND [1]) IN THE COMMUNITY, BY CAUSES OF ACCIDENT



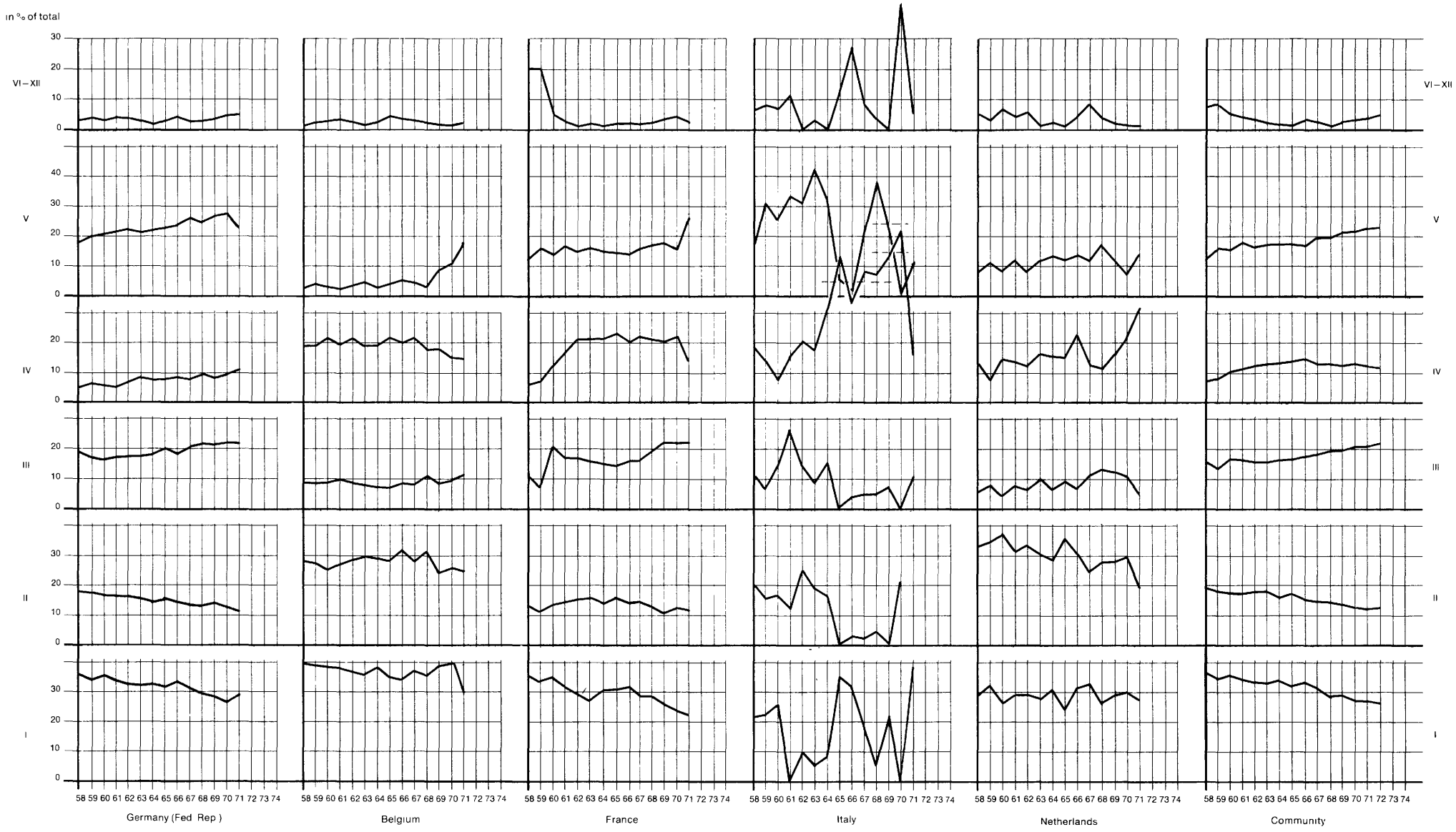
1) CASUALTIES WERE UNABLE TO RESUME WORK BELOW GROUND FOR AT LEAST EICHT WEEKS

G. FATALITIES BELOW GROUND [1]) IN THE COMMUNITY
BY CAUSES OF ACCIDENT



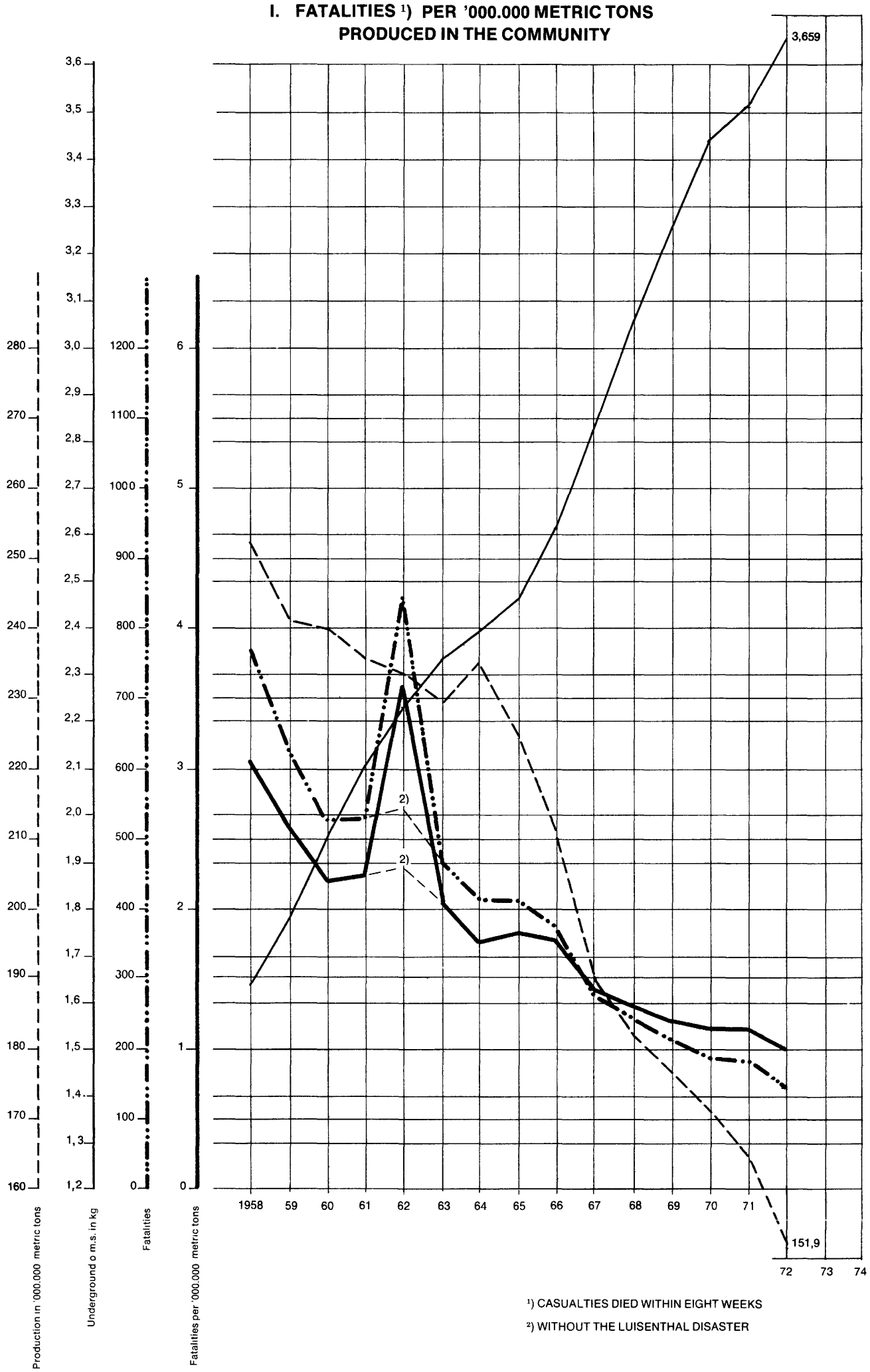
[1]) CASUALTIES DIED WITHIN EIGHT WEEKS

H. CASES OF SERIOUS INJURY BELOW GROUND [1]) IN THE COMMUNITUY BY CAUSES OF ACCIDENT



[1]) CASUALTIES WERE UNABLE TO RESUME WORK BELOW FOR AT LEAST EIGHT WEEKS

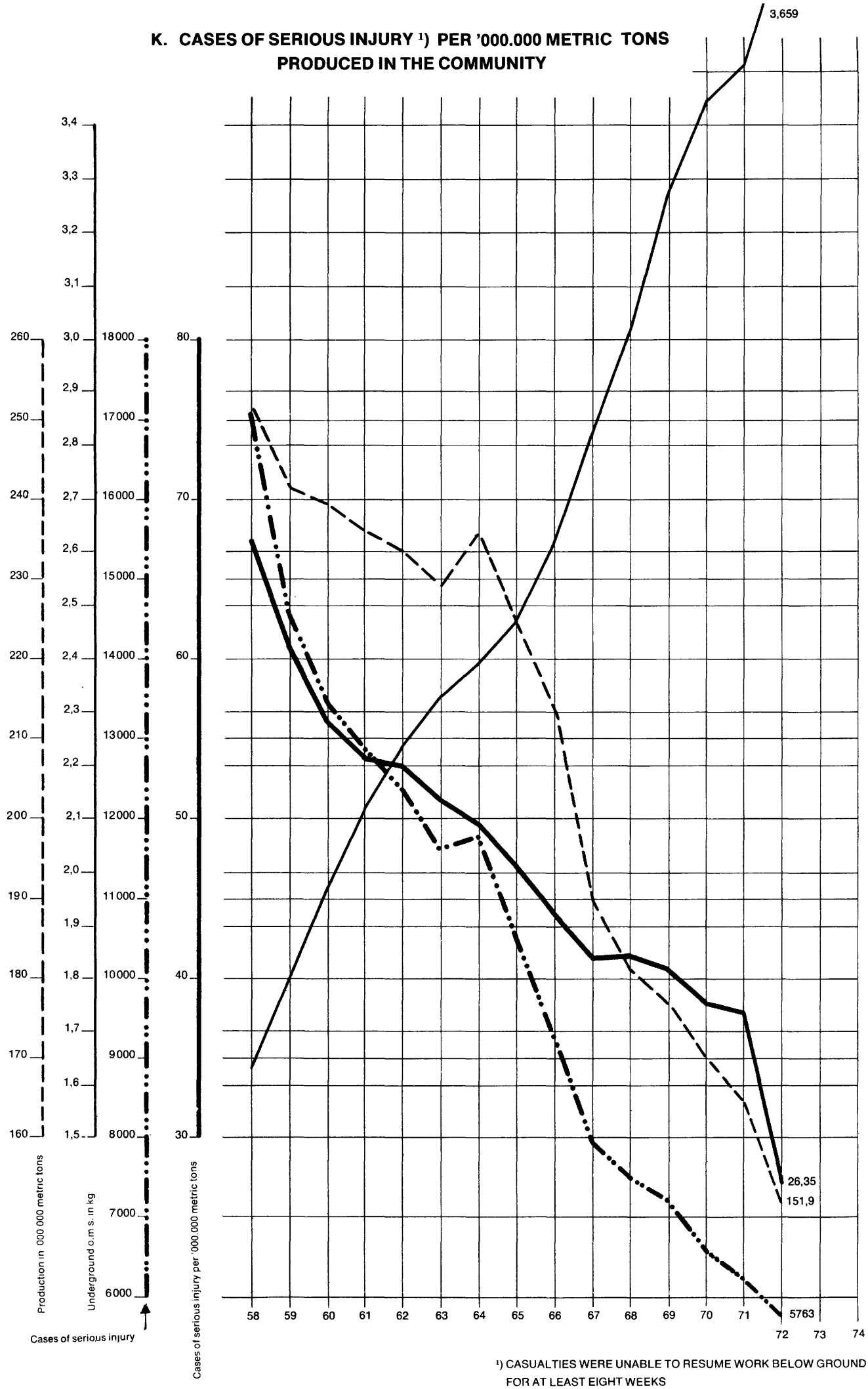
I. FATALITIES [1]) PER '000.000 METRIC TONS PRODUCED IN THE COMMUNITY



[1]) CASUALTIES DIED WITHIN EIGHT WEEKS

[2]) WITHOUT THE LUISENTHAL DISASTER

K. CASES OF SERIOUS INJURY [1]) PER '000.000 METRIC TONS PRODUCED IN THE COMMUNITY



[1]) CASUALTIES WERE UNABLE TO RESUME WORK BELOW GROUND FOR AT LEAST EIGHT WEEKS

ANNEXES

LIST OF ANNEXES

COMMON STATISTICAL SUMMARY OF UNDERGROUND ACCIDENTS AT MINES IN 1972

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: Germany

YEAR: 1972

COAL-FIELD: Land North Rhine/Westphalie

MAN-HOURS WORKED *(1)*: 200 583 609

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	3 401	1 831	561	16	5 809	1 965	839	272	6	3 082	34	22	8	-	64	12	8	2	-	22	5 412	2 700	843	22	8 977	-	-	-
II. TRANSPORT, TOTAL	41	66	34	4	145	358	406	262	19	1 045	60	72	50	7	189	6	2	3	1	12	465	546	349	31	1 391			
a) Continuous Transport	31	40	22	3	96	139	94	54	1	288	5	4	3	-	12	3	1	1	-	5	178	139	80	4	401			
b) Discontinuous Transport	10	26	12	1	49	219	312	208	18	757	55	68	47	7	177	3	1	2	1	7	287	407	269	27	990			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	888	633	157	5	1 683	3 298	1 989	513	4	5 804	288	239	62	4	593	123	73	19	-	215	4 597	2 934	751	13	8 295			
a) while moving about the mine	41	26	6	-	73	488	250	94	1	833	39	28	8	2	77	4	1	2	-	7	572	305	110	3	990			
b) in the course of other activities	847	607	151	5	1 610	2 810	1 739	419	3	4 971	249	211	54	2	516	119	72	17	-	208	4 025	2 629	641	10	7 305			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	1 129	779	195	4	2 107	493	272	63	1	829	45	19	6	-	70	33	15	1	-	49	1 700	1 085	265	5	3 055			
a) Machines	64	42	25	1	132	26	36	19	1	82	1	-	1	-	2	-	-	-	-	-	91	78	45	2	216			
b) Tools	280	167	35	-	482	466	234	44	-	744	44	19	5	-	68	33	15	1	-	49	823	435	85	-	1 343			
c) Supports	785	570	135	3	1 493	1	2	-	-	3	-	-	-	-	-	-	-	-	-	-	786	572	135	3	1 496			
V. FALLS OF OBJECTS	1 764	1 134	345	7	3 250	2 050	1 116	332	4	3 502	128	75	40	1	244	67	32	4	-	103	4 009	2 357	721	12	7 099			
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	-	-	-	1	1			
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	1			
IX. HEATINGS OR FIRES	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2			
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
XI. ELECTRICITY	1	1	-	-	2	5	10	1	-	16	-	-	1	-	1	1	2	-	1	4	7	13	2	1	23			
XII. OTHER CAUSES	115	69	34	3	221	350	128	62	3	543	49	27	15	-	91	20	7	3	2	32	534	231	114	8	887			
TOTAL	7 340	4 513	1 326	39	13 218	8 521	4 760	1 505	37	14 823	604	454	182	12	1 252	262	139	32	5	438	16 727	9 866	3 045	93	29 731	-	-	-

(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) 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

(frequency rates)

Table 1b

COUNTRY: Germany

YEAR: 1972

COAL-FIELD: Land North Rhine/Westphalie

MAN-HOURS WORKED *(1)*: 200 583 609

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	16,96	9,13	2,80	0,08	28,96	9,80	4,18	1,36	0,03	15,37	0,17	0,11	0,04	-	0,32	0,06	0,04	0,01	-	0,11	26,98	13,46	4,20	0,11	44,76			
II. TRANSPORT, TOTAL	0,20	0,33	0,17	0,02	0,72	1,78	2,02	1,31	0,09	5,21	0,30	0,36	0,25	0,03	0,94	0,03	0,01	0,01	0,005	0,06	2,32	2,72	1,74	0,15	6,93			
a) Continuous Transport	0,15	0,20	0,11	0,01	0,48	0,69	0,47	0,27	0,005	1,44	0,02	0,02	0,01	-	0,06	0,015	0,005	0,005	-	0,02	0,89	0,69	0,40	0,02	2,00			
b) Discontinuous Transport	0,05	0,13	0,06	0,005	0,24	1,09	1,56	1,04	0,09	3,77	0,27	0,34	0,23	0,03	0,88	0,015	0,005	0,01	0,005	0,03	1,43	2,03	1,34	0,13	4,93			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	4,43	3,16	0,78	0,02	8,39	16,44	9,92	2,56	0,02	28,94	1,47	1,19	0,31	0,02	2,96	0,61	0,36	0,09	-	1,07	22,92	14,63	3,74	0,06	41,36			
a) while moving about the mine	0,20	0,13	0,03	-	0,36	2,43	1,25	0,47	0,005	4,15	0,19	0,14	0,04	0,01	0,38	0,02	0,005	0,01	-	0,03	2,85	1,52	0,55	0,01	4,93			
b) in the course of other activities	4,22	3,03	0,75	0,02	8,03	14,01	8,67	2,09	0,01	24,79	1,24	1,05	0,27	0,01	2,57	0,59	0,36	0,08	-	1,04	20,07	13,11	3,20	0,05	36,42			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	5,63	3,88	0,97	0,02	10,50	2,46	1,36	0,31	0,005	4,13	0,22	0,09	0,03	-	0,35	0,16	0,07	0,005	-	0,24	8,48	5,41	1,32	0,02	15,23			
a) Machines	0,32	0,21	0,12	0,005	0,66	0,13	0,18	0,09	0,005	0,41	0,005	-	0,005	-	0,01	-	-	-	-	-	0,45	0,39	0,22	0,01	1,08			
b) Tools	1,40	0,83	0,17	-	2,40	2,32	1,17	0,22	-	3,71	0,22	0,09	0,02	-	0,34	0,16	0,07	0,005	-	0,24	4,10	2,17	0,42	-	6,70			
c) Supports	3,91	2,84	0,67	0,01	7,44	0,005	0,01	-	-	0,01	-	-	-	-	-	-	-	-	-	-	3,92	2,85	0,67	0,01	7,46			
V. FALLS OF OBJECTS	8,79	5,65	1,72	0,03	16,20	10,22	5,56	1,66	0,02	17,46	0,64	0,37	0,20	0,005	1,22	0,33	0,16	0,02	-	0,51	19,99	11,75	3,59	0,06	35,39			
VI. EXPLOSIVES	0,05	-	-	-	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	-	-	-	0,005	0,005			
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,005	0,005	-	-	-	0,005	0,005			
IX. HEATINGS OR FIRES	-	-	-	-	-	0,01	-	-	-	0,01	-	-	-	-	-	-	-	-	-	-	0,01	-	-	-	0,01			
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
XI. ELECTRICITY	0,005	0,005	-	-	0,01	0,02	0,05	0,005	-	0,08	-	-	0,005	-	0,005	0,005	0,01	-	0,005	0,02	0,03	0,06	0,01	0,005	0,11			
XII. OTHER CAUSES	0,57	0,34	0,17	0,01	1,10	1,75	0,64	0,31	0,01	2,71	0,24	0,13	0,07	-	0,45	0,10	0,03	0,01	0,01	0,16	2,66	1,15	0,57	0,04	4,42			
TOTAL	36,60	22,50	6,61	0,19	65,90	42,49	23,73	7,50	0,18	73,91	3,01	2,26	0,91	0,06	6,24	1,31	0,69	0,16	0,02	2,18	83,39	49,19	15,18	0,46	148,22	-	-	-

(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) Calender days.

MINES SAFETY 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: Germany

COAL-FIELD: Land North Rhine/Westphalie

YEAR: 1972

MAN-HOURS WORKED *(1)*: 200 583 609

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	2	80	31	278	-	-	40	15	3	178	54	6	2 515	-	-	18				-	-	4	2 275	571	149	40	3 035
II. Eyes	4	-	8							-	-	9	30	-	623	1	-	63				2	-	6	602	70	37	-	709
III. Trunk	-	-	1	108	7	357	2	-	38	5	10	35	54	2	1 474	2	-	16				-	-	1	1 068	664	171	19	1 922
IV. Upper limbs (excluding the hands) *(3)*	1	-	3	183	1	276	12	-	92				67	-	2 831	-	-	20				-	-	2	2 282	678	263	1	3 224
V. Hands	66	-	201	705	-	3 135	45	-	260				276	-	7 709	3	-	30				-	-	5	5 615	4 630	1 095	-	11 340
VI. Lower limbs (excluding feet) *(4)*	5	-	6	279	-	357	64	-	345				202	1	3 448	1	-	14				2	-	7	2 217	1 406	553	1	4 177
VII. Feet	4	-	6	484	-	1 295	30	-	677				139	-	2 295	1	-	10				-	-	1	2 129	1 497	658	-	4 284
VIII. Multiple locations	-	2	2	57	22	133	2	-	18	6	1	20	52	-	829	1	-	19				-	-	-	530	348	118	25	1 021
IX. Not specified																-	1	4	-	1	8	1	5	7	9	2	1	7	19
TOTAL	80	2	229	1 896	61	5 831	155	-	1 470	26	14	242	874	9	21 724	9	1	194	-	1	8	5	5	33	16 727	9 866	3 045	93	29 731

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY: Germany

YEAR: 1972

COAL-FIELD: Land North/Rhine Westphalie

MAN-HOURS WORKED *(1)*: 200 583 609

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	0,01	0,40	0,15	1,39	-	-	0,20	0,07	0,02	0,89	0,27	0,03	12,54	-	-	0,09				-	-	0,02	11,34	2,85	0,74	0,20	15,13
II. Eyes	0,02	-	0,04							-	-	0,04	0,15	-	3,11	0,01	-	0,31				0,01	-	0,03	3,00	0,35	0,18	-	3,53
III. Trunk	-	-	0,01	0,54	0,03	1,78	0,01	-	0,19	0,02	0,05	0,17	0,27	0,01	7,35	0,01	-	0,08				-	-	0,01	5,32	3,31	0,85	0,09	9,58
IV. Upper limbs (excluding the hands) *(3)*	0,01	-	0,02	0,91	0,01	1,38	0,06	-	0,46				0,33	-	14,11	-	-	0,10				-	-	0,01	11,38	3,38	1,31	0,01	16,07
V. Hands	0,33	-	1,00	3,51	-	15,63	0,22	-	1,30				1,38	-	38,43	0,02	-	0,15				-	-	0,02	27,99	23,08	5,46	-	56,53
VI. Lower limbs (excluding feet) *(4)*	0,02	-	0,03	1,39	-	1,78	0,32	-	1,72				1,01	0,01	17,19	0,01	-	0,07				0,01	-	0,03	11,05	7,01	2,76	0,01	20,82
VII. Feet	0,02	-	0,03	2,41	-	6,46	0,15	-	3,38				0,69	-	11,44	0,01	-	0,05				-	-	0,01	10,61	7,46	3,28	-	21,36
VIII. Multiple locations	-	0,01	0,01	0,28	0,11	0,66	0,01	-	0,09	0,03	0,01	0,10	0,26	-	4,13	0,01	-	0,09				-	-	-	2,64	1,73	0,59	0,12	5,09
IX. Not specified																-	0,01	0,02	-	0,01	0,04	0,01	0,02	0,03	0,04	0,01	0,01	0,03	0,09
TOTAL	0,40	0,01	1,14	9,45	0,30	29,07	0,77	-	7,33	0,13	0,07	1,21	4,36	0,04	188,30	0,04	0,01	0,97	-	0,01	0,04	0,02	0,02	0,16	83,39	49,19	15,18	0,46	148,22

(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: Germany

COAL-FIELD: Saar

YEAR: 1972

MAN-HOURS WORKED *(1)*: 23 730 912

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	360	217	71	-	648	104	40	26	-	170	1	1	-	-	2	1	1	-	-	2	466	259	97	-	822	-	-	-
II. TRANSPORT, TOTAL	20	24	9	-	53	93	87	42	3	225	8	10	4	1	23	-	-	1	-	1	121	121	56	4	302	-	-	-
a) Continuous Transport	17	20	6	-	43	32	26	14	-	72	-	1	-	-	1	-	-	1	-	1	49	47	21	-	117	-	-	-
b) Discontinuous Transport	3	4	3	-	10	61	61	28	3	153	8	9	4	1	22	-	-	-	-	-	72	74	35	4	185	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	62	31	25	1	119	34	24	4	-	62	1	-	-	-	1	-	-	-	-	-	97	55	29	1	182	-	-	-
a) while moving about the mine	5	2	1	1	9	3	1	1	-	5	-	-	-	-	-	-	-	-	-	-	8	3	2	1	14	-	-	-
b) in the course of other activities	57	29	24	-	110	31	23	3	-	57	1	-	-	-	1	-	-	-	-	-	89	52	27	-	168	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	130	69	31	2	232	105	64	13	-	182	8	1	1	-	10	-	-	-	-	-	243	134	45	2	424	-	-	-
a) Machines	62	32	25	1	120	37	31	4	-	72	2	-	-	-	2	-	-	-	-	-	101	63	29	1	194	-	-	-
b) Tools	66	35	5	1	107	65	33	7	-	105	6	1	1	-	8	-	-	-	-	-	137	69	13	1	220	-	-	-
c) Supports	2	2	1	-	5	3	-	2	-	5	-	-	-	-	-	-	-	-	-	-	5	2	3	-	10	-	-	-
V. FALLS OF OBJECTS	181	142	47	1	371	60	43	14	-	117	4	5	1	-	10	2	-	-	-	2	247	190	62	1	500	-	-	-
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	189	112	37	-	338	307	196	63	1	567	17	16	2	-	35	1	1	-	-	2	514	325	102	1	942	-	-	-
TOTAL	942	595	220	4	1 761	703	454	162	4	1 323	39	33	8	1	81	4	2	1	-	7	1 688	1 084	391	9	3 172	-	-	-

(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) 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

(frequency rates)

Table 1b

COUNTRY: Germany

COAL-FIELD: Saar

YEAR: 1972

MAN-HOURS WORKED (1): 23 730 912

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	15,17	9,15	2,99	-	27,31	4,38	1,69	1,10	-	7,17	0,04	0,04	-	-	0,08	0,04	0,04	-	-	0,08	19,64	10,91	4,09	-	34,64	-	-	-
II. TRANSPORT, TOTAL	0,84	1,01	0,38	-	2,23	3,92	3,67	1,77	0,12	9,48	0,34	0,42	0,17	0,04	0,97	-	-	0,04	-	0,04	5,10	5,10	2,36	0,16	12,72	-	-	-
a) Continuous Transport	0,72	0,84	0,25	-	1,81	1,35	1,10	0,58	-	3,03	-	0,04	-	-	0,04	-	-	0,04	-	0,04	2,06	1,98	0,89	-	4,93	-	-	-
b) Discontinuous Transport	0,12	0,17	0,13	-	0,42	2,57	2,57	1,19	0,12	6,45	0,34	0,38	0,17	0,04	0,93	-	-	-	-	-	2,04	3,12	1,47	0,16	7,79	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	2,61	1,31	1,06	0,04	5,02	1,43	1,01	0,17	-	2,61	0,04	-	-	-	0,04	-	-	-	-	-	4,09	2,32	1,22	0,04	7,67	-	-	-
a) while moving about the mine	0,24	0,08	0,04	0,04	0,40	0,13	0,04	0,04	-	0,21	-	-	-	-	-	-	-	-	-	-	0,34	0,13	0,08	0,04	0,59	-	-	-
b) in the course of other activities	2,37	1,23	1,02	-	4,62	1,31	0,97	0,12	-	2,40	0,04	-	-	-	0,04	-	-	-	-	-	3,75	2,19	1,14	-	7,08	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	5,48	2,91	1,31	0,08	9,78	4,42	2,70	0,55	-	7,67	0,34	0,04	0,04	-	0,42	-	-	-	-	-	10,24	5,65	1,90	0,08	17,87	-	-	-
a) Machines	2,62	1,35	1,06	0,04	5,06	1,56	1,31	0,17	-	3,04	0,08	-	-	-	0,08	-	-	-	-	-	4,26	2,66	1,23	0,04	8,19	-	-	-
b) Tools	2,78	1,48	0,21	0,04	4,51	2,74	1,39	0,30	-	4,43	0,26	0,04	0,04	-	0,34	-	-	-	-	-	5,77	2,91	0,55	0,04	9,27	-	-	-
c) Supports	0,08	0,08	0,04	-	0,21	0,12	-	0,08	-	0,20	-	-	-	-	-	-	-	-	-	-	0,21	0,08	0,12	-	0,41	-	-	-
V. FALLS OF OBJECTS	7,63	5,99	1,98	0,04	15,64	2,53	1,81	0,59	-	4,93	0,17	0,21	0,04	-	0,42	0,08	-	-	-	0,08	10,41	8,01	2,61	0,04	21,07	-	-	-
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	7,96	4,72	1,56	-	14,24	12,94	8,26	2,65	0,04	23,89	0,72	0,68	0,08	-	1,48	0,04	0,04	-	-	0,08	21,66	13,69	4,30	0,04	39,69	-	-	-
TOTAL	39,70	25,07	9,28	0,17	74,22	29,62	19,13	6,83	0,17	55,75	1,64	1,39	0,34	0,04	3,41	0,16	0,08	0,04	-	0,28	71,13	45,68	16,47	0,38	133,66	-	-	-

(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) Calender days.

MINES SAFETY 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 : Germany

COAL-FIELD : Saar

YEAR: 1972

MAN-HOURS WORKED *(1)*: 23 730 912

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	3	2	5	1	-	1	2	-	2	20	-	20	-	-	-				-	-	-	266	80	26	2	374
II. Eyes	-	-	-							-	-	-	5	-	5	1	-	1				1	-	1	88	12	7	-	107
III. Trunk	-	-	-	4	1	5	1	-	1	1	-	1	11	2	13	-	-	-				-	-	-	114	61	17	3	195
IV. Upper limbs (excluding the hands) *(3)*	1	-	1	7	-	7	2	-	2				22	-	22	-	-	-				-	-	-	231	76	32	-	339
V. Hands	8	-	8	35	-	35	3	-	3				92	-	92	-	-	-				-	-	-	507	452	138	-	1097
VI. Lower limbs (excluding feet) *(4)*	1	-	1	18	1	19	4	-	4				47	-	47	-	-	-				-	-	-	199	175	70	1	445
VII. Feet	2	-	2	12	-	12	-	-	-				62	-	62	-	-	-				-	-	-	194	159	76	-	429
VIII. Multiple locations	-	-	-	4	1	5	-	-	-	-	-	-	21	2	23	-	-	-				-	-	-	89	66	25	3	183
IX. Not specified																-	-	-	-	-	-	-	-	-	-	3	-	-	3
TOTAL	12	-	12	83	5	88	11	-	11	3	-	3	280	4	284	1	-	1	-	-	-	1	-	1	1688	1084	391	9	3172

(1) Number of houre 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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : Germany

COAL-FIELD : Saar

YEAR : 1972

MAN-HOURS WORKED *(1)* : 23 730 912

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	0,13	0,08	0,21	0,04	-	0,04	0,08	-	0,08	0,84	-	0,84	-	-	-				-	-	-	11,21	3,37	1,09	0,08	15,75
II. Eyes	-	-	-							-	-	-	0,21	-	0,21	0,04	-	0,04				0,04	-	0,04	3,71	0,51	0,29	-	4,91
III. Trunk	-	-	-	0,17	0,04	0,21	0,04	-	0,04	0,04	-	0,04	0,47	0,08	0,55	-	-	-				-	-	-	4,80	2,57	0,72	0,18	8,22
IV. Upper limbs (excluding the hands) *(3)*	0,04	-	0,04	0,30	-	0,30	0,08	-	0,08				0,93	-	0,93	-	-	-				-	-	-	9,73	3,20	1,35	-	14,28
V. Hands	0,34	-	0,34	1,47	-	1,47	0,13	-	0,13				3,88	-	3,88	-	-	-				-	-	-	21,36	19,05	5,82	-	46,23
VI. Lower limbs (excluding feet) *(4)*	0,04	-	0,04	0,76	0,04	0,80	0,17	-	0,17				1,98	-	1,98	-	-	-				-	-	-	8,39	7,37	2,95	0,04	18,75
VII. Feet	0,08	-	0,08	0,51	-	0,51	-	-	-				2,61	-	2,61	-	-	-				-	-	-	8,18	6,70	3,20	-	18,08
VIII. Multiple locations	-	-	-	0,17	0,04	0,21	-	-	-	-	-	-	0,89	0,08	0,97	-	-	-				-	-	-	3,75	2,78	1,05	0,13	7,71
IX. Not specified																-	-	-	-	-	-	-	-	-	-	0,13	-	-	0,13
TOTAL	0,51	-	0,51	3,50	0,21	3,71	0,46	-	0,46	0,12	-	0,12	11,80	0,17	11,97	0,04	-	0,04	-	-	-	0,04	-	0,04	71,13	45,68	16,47	0,38	133,66

(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 : Germany

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 224 314 521

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	3 761	2 048	632	16	6 457	2 069	879	298	6	3 252	35	23	8	-	66	13	9	2	-	24	5 878	2 959	940	22	9 799	-	-	-
II. TRANSPORT, TOTAL	61	90	43	4	198	451	493	304	22	1 270	68	82	54	8	212	6	2	4	1	13	586	667	405	35	1 693	-	-	-
a) Continuous Transport	48	60	28	3	139	171	120	68	1	360	5	5	3	-	13	3	1	2	-	6	227	186	101	4	518	-	-	-
b) Discontinuous Transport	13	30	15	1	59	280	373	236	21	910	63	77	51	8	199	3	1	2	1	7	359	481	304	31	1 175	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	950	664	182	6	1 802	3 332	2 013	517	4	5 866	289	239	62	4	594	123	73	19	-	215	4 694	2 989	780	14	8 477	-	-	-
a) while moving about the mine	46	28	7	1	82	491	251	95	1	838	39	28	8	2	77	4	1	2	-	7	580	308	112	4	1 004	-	-	-
b) in the course of other activities	904	636	175	5	1 720	2 841	1 762	422	3	5 028	250	211	54	2	517	119	72	17	-	208	4 114	2 681	668	10	7 473	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	1 259	848	226	6	2 339	598	336	76	1	1 011	53	20	7	-	80	33	15	1	-	49	1 943	1 219	310	7	3 479	-	-	-
a) Machines	126	74	50	2	252	63	67	23	1	154	3	-	1	-	4	-	-	-	-	-	192	141	74	3	410	-	-	-
b) Tools	346	202	40	1	589	531	267	51	-	849	50	20	6	-	76	33	15	1	6	49	960	504	98	1	1 563	-	-	-
c) Supports	787	572	136	3	1 498	4	2	2	-	8	-	-	-	-	-	-	-	-	-	-	791	574	138	3	1 506	-	-	-
V. FALLS OF OBJECTS	1 945	1 276	392	8	3 621	2 110	1 159	346	4	3 619	132	80	41	1	254	69	32	4	-	105	4 256	2 547	783	13	7 599	-	-	-
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	-	-	-	1	1	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	1	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	1	1	-	-	2	5	10	1	-	16	-	-	1	-	1	1	2	-	1	4	7	13	2	1	23	-	-	-
XII. OTHER CAUSES	304	181	71	3	559	657	324	125	4	1 110	66	43	17	-	126	21	8	3	2	34	1 048	556	216	9	1 829	-	-	-
TOTAL	8 282	5 108	1 546	43	14 979	9 224	5 214	1 667	41	16 146	643	487	190	13	1 333	266	141	33	5	445	18 415	10 950	3 436	102	32 903	-	-	-

(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) 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

(frequency rates)

Table 1b

COUNTRY : Germany

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 224 314 521

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	16,77	9,13	2,82	0,07	28,79	9,22	3,92	1,33	0,03	14,50	0,16	0,10	0,04	-	0,30	0,06	0,04	0,01	-	0,11	26,21	13,19	4,20	0,10	43,70	-	-	-
II. TRANSPORT, TOTAL	0,27	0,40	0,19	0,02	0,88	2,01	2,20	1,35	0,10	5,66	0,30	0,37	0,24	0,04	0,95	0,03	0,01	0,02	-	0,06	2,61	2,97	1,81	0,16	7,55	-	-	-
a) Continuous Transport	0,21	0,27	0,12	0,01	0,62	0,76	0,54	0,30	-	1,60	0,02	0,02	0,01	-	0,05	0,01	0,01	0,01	-	0,03	1,01	0,83	0,45	0,01	2,31	-	-	-
b) Discontinuous Transport	0,06	0,13	0,07	0,01	0,26	1,25	1,66	1,05	0,10	4,06	0,28	0,35	0,23	0,04	0,90	0,01	-	0,01	-	0,03	1,60	2,14	1,36	0,15	5,24	-	-	-
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	4,23	2,96	0,81	0,03	8,04	14,85	8,97	2,30	0,02	26,14	1,29	1,06	0,28	0,02	2,65	0,55	0,33	0,07	-	0,95	20,93	13,32	3,48	0,07	37,79	-	-	-
a) while moving about the mine	0,20	0,13	0,03	0,01	0,37	2,19	1,12	0,42	0,01	3,74	0,17	0,12	0,04	0,01	0,34	0,02	0,01	0,01	-	0,04	2,57	1,37	0,50	0,03	4,48	-	-	-
b) in the course of other activities	4,03	2,83	0,78	0,02	7,67	12,66	7,85	1,88	0,01	22,40	1,12	0,94	0,24	0,01	2,31	0,53	0,32	0,06	-	0,91	18,34	11,95	2,98	0,04	33,31	-	-	-
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	5,61	3,78	1,01	0,02	10,43	2,67	1,50	0,34	-	4,51	0,24	0,09	0,03	-	0,36	0,15	0,07	-	-	0,22	8,67	5,44	1,38	0,03	15,51	-	-	-
a) Machines	0,56	0,33	0,22	0,01	1,12	0,28	0,30	0,10	-	0,69	0,01	-	-	-	0,02	-	-	-	-	-	0,86	0,63	0,33	0,01	1,83	-	-	-
b) Tools	1,54	0,90	0,18	-	2,62	2,37	1,19	0,23	-	3,78	0,23	0,09	0,03	-	0,34	0,15	0,07	-	-	0,22	4,28	2,25	0,44	-	6,97	-	-	-
c) Supports	3,51	2,55	0,61	0,01	6,68	0,02	0,01	0,01	-	0,04	-	-	-	-	-	-	-	-	-	-	3,53	2,56	0,61	0,01	6,71	-	-	-
V. FALLS OF OBJECTS	8,67	5,69	1,75	0,04	16,15	9,41	5,17	1,54	0,02	16,13	0,59	0,36	0,18	-	1,13	0,31	0,14	0,02	-	0,47	18,97	11,36	3,49	0,06	33,88	-	-	-
VI. EXPLOSIVES	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
a) Outbursts of Gas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	0,01	-	-	-	0,01	-	-	-	-	-	-	-	-	-	-	0,01	-	-	-	0,01	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	0,01	-	-	-	0,01	0,02	0,04	0,01	-	0,07	-	-	-	-	-	-	0,01	-	-	0,02	0,03	0,06	0,01	-	0,10	-	-	-
XII. OTHER CAUSES	1,35	0,81	0,32	0,01	2,49	2,93	1,44	0,56	0,02	4,95	0,29	0,19	0,08	-	0,56	0,09	0,04	0,01	0,01	0,15	4,67	2,48	0,96	0,04	8,15	-	-	-
TOTAL	36,92	22,77	6,90	0,19	66,78	41,12	23,24	7,43	0,18	71,97	2,87	2,57	0,85	0,06	5,95	1,19	0,64	0,13	0,01	1,97	82,10	48,82	15,31	0,44	146,67	-	-	-

(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) Calender days.

MINES SAFETY 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 : Germany

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 224 314 521

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	83	33	116	1	-	1	17	3	20	74	6	80	-	-	-				-	-	-	2 541	651	175	42	3 409
II. Eyes	4	-	4							-	-	-	35	-	35	2	-	2				3	-	3	690	82	44	-	816
III. Trunk	-	-	-	112	8	120	3	-	3	6	10	16	65	4	69	2	-	2				-	-	-	1 182	725	188	22	2 117
IV. Upper limbs – (excluding the hands) *(3)*	2	-	2	190	1	191	14	-	14				89	-	89	-	-	-				-	-	-	2 513	754	295	1	3 563
V. Hands	74	-	74	740	-	740	48	-	48				368	-	368	3	-	3				-	-	-	6 122	5 082	1 233	-	12 437
VI. Lower limbs (excluding feet) *(4)*	6	-	6	297	1	298	68	-	68				249	1	250	1	-	1				2	-	2	2 416	1 581	623	2	4 622
VII. Feet	6	-	6	496	-	496	30	-	30				201	-	201	1	-	1				-	-	-	2 323	1 656	734	-	4 713
VIII. Multiple locations	-	2	2	61	23	84	2	-	2	6	1	7	73	2	75	1	-	1				-	-	-	619	414	143	28	1 204
IX. Not specified																-	1	1	-	1	1	1	5	6	9	5	1	7	22
TOTAL	92	2	94	1 979	66	2 045	166	-	166	29	14	43	1154	13	1 167	10	1	11	-	1	1	6	5	11	18 415	10 950	3 436	102	32 903

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : Germany

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 224 314 521

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	0,01	0,37	0,15	1,26	-	-	0,18	0,08	0,01	0,80	0,33	0,03	11,30	-	-	0,08				-	-	0,02	11,33	2,90	0,78	0,19	15,20
II. Eyes	0,02	-	0,04							-	-	0,04	0,16	-	2,80	0,01	-	0,29				0,01	-	0,03	3,08	0,37	0,19	-	3,65
III. Trunk	-	-	-	0,50	0,04	1,61	0,01	-	0,17	0,03	0,04	0,16	0,29	0,02	6,63	0,01	-	0,07				-	-	-	5,27	3,23	0,84	0,10	9,44
IV. Upper limbs (excluding the hands) *(3)*	0,01	-	0,02	0,85	-	1,26	0,06	-	0,42				0,40	-	12,72	-	-	0,09				-	-	0,01	11,20	3,36	1,31	-	15,88
V. Hands	0,33	-	0,93	3,30	-	14,13	0,21	-	1,17				1,64	-	34,78	0,01	-	0,13				-	-	0,02	27,29	22,66	5,50	-	55,44
VI. Lower limbs (excluding feet) *(4)*	0,03	-	0,03	1,32	-	1,68	0,30	-	1,56				1,11	-	15,58	-	-	0,06				0,01	-	0,03	10,77	7,05	2,78	-	20,59
VII. Feet	0,03	-	0,04	2,21	-	5,83	0,13	-	3,02				0,90	-	10,51	-	-	0,04				-	-	-	10,36	7,38	3,27	-	21,01
VIII. Multiple locations	-	0,01	0,01	0,27	0,10	0,61	0,01	-	0,08	0,03	-	0,09	0,33	0,01	3,80	-	-	0,08				-	-	-	2,76	1,85	0,64	0,13	5,37
IX. Not specified																-	-	0,02	-	-	0,04	-	0,02	0,03	0,04	0,02	-	0,02	0,08
TOTAL	0,42	0,01	1,08	0,82	0,29	26,38	0,72	-	6,60	0,14	0,05	1,09	5,16	0,06	98,12	0,03	-	0,86	-	-	0,04	0,02	0,02	0,14	82,10	48,82	15,31	0,44	146,67

(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: Belgium

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 38 220 664

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	2 997	526	145	2	3 670	998	143	29	-	1 170	27	5	-	-	32	176	17	3	1	197	4 198	691	177	3	5 069	-	-	-
II. TRANSPORT, TOTAL	286	90	27	2	405	272	92	37	4	405	42	5	4	1	52	315	93	38	-	446	915	280	106	7	1 308	-	-	-
a) Continuous Transport																												
b) Discontinuous Transport																												
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	301	74	7	-	382	399	75	17	-	491	53	3	3	1	60	310	48	23	-	381	1 063	200	50	1	1 314	-	-	-
a) while moving about the mine																												
b) in the course of other activities																												
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	1 415	278	39	-	1 732	574	120	18	-	712	44	4	3	-	51	201	38	4	-	243	2 234	440	64	-	2738	-	-	-
a) Machines	554	101	14	-	669	255	49	10	-	314	21	3	-	-	24	99	13	4	-	116	929	166	28	-	1123	-	-	-
b) Tools																												
c) Supports	861	177	25	-	1 063	319	71	8	-	398	23	1	3	-	27	102	25	-	-	127	1 305	274	36	-	1615	-	-	-
V. FALLS OF OBJECTS	604	138	20	-	762	424	108	16	-	548	51	9	3	1	64	410	56	18	-	484	1 489	311	57	1	1 858	-	-	-
VI. EXPLOSIVES	1	-	-	-	1	1	-	1	-	2	-	-	-	-	-	-	-	-	-	-	2	-	1	-	3	-	-	-
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	5	-	-	1	6	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	5	-	-	7	12	-	6	6
a) Outbursts of Gas	5	-	-	1	6	-	-	-	5	5	-	-	-	-	-	-	-	-	-	-	5	-	-	6	11	-	6	6
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	-	-	-	-	-	3	1	-	-	4	-	-	-	-	-	4	-	-	-	4	7	1	-	-	8	-	-	-
XII. OTHER CAUSES	137	19	1	-	157	82	19	3	1	105	10	-	-	-	10	100	16	3	-	119	329	54	7	1	391	-	-	-
TOTAL	5 746	1 125	239	5	7 115	2 753	558	121	11	3 443	227	26	13	3	269	1 516	268	89	1	1 874	10 242	1 977	462	20	12 701	-	6	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) 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

(frequency rates)

Table 1b

COUNTRY : Belgium

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 38 220 664

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	78,4	13,8	3,8	0,0	96,0	26,1	3,7	0,8	-	30,7	0,7	0,1	-	-	0,8	4,6	0,4	0,0	0,0	5,1	109,8	18,1	4,6	0,0	132,5	-	-	-
II. TRANSPORT, TOTAL	7,5	2,4	0,7	0,0	10,6	7,1	3,4	1,0	0,1	10,6	1,1	0,1	0,1	0,0	1,3	8,2	2,4	1,0	-	11,6	23,9	7,3	2,8	0,1	34,1	-	-	-
a) Continuous Transport																												
b) Discontinuous Transport																												
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	7,9	1,9	0,2	-	10,0	10,4	1,9	0,5	-	12,8	1,4	0,1	0,1	0,0	1,6	8,1	1,3	0,6	-	10,0	27,8	5,2	1,3	0,0	34,3	-	-	-
a) while moving about the mine																												
b) in the course of other activities																												
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	37,0	7,3	1,0	-	45,3	15,0	3,1	0,5	-	18,6	1,1	0,1	0,1	-	1,3	5,3	1,0	0,1	-	6,4	58,5	11,5	1,7	-	71,7	-	-	-
a) Machines	14,5	2,6	0,4	-	17,5	6,7	1,2	0,3	-	8,2	0,5	0,1	-	-	0,6	2,6	0,3	-	-	2,9	24,3	4,3	0,7	-	29,3	-	-	-
b) Tools																												
c) Supports	22,5	4,7	0,6	-	27,8	8,3	1,9	0,2	-	10,4	9,6	0,0	0,1	-	0,7	2,7	0,7	-	-	3,4	34,2	7,2	1,0	-	42,4	-	-	-
V. FALLS OF OBJECTS	15,8	3,6	0,5	-	19,9	11,1	2,8	0,4	-	14,3	1,3	0,2	0,1	0,0	1,6	10,7	1,5	0,5	-	12,7	38,9	8,1	1,5	0,0	48,5	-	-	-
VI. EXPLOSIVES	0,0	-	-	-	0,0	0,0	-	0,0	-	0,0	-	-	-	-	-	-	-	-	-	-	0,0	-	0,0	-	0,0	-	-	-
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	0,1	-	-	0,0	0,1	-	-	-	0,2	0,2	-	-	-	-	-	-	-	-	-	-	0,1	-	-	0,2	0,3	-	0,2	0,2
a) Outbursts of Gas	0,1	-	-	0,0	0,1	-	-	-	0,1	0,1	-	-	-	-	-	-	-	-	-	-	0,1	-	-	0,1	0,2	-	0,2	0,2
b) De-oxygenation and Poisoning by natural Gases	-	-	-	-	-	-	-	-	0,0	0,0	-	-	-	-	-	-	-	-	-	-	-	-	-	0,0	0,0	-	-	-
IX. HEATINGS OR FIRES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X. INRUSHES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XI. ELECTRICITY	-	-	-	-	-	0,1	0,0	-	-	0,1	-	-	-	-	-	0,1	-	-	-	0,1	0,1	0,0	-	-	0,2	-	-	-
XII. OTHER CAUSES	3,6	0,5	0,0	-	4,2	2,1	0,5	0,1	0,0	2,7	0,3	-	-	-	0,3	2,6	0,4	0,1	-	3,1	8,6	1,4	0,2	0,0	10,2	-	-	-
TOTAL	150,4	29,5	6,2	0,1	186,2	72,0	14,5	3,3	0,3	90,1	5,9	0,6	0,4	0,0	7,0	39,7	7,0	2,3	0,0	49,0	267,8	51,7	12,1	0,4	332,1	0,0	0,2	0,2

(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) Calender days.

MINES SAFETY 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 : Belgium

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 38 220 664

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	6	2	8	-	-	-	4	-	4	15	-	15	-	-	-				2	-	2			27	2	29
II. Eyes	1	-	1							-	-	-	2	-	2	-	-	-				-	-	-			3	-	3
III. Trunk	-	-	-	29	1	30	1	-	1	3	1	4	17	1	18	-	-	-				2	-	2			52	3	55
IV. Upper limbs (excluding the hands) *(3)*	-	-	-	33	-	33	4	1	5				20	-	20	-	-	-				3	-	3			60	1	61
V. Hands	11	-	11	92	-	92	4	-	4				69	-	69	1	-	1				6	-	6			183	-	183
VI. Lower limbs (excluding feet) *(4)*	1	1	2	54	1	55	4	-	4				66	-	66	-	-	-				9	-	9			134	2	136
VII. Feet	3	-	3	53	-	53	-	-	-				28	-	28	-	-	-				5	-	5			89	-	89
VIII. Multiple locations	-	-	-	-	2	2	-	-	-	2	1	3	3	1	4	-	-	-				1	-	1			6	4	10
IX. Not specified																-	-	-	-	8	8	-	-	-			2	8	10
TOTAL	16	1	17	267	6	273	13	1	14	9	2	11	222	2	224	1	-	1	-	8	8	28	-	28			556	20	576

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : Belgium

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 38 220 664

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	0,1	0,3	-	0,3	-	-	-				0,0	-	0,0			0,7	0,0	0,7
II. Eyes	0,0	-	0,0							-	-	-	0,0	-	0,0	-	-	-				-	-	-			0,0	-	0,0
III. Trunk	-	-	-	0,7	0,0	0,7	0,0	-	0,0	0,0	0,0	0,1	0,4	0,0	0,4	-	-	-				0,0	-	0,0			1,3	0,1	1,4
IV. Upper limbs (excluding the hands) *(3)*	-	-	-	0,8	-	0,8	0,1	0,0	0,1				0,4	-	0,4	-	-	-				0,0	-	0,0			1,6	0,0	1,6
V. Hands	0,2	-	0,2	2,4	-	2,4	0,1	-	0,1				1,8	-	1,8	0,0	-	0,0				0,1	-	0,1			4,7	-	4,7
VI. Lower limbs (excluding feet) *(4)*	0,0	0,0	0,0	1,4	0,0	1,4	0,1	-	0,1				1,7	-	1,7	-	-	1,7				0,2	-	0,2			3,5	0,0	3,6
VII. Feet	0,0	-	0,0	1,4	-	1,4	-	-	-				0,7	-	0,7	-	-	-				0,1	-	0,1			2,3	-	2,3
VIII. Multiple locations	-	-	-	-	0,0	0,0	-	-	-	0,0	0,0	0,0	0,0	0,0	0,1	-	-	-				0,0	-	0,0			0,2	0,1	0,3
IX. Not specified													0,0	-	0,0	-	-	-	-	0,2	0,2	-	-	-			0,0	0,2	0,3
TOTAL	0,3	0,0	0,4	6,9	0,1	7,0	0,3	0,0	0,3	0,2	0,0	0,2	5,8	0,0	5,8	0,0	-	0,0	-	0,2	0,2	0,7	-	0,7			14,5	0,5	15,0

(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) 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 : Nord

YEAR : 1972

MAN-HOURS WORKED *(1)* : 55 173 272

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	1193	409	120	4	1726	542	163	42	0	747	2	2	0	0	4	217	62	14	0	293	1954	636	176	4	2770	0	0	0
II. TRANSPORT, TOTAL	46	14	9	2	71	68	36	24	0	128	18	12	5	0	35	135	106	51	2	314	287	168	89	4	548	0	0	0
a) Continuous Transport	24	6	6	2	38	13	7	4	0	24	0	1	0	0	1	19	8	3	1	31	56	22	13	3	94	0	0	0
b) Discontinuous Transport	22	8	3	0	33	55	29	20	0	104	18	11	5	0	34	136	98	48	1	283	231	146	76	1	454	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	204	68	32	0	304	248	101	41	0	390	26	17	5	0	48	399	173	68	0	640	877	359	146	0	1382	0	0	0
a) while moving about the mine	163	55	26	0	244	201	78	32	0	311	22	10	4	0	36	332	138	51	0	521	718	281	113	0	1112	0	0	0
b) in the course of other activities	41	13	6	0	60	47	23	9	0	79	4	7	1	0	12	67	35	17	0	119	159	78	33	0	270	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	601	200	52	0	853	286	95	33	0	414	10	8	2	0	20	298	111	21	0	430	1195	414	108	0	1717	0	0	0
a) Machines	40	16	14	0	70	33	23	9	0	65	0	1	1	0	2	22	8	6	0	36	95	48	30	0	173	0	0	0
b) Tools	190	61	7	0	258	125	31	8	0	164	7	2	0	0	9	104	32	6	0	142	426	126	21	0	573	0	0	0
c) Supports	371	123	31	0	525	128	41	16	0	185	3	5	1	0	9	172	71	9	0	252	674	240	57	0	971	0	0	0
V. FALLS OF OBJECTS	906	378	112	0	1396	448	210	46	0	704	33	13	7	0	53	575	246	68	0	889	1962	847	233	0	3042	0	0	0
VI. EXPLOSIVES	2	0	0	0	2	9	0	0	0	9	0	0	0	0	0	1	0	0	0	1	12	0	0	0	12	0	0	0
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	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	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	4	1	0	0	5	0	0	0
XI. ELECTRICITY	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	4	0	0	0	4	4	2	0	0	6	0	0	0
XII. OTHER CAUSES	180	35	8	0	223	157	26	8	0	191	25	2	1	0	28	115	25	5	0	145	477	88	22	0	587	0	0	0
TOTAL	3135	1106	333	6	4580	1758	632	194	0	2584	114	54	20	0	188	1765	724	227	2	2718	6772	2516	774	8	10070	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) 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

(frequency rates)

Table 1b

COUNTRY : France

COAL-FIELD : Nord

YEAR : 1972

MAN-HOURS WORKED *(1)* : 55 173 272

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	21,62	7,41	2,17	0,07	31,28	9,82	2,95	0,76	0,00	13,54	0,04	0,04	0,00	0,00	0,07	3,93	1,12	0,25	0,00	5,31	35,42	11,53	3,19	0,07	50,21	0,00	0,00	0,00
II. TRANSPORT, TOTAL	0,83	0,25	0,16	0,04	1,29	1,23	0,65	0,43	0,00	2,32	0,33	0,22	0,09	0,00	0,63	2,81	1,92	0,92	0,04	5,69	5,20	3,04	1,61	0,07	9,93	0,00	0,00	0,00
a) Continuous Transport	0,43	0,11	0,11	0,04	0,69	0,24	0,13	0,07	0,00	0,43	0,00	0,02	0,00	0,00	0,02	0,34	0,14	0,05	0,02	0,56	1,01	0,40	0,24	0,05	1,70	0,00	0,00	0,00
b) Discontinuous Transport	0,40	0,14	0,05	0,00	0,60	1,00	0,53	0,36	0,00	1,88	0,33	0,20	0,09	0,00	0,62	2,46	1,78	0,87	0,02	5,13	4,19	2,65	1,38	0,02	8,23	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	3,70	1,23	0,58	0,00	5,51	4,49	1,83	0,74	0,00	7,07	0,47	0,31	0,09	0,00	0,87	7,23	3,14	1,23	0,00	11,60	15,90	6,51	2,65	0,00	25,05	0,00	0,00	0,00
a) while moving about the mine	2,95	1,00	0,47	0,00	4,42	3,64	1,41	0,58	0,00	5,64	0,40	0,18	0,07	0,00	0,65	6,02	2,50	0,92	0,00	9,44	13,01	5,09	2,05	0,00	20,15	0,00	0,00	0,00
b) in the course of other activities	0,74	0,24	0,11	0,00	1,09	0,85	0,42	0,16	0,00	1,43	0,07	0,13	0,02	0,00	0,22	1,21	0,63	0,31	0,00	2,16	2,88	1,41	0,60	0,00	4,89	0,00	0,00	0,00
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	10,89	3,62	0,94	0,00	15,46	5,18	1,72	0,60	0,00	7,50	0,18	0,14	0,04	0,00	0,36	5,40	2,01	0,38	0,00	7,79	21,66	7,50	1,96	0,00	31,12	0,00	0,00	0,00
a) Machines	0,72	0,29	0,25	0,00	1,27	0,60	0,42	0,16	0,00	1,18	0,00	0,02	0,02	0,00	0,04	0,40	0,14	0,11	0,00	0,65	1,72	0,87	0,54	0,00	3,14	0,00	0,00	0,00
b) Tools	3,44	1,11	0,13	0,00	4,68	2,27	0,56	0,14	0,00	2,97	0,13	0,04	0,00	0,00	0,16	1,88	0,58	0,11	0,00	2,57	7,72	2,28	0,38	0,00	10,39	0,00	0,00	0,00
c) Supports	6,72	2,23	0,56	0,00	9,52	2,32	0,74	0,29	0,00	3,35	0,05	0,09	0,02	0,00	0,16	3,12	1,29	0,16	0,00	4,57	12,22	4,35	1,03	0,00	17,60	0,00	0,00	0,00
V. FALLS OF OBJECTS	16,42	6,85	2,03	0,00	25,30	8,12	3,81	0,83	0,00	12,76	0,60	0,24	0,13	0,00	0,96	10,42	4,46	1,23	0,00	16,11	35,56	15,35	4,22	0,00	55,14	0,00	0,00	0,00
VI. EXPLOSIVES	0,04	0,00	0,00	0,00	0,04	0,16	0,00	0,00	0,00	0,16	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,02	0,22	0,00	0,00	0,00	0,22	0,00	0,00	0,00
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0,00	0,02	0,00	0,00	0,02	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	0,02	0,00	0,00	0,02	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	0,05	0,00	0,00	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,02	0,00	0,00	0,04	0,07	0,02	0,00	0,00	0,09	0,00	0,00	0,00
XI. ELECTRICITY	0,00	0,02	0,00	0,00	0,02	0,00	0,02	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,07	0,00	0,00	0,00	0,07	0,07	0,04	0,00	0,00	0,11	0,00	0,00	0,00
XII. OTHER CAUSES	3,26	0,63	0,14	0,00	4,04	2,85	0,47	0,14	0,00	3,46	0,45	0,04	0,02	0,00	0,51	2,08	0,45	0,09	0,00	2,63	8,65	1,59	0,40	0,00	10,64	0,00	0,00	0,00
TOTAL	56,82	20,05	6,04	0,11	83,01	31,86	11,45	3,52	0,00	46,83	2,07	0,98	0,36	0,00	3,41	31,99	13,12	4,11	0,04	49,26	122,74	45,60	14,03	0,14	182,52	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) Calender days.

MINES SAFETY 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 : France

COAL-FIELD : Nord

YEAR : 1972

MAN-HOURS WORKED *(1)* : 55 173 272

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	9	3	12	0	0	0	0	0	0	18	0	18	0	0	0				3	1	4	473	78	30	4	585
II. Eyes	0	0	0							1	0	1	13	0	13	0	0	0				0	0	0	579	40	14	0	633
III. Trunk	0	0	0	36	1	37	14	0	14	3	1	4	14	0	14	0	0	0				6	0	6	820	335	73	2	1230
IV. Upper limbs (excluding the hands) *(3)*	0	0	0	48	0	48	5	0	5				33	0	33	0	0	0				3	0	3	873	190	89	0	1152
V. Hands	21	0	21	130	0	130	2	0	2				68	0	68	0	0	0				8	0	8	2288	1081	229	0	3598
VI. Lower limbs (excluding feet) *(4)*	4	0	4	81	0	81	17	0	17				90	0	90	0	0	0				27	0	27	972	402	219	0	1593
VII. Feet	4	0	4	44	0	44	2	0	2				15	0	15	0	0	0				0	0	0	510	281	65	0	856
VIII. Multiple locations	0	0	0	8	0	8	0	0	0	0	0	0	4	0	4	0	0	0				8	0	8	89	25	20	0	134
IX. Not specified	0	0	0	23	0	23	1	0	1	0	1	1	6	0	6	0	0	0	0	0	0	5	1	6	168	84	35	2	289
TOTAL	29	0	29	379	4	383	41	0	41	4	2	6	261	0	261	0	0	0	0	0	0	60	2	62	6772	2516	774	8	10070

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : France

COAL-FIELD : Nord

YEAR : 1972

MAN-HOURS WORKED *(1)* : 55 173 272

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	> 55 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	0,16	0,05	0,22	0,00	0,00	0,00	0,00	0,00	0,00	0,33	0,00	0,33	0,00	0,00	0,00				0,05	0,02	0,07	8,57	1,41	0,54	0,07	10,60
II. Eyes	0,00	0,00	0,00							0,02	0,00	0,02	0,24	0,00	0,24	0,00	0,00	0,00				0,00	0,00	0,00	10,49	0,72	0,25	0,00	11,47
III. Trunk	0,00	0,00	0,00	0,65	0,02	0,67	0,25	0,00	0,25	0,05	0,02	0,07	0,25	0,00	0,25	0,00	0,00	0,00				0,11	0,00	0,11	14,86	6,07	1,32	0,04	22,29
IV. Upper limbs (excluding the hands) *(3)*	0,00	0,00	0,00	0,87	0,00	0,87	0,09	0,00	0,09				0,60	0,00	0,60	0,00	0,00	0,00				0,05	0,00	0,05	15,82	3,44	1,61	0,00	20,38
V. Hands	0,38	0,00	0,38	2,36	0,00	2,36	0,04	0,00	0,04				1,23	0,00	1,23	0,00	0,00	0,00				0,14	0,00	0,14	41,47	19,59	4,15	0,00	65,21
VI. Lower limbs (excluding feet) *(4)*	0,07	0,00	0,07	1,47	0,00	1,47	0,31	0,00	0,31				1,63	0,00	1,63	0,00	0,00	0,00				0,49	0,00	0,49	17,62	7,29	3,97	0,00	28,87
VII. Feet	0,07	0,00	0,07	0,80	0,00	0,80	0,04	0,00	0,04				0,27	0,00	0,27	0,00	0,00	0,00				0,00	0,00	0,00	9,24	5,09	1,18	0,00	15,51
VIII. Multiple locations	0,00	0,00	0,00	0,14	0,00	0,14	0,00	0,00	0,00	0,00	0,00	0,00	0,07	0,00	0,07	0,00	0,00	0,00				0,14	0,00	0,14	1,61	0,45	0,36	0,00	2,43
IX. Not specified	0,00	0,00	0,00	0,42	0,00	0,42	0,02	0,00	0,02	0,00	0,02	0,02	0,11	0,00	0,11	0,00	0,00	0,00	0,00	0,00	0,00	0,09	0,02	0,11	3,04	1,52	0,63	0,04	5,24
TOTAL	0,53	0,00	0,53	6,87	0,07	6,94	0,74	0,00	0,74	0,07	0,04	0,11	4,73	0,00	4,73	0,00	0,00	0,00	0,00	0,00	0,00	1,09	0,04	1,12	122,74	45,60	14,03	0,14	182,52

(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 : Lorraine

YEAR : 1972

MAN-HOURS WORKED *(1)* : 22 792 368

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	400	310	94	2	806	95	59	24	0	178	0	0	0	0	0	8	3	1	0	12	503	372	119	2	996	0	0	0
II. TRANSPORT, TOTAL	33	39	19	0	91	6	10	4	0	20	2	2	9	2	15	30	42	22	2	96	71	93	54	4	222	0	0	0
a) Continuous Transport	22	23	17	0	62	3	3	2	0	8	0	0	0	0	0	7	6	5	1	19	32	32	24	1	89	0	0	0
b) Discontinuous Transport	11	16	2	0	29	3	7	2	0	12	2	2	9	2	15	23	36	17	1	77	39	61	30	3	133	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	531	415	86	1	1033	94	82	28	0	204	9	14	4	0	27	234	197	60	0	491	868	708	178	1	1755	0	0	0
a) while moving about the mine	485	359	72	1	917	83	74	23	0	180	8	11	3	0	22	208	166	49	0	423	784	610	147	1	1542	0	0	0
b) in the course of other activities	46	56	14	0	116	11	8	5	0	24	1	3	1	0	5	26	31	11	0	68	84	98	31	0	213	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	225	100	24	0	349	70	33	3	0	106	2	0	1	0	3	37	27	10	0	74	334	160	38	0	532	0	0	0
a) Machines	32	36	8	0	76	23	7	1	0	31	2	0	0	0	2	5	8	1	0	14	62	51	10	0	123	0	0	0
b) Tools	181	54	15	0	250	45	25	2	0	72	0	0	1	0	1	32	17	9	0	58	258	96	27	0	381	0	0	0
c) Supports	12	10	1	0	23	2	1	0	0	3	0	0	0	0	0	0	2	0	0	2	14	13	1	0	28	0	0	0
V. FALLS OF OBJECTS	237	167	54	0	458	41	28	7	0	76	3	5	1	0	9	82	73	38	0	193	363	273	100	0	736	0	0	0
VI. EXPLOSIVES	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	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	1	2	0	0	3	1	2	0	0	3	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	1	0	0	0	1	1	0	0	0	1	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	1	0	0	0	1	1	0	0	0	1	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	1	1	0	0	0	1	1	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	0	0	0	0	0	0	0	0	0	0	0	0
XII. OTHER CAUSES	23	9	2	0	34	9	2	1	0	12	3	0	0	0	3	15	10	0	0	25	50	21	3	0	74	0	0	0
TOTAL	1449	1040	279	3	2771	315	214	69	0	598	19	21	15	2	57	408	354	131	3	896	2191	1629	494	8	4322	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) 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

(frequency rates)

Table 1b

COUNTRY: France

COAL-FIELD . Lorraine

YEAR: 1972

MAN-HOURS WORKED *(1)*: 22 792 368

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	17,55	13,60	4,12	0,09	35,36	4,17	2,59	1,05	0,00	7,81	0,00	0,00	0,00	0,00	0,00	0,35	0,13	0,04	0,00	0,53	22,07	16,32	5,22	0,09	43,70	0,00	0,00	0,00
II. TRANSPORT, TOTAL	1,45	1,71	0,83	0,00	3,99	0,26	0,44	0,18	0,00	0,88	0,09	0,09	0,39	0,09	0,66	1,32	1,84	0,97	0,09	4,21	3,12	4,08	2,37	0,18	9,74	0,00	0,00	0,00
a) Continuous Transport	0,97	1,01	0,75	0,00	2,72	0,13	0,13	0,09	0,00	0,35	0,00	0,00	0,00	0,00	0,00	0,31	0,26	0,22	0,04	0,83	1,40	1,40	1,05	0,04	3,90	0,00	0,00	0,00
b) Discontinuous Transport	0,48	0,70	0,09	0,00	1,27	0,13	0,31	0,09	0,00	0,53	0,09	0,09	0,39	0,09	0,66	1,01	1,58	0,75	0,04	3,38	1,71	2,68	1,32	0,13	5,84	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	23,30	18,21	3,77	0,04	45,32	4,12	3,60	1,23	0,00	8,95	0,39	0,61	0,18	0,00	1,18	10,27	8,64	2,63	0,00	21,54	38,08	31,06	7,81	0,04	77,00	0,00	0,00	0,00
a) while moving about the mine	21,28	15,75	3,16	0,04	40,23	3,64	3,25	1,01	0,00	7,90	0,35	0,48	0,13	0,00	0,97	9,13	7,28	2,15	0,00	18,56	34,40	26,76	6,45	0,04	67,65	0,00	0,00	0,00
b) in the course of other activities	2,02	2,46	0,61	0,00	5,09	0,48	0,35	0,22	0,00	1,05	0,04	0,13	0,04	0,00	0,22	1,14	1,36	0,48	0,00	2,98	3,69	4,30	1,36	0,00	9,35	0,00	0,00	0,00
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	9,87	4,39	1,05	0,00	15,31	3,07	1,45	0,13	0,00	4,65	0,09	0,00	0,04	0,00	0,13	1,62	1,18	0,44	0,00	3,25	14,65	7,02	1,67	0,00	23,34	0,00	0,00	0,00
a) Machines	1,40	1,58	0,35	0,00	3,33	1,01	0,31	0,04	0,00	1,36	0,09	0,00	0,00	0,00	0,09	0,22	0,35	0,04	0,00	0,61	2,72	2,24	0,44	0,00	5,40	0,00	0,00	0,00
b) Tools	7,94	2,37	0,66	0,00	10,97	1,97	1,10	0,09	0,00	3,16	0,00	0,00	0,04	0,00	0,04	1,40	0,75	0,39	0,00	2,54	11,32	4,21	1,18	0,00	16,72	0,00	0,00	0,00
c) Supports	0,53	0,44	0,04	0,00	1,01	0,09	0,04	0,00	0,00	0,13	0,00	0,00	0,00	0,00	0,00	0,00	0,09	0,00	0,00	0,09	0,61	0,57	0,04	0,00	1,23	0,00	0,00	0,00
V. FALLS OF OBJECTS	10,40	7,33	2,37	0,00	20,09	1,80	1,23	0,31	0,00	3,33	0,13	0,22	0,04	0,00	0,39	3,60	3,20	1,67	0,00	8,47	15,93	11,98	4,39	0,00	32,29	0,00	0,00	0,00
VI. EXPLOSIVES	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,09	0,00	0,09	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,09	0,00	0,09	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	0,04	0,09	0,00	0,00	0,13	0,04	0,09	0,00	0,00	0,13	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	0,04	0,00	0,00	0,00	0,04	0,04	0,00	0,00	0,00	0,04	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	0,04	0,00	0,00	0,00	0,04	0,04	0,00	0,00	0,00	0,04	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	0,04	0,04	0,00	0,00	0,00	0,04	0,04	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	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
XII. OTHER CAUSES	1,01	0,39	0,09	0,00	1,49	0,39	0,09	0,04	0,00	0,53	0,13	0,00	0,00	0,00	0,13	0,66	0,44	0,00	0,00	1,10	2,19	0,92	0,13	0,00	3,25	0,00	0,00	0,00
TOTAL	163,57	45,63	12,24	0,13	21,58	13,82	9,39	3,03	0,00	26,24	0,83	0,92	0,55	0,09	2,50	17,90	15,53	5,75	0,13	39,31	96,13	71,47	21,67	0,35	189,62	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) Calender days.

MINES SAFETY 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 : France

COAL-FIELD : Lorraine

YEAR : 1972

MAN-HOURS WORKED *(1)* : 22 792 368

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	0	3	0	0	0	3	0	3	27	1	28	0	0	0				6	1	7	240	131	39	2	412
II. Eyes	0	0	0							0	0	0	5	0	5	1	0	1				1	0	1	232	33	7	0	272
III. Trunk	0	0	0	16	1	17	15	0	15	0	0	0	19	0	19	0	0	0				4	1	5	328	302	54	2	686
IV. Upper limbs (excluding the hands) *(3)*	0	0	0	19	0	19	2	0	2				20	0	20	0	0	0				2	0	2	309	169	43	0	521
V. Hands	8	0	8	76	0	76	3	0	3				48	0	48	0	0	0				10	0	10	432	485	145	0	1062
VI. Lower limbs (excluding feet) *(4)*	0	0	0	54	0	54	17	0	17				41	0	41	0	0	0				12	0	12	366	276	124	0	766
VII. Feet	0	0	0	41	0	41	2	0	2				13	0	13	0	0	0				1	0	1	159	119	57	0	335
VIII. Multiple locations	0	0	0	7	1	8	0	0	0	0	1	1	16	0	16	0	0	0				1	1	2	98	101	24	3	226
IX. Not specified																0	0	0	0	1	1	1	0	1	27	13	1	1	42
TOTAL	8	0	8	216	2	218	39	0	39	3	1	4	189	1	190	1	0	1	0	1	1	38	3	41	2191	1629	494	8	4322

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : France

COAL-FIELD : Lorraine

YEAR : 1972

MAN-HOURS WORKED *(1)* : 22 792 368

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	> 55 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	0,13	0,00	0,13	0,00	0,00	0,00	0,13	0,00	0,13	1,18	0,04	1,23	0,00	0,00	0,00				0,26	0,04	0,31	10,53	5,75	1,71	0,09	18,08
II. Eyes	0,00	0,00	0,00							0,00	0,00	0,00	0,22	0,00	0,22	0,04	0,00	0,04				0,04	0,00	0,04	10,18	1,45	0,31	0,00	11,93
III. Trunk	0,00	0,00	0,00	0,70	0,04	0,75	0,66	0,00	0,66	0,00	0,00	0,00	0,83	0,00	0,83	0,00	0,00	0,00				0,18	0,04	0,22	14,39	13,25	2,37	0,09	30,10
IV. Upper limbs (excluding the hands) *(3)*	0,00	0,00	0,00	0,83	0,00	0,83	0,09	0,00	0,09				0,88	0,00	0,88	0,00	0,00	0,00				0,09	0,00	0,09	13,56	7,41	1,89	0,00	22,86
V. Hands	0,35	0,00	0,35	3,33	0,00	3,33	0,13	0,00	0,13				2,11	0,00	2,11	0,00	0,00	0,00				0,44	0,00	0,44	18,95	21,28	6,36	0,00	46,59
VI. Lower limbs (excluding feet) *(4)*	0,00	0,00	0,00	2,37	0,00	2,37	0,75	0,00	0,75				1,80	0,00	1,80	0,00	0,00	0,00				0,53	0,00	0,53	16,06	12,11	5,44	0,00	33,61
VII. Feet	0,00	0,00	0,00	1,80	0,00	1,80	0,09	0,00	0,09				0,57	0,00	0,57	0,00	0,00	0,00				0,04	0,00	0,04	6,98	5,22	2,50	0,00	14,70
VIII. Multiple locations	0,00	0,00	0,00	0,31	0,04	0,35	0,00	0,00	0,00	0,00	0,04	0,04	0,70	0,00	0,70	0,00	0,00	0,00				0,04	0,04	0,09	4,30	4,43	1,05	0,13	9,92
IX. Not specified																0,00	0,00	0,00	0,00	0,04	0,04	0,04	0,00	0,04	1,18	0,57	0,04	0,04	1,84
TOTAL	0,35	0,00	0,35	9,48	0,09	9,56	1,71	0,00	1,71	0,13	0,04	0,18	8,29	0,04	8,34	0,04	0,00	0,04	0,00	0,04	0,04	1,67	0,13	1,80	96,13	71,47	21,67	0,35	189,62

(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 : Centre-Midi

YEAR : 1972

MAN-HOURS WORKED *(1)* : 20 255 808

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	117	94	44	0	255	66	37	21	0	124	1	0	0	0	1	38	33	12	1	84	222	164	77	1	464	0	0	0
II. TRANSPORT, TOTAL	17	22	12	0	51	1	7	4	0	12	1	1	0	0	2	51	50	27	0	128	70	80	43	0	193	0	0	0
a) Continuous Transport	13	19	11	0	43	0	4	0	0	4	0	0	0	0	0	28	22	8	0	58	41	45	19	0	105	0	0	0
b) Discontinuous Transport	4	3	1	0	8	1	3	4	0	8	1	1	0	0	2	23	28	19	0	70	29	35	24	0	88	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	55	43	24	0	122	32	23	16	0	71	3	9	5	0	17	170	160	74	0	404	260	235	119	0	614	0	0	0
a) while moving about the mine	32	28	15	0	75	18	13	12	0	43	2	4	4	0	10	115	95	48	0	258	167	140	79	0	386	0	0	0
b) in the course of other activities	23	15	9	0	47	14	10	4	0	28	1	5	1	0	7	55	65	26	0	146	93	95	40	0	228	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	141	145	48	0	334	66	28	16	0	110	4	1	2	0	7	153	122	46	0	321	364	296	112	0	772	0	0	0
a) Machines	10	10	9	0	29	6	5	3	0	14	1	0	1	0	2	9	10	7	0	26	26	25	20	0	71	0	0	0
b) Tools	46	38	6	0	90	25	11	2	0	38	0	0	1	0	1	72	46	12	0	130	143	95	21	0	259	0	0	0
c) Supports	85	97	33	0	215	35	12	11	0	58	3	1	0	0	4	72	66	27	0	165	195	176	71	0	442	0	0	0
V. FALLS OF OBJECTS	123	121	51	0	295	62	45	15	0	122	12	11	8	0	31	207	194	80	0	481	404	371	154	0	929	0	0	0
VI. EXPLOSIVES	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	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	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	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	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0
IX. HEATINGS OR FIRES	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
X. INRUSHES	1	0	1	1	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	1	1	4	0	0	0
XI. ELECTRICITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	1	0	1	0	2	0	0	0
XII. OTHER CAUSES	40	11	11	0	62	15	4	3	0	22	0	1	0	0	1	48	10	1	3	64	103	26	17	3	149	0	0	0
TOTAL	495	436	191	1	1 123	244	144	75	0	463	21	23	15	0	59	669	570	243	4	1 486	1 429	1 173	524	5	3 131	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) 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

(frequency rates)

Table 1b

COUNTRY : France

COAL-FIELD : Centre-Midi

YEAR : 1972

MAN-HOURS WORKED *(1)* : 20 255 808

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	5,78	4,64	2,17	0,00	12,59	3,26	1,83	1,04	0,00	6,12	0,05	0,00	0,00	0,00	0,05	1,88	1,63	0,59	0,05	4,15	10,96	8,10	3,80	0,05	22,91	0,00	0,00	0,00
II. TRANSPORT, TOTAL	0,84	1,09	0,59	0,00	2,52	0,05	0,35	0,20	0,00	0,59	0,05	0,05	0,00	0,00	0,10	2,52	2,47	1,33	0,00	6,32	3,46	3,95	2,12	0,00	9,53	0,00	0,00	0,00
a) Continuous Transport	0,64	0,94	0,54	0,00	2,12	0,00	0,20	0,00	0,00	0,20	0,00	0,00	0,00	0,00	0,00	1,38	1,09	0,39	0,00	2,86	2,02	2,22	0,94	0,00	5,18	0,00	0,00	0,00
b) Discontinuous Transport	0,20	0,15	0,05	0,00	0,39	0,05	0,15	0,20	0,00	0,39	0,05	0,05	0,00	0,00	0,10	1,14	1,38	0,94	0,00	3,46	1,43	1,73	1,18	0,00	4,34	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	2,72	2,12	1,18	0,00	6,02	1,58	1,14	0,79	0,00	3,51	0,15	0,44	0,25	0,00	0,84	8,39	7,90	3,65	0,00	19,94	12,84	11,60	5,87	0,00	30,31	0,00	0,00	0,00
a) while moving about the mine	1,58	1,38	0,74	0,00	3,70	0,89	0,64	0,59	0,00	2,12	0,10	0,20	0,20	0,00	0,49	5,68	4,69	2,37	0,00	12,74	8,24	6,91	3,90	0,00	19,06	0,00	0,00	0,00
b) in the course of other activities	1,14	0,74	0,44	0,00	2,32	0,69	0,49	0,20	0,00	1,38	0,05	0,25	0,05	0,00	0,35	2,72	3,21	1,28	0,00	7,21	4,59	4,69	1,97	0,00	11,26	0,00	0,00	0,00
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	6,96	7,16	2,37	0,00	16,49	3,26	1,38	0,79	0,00	5,43	0,20	0,05	0,10	0,00	0,35	7,55	6,02	2,27	0,00	15,85	17,97	14,61	5,53	0,00	38,11	0,00	0,00	0,00
a) Machines	0,49	0,49	0,44	0,00	1,43	0,30	0,25	0,15	0,00	0,69	0,05	0,00	0,05	0,00	0,10	0,44	0,49	0,35	0,00	1,28	1,28	1,23	0,99	0,00	3,51	0,00	0,00	0,00
b) Tools	2,27	1,88	0,30	0,00	4,44	1,23	0,54	0,10	0,00	1,88	0,00	0,00	0,05	0,00	0,05	3,55	2,27	0,59	0,00	6,42	7,06	4,69	1,04	0,00	12,79	0,00	0,00	0,00
c) Supports	4,20	4,79	1,63	0,00	10,61	1,73	0,59	0,54	0,00	2,86	0,15	0,05	0,00	0,00	0,20	3,55	3,26	1,33	0,00	8,15	9,63	8,69	3,51	0,00	21,82	0,00	0,00	0,00
V. FALLS OF OBJECTS	6,07	5,97	2,52	0,00	14,56	3,06	2,22	0,74	0,00	6,02	0,59	0,54	0,39	0,00	1,53	10,22	9,58	3,95	0,00	23,75	19,94	18,32	7,60	0,00	45,86	0,00	0,00	0,00
VI. EXPLOSIVES	0,05	0,00	0,00	0,00	0,05	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	0,00	0,05	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	0,10	0,00	0,00	0,00	0,10	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,10	0,00	0,00	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	0,00	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	0,10	0,00	0,00	0,00	0,10	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,10	0,00	0,00	0,00	0,10	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	0,05	0,00	0,00	0,05	0,00	0,05	0,00	0,00	0,05	0,00	0,00	0,00
X. INRUSHES	0,05	0,00	0,05	0,05	0,15	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	0,00	0,05	0,10	0,00	0,05	0,05	0,20	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	0,05	0,00	0,05	0,00	0,10	0,05	0,00	0,05	0,00	0,10	0,00	0,00	0,00
XII. OTHER CAUSES	1,97	0,54	0,54	0,00	3,06	0,74	0,20	0,15	0,00	1,09	0,00	0,05	0,00	0,00	0,05	2,37	0,49	0,15	0,15	3,16	5,08	1,28	0,84	0,15	7,36	0,00	0,00	0,00
TOTAL	24,44	21,52	9,43	0,05	55,44	12,05	7,11	3,70	0,00	22,86	1,04	1,14	0,74	0,00	2,91	33,03	28,14	12,00	0,20	73,36	70,55	57,91	25,87	0,25	154,57	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) Calender days.

MINES SAFETY 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 : France

COAL-FIELD : Centre-Midi

YEAR : 1972

MAN-HOURS WORKED *(1)*: 20 255 808

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	4	0	4	0	0	0	1	0	1	7	0	7	0	0	0				0	1	1	132	33	12	1	178
II. Eyes	0	0	0							0	0	0	5	0	5	1	0	1				1	0	1	123	17	7	0	147
III. Trunk	0	0	0	17	0	17	47	0	47	9	1	10	33	0	33	0	0	0				2	0	2	254	223	108	1	586
IV. Upper limbs (excluding the hands) *(3)*	1	0	1	13	0	13	5	0	5				18	0	18	0	0	0				0	0	0	101	65	37	0	203
V. Hands	18	0	18	63	0	63	5	0	5				60	0	60	0	0	0				3	0	3	336	411	149	0	896
VI. Lower limbs (excluding feet) *(4)*	0	0	0	26	0	26	33	0	33				68	0	68	1	0	1				5	0	5	259	225	133	0	617
VII. Feet	3	0	3	23	0	23	5	0	5				19	0	19	0	0	0				0	0	0	139	120	50	0	309
VIII. Multiple locations	0	0	0	4	0	4	2	0	2	3	1	4	11	0	11	0	0	0				8	1	9	77	74	28	2	181
IX. Not specified																0	0	0	0	1	1	0	0	0	8	5	0	1	14
TOTAL	22	0	22	150	0	150	97	0	97	13	2	15	221	0	221	2	0	2	0	1	1	19	2	21	1 429	1 173	524	5	3 131

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY . France

COAL-FIELD : Centre-Midi

YEAR · 1972

MAN-HOURS WORKED *(1)* : 20 255 808

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	0,20	0,00	0,20	0,00	0,00	0,00	0,05	0,00	0,05	0,35	0,00	0,35	0,00	0,00	0,00				0,00	0,05	0,05	6,52	1,63	0,59	0,05	8,79
II. Eyes	0,00	0,00	0,00							0,00	0,00	0,00	0,25	0,00	0,25	0,05	0,00	0,05				0,05	0,00	0,05	6,07	0,84	0,35	0,00	7,26
III. Trunk	0,00	0,00	0,00	0,84	0,00	0,84	2,32	0,00	2,32	0,44	0,05	0,49	1,63	0,00	1,63	0,00	0,00	0,00				0,10	0,00	0,10	12,54	11,01	5,33	0,05	23,93
IV. Upper limbs (excluding the hands) *(3)*	0,05	0,00	0,05	0,64	0,00	0,64	0,25	0,00	0,25				0,89	0,00	0,89	0,00	0,00	0,00				0,00	0,00	0,00	4,99	3,21	1,83	0,00	10,02
V. Hands	0,89	0,00	0,89	3,11	0,00	3,11	0,25	0,00	0,25				2,96	0,00	2,96	0,00	0,00	0,00				0,15	0,00	0,15	16,59	20,29	7,36	0,00	44,23
VI. Lower limbs (excluding feet) *(4)*	0,00	0,00	0,00	1,28	0,00	1,28	1,63	0,00	1,63				3,36	0,00	3,36	0,05	0,00	0,05				0,25	0,00	0,25	12,79	11,11	6,57	0,00	30,46
VII. Feet	0,15	0,00	0,15	1,14	0,00	1,14	0,25	0,00	0,25				0,94	0,00	0,94	0,00	0,00	0,00				0,00	0,00	0,00	6,86	5,92	2,47	0,00	15,25
VIII. Multiple locations	0,00	0,00	0,00	0,20	0,00	0,20	0,10	0,00	0,10	0,15	0,05	0,20	0,54	0,00	0,54	0,00	0,00	0,00				0,39	0,05	0,44	3,80	3,65	1,38	0,10	8,94
IX. Not specified																0,00	0,00	0,00	0,00	0,05	0,05	0,00	0,00	0,00	0,39	0,25	0,00	0,05	0,69
TOTAL	1,09	0,00	1,09	7,41	0,00	7,41	4,79	0,00	4,79	0,64	0,10	0,74	10,91	0,00	10,91	0,10	0,00	0,10	0,00	0,05	0,05	0,94	0,10	1,04	70,55	57,91	25,87	0,25	154,57

(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 : 1972

MAN-HOURS WORKED *(1)* : 98 221 448

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	1 710	813	258	6	2 787	703	259	87	0	1 049	3	2	0	0	5	263	98	27	1	389	2 679	1 172	372	7	4 230	0	0	0
II. TRANSPORT, TOTAL	96	75	40	2	213	75	53	32	0	160	21	15	14	2	52	236	198	100	4	538	428	341	186	8	963	0	0	0
a) Continuous Transport	59	48	34	2	143	16	14	6	0	36	0	1	0	0	1	54	36	16	2	108	129	99	56	4	288	0	0	0
b) Discontinuous Transport	37	27	6	0	70	59	39	26	0	124	21	14	14	2	51	182	162	84	2	430	299	242	130	4	675	0	0	0
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	790	526	142	1	1 459	374	206	85	0	665	38	40	14	0	92	803	530	202	0	1 535	2 005	1 302	443	1	3 751	0	0	0
a) while moving about the mine	680	442	113	1	1 236	302	165	67	0	534	32	25	11	0	68	655	399	148	0	1 202	1 669	1 031	339	1	3 040	0	0	0
b) in the course of other activities	110	84	29	0	223	72	41	18	0	131	6	15	3	0	24	148	131	54	0	333	336	271	104	0	711	0	0	0
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	967	445	124	0	1 536	422	156	52	0	630	16	9	5	0	30	488	260	77	0	825	1 893	870	258	0	3 021	0	0	0
a) Machines	82	62	31	0	175	62	35	13	0	110	3	1	2	0	6	36	26	14	0	76	183	124	60	0	367	0	0	0
b) Tools	417	153	28	0	598	195	67	12	0	274	7	2	2	0	11	208	95	27	0	330	827	317	69	0	1 213	0	0	0
c) Supports	468	230	65	0	763	165	54	27	0	246	6	6	1	0	13	244	139	36	0	419	883	429	129	0	1 441	0	0	0
V. FALLS OF OBJECTS	1 266	666	217	0	2 149	551	283	68	0	902	48	29	16	0	93	864	513	186	0	1 563	2 729	1 491	487	0	4 707	0	0	0
VI. EXPLOSIVES	3	0	0	0	3	9	0	2	0	11	0	0	0	0	0	1	0	0	0	1	13	0	2	0	15	0	0	0
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	1	3	0	0	4	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	2	0	0	0	2	0	0	0	0	0	1	0	0	0	1	3	0	0	0	3	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	2	0	0	0	2	0	0	0	0	0	1	0	0	0	1	3	0	0	0	3	0	0	0
IX. HEATINGS OR FIRES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	1	0	1	2	0	0	0
X. INRUSHES	4	0	1	1	6	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	6	1	1	1	9	0	0	0
XI. ELECTRICITY	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	5	0	1	0	6	5	2	1	0	8	0	0	0
XII. OTHER CAUSES	243	55	21	0	319	181	32	12	0	225	28	3	1	0	32	178	45	8	3	234	630	135	42	3	810	0	0	0
TOTAL	5 079	2 582	803	10	8 474	2 317	990	338	0	3 645	154	98	50	2	304	2 842	1 648	601	9	5 100	10 392	5 318	1 792	21	17 523	0	0	0

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

(frequency rates)

Table 1b

COUNTRY : France

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 98 221 448

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	17,41	8,28	2,63	0,06	28,37	7,16	2,64	0,89	0,00	10,68	0,03	0,02	0,00	0,00	0,05	2,68	1,00	0,27	0,01	3,96	27,28	11,93	3,79	0,07	43,07	0,00	0,00	0,00
II. TRANSPORT, TOTAL	0,98	0,76	0,41	0,02	2,17	0,76	0,54	0,33	0,00	1,63	0,21	0,15	0,14	0,02	0,53	2,40	2,02	1,02	0,04	5,48	4,36	3,47	1,89	0,08	9,80	0,00	0,00	0,00
a) Continuous Transport	0,60	0,49	0,35	0,02	1,46	0,16	0,14	0,06	0,00	0,37	0,00	0,01	0,00	0,00	0,01	0,55	0,37	0,16	0,02	1,10	1,31	1,01	0,57	0,04	2,93	0,00	0,00	0,00
b) Discontinuous Transport	0,38	0,27	0,06	0,00	0,71	0,60	0,40	0,26	0,00	1,26	0,21	0,14	0,14	0,02	0,52	1,85	1,65	0,86	0,02	4,38	3,04	2,46	1,32	0,04	6,87	0,00	0,00	0,00
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	9,04	5,36	1,45	0,01	14,85	3,81	2,10	0,87	0,00	6,77	0,39	0,41	0,14	0,00	0,94	8,18	5,40	2,06	0,00	15,63	20,41	13,26	4,51	0,01	38,19	0,00	0,00	0,00
a) while moving about the mine	6,92	4,50	1,15	0,01	12,58	3,07	1,68	0,68	0,00	5,44	0,33	0,25	0,11	0,00	0,69	6,67	4,06	1,51	0,00	12,24	16,99	10,50	3,45	0,01	30,95	0,00	0,00	0,00
b) in the course of other activities	1,12	0,86	0,30	0,00	2,27	0,73	0,42	0,18	0,00	1,33	0,06	0,15	0,03	0,00	0,24	1,51	1,33	0,55	0,00	3,39	3,42	2,76	1,06	0,00	7,24	0,00	0,00	0,00
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	9,85	4,53	1,26	0,00	15,64	4,30	1,59	0,53	0,00	6,41	0,16	0,09	0,05	0,00	0,31	4,97	2,65	0,78	0,00	8,40	19,27	8,86	2,63	0,00	30,76	0,00	0,00	0,00
a) Machines	0,83	0,63	0,32	0,00	1,78	0,63	0,36	0,13	0,00	1,12	0,03	0,01	0,02	0,00	0,06	0,37	0,26	0,14	0,00	0,77	1,86	1,26	0,61	0,00	3,74	0,00	0,00	0,00
b) Tools	4,25	1,56	0,29	0,00	6,09	1,99	0,68	0,12	0,00	2,79	0,07	0,02	0,02	0,00	0,11	2,12	0,97	0,27	0,00	3,36	8,42	3,23	0,70	0,00	12,35	0,00	0,00	0,00
c) Supports	4,76	2,34	0,66	0,00	7,77	1,68	0,55	0,27	0,00	2,50	0,06	0,06	0,01	0,00	0,13	2,48	1,42	0,37	0,00	4,27	8,99	4,37	1,31	0,00	14,67	0,00	0,00	0,00
V. FALLS OF OBJECTS	12,89	6,78	2,21	0,00	21,88	5,61	2,88	0,69	0,00	9,18	0,49	0,30	0,16	0,00	0,95	8,80	5,22	1,89	0,00	15,91	27,78	15,18	4,96	0,00	47,92	0,00	0,00	0,00
VI. EXPLOSIVES	0,03	0,00	0,00	0,00	0,03	0,09	0,00	0,02	0,00	0,11	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,01	0,13	0,00	0,02	0,00	0,15	0,00	0,00	0,00
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,02	0,00	0,00	0,03	0,01	0,03	0,00	0,00	0,04	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	0,02	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,01	0,03	0,00	0,00	0,00	0,03	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	0,02	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,01	0,03	0,00	0,00	0,00	0,03	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	0,01	0,00	0,01	0,02	0,00	0,01	0,00	0,01	0,02	0,00	0,00	0,00
X. INRUSHES	0,04	0,00	0,01	0,01	0,06	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,01	0,00	0,00	0,03	0,06	0,01	0,01	0,01	0,09	0,00	0,00	0,00
XI. ELECTRICITY	0,00	0,01	0,00	0,00	0,01	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,01	0,00	0,06	0,05	0,02	0,01	0,00	0,08	0,00	0,00	0,00
XII. OTHER CAUSES	2,47	0,56	0,21	0,00	3,25	1,84	0,33	0,12	0,00	2,29	0,29	0,03	0,01	0,00	0,33	1,81	0,46	0,08	0,03	2,38	6,41	1,37	0,43	0,03	8,25	0,00	0,00	0,00
TOTAL	51,71	26,29	8,18	0,10	86,27	23,59	10,08	3,44	0,00	37,11	1,57	1,00	0,51	0,02	3,10	28,93	16,78	6,12	0,09	51,92	105,80	54,14	18,24	0,21	178,40	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) Calender days.

MINES SAFETY 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 : France

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 98 221 448

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	16	3	19	0	0	0	4	0	4	52	1	53	0	0	0				9	3	12	845	242	81	7	1 175
II. Eyes	0	0	0							1	0	1	23	0	23	2	0	2				2	0	2	934	90	28	0	1 052
III. Trunk	0	0	0	69	2	71	76	0	76	12	2	14	66	0	66	0	0	0				12	1	13	1 402	860	235	5	2 502
IV. Upper limbs (excluding the hands) *(3)*	1	0	1	80	0	80	12	0	12				71	0	71	0	0	0				5	0	5	1 283	424	169	0	1 876
V. Hands	47	0	47	269	0	269	10	0	10				176	0	176	0	0	0				21	0	21	3 056	1 977	523	0	5 556
VI. Lower limbs (excluding feet) *(4)*	4	0	4	161	0	161	67	0	67				199	0	199	1	0	1				44	0	44	1 597	903	476	0	2 976
VII. Feet	7	0	7	108	0	108	9	0	9				47	0	47	0	0	0				1	0	1	808	520	172	0	1 500
VIII. Multiple locations	0	0	0	19	1	20	2	0	2	3	2	5	31	0	31	0	0	0				17	2	19	264	200	72	5	541
IX. Not specified	0	0	0	23	0	23	1	0	1	0	1	1	6	0	6	0	0	0	0	2	2	6	1	7	203	102	36	4	345
TOTAL	59	0	59	745	6	751	177	0	177	20	5	25	671	1	672	3	0	3	0	2	2	117	7	124	10 392	5 318	1 792	21	17 523

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : France

COAL-FIELD : Total

YEAR : 1972

MAN-HOURS WORKED *(1)* : 98 221 448

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	0,16	0,03	0,19	0,00	0,00	0,00	0,04	0,00	0,04	0,53	0,01	0,54	0,00	0,00	0,00				0,09	0,03	0,12	8,60	2,46	0,82	0,07	11,96
II. Eyes	0,00	0,00	0,00							0,01	0,00	0,01	0,23	0,00	0,23	0,02	0,00	0,02				0,02	0,00	0,02	9,51	0,92	0,29	0,00	10,71
III. Trunk	0,00	0,00	0,00	0,70	0,02	0,72	0,77	0,00	0,77	0,12	0,02	0,14	0,67	0,00	0,67	0,00	0,00	0,00				0,12	0,01	0,13	14,27	8,76	2,39	0,05	25,47
IV. Upper limbs (excluding the hands) *(3)*	0,01	0,00	0,01	0,81	0,00	0,81	0,12	0,00	0,12				0,72	0,00	0,72	0,00	0,00	0,00				0,05	0,00	0,05	13,06	4,32	1,72	0,00	19,10
V. Hands	0,48	0,00	0,48	2,74	0,00	2,74	0,10	0,00	0,10				1,79	0,00	1,79	0,00	0,00	0,00				0,21	0,00	0,21	31,11	20,13	5,32	0,00	56,57
VI. Lower limbs (excluding feet) *(4)*	0,04	0,00	0,04	1,64	0,00	1,64	0,68	0,00	0,68				2,03	0,00	2,03	0,01	0,00	0,01				0,45	0,00	0,45	16,26	9,19	4,85	0,00	30,30
VII. Feet	0,07	0,00	0,07	1,10	0,00	1,10	0,09	0,00	0,09				0,48	0,00	0,48	0,00	0,00	0,00				0,01	0,00	0,01	8,23	5,29	1,75	0,00	15,27
VIII. Multiple locations	0,00	0,00	0,00	0,19	0,01	0,20	0,02	0,00	0,02	0,03	0,02	0,05	0,32	0,00	0,32	0,00	0,00	0,00				0,17	0,02	0,19	2,69	2,04	0,73	0,05	5,51
IX. Not specified	0,00	0,00	0,00	0,23	0,00	0,23	0,01	0,00	0,01	0	0,01	0,01	0,06	0	0,06	0,00	0,00	0,00	0,00	0,02	0,02	0,06	0,01	0,07	2,07	1,04	0,37	0,04	3,51
TOTAL	0,60	0,00	0,60	7,58	0,06	7,65	1,80	0,00	1,80	0,20	0,05	0,25	6,83	0,01	6,84	0,03	0,00	0,03	0,00	0,02	0,02	1,19	0,07	1,26	105,80	54,14	13,24	0,21	178,40

(1) Number of houre 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 : 1972

MAN-HOURS WORKED *(1)* : 909 633

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	35	9	1		45	24	5	1	2	32						-	1			1	59	15	2	2	78			
II. TRANSPORT, TOTAL	6				6	17	6			23						2	1			3	25	7			32			
a) Continuous Transport	5				5	7	3			10						2	1			3	14	4			18			
b) Discontinuous Transport	1				1	10	3			13											11	3			14			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	10	6			16	25	7			32						3	1			4	38	14			52			
a) while moving about the mine	5	4			9	11	4			15						2	1			3	18	9			27			
b) in the course of other activities	5	2			7	14	3			17						1				1	20	5			25			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	17	6			23	21	3			24						1				1	39	9			48			
a) Machines	4				4	4				4											8				8			
b) Tools	5	2			7	10				10						1				1	16	2			18			
c) Supports	8	4			12	7	3			10											15	7			22			
V. FALLS OF OBJECTS	8	1			9	6				6							1			1	14	2			16			
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	1				1	20	1			21						3	1			4	24	2			26			
TOTAL	77	22	1		100	113	22	1	2	138						9	5			14	199	49	2	2	252			

(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) 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

(frequency rates)

Table 1b

COUNTRY : Italy

COAL-FIELD : Sulcis

YEAR : 1972

MAN-HOURS WORKED *(1)*: 909 633

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	39	10	1		50	26	6	1	2	35							1			1	65	17	2	2	86			
II. TRANSPORT, TOTAL	7				7	19	6			25						2	1			3	28	7			35			
a) Continuous Transport	6				6	8	3			11						2	1			3	16	4			20			
b) Discontinuous Transport	1				1	11	3			14						-	-			-	12	3			15			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	12	6			18	27	9			36						3	1			4	42	16			58			
a) while moving about the mine	6	4			10	12	5			17						2	1			3	20	10			30			
b) in the course of other activities	6	2			8	15	4			19						1	-			1	22	6			28			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	18	7			25	23	3			26						2				2	43	10			53			
a) Machines	4				4	5				5											9				9			
b) Tools	6	2			8	10				10						2				2	18	2			20			
c) Supports	8	5			13	8	3			11											16	8			24			
V. FALLS OF OBJECTS	9	1			10	6				6							1			1	15	2			17			
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					-	23	-	-		23						3	2			5	26	2			28			
TOTAL	85	24	1		110	124	24	1	2	151						10	6			16	219	54	2	2	277			

(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) Calender days.

MINES SAFETY 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 : 1972

MAN-HOURS WORKED *(1)*: 909 633

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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																									13	2			15
II. Eyes																									24	-			24
III. Trunk																							1	1	13	6		1	20
IV. Upper limbs (excluding the hands) *(3)*																									21	1			22
V. Hands													1		1										57	21	1		79
VI. Lower limbs (excluding feet) *(4)*				1	-	1																			47	11	1		59
VII. Feet																									18	4			22
VIII. Multiple locations																							1	1	6	4	-	1	11
IX. Not specified																													
TOTAL				1	-	1							1		1								2	2	199	49	2	2	252

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : Italy

COAL-FIELD : Sulcis

YEAR : 1972

MAN-HOURS WORKED *(1)* : 909 633

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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																									14	2	-	-	16
II. Eyes																									26	-	-	-	26
III. Trunk																							1		14	7	-	1	22
IV. Upper limbs (excluding the hands) *(3)*																									23	1	-	-	24
V. Hands													1												63	23	1	-	87
VI. Lower limbs (excluding feet) *(4)*				1																					52	12	1	-	65
VII. Feet																									20	5			25
VIII. Multiple locations																							1		7	4	-	1	12
IX. Not specified																													
TOTAL				1									1										2		219	54	2	2	277

(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 : Netherlands

COAL-FIELD : South-Limbourg

YEAR : 1972

MAN-HOURS WORKED *(1)* : 7 757 576

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	253	44	15	-	312	23	6	1	-	30	-	-	-	-	-	60	10	-	-	70	336	60	16	-	412			
II. TRANSPORT, TOTAL	21	4	2	-	27	2	1	1	-	4	2	1	1	-	4	86	22	13	2	123	111	28	17	2	158			
a) Continuous Transport	12	3	2	-	17	1	1	1	-	3	1	-	-	-	1	38	8	2	1	49	52	12	5	1	70			
b) Discontinuous Transport	9	1	-	-	10	1	-	-	-	1	1	1	1	-	3	48	14	11	1	74	59	16	12	1	88			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	36	4	-	-	40	3	-	-	-	3	2	-	-	-	2	114	24	8	-	146	155	28	8	-	191			
a) while moving about the mine	4	-	-	-	4	-	-	-	-	-	1	-	-	-	1	37	8	3	-	48	42	8	3	-	53			
b) in the course of other activities	32	4	-	-	36	3	-	-	-	3	1	-	-	-	1	77	16	5	-	98	113	20	5	-	138			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	156	53	12	-	221	12	4	-	-	16	1	-	-	-	1	49	10	2	-	61	218	67	14	-	299			
a) Machines	11	3	1	-	15	1	-	-	-	1	-	-	-	-	-	10	1	-	-	11	22	4	1	-	27			
b) Tools	32	10	2	-	44	9	2	-	-	11	1	-	-	-	1	26	6	1	-	33	68	18	3	-	89			
c) Supports	113	40	9	-	162	2	2	-	-	4	-	-	-	-	-	13	3	1	-	17	128	45	10	-	183			
V. FALLS OF OBJECTS	102	15	2	-	119	10	1	-	-	11	-	-	-	-	-	87	24	10	-	121	199	40	12	-	251			
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	33	2	1	-	36	8	-	-	-	8	8	-	1	-	9	60	12	2	-	74	109	14	4	-	127			
TOTAL	601	122	32	-	755	58	12	2	-	72	13	1	2	-	16	456	102	35	2	595	1 128	237	71	2	1 438			

(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) 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

(frequency rates)

Table 1b

COUNTRY : Netherlands

COAL-FIELD : South-Limbourg

YEAR : 1972

MAN-HOURS WORKED *(1)* : 7 757 576

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	32,613	5,672	1,934	-	40,219	2,964	0,773	0,129	-	3,867	-	-	-	-	-	7,734	1,289	-	-	9,023	43,312	7,735	2,062	-	53,109			
II. TRANSPORT, TOTAL	2,707	0,515	0,258	-	3,480	0,258	0,129	0,129	-	0,515	0,258	0,129	0,129	-	0,515	11,086	2,836	1,676	0,258	15,856	14,308	3,609	2,191	0,258	20,367			
a) Continuous Transport	1,547	0,387	0,258	-	2,191	0,129	0,129	0,129	-	0,387	0,129	-	-	-	0,129	4,898	1,031	0,258	0,129	6,316	6,703	1,547	0,644	0,129	9,023			
b) Discontinuous Transport	1,160	0,129	-	-	1,289	0,129	-	-	-	0,129	0,129	0,129	0,129	-	0,387	6,188	1,805	1,418	0,129	9,539	7,605	2,062	1,547	0,129	11,344			
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	4,641	0,515	-	-	5,156	0,387	-	-	-	0,387	0,258	-	-	-	0,258	14,695	3,093	1,031	-	18,820	19,980	3,609	1,031	-	24,621			
a) while moving about the mine	0,515	-	-	-	0,515	-	-	-	-	-	0,129	-	-	-	0,129	4,769	1,031	0,387	-	6,188	5,414	1,031	0,387	-	6,832			
b) in the course of other activities	4,125	0,515	-	-	4,641	0,387	-	-	-	0,387	0,129	-	-	-	0,129	9,926	2,062	0,644	-	12,632	14,566	2,578	0,644	-	17,789			
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	20,109	6,832	1,547	-	28,488	1,547	0,515	-	-	2,062	0,129	-	-	-	0,129	6,316	1,289	0,258	-	7,863	28,102	8,637	1,805	-	38,543			
a) Machines	1,418	0,387	0,129	-	1,934	0,129	-	-	-	0,129	-	-	-	-	-	1,289	0,129	-	-	1,418	2,836	0,516	0,129	-	3,480			
b) Tools	4,125	1,289	0,258	-	5,672	1,160	0,258	-	-	1,418	0,129	-	-	-	0,129	3,351	0,773	0,129	-	4,254	8,766	2,320	0,387	-	11,473			
c) Supports	14,566	5,156	1,160	-	20,882	0,258	0,258	-	-	0,515	-	-	-	-	-	1,676	0,387	0,129	-	2,191	16,500	5,801	1,289	-	23,590			
V. FALLS OF OBJECTS	13,148	1,934	0,258	-	15,340	1,209	0,129	-	-	1,418	-	-	-	-	-	11,215	3,094	1,289	-	15,598	25,653	5,156	1,547	-	32,356			
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	4,254	0,258	0,129	-	4,641	1,031	-	-	-	1,031	1,031	-	0,129	-	1,160	7,735	1,547	0,258	-	9,539	14,051	1,805	0,516	-	16,371			
TOTAL	77,472	15,726	4,125	-	97,324	7,476	1,547	0,258	-	9,281	1,676	0,129	0,258	-	2,062	58,781	13,148	4,512	0,258	76,699	145,406	30,551	9,152	0,258	185,367			

(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) Calender days.

MINES SAFETY 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 : Netherlands

COAL-FIELD : South-Limbourg

YEAR : 1972

MAN-HOURS WORKED *(1)* : 7 757 576

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-				-	-	-	114	12	-	1	127
II. Eyes	-	-	-							-	-	-	-	-	-	-	-	-				-	-	-	86	1	-	-	87
III. Trunk	-	-	-	-	-	-	-	-	-	-	1	1	2	-	2	-	-	-				1	-	1	42	6	3	1	52
IV. Upper limbs (excluding the hands) *(3)*	-	-	-	7	-	7	1	-	1				2	-	2	-	-	-				-	-	-	99	12	10	-	121
V. Hands	1	-	1	16	-	16	-	-	-				9	-	9	-	-	-				-	-	-	476	109	26	-	611
VI. Lower limbs (excluding feet) *(4)*	-	-	-	15	-	15	1	-	1				4	-	4	-	-	-				-	-	-	161	50	20	-	231
VII. Feet	-	-	-	10	-	10	-	-	-				-	-	-	-	-	-				-	-	-	132	46	10	-	188
VIII. Multiple locations	-	-	-	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-				-	-	-	18	1	2	-	21
IX. Not specified																-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	1	-	1	49	-	49	2	-	2	1	2	3	17	-	17	-	-	-	-	-	-	1	-	1	1 128	237	71	2	1 438

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : Netherlands

COAL-FIELD : South-Limbourg

YEAR : 1972

MAN-HOURS WORKED *(1)*: 7 757 576

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	-	-	-	-	-	-	-	0,129	0,129	-	-	-	-	-	-				-	-	-	14,695	1,547	-	0,129	16,371
II. Eyes	-	-	-							-	-	-	-	-	-	-	-	-				-	-	-	11,086	0,129	-	-	11,215
III. Trunk	-	-	-	-	-	-	-	-	-	-	0,129	0,129	0,258	-	0,258	-	-	-				0,129	-	0,129	5,414	0,773	0,387	0,129	6,703
IV. Upper limbs (excluding the hands) *(3)*	-	-	-	0,902	-	0,902	0,129	-	0,129				0,258	-	0,258	-	-	-				-	-	-	12,762	1,547	1,289	-	15,598
V. Hands	0,129	-	0,129	2,062	-	2,062	-	-	-				1,160	-	1,160	-	-	-				-	-	-	61,359	14,051	3,351	-	78,762
VI. Lower limbs (excluding feet) *(4)*	-	-	-	1,934	-	1,934	0,129	-	0,129				0,515	-	0,515	-	-	-				-	-	-	20,754	6,445	2,578	-	29,777
VII. Feet	-	-	-	1,289	-	1,289	-	-	-				-	-	-	-	-	-				-	-	-	17,016	5,930	1,289	-	24,234
VIII. Multiple locations	-	-	-	0,129	-	0,129	-	-	-	0,129	-	0,129	-	-	-	-	-	-				-	-	-	2,320	0,129	0,258	-	2,707
IX. Not specified																-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0,129	-	0,129	6,316	-	6,316	0,258	-	0,258	0,129	0,258	0,387	2,191	-	2,191	-	-	-	-	-	-	0,129	-	0,129	145,406	30,551	9,152	0,258	185,367

(1) Number of houre worked by pit staff and employees of contractor firms who belong to a miner's social insurance scheme.
(2) including complications.
(3) The shouldere 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 : COMUNITY

COAL-FIELD

YEAR : 1972

MAN-HOURS WORKED *(1)* : 369 423 842

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	8 756	3 440	1 051	24	13 271	3 817	1 292	416	8	5 533	65	30	8	-	103	512	135	32	2	681	13 150	4 897	1 507	34	19 588			
II. TRANSPORT, TOTAL	470	259	112	8	849	817	645	374	26	1 862	133	103	73	11	320	645	316	155	7	1 123	2 065	1 323	714	52	4 154			
a) Continuous Transport																												
b) Discontinuous Transport																												
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	2 087	1 274	331	7	3 699	4 133	2 301	619	4	7 057	382	282	79	5	748	1 353	676	252	-	2 281	7 955	4 533	1 281	16	13 785			
a) while moving about the mine																												
b) in the course of other activities																												
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	3 814	1 630	401	6	5 851	1 627	619	146	1	2 393	114	33	15	-	162	772	323	84	-	1 179	6 327	2 605	646	7	9 585			
a) Machines																												
b) Tools																												
c) Supports																												
V. FALLS OF OBJECTS	3 925	2 096	631	8	6 660	3 101	1 551	430	4	5 086	231	118	60	2	411	1 430	626	218	-	2 274	8 687	4 391	1 339	14	14 431			
VI. EXPLOSIVES	5	-	-	-	5	10	-	3	-	13	-	-	-	-	-	1	-	-	-	1	16	-	3	-	19			
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	2	-	-	3	1	3	-	-	4			
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	5	-	-	1	6	2	-	-	6	8	-	-	-	-	-	1	-	-	1	2	8	-	-	8	16	-	6	6
a) Outbursts of Gas																												
b) De-oxygenation and Poisoning by natural Gases																												
IX. HEATINGS OR FIRES	-	-	-	-	-	2	-	-	-	2	-	-	-	-	-	-	1	-	1	2	2	1	-	1	4			
X. INRUSHES	4	-	1	1	6	-	-	-	-	-	-	-	-	-	-	2	1	-	-	3	6	1	1	1	9			
XI. ELECTRICITY	1	2	-	-	3	8	12	1	-	21	-	-	1	-	1	10	2	1	1	14	19	16	3	1	39			
XII. OTHER CAUSES	718	257	94	3	1 072	948	376	140	5	1 469	112	46	19	-	177	362	82	16	5	465	2 140	761	269	13	3 183			
TOTAL	19 785	8 959	2 621	58	31 423	14 465	6 796	2 129	54	23 444	1 037	612	255	18	1 922	5 089	2 164	758	17	8 028	40 376	18 531	5 763	147	64 817		6	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) 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

(frequency rates)

Table 1b

COUNTRY : COMUNITY

YEAR : 1972

COAL-FIELD

MAN-HOURS WORKED *(1)* : 369 423 842

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		
Period of incapacity / CAUSES OF ACCIDENTS	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	23,70	9,31	2,85	0,065	35,93	10,33	3,50	1,13	0,020	14,99	0,176	0,081	0,020	-	0,279	1,39	0,365	0,087	0,005	1,84	35,60	13,26	4,08	0,092	53,03			
II. TRANSPORT, TOTAL	1,27	0,70	0,30	0,020	2,30	2,21	1,75	1,01	0,070	5,04	0,360	0,279	0,198	0,030	0,866	1,75	0,86	0,42	0,019	3,04	5,60	3,58	1,93	0,141	11,25			
a) Continuous Transport																												
b) Discontinuous Transport																												
III. FALLS AND MOVEMENT OF THE VICTIM, TOTAL	5,65	3,45	0,90	0,019	10,01	11,19	6,23	1,68	0,011	19,10	1,034	0,763	0,214	0,013	2,025	3,66	1,83	0,68	-	6,17	21,53	12,27	3,47	0,043	37,32			
a) while moving about the mine																												
b) in the course of other activities																												
IV. MACHINES, TOOLS AND SUPPORTS TOTAL	10,32	4,41	1,09	0,016	15,84	4,40	1,67	0,40	0,003	6,48	0,309	0,089	0,041	-	0,438	2,09	0,87	0,23	-	3,19	17,13	7,05	1,75	0,019	25,95			
a) Machines																												
b) Tools																												
c) Supports																												
V. FALLS OF OBJECTS	10,63	5,67	1,71	0,020	18,03	8,39	4,20	1,16	0,011	13,77	0,625	0,319	0,162	0,005	1,113	3,87	1,69	0,59	-	6,16	23,52	11,89	3,62	0,038	39,07			
VI. EXPLOSIVES	0,013	-	-	-	0,013	0,027	-	0,008	-	0,035	-	-	-	-	-	0,003	-	-	-	0,003	0,043	-	0,008	-	0,05			
VII. IGNITIONS OR EXPLOSIONS OF FIREDAMP AND COAL DUST	-	0,003	-	-	0,003	-	-	-	-	-	-	-	-	-	-	0,003	0,005	-	-	0,008	0,003	0,008	-	-	0,01			
VIII. OUTBURSTS OF GAS, DE-OXYGENATION, SUFFOCATION OR POISONING BY NATURAL GASES (CO_2, CH_4, CO, H_2S), TOTAL	0,013	-	-	0,003	0,016	0,005	-	-	0,016	0,020	-	-	-	-	-	0,003	-	-	0,003	0,005	0,022	-	-	0,022	0,04	-	0,016	0,016
a) Outbursts of Gas																												
b) De-oxygenation and Poisoning by natural Gases																												
IX. HEATINGS OR FIRES	-	-	-	-	-	0,005	-	-	-	0,005	-	-	-	-	-	-	0,003	-	0,003	0,005	0,005	0,003	-	0,003	0,01			
X. INRUSHES	0,011	-	0,003	0,003	0,016	-	-	-	-	-	-	-	-	-	-	0,005	0,003	-	-	0,008	0,016	0,003	0,003	0,003	0,02			
XI. ELECTRICITY	0,003	0,005	-	-	0,008	0,020	0,033	0,003	-	0,056	-	-	0,003	-	0,003	0,005	0,003	0,003	0,011	0,051	0,05	0,043	0,008	0,003	0,11			
XII. OTHER CAUSES	1,94	0,70	0,25	0,008	2,90	2,57	1,02	0,38	0,013	3,98	0,303	0,125	0,051	-	0,479	0,98	0,22	0,043	0,014	1,26	5,79	2,06	0,73	0,035	8,62			
TOTAL	53,56	24,25	7,10	0,157	85,06	39,16	18,40	5,76	0,146	63,47	2,81	1,66	0,69	0,049	5,20	13,78	5,86	2,05	0,046	21,73	109,31	50,17	15,60	0,399	175,48			

(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) Calender days.

MINES SAFETY 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 : COMUNITY

COAL-FIELD

YEAR : 1972

MAN-HOURS WORKED *(1)* : 369 423 842

NATURE OF THE INJURY	Amputations and enucleations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	105	38	143	1	-	1	25	4	29	141	7	148	-	-	-				11	3	14	3 513	907	283	52	4 755
II. Eyes	5	-	5							1	-	1	60	-	60	4	-	4				5	-	5	1 734	173	75	-	1 982
III. Trunk	-	-	-	210	11	221	80	-	80	21	14	35	150	5	155	2	-	2				15	2	17	2 639	1 597	478	32	4 746
IV. Upper limbs (excluding the hands) *(3)*	3	-	3	310	1	311	31	1	32				182	-	182	-	-	-				8	-	8	3 916	1 191	534	2	5 643
V. Hands	133	-	133	1 117	-	1 117	62	-	62				623	-	623	4	-	4				27	-	27	9 711	7 189	1 966	-	18 866
VI. Lower limbs (excluding feet) *(4)*	11	1	12	528	2	530	140	-	140				518	1	519	2	-	2				55	-	55	4 221	2 545	1 254	4	8 024
VII. Feet	16	-	16	667	-	667	39	-	39				276	-	276	1	-	1				6	-	6	3 281	2 226	1 005	-	6 512
VIII. Multiple locations	-	2	2	81	26	107	4	-	4	12	4	16	107	3	110	1	-	1				18	3	21	907	619	223	38	1 787
IX. Not specified				23	-	23	1	-	1	-	1	1	6	-	6	-	1	1	-	11	11	7	6	13	212	107	37	19	375
TOTAL	168	3	171	3 041	78	3 119	358	1	359	59	23	82	2 063	16	2 081	14	1	15	-	11	11	152	14	166	30 134	16 554	5 855	147	52 690

(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 VICTIMS ACCORDING TO LOCATION AND NATURE OF INJURY AND PERIOD OF INCAPACITY

(Frequency rates)

Table 2b

COUNTRY : COMUNITY

COAL-FIELD

YEAR : 1972

MAN-HOURS WORKED *(1)* : 369 423 842

NATURE OF THE INJURY	Amputations and enucléations 1			Fractures with or without dislocation 2			Luxations, twists and sprains 3			Concussion and internal injury 4			Open wounds contusions 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	-	-	-	0,29	0,103	0,39	0,003	-	0,003	0,068	0,011	0,079	0,382	0,019	0,401	-	-	-				0,030	0,008	0,038	9,52	2,46	0,77	0,141	12,89
II. Eyes	0,014	-	0,014							0,003	-	0,003	0,163	-	0,163	0,011	-	0,011				0,014	-	0,014	4,70	0,47	0,20	-	5,37
III. Trunk	-	-	-	0,57	0,030	0,60	0,22	-	0,22	0,057	0,038	0,035	0,407	0,014	0,420	0,005	-	0,005				0,041	0,005	0,046	7,15	4,33	1,30	0,087	12,86
IV. Upper limbs (excluding the hands) *(3)*	0,008	-	0,008	0,84	0,003	0,84	0,084	0,003	0,087				0,49	-	0,493	-	-	-				0,022	-	0,022	10,60	3,23	1,45	0,005	15,29
V. Hands	0,36	-	0,36	3,02	-	3,03	0,168	-	0,168				1,69	-	1,69	0,011	-	0,011				0,073	-	0,073	26,32	19,48	5,33	-	51,13
VI. Lower limbs (excluding feet) *(4)*	0,030	0,003	0,033	1,43	0,005	1,43	0,379	-	0,379				1,40	0,003	1,41	0,005	-	0,005				0,149	-	0,149	11,44	6,90	3,40	0,011	21,75
VII. Feet	0,043	-	0,043	1,81	-	1,81	0,106	-	0,106				0,75	-	0,75	0,003	-	0,003				0,016	-	0,016	8,89	6,03	2,72	-	17,65
VIII. Multiple locations	-	0,005	0,005	0,22	0,070	0,29	0,011	-	0,011	0,033	0,011	0,044	0,290	0,008	0,298	0,003	-	0,003				0,049	0,008	0,057	2,46	1,68	0,60	0,103	4,84
IX. Not specified				0,06	-	0,06	0,003	-	0,003	-	0,003	0,003	0,016	-	0,016	-	0,003	0,003	-	0,030	0,030	0,019	0,016	0,035	0,58	0,29	0,10	0,052	1,02
TOTAL	0,455	0,008	0,46	8,24	0,21	8,45	0,97	0,003	0,97	0,160	0,062	0,222	5,59	0,043	5,64	0,038	0,003	0,041	-	0,030	0,030	0,41	0,038	0,45	81,66	44,86	15,87	0,398	142,79

(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

DECISION *(1)*
OF 9 JULY, 1957
CONCERNING THE TERMS OF REFERENCE AND RULES OF PROCEDURE OF THE MINES SAFETY COMMISSION

(1) See "Journal officiel de la Communauté européenne du charbon et de l'acier" no. 28 of the 31st August 1957.

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.

ANNEX

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 Commununity,

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.

Annex III

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

(as at 31.12.1972)

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) and in particular to take note of the new technique of traction by linear motors.

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

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 Groupe 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 appropriate 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 neutralisation (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,

(b) 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 Medaets

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 dust control methods where 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 dustiness 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: Chairman Mr Van der Hooft

Terms of reference (suspended):

Number of hours worked in wet working points. Determining in what cases a working points is to be considered wet and the precautions to be taken.

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 Knuttel

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 showed 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 stabilization of ventilation and the means and procedures for monitoring ventilation.

Priority will be given to examination of the procedures for a possible raising, either local or general, of the maximum permissible firedamp level in ventilation air streams from 1 to 1,50 or 2%, and measures to be applied in this event to ensure at least equivalent safety.

X - Working Party on "Mechanization" - Chairman Mr Koch

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 controls" - Chairman Mr Hübner

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 context 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 measure 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;

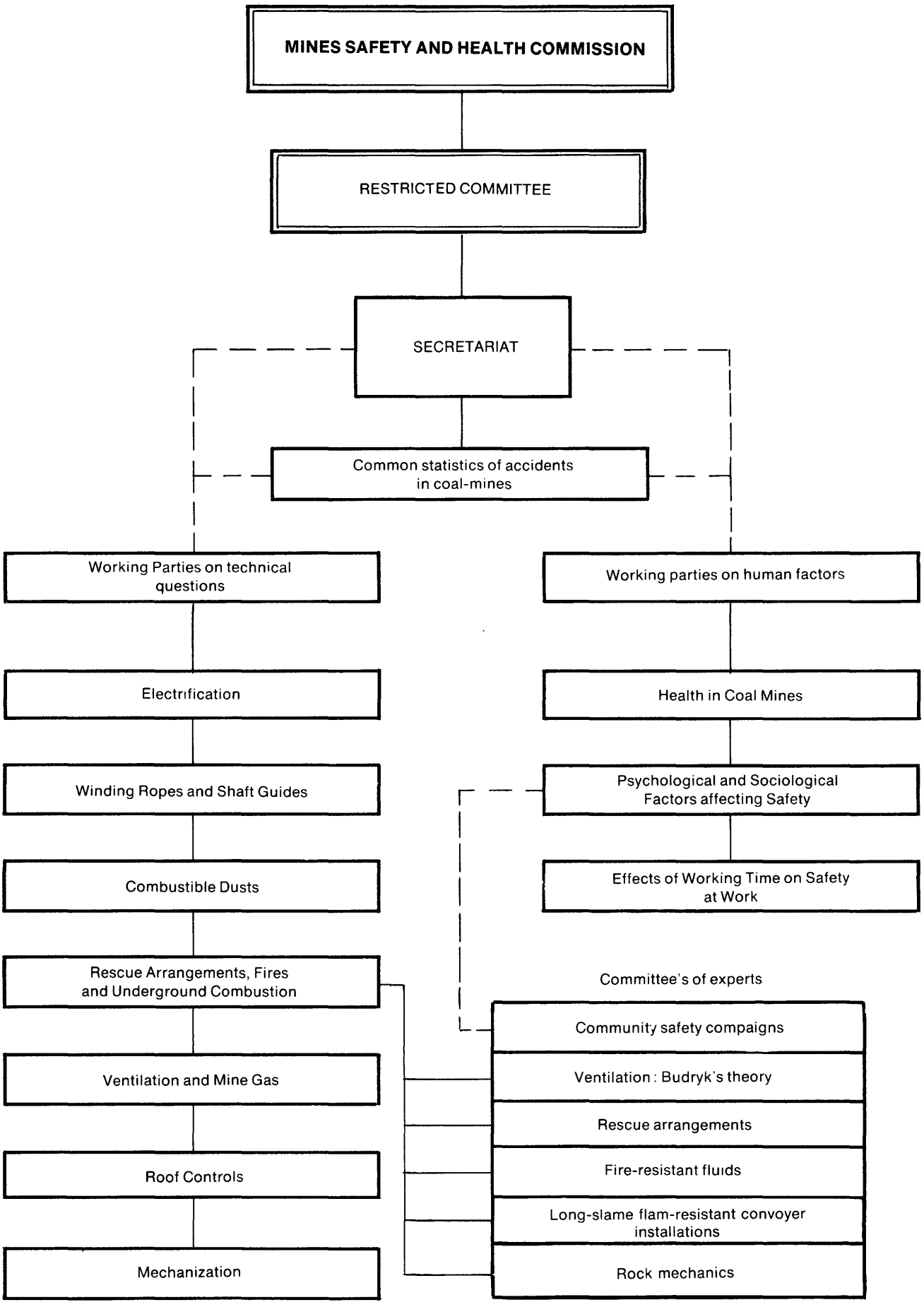
   (b) specific measures to deal with individual difficulties which may or may not foreseeably arise in the long term, such as disturbance zones, protective banks, working of a face at right-angles to the end of an old seam, etc.

   (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 linings and draw up minimum roof control requirements, taking into account the characteristics of the various faces (overall seam thickness, dip, dead rock ...).

ANNEXE IV

COMPOSITION OF THE MINES SAFETY AND HEALTH COMMISSION AND ITS WORKING PARTIES (AS AT 31.12.1972)


MINES SAFETY AND HEALTH COMMISSION
RESTRICTED COMMITTEE
SECRETARIAT
Common statistics of accidents in coal-mines
Working Parties on technical questions
Working parties on human factors
Electrification
Health in Coal Mines
Winding Ropes and Shaft Guides
Psychological and Sociological Factors affecting Safety
Combustible Dusts
Effects of Working Time on Safety at Work
Rescue Arrangements, Fires and Underground Combustion
Committee's of experts
Community safety compaigns
Ventilation and Mine Gas
Ventilation : Budryk's theory
Rescue arrangements
Roof Controls
Fire-resistant fluids
Long-slame flam-resistant convoyer installations
Mechanization
Rock mechanics

A - MINES SAFETY AND HEALTH COMMISSION

FEDERAL REPUBLIC OF GERMANY

Government Representatives

Ministerialrat W. SCHNASE, Referat III A 1, Bundesministerium für Wirtschaft und Finanzen, 53 Bonn

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

Employers' Representative

Bergrat a.D. H. ERNST, Geschäftsführer des Steinkohlenbergbauvereins, 43 Essen, Frillendorfer-Strasse 351

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

BELGIUM

Government Representatives

J. MEDAETS, Directeur général des mines, ministère des affaires économiques, rue Montoyer, 3 - B 1040 Bruxelles

J. STASSEN, Directeur divisionnaire des mines, ministère des affaires économiques, rue Montoyer, 3 - B 1040 Bruxelles

Employers' Representative

A. HAUSMAN, Directeur du Centre de coordination de sauvetage du bassin de campine, 555, Kempische Steenweg, Kiewit-Hasselt

Workers' Representative

J. OLYSIAEGERS, Secrétaire national de la Centrale syndicale des travailleurs des mines de Belgique, FGTB, Koolmijnlaan 1, Houthalen

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, 99, rue de Grenelle, 75-Paris 7e

M. YOLIN, Ingénieur des mines, arrondissement minéralogique de Douai, 941, rue Ch.-Bourseul - 59-Douai

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 Advisers

St. NOWAK, 4, rue Charcot, 62-Lens

ITALY

Government Representatives

Dott. A. VENTURELLA, Console d'Italia ad Esch/Alzette, Lussemburgo

Dott. ing. M. MARRA, ispettore generale delle miniere, ministero dell'industria e commercio, via Veneto 33, 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 Adviser

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

R. MAYER, Ingénieur des mines, Chef de service-adjoint à l'ARBED, 78, rue du Fossé, Esch-sur-Alzette

Workers' Representative

N. PASCOLINI, Président de la délégation ouvrière d'Arbed-Mines, 90, rue des Fleurs, Schifflange

NETHERLANDS

Government Representatives

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

Ir. D.J. KNUTTEL, plaatsvervangend inspecteur-generaal der jijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L.)

Employers' Representative

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

Workers' Representative

J.M. WEIJERS, Vice-voorzitter van de Nederlandse Katholieke Mijnwerkersbond, Seringenstraat 9, Passart-Zuid

Technical Adviser

H.L. GROND, chef van de veiligheidsdienst, p/a Oranje-Nassau Mijnen, Heerlen (L.)

UNITED KINGDOM

Government Representative

J.W. CALDER O.B.E., H.M., Chief Inspector of Mines and Quarries, Department of Trade and Industry, Thames House South, Millbank, London S.W.1

J.R. WILSON, Assistant Secretary, Department of Trade and Industry, Thames House South, Millbank, London S.W.1

Employers' Representative

Dr. H.L. WILLET, Deputy Director-General of Production, National Coal Board, Hobart House, Grosvenor Place, London S.W.1

Workers ' Representative

S. SCHOFIELD, Vice-President of the National Union of Mineworkers, c/o Miners' Offices Barnsley - Yorkshire

INTERNATIONAL LABOUR ORGANIZATION, GENEVA

Ein Vertreter des Internationalen Arbeitsamts als Beobachter - Un représentant du Bureau international du travail en qualité d'observateur

B - RESTRICTED COMMITTEE

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

C - WORKING PARTIES ON TECHNICAL QUENSTIONS

I. Working Party on Electrification

- Members of the Working Party

GERMANY

Oberbergamtsdirektor W. SCHÖTTELNDREIER, Landesoberbergamt Nordrhein-Westfalen, 46 Dortmund, Goebenstrasse 25

Dipl.-Ing. L. GEBHARDT, Steinkohlenbergbauverein, 43, Essen, Frillendorfer Strasse 351

BELGIUM

J. STASSEN *(1)*, Directeur divisionnaire des mines, ministère des affaires économiques, rue Montoyer, 3 - B 1040 Bruxelles

R. STENUIT, Directeur divisionnaire à l'administration des mines, 24-26, rue J.A.-Demot, Bruxelles 4

G.J.A. COOLS, Inspecteur général des mines honoraire, Eug. Plasky Laan 75, B-1040 Brussel

FRANCE

N. TRETIAKOW, Ingénieur en chef au service exploitation des Charbonnages de France, 9, avenue Percier, 75-Paris 8e

F. VIN, Ministère de l'industrie, service de l'hygiène et de la sécurité minière, 97, rue de Grenelle, 75-Paris 7e

ITALY

Dott. ing. C. MACCIONI, ENEL, compartimento Cagliari, sett. tecnico, Piazza Deffenu 2, Cagliari

---

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

LUXEMBOURG

R. MAYER, Ingénieur civil des mines, chef de service-adjoint à l'ARBED, 78, rue du Fossé, Esch-sur-Alzette

NETHERLANDS

Ir. E.A. R. HOEFNAGELS, inspecteur der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L.)

UNITED KINGDOM

S. LUXMORE, H.M. Principal Electrical Inspector of Mines and Quarries, Thames House South, Millbank, London S.W.1

R. HARTILL, Chief Electrical Engineer, National Coal Board, The Lodge, South Parade, Doncaster (Yorkshire)

- Experts on cables and leads

Dr. J. UELPENICH, Land- und Seekabelwerke, Niehler Strasse 100, 50 Köln-Nippes

H. GOBBE, Directeur à la division câblerie des ACEC, Charleroi

M. OSTY, Directeur technique à la Société industrielle de liaisons électriques, 64bis, rue de Monceau, 75-Paris 8e

M. PAINDAVOINE, Ingénieur au Cerchar, 60-Verneuil-en-Halatte

Y. EYRAUD, Chef du Laboratoire d'études générales des Câbles de Lyon, 170, avenue Jean-Jaurès, 69-Lyon

Ir. F. GOEDBLOED, Nederlandse Kabelfabriek, Delft

Ir. W.L. BAER, N.V. Hollandse Draad- en Kabelfabriek, Amsterdam

II. Working Party on Rescue Arrangements and on Fires and Underground Combustion

- Members of the Working Party

GERMANY

Dipl. Ing. A. COENDERS *(1)*, Präsident des Landesoberbergamts Nordrhien-Westfalen, 4600 Dortmund, Goebenstrasse 25

Dipl.-Ing. E. BREDENBRUCH, Leiter der Hauptstelle für das Grubenrettungswesen des Steinkohlenbergbauverins, 43 Essen-Kray, Schönscheidtstrasse 28

Dipl.-Ing. A. SCHEWE, Technischer Leiter der Hauptstelle für das Grubenrettungswesen des Steinkohlenbergbauvereins, 43 Essen-Kray, Schönscheidtstrasse 28

---

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

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

R. MUELLER, Dipl. Ing., Betriebsdirektor, Leiter der Hauptrettungsstelle in Friedrichsthal, 6605 Friedrichsthal

BELGIUM

J. MEDAETS, Directeur général des mines, Ministère des affaires économiques, administration des mines, 3, rue Montoyer, 1040-Bruxelles

J. STASSEN, Directeur divisionnaire des mines, Ministère des affaires économiques, administration des mines, 3, rue Montoyer, 1040-Bruxelles

R. STENUIT, Directeur divisionnaire à l'administration des mines, 3, rue Montoyer, 1040-Bruxelles

A. HAUSMANN, Directeur du Centre de coordination de sauvetage du bassin de Campine, Kempische Steenweg 555, Kiewitt-Hasselt

FRANCE

R. GRISARD, Ingénieur des mines, Chef du service "Sécurité des mines", Charbonnages de France, 9, avenue Percier, 75-Paris 8e

G. ROGEZ, Directeur du poste central de secours des Mines du Nord et du Pas-de-Calais, rue Notre-Dame-de-Lorette, 62-Lens

J. CRETIN, Ingénieur divisionnaire, poste central de secours, Belle-Roche, 57-Merlebach

H. BONARDOT, Ingénieur en chef, Houillères du bassin de la Loire, 9, rue Benoît-Charvet, 42-Saint-Etienne

LUXEMBOURG

R. MAYER, Ingénieur des mines, Chef de service-adjoint à l'ARBED, 28, rue du Fossé, Esch-sur-Alzette

ITALY

Dr. ing. B. ANEDDA, ispettore generale, Pal INA, 09016 Iglesias, Cagliari

Dott. ing. E. ORRU, direttore della miniera di Seruci, casella postale 117, 09013 Carbonia, Cagliari

P. PIZA, Prof. Ing., Titolare delle Cattedra di Arte Mineraria della Facoltà di Ingegneria di Roma, via Eusossiana - 00100 Roma

NETHERLANDS

Ir. D.J. KNUTTEL, plaatsvervangend inspecteur-generaal der mijnen, Staatstoezicht op de mijnen, Apollolaan 8, Heerlen (L.)

Prof. dr. W. MAAS, chef van de veiligheidsdienst, N.V. Nederlandse Staatsmijnen, Postbus 65, Heerlen (L.)

H.L. GROND, chef van de veiligheidsdienst, p/a Oranje-Nassau Mijnen, Heerlen (L.)

UNITED KINGDOM

Dr. H.L. WILLETT, Deputy Director-General of Production, National Coal Board, Hobart House, Grosvenor Place, London S.W.1

G. MILLER, Deputy Chief Inspector of Mines and Quarries, Department of Trade and Industry, Thames House South, Millbank, London S.W.1

R.F. YOUNG, Esq. Rescue Apparatus, Testing Office, Dept. Trade and Industry, 17, Firs Road, Edwalton, Nottingham, NG 12 4BY

J. BLUNT, General Manager of rescue Station, National Coal Board, The Lodge, South Parade, Doncaster, Yorkshire

- Experts on fire-resistant fluids

GERMANY

Dipl.-Ing. E. BREDENBRUCH, Leiter der Hauptstelle für das Grubenrettungswesen des Steinkohlenbergbauvereins, 43 Essen-Kray, Schönscheidtstrasse 28

Dr. rer. nat. H.W. THOENES, Direktor, Technischer Überwachungsverein e.V., 43 Essen, Steubenstrasse 43

Dipl.-Ing. K. GRUMBRECHT, Abteilungsleiter, Versuchsgrubengesellschaft mbH, 46 Dortmund, Tremoniastrasse 13

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 der Universität Hamburg, 2 Hamburg, Martinistrasse 52

BELGIUM

Ch. FRENAY, Ingénieur en chef - Directeur des mines, administration des mines, division de Liège, avenue Rogier, 10 - B 4000 Liège

J. BRACKE, Ingénieur principal divisionnaire, Institut national des industries extractives (INIEX), 60, rue Grande, 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 des mines, chef du laboratoire lubrifiant, 59-Sin-le-Noble

Dr AMOUDRU, Médecin-chef des Charbonnages de France, 9, avenue Percier, 75-Paris 8e

E. QUINOT, Chef de la section physique et recherches mathématiques, Centre d'études médicales minières du Nord/Pas-de-Calais, 129-133, avenue Salengro, 59-Sin-le-Noble

M. LE BOUFFANT, Chef du département physique du laboratoire du Cerchar, Verneuil-en-Halatte, BP 27, 60-Creil

Dr J.C. MARTIN, département physique du laboratoire du Cerchar, Verneuil-en-Halatte, BP 27, 60-Creil

NETHERLANDS

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

- Experts on Ventilation

GERMANY

Dipl.-Ing. W. BOTH, Hauptstelle für das Grubenrettungswesen des Steinkohlenbergbauvereins, 43 Essen-Kray, Schönscheidtstrasse 28

Dr. rer. nat. W. SCHMIDT, Prüfstelle für Grubenbewetterung, 4630 Bochum, Herner Strasse 45

Dipl.-Ing. Edouard SCHUBERT, Leiter der Prüfstelle für Grubenbewetterung der westfälischen Berggewerkschaftskasse, 4630 Bochum, alte Hattingerstrasse 19

BELGIUM

R. STENUIT, Directeur divisionnaire à l'administration des mines, 24-26, rue J.A.-Demot, Bruxelles 4

J. PATIGNY, Ingénieur divisionnaire, Institut d'hygiène des mines, Havermarkt 22, Hasselt

FRANCE

M. GANIER, Ingénieur principal, Cerchar, 35, rue St-Dominique, 75-Paris 7e

J. CRETIN, Ingénieur divisionnaire, poste central de secours, Belle-Roche, 57-Merlebach

E. SIMODE, Ingénieur divisionnaire, Houillères du bassin de Lorraine, direction des études et des travaux neufs, 57-Petite-Rosselle

NETHERLANDS

Prof. dr. W. MAAS, chef van de veiligheidsdienst, N.V. Nederlandse Staatsmijnen, Postbus 65, Heerlen (L.)

- Experts on Long-Distance Flame-Resistant Conveyor Installations

III. Working Party on Winding Ropes and Shaft Guides

- Members of the Working Party

GERMANY

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

Dipl.-Ing. H. RÖHLINGER, Leiter der Seilprüfstelle der Saarbergwerke AG, 66 Saarbrücken, Trierer Strasse 1

BELGIUM

G. MIGNION, Ingénieur principal divisionnaire, Administration des mines, division du Hainaut, Centre Albert, place Albert-Ier,B 6000 Charleroi

J. VERSCHROEVEN, Mijningenieur, Administratie van het Mijnwezen, Afdeling Kempen, Thonissenlaan 18, B 3500 Hasselt

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

FRANCE

M. TCHOULAKIAN, Chef du service "matériel et approvisionnement", Charbonnages de France 9, avenue Percier, 75-Paris 8e

C. ROGEZ, Directeur 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

Prof. dott. ing. L. STRAGIOTTI, direttore dell/istituto di arte mineraria del politecnico di Torino, via S. Quintino 42, Torino

LUXEMBOURG

R. MAYER, Ingénieur des mines, Chef de service-adjoint à l'ARBED, 78, rue du Fossé, Esch-sur-Alzette

NETHERLANDS

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

Ir. F.H. SMULDERS, Laura en Vereeniging, Eygelshoven (L.)

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

UNITED KINGDOM

G.E. WINDER, Head, Mechanical Engineering Section, Ministry of Power, Safety in Mines Research Establishment, Red Hill, Off Broad Lane, Sheffield 3

J.H. LONGSTAFFE, Esq., H.M. Principal Inspector of Mechanical Engineering, H.M. Mines and Quarries Inspectorate, Ministry of Technology, Thames House South, Millbank, London S.W.1

N. HIGGINSON, Esq., Chief Mechanical Engineer of the 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. GÖTZMANN, Seilprüfstelle der 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

IV. Working Party on Combustible Dusts

GERMANY

F. GROSS, Berdirektor, Oberbergamt für das Saarland und das Land Rheinland-Pfalz, 6600 Saarbrücken, Am Standen 17

Dr.-Ing. K. REINKE, Geschäftsführer der Versuchsgrubengesellschaft mbH, 46 Dortmund, Tremoniastrasse 13

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

K. RÖSGEN, Erster Bergrat a.D., Steinkohlenbergbauverein, Abteilung Grubensicherheit, 43 Essen-Kray, Frillendorfer Strasse 351

---

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

BELGIUM

P. GOFFART, Ingénieur principal divisionnaire, administration des mines, Ministère des affaires économiques, 24-26, rue K.A.-Demot, Bruxelles 4

J. BRACKE, Ingénieur en chef - Directeur des mines, Institut national des industries extractives (INIEX), 60, rue Grande, 7260-Pâturages

A. HAUSMAN, Directeur du Centre de coordination des moyens de sauvetage de Campine, 555, Kempische Steenweg, Kiewitt-Hasselt

FRANCE

G. DELACOTE, Ingénieur général des mines, Ministère du développement industriel et scientifique, conseil général des mines, 35, rue Saint-Dominique, 75-Paris 7e

L. KOCH, Ingénieur en chef, chef du service des techniques minières, direction des mines, Ministère de l'industrie, 99, rue de Grenelle, 75-Paris 7e

DELANNOY, Directeur des groupes de recherches Cerchar, 35, rue Saint-Dominique, 75-Paris 7e

M. SCHWEITZER, Directeur du service technique des Charbonnages de France, 9, avenue Percier, 75-Paris 8e

L. CHAVEAU, Fédération nationale des syndicats chrétiens des mineurs, 8, rue de Navarre, 75-Paris 7e

St. NOWAK, 4, rue Charcot, 62-Lens

NETHERLANDS

Ir. D.J. KNUTTEL, plaatsvervangend inspecteur-generaal der mijnen, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L.)

Prof. Dr. W. MAAS, chef van de Veiligheidsdienst, NV Nederlandse Staatsmijnen, Postbus 65, Heerlen (L.)

UNITED KINGDOM

Dr. H.L. WILLETT, Deputy Director-General of Production, National Coal Board, Hobart House, Grosvenor Place, London S.W.1

Director of Safety in Mines, Research Establishment, Ministry of Technology, Field Laboratories, Harpur Hill, Buxton (Derbyshire)

G. MILLER, Deputy Chief, Inspector of Mines and Quarries, Ministry of Power, Thames House South, Millbank, London S.W.1

J.W. CALDER, Esq., O.B.E., H.M. Chief Inspector of Mines and Quarries, Department of Trade and Industry, Thames House South, Millbank, London S.W.1

V. Working Party on Common Statistics of Accidents in Coal-mines

GERMANY

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

K. RÖSGEN, Erster Bergrat a.D., Steinkohlenbergbauverein, 43 Essen, Frillendorfer Strasse 351

BELGIUM

M. TONDEUR, Ingénieur principal des mines, Ministère des affaires économiques, 24-26 rue J.A.-Demot, B 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, 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 des mines, Charbonnages de France, 9, avenue Percier, 75-Paris 8e

ITALY

Dott. ing. B. ANEDDA, ispettore generale delle miniere, distretto minerario di Iglesias, via Gramsci, Iglesias (Cagliari)

Dott. ing. G. SATTA, ingegnere cappo delle miniere, direzione generale delle miniere, ministero dell'industria, via Molise 2, Roma

NETHERLANDS

J. VAN LOO, N.V. Nederlandse Staatsmijnen, Postbus 65, Heerlen (L.)

Ir. Th. M. JANSEN, inspecteur der mijnen, staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L.)

UNITED KINGDOM

JS. MARSHALL, H.M. Divisional inspector of Mines and Quarries, 31, Cathedral Road, Cardiff, CF1 9 UY

VI. Working Party "Ventilation and Mine Gas"

GERMANY

K. PALM, Abteilungsdirektor, Landesoberbergamt Nordrhein-Westfalen, 46 Dortmund, Goebenstrasse 25

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 des Westfälischen Berggewerkschaftskasse, 463 Bochum, Hernerstrasse 43-45

---

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

H. ALKER, Hauptverwaltung der Industriegewerkschaft Bergbau und Energie, 463, Bochum, Alte Hattingerstrasse 19

BELGIUM

H. GREGOIRE, Hoofdingenieur-directeur der mijnen, Thonissenlaan 18, 3500 Hasselt

J. PATIGNY, Ingénieur divisionnaire, Havermarkt, 3500 Hasselt

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

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

FRANCE

YOLIN, Ingénieur des mines, Arrondissement minéralogique de Douai, 941, rue Ch.-Bourseul, 59-Douai

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

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

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

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

LUXEMBOURG

R. MAYER, Ingénieur civil des mines, chef de service-adjoint, ARBED, 78, rue du Fossé, Esch-sur-Alzette

ITALY

Dott. ing. R. BONAZZA, capo del distretto minerario, 58100 Grosseto, Via Trieste 1

Prof. dott. ing. G. BULGARELLI, Via Genova 22, 35100 Padova

NETHERLANDS

Ir. D.J. KNUTTEL *(1)*, plaatsvervangend inspecteur-generaal der Mijnen, staatstoezicht op de Mijnen, Appololaan 9, Heerlen (L.)

Prof. dr. MAAS, chef van de veiligheidsdienst, NV Nederlandse Staatsmijnen, Postbus 65, Heerlen (L.)

T.H. OFFERMANS, Staatsmijn Emma-Hendrik, Hoensbroek

---

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

UNITED KINGDOM

A. HARLEY H.M. Senior District Inspector of Mines and Quarries, Department of Trade and Industry, Thames House, South Millbank, London S.W.1

P. THORPE, Technical Assistant to Deputy Director-General, National Coal Board, Hobart House, Grosvenor Place, London, S.W.1 x 7 AE

K.H. SAUNDERS, Safety and Engineering Officer, National Union of Mineworkers, 222, Enston Road, London S.W.1 2 BX

VII. Working Party on "Mechanization"

GERMANY

Dipl.-Ing. F.K. BASSIER, Bergwerksdirektor, Bergbau AG Niederrhein, Bergwerksdirektion Walsum 4132 Kamp-Lintfort, Postfache 88

W. SCHÖNWÄLDER, leitender Bergdirektor, Landesoberbergamt Nordrhein-Westfalen, 46 Dortmund, Goebenstrasse 24

BELGIUM

F. DECKERS, e.a. divisiemijningenieur, Thonissenlaan 18, 3500 Hasselt

M. MAUFORT, Steenweg op Beverlo 49, 3950 Beringen

J. OLYSLAEGERS, FGTB, Statiestraat 78 A, 35, 30 Houthalen

FRANCE

L. KOCH, Ingénieur en chef des mines, direction de la technologie de l'environnement industriel et des mines, Ministère du développement industriel et scientifique, 90, rue de Grenelle, 75-Paris 7e

ADAM, Charbonnages de France, 9, avenue Percier, 75-Paris 8e

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

L. TOURAND, 20, rue Roger-Cadel, 57-Forbach

LUXEMBOURG

R. MAYER, Ingénieur civil des mines, Chef de service-adjoint, ARBED, 78, rue du Fossé, Esch-sur-Alzette

ITALY

Dr. ing. A. GALATTI, ingegnere capo delle miniere, ministero dell'industria, del commercio e dell'artigianato, 00100 Roma

Dr. ing. COPPOLA Enel- Direzione della produzione e trasmissione 0100 Roma Casella postale 386

NETHERLANDS

Ir. E.A.R. HOEFNAGELS, inspecteur der mijnen, staatstoezicht op de Mijnen, Apollolaan 9, Heerlen (L.)

Ir. H.W. KIBBELING, Oranje-Nassaumijnnen N.V., Heerlen

T.T.L. WILLEMS, Laura en Vereeniging, Eygelshoven

UNITED KINGDOM

J. CARVER, H.M. Principal Inspector of Mines and Quarries, Department of Trade and Industry, Thames House, South Millbank, London S.W.1

W.J.W. BOURNE, Chief Mechanisation Engineer, National Coal Board, The Lodge, South Parade, Doncaster/Yorkshire

K.H. SAUNDERS, Safety and Engineering Officer, National Union of Mineworkers, 222, Enston Road, London S.W.1 2BX

VIII. Working Party on "Roof controls"

GERMANY

K. HÜBNER *(1)*, Berghauptmann, Leiter des Oberbergamtes für das Saarland und das Land Rheinland-Pfalz, 6600 Saarbrücken, Am Standen 17

U. CROTOWSKY, Dipl.-Ing., Bergwerksdirektor der Bergbau AG Gelsenkirchen, Bergwerksdirektion Hugo, 465 Gelsenkirchen, Postfach 1727

A. KEUSGEN, Dr.-Ing., Regierungsdirektor, Bundesministerium für Wirtschaft und Finanzen, 5300 Bonn-Duisdorf

K. FLECK, Oberbergrat, Oberbergamt für das Saarland und das Land Rheinland-Pfalz 6600 Saarbrücken, Am Staden 17

BELGIUM

P.J. MAINIL, Administrateur des mines, Ministère des affaires économiques, 3, rue Montoyer, 1040-Bruxelles

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

J. OOMS, Reinpadstraat 79, 3600 Genk

FRANCE

P. AURIOL, Ingénieur à la direction des services techniques, Charbonnages de France, 9, avenue Percier, 75-Paris 8e

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

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

ITALY

Prof. dr. ing., D. VITALI, capo del distretto minerario, 40121 Bologna, Via Ugo Bassi 7

Prof. dr. ing., R. COTZA, istituto di arte mineraria dell'Università, 09100 Cagliari

M. Tarabochia, Federestrattive C.I.S.L., (Miniera 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, Luxembourg

NETHERLANDS

Th.M. JANSEN, ir. Staatstoezicht op de Mijnen te Heerlen, Apollolaan 9, Heerlen (L.)

A.W. SNELL, ir. der Mijnen, N.V. Laura en Vereeniging te Eygelshoven, Eygelshoven

J.J. PEULEN, inspecteur bij de Oranje-Nassau-Mijn I, Kloosterweg 1, Heerlen

UNITED KINGDOM

J. CARVER H.M. Principal Inspector of Mines and Quarries, Department of Trade and Industry, Thames House South, Millbank, London S.W.1

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

K.H. SAUNDERS, Safety and Engineering Officer, National Union of Mineworkers, 222, Euston Road, London N.W.1, 2 Bx

D - WORKING PARTIES ON HUMAN FACTORS

I. Working Party on the Effects of Working Hours on Safety, with special reference to uncomfortable and unhealthy workings

GERMANY

Bergwerksdirektor H. MIDDENDORF, Bergassessor a.D., Steinkohlenbergwerke Mathias Stinnes AG, 414 Rheinhausen

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

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

BELGIUM

VAN MALDEREN, Divisiedirecteur van het Mijnwezen, Kempens Bekken 18, Thonischen Laan, Hasselt,

M.J. SAUCEZ, Attaché au Centre de formation postuniversitaire de Mons, 11, rue d'Egmont, Mons

FRANCE

M. COLLOMB, Ingénieur des mines, 1, rue Eugène-Schneider, 57-Metz

R. GRISARD, Ingénieur des mines, Charbonnages de France, 9, avenue Percier, 75-Paris 8e

A. AUGARD, Secrétaire général adjoint de la Fédération nationale force ouvrière des mineurs, 169, avenue de Choisy, 75-Paris 13e

M. BRADEFER, 169, avenue de Choisy, 75-Paris 13e

ITALY

Ing. G. BULGARELLI, capo del distretto di Padova, via Baiamonti 1, Padova

Prof. M. CARTA, istituto di arte mineraria della facoltà di ingegneria, Piazza d'Armi, Cagliari

Dott. L. BACCI, segretario nazionale minatori e cavatori - UIL, via Sicilia 154, Roma

NETHERLANDS

Drs. D.C. VAN DER HOOFT *(1)* hoofd van de Directie Mijnwezen, Ministerie van Economische Zaken, Bezuidenhoutseweg 30, 's-Gravenhage

Ir. D.J. KNUTTEL, plaatsvervangend inspecteur-generaal, Staatstoezicht op de mijnen, Apollolaan 9, Heerlen (L.)

Ir. F.W. FENNELL, hoofdingenieur van de Staatsmijnen in Limburg, p/a Staatsmijn Wilhelmina, Terwinselen (L.)

H.L. GROND, chef van de veiligheidsdient, p/a Oranje-Nassau Mijnen, Heerlen (L.)

UNITED KINGDOM

R. BELL, National Coal Board, Production Department, Hobart House, Grosvenor Place, London S.W.1

II. Working Party on Psychological and Sociological Factors in Safety

GERMANY

Ministerialrat W. SCHNASE *(1)*, Bundesministerium für Wirtschaft und Finanzen, Referat III A 1, 53 Bonn

---

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

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

Dr.-Ing. H. SCHRAER, Gesamtverband des deutschen Steinkohlenbergbaus, 43 Essen, Friedrichstrasse 1

H. ALKER, Industriegewerkschaft Bergbau und Energie, 4630 Bochum, Alte Hattingerstrasse 19

BELGIUM

I. PUT, Ingénieur principal divisionnaire des mines, Administration des mines, Ministère des affaires économiques, 3, rue Montoyer, 1040-Bruxelles

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

M. PETIT, Ingénieur des mines à l'Arrondissement minéralogique de Metz (57)

M. VERDET, Ingénieur en 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. Quintino, Torino

Prof. N. DE PAMPHILLIS, CISL, via Isonzo 42, Roma

LUXEMBOURG

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

R. MAYER, Ingénieur civil des mines à l'ARBED, chef de service-ajoint, 78, rue du Fossé, Esch-sur-Alzette

E. SCHMIT, Ingénieur principal pour la sécurité à l'ARBED, 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.)

F.S. DOHMEN, Nederlandse Kath. Mijnwerkersbond, Schinkelstraat 13, Heerlen

III. Working Party on Health Protection in Coal-mines

GERMANY

Ministerialrat W. SCHNASE, Referat III A 1, Bundesministerium für Wirtschaft und Finanzen, 53 Bonn

Grubeninspektor A. AUGST, Assessor des Bergfachs, Bergwerksgesellschaft Walsum AG, 4103 Walsum, Dr.-Wilhelm.Roelen-Strasse 129

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

BELGIUM

MEDAETS *(1)*, Directeur-generaal van het Mijnwezen, Ministerie van Economische Zaken en Energie, 24-26, rue J.A.-Demot, Bruxelles 4

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, Hasselt

FRANCE

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

B. SCHNELL, Ingénieur général des mines, Ministère de l'industrie, 97, rue de Grenelle, 75-Paris 7e

B. GRISARD, Ingénieur des mines, chef du service "sécurité des mines", des Charbonnages de France, 9, 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. D.J. KNUTTEL, plaatsvervangend inspecteur-generaal der mijnen, Staatstoezicht op de Mijnen, Apollolaan 9, Heerlen (L.)

Dr. J. TERPSTRA, chef van het Stofinstituut der Gezamenlijke Steenkolenmijnen in Limburg, Wilhelminaplein 24-26, Postbox 38, Heerlen (L.)

---

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

UNITED KINGDOM

Dr. H.L. WILLETT, Deputy Director-General of Production, National Coal Board, Hobart House, Grosvenor Place, London S.W.1

E.J. RAINE, H.M. Senior District Inspector of Mines and Quarries on Special Duties, Ministry of Power, Thames House, Millbank, London S.W.1

H.L. JONES, National Coal Board, Production Department, The Lodge, Doncaster

B. GODDARD, Head of Mining Branch, National Coal Board, The Lodge, South Parade Doncaster, Yorkshire

ANNEX V

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

(Adopted by the Mines Safety and Health Commission on 6 February 1973)

CONTENTS

1. and 2. Fresh data obtained on shaft and roadway haulage ropes using the dynamic and geometrical procedures (three- and four-roller apparatus) and other test installations

1. Role of rope atlas, description of test procedures, summary of results obtained

1.1. Role

The multitude of factors influencing the rope service life means that determination of the rope renewal schedule is impossible in the absence of knowledge concerning the rope behaviour under dynamic and geometric loading. The winding line layout and length, the number of curves, the gradients, etc., and the individual components used, all influence the service life of the haulage ropes, as also do the selection of make of rope, the wire strength and the rope lubrication. A prerequisite in the rope renewal schedule is detailed knowledge of the behaviour of the various makes of rope under the various special modes of loading of the winding installation, and a knowledge of the degree of stressing of the rope due to installation and operational factors.

Thus the rope atlas presented here for rope-operated roadway winding vehicles cannot be regarded as giving exhaustive data on all matters relating to the renewal times of ropes. It is simply intended as an aid to those responsible for the construction and operation of such winding installations. It should be useful in increasing both the service life of haulage ropes and operational safety.

We would mention here expressly that in its present form this atlas is not designed as a manual for rope testers, rather it summarises:

(a) the theoretical principles;

(b) the results of tests carried out on new installations and means of testing;

(c) the explanations accompanying the test data;

(d) experience acquired so far as regards roadway rope haulage installations by the Rope Testing Office during its investigation and testing work.

It is intended to draw up for rope testers and also for tradesmen and supervision personnel, an extract from the results of the investigations, specially designed for supervision and testing.

Evaluation of a wire rope on the basis of external examination is based essentially on the experience of the tester. Only rarely is it possible to state in each case the breaking strength. The desire to obtain more accurate data leads to the formulation of documents giving data which can be used either in revised and simplified form by the rope tester or in their actual form by the specialist engineer. Thus, by means of the sets of diagrams indicating the loss of breaking strength under substantial stressing, and the photographs attached to these diagrams to illustrate the state of the rope and the examinations of the splice joints and the tensioning points, the rope atlas constitutes an effective aid in improving safety of roadway rope haulage installation. Furthermore, since these conveying systems are being improved continuously, it is necessary in order to establish the renewal date of the ropes, to keep a constant check on the investigation data and to replace or supplement them by fresh data based on the various modifications introduced.

For the various types of rope concerned here, characteristics have been formulated concerning the loss of breaking strength, with indications of the onset and evolution of the loss of strength under diffenent types of stresses.

Although for rope testing the rope atlas at present available, and the rope tester's guide which will be issued later, considerably facilitate determination of the renewal date, the work of the rope tester is still difficult, since considerable soiling on the rope surface, the very great length

(in certain cases up to more than 10 km), the differences in the operating times of certain parts subjected to different stressing, and the different types of rope joints, complicate the tests involved. Moreover, where possible rope testing should also allow for rapid modificaions to the guides and rails (friction points, etc.). The rope testing procedures based on magnetic induction, fortunately, can supplement the examinations.

It is assumed that the user of the rope atlas is familiar with the procedures for evaluating the state of a rope, as imparted by the courses run by the Rope Testing Office.

The test data used in preparing this atlas were obtained by means of several different test procedures, and thus the influences inherent in the various procedures used were able to be established and eliminated. The various test procedures are described below under point 1.2.

The rope atlas is designed so that it can be supplemented on the basis of new ideas and viewpoints.

In order to evaluate the state of a rope it is also necessary to know the degree of difficulty presented by the roadway profile. When the roadway is horizontal or on a slight gradient, it will be possible to apply other rope testing criteria than in the case of high-gradient roadways. The criteria are also different depending on whether the installations are stationary or mobile.

Evaluation or rope loading involves also the degree of difficulty of the roadway profile, through allowance for dynamic and geometric factors influencing the rope's service life. The Rope Testing Office is engaged in the development in this field, for use in practice, of a stress measuring and grading device already employed in test trials.

1.2 Description of test procedures

Fig. 1 shows a three-roller apparatus actuated by a translatory motion which in one stroke rolls once, twice, or three times the various segments of a rope tensioned on a testing machine with a pulsator. In the segments of single rolling, the rope is bent in a single direction, while in segments 2 and 3 there is alternate bending.

In order to be able to determine the effects of simple bending and of alternate bending on the service life of the rope, a 4-roller apparatus has been developed, where in contrast with the 3-roller apparatus, each of the four rollers can produce the same bending angles so that the difference between the simple bending and the alternate bending can be determined quantitatively during such tests (Fig. 2).

Fig. 3 shows a rotary test rig for ropes and rollers which permits not only testing of ropes and rollers but also determination of the magnitude of the undulating stresses set up by rolling and unrolling of the rope on the rollers. Also this test apparatus permits determination of the most favourable rope curvature for the service life. (Number of rollers and corresponding roller diameter for each unit of curvature, Fig. 4).

The new data obtained were confirmed by the tests carried out on the rope testing tracks installed in the basement of the Rope Testing Office (Fig. 5).

1.3 Summary of test results

1.3.1 Haulage ropes

The service life of haulage ropes is established in the following order, depending on the type of rope:

1. Wire-filled type
2. Warrington type
3. Seale type
4. Normal type

The service life of haulage cables is influenced by the following factors:

1. Tensile forces in the rope
2. Prestress in the rope
3. Number of guide rollers and deflection rollers
4. Surface pressure or ration between rope and roller diameters
5. Magnitude of deflection angles
6. Type of roller
7. Degree of lubrication of rope

The differences in rope service lives depending on type decreases as the effect of the above-mentioned factors increases.

The greater the dynamic load withstood by the rope, the shorter is the rope service life. This is also reduced by each unnecessary deflection (Fig. 13). The rollers must be as large as possible in order to minimise the surface pressure between the rope and the roller. The roller grooves must be suited to the rope diameter (Fig. 8). Cylindrical rollers must be avoided in the case of deflections. The service life of the ropes is appreciably increased by adequate lubrication during manufacture (lubricants according to standard DIN 21258 (Figs. 15 and 16).

The service life can be increased by selecting a wire of increased mechanical strength. It should be noted here that the examination gave better results when the higher mechanical strength of the wires was accompanied by a higher carbon content (Figs. 9 to 13).

1.3.2 Rope rollers

The service life of ropes is increased when the following points are taken into account:

1. Roller diameter as large as possible
2. Small angle of deflection of the rope on the roller, and elimination of travel over the roller
3. Optimum groove bottom for rope diameter; avoid cylindrical rollers for deflections
4. Renewal of roller once the groove bottom is worn by the rope friction and exhibits sharp edges; this wear can generally be avoided by using a larger number of rollers
5. Although hardened rollers do not generally wear at the bottom of the groove, their use does reduce the service life of the rope (Fig. 6).

The roller shape substantially affects the rope service life. During the tests, rope guide rollers were used in the state in which they were delivered by the manufacturer, whereas others were provided at the bottom of the groove with a 'fit groove'. The rope service life increased as a result of this fit groove, since the pressure between the cable and the roller groove is thereby appreciably reduced. This rope protection can be effected in practice at the points of curvature and at the tensioning points where the rope path is unchanged (Figs. 7 and 8).

Since it is near the winch that the main forces are exerted in the haulage rope, it is here that most care is required to ensure satisfactory travel of the rope over the rollers.

The use of hardened rollers reduces the service life of all types of rope (Figs. 9 and 12). Nevertheless on using unhardened rollers the ropes will dig into the bottom of the groove. It is then frequently found that the surface structure of the rope becomes imprinted in the bottom of the groove.

Since it cannot be expected that the type of twist will remain constant over a sufficient length of the haulage rope, it is often found that the rope profile structure does not correspond to its impression in the roller. This observation is particularly applicable to splices. Here the various rope strands are made to pass over the sharp edges of the worn bottom of the groove, which appreciably reduces the rope service life.

1.3.3 Rope joints

In the haulage ropes used on winding tracks, only straight (1 000 x d) splices and thimble-ring splices can be considered appropriate.

Whereas generally the thimble-ring splice is only prepared at the works, in underground operation the haulage ropes are connected by means of straight splices.

Nevertheless the service life of the straight splice will only be fairly long if the following rules are observed, which were drawn up on the basis of the tests and which wre being incorporated in the conditions laid down in German Standard DIN 83318:

1. Careful production of the splice, since every minute saved by negligence reduces the rope life by hours
2. The strand ends to be installed must be carefully straightened
3. The strand ends must be wound over their entire length with a good thickness hemp (in the lay direction of the wires)
4. The strand ends arranged in the opposite direction inside the cable must be cut exactly to size at the joints so as to give a continuous 'core' in the rope
5. Excessive prestress in the rope must be avoided during use, since experience shows that this prestress causes premature destruction of the splice.

1.3.4 Tensioning points

It has still not been possible to carry out systematic examinations of the rope tensioning points. These examinations will be carried out once the large test rig has been mounted in position at the Rope Testing Office.

Theoretical research can however already provide the operator with important data as regards the tensioning points. These data are given in point 6.1 of the rope atlas. Attention is drawn to the need for and the advantage of the tensioning points, especially along long and difficult tracks.

Practical measures have shown that tensioning points can be dispensed with when the track is not long, has a low gradient and no bends in it. Also, the track profile should be regular and free from hollows. The rope prestress should in this case not exceed 8% of the breaking strength per strand at the deflection drum.

To enable the operator to calculate the rope elongation in advance over a given roadway length, and from this the roadway length of the tensioning point, the modulus of elasticity of the haulage ropes of suspended monorails was measured during examination of these ropes.

2. Diagram system for evaluation and selection of ropes

The study of a large number of factors affecting rope strength necessitates systematic classification of the test data. In view of the extent of the problem, a classification system is indispensable, if only to ensure a regular test series procedure and accurate recording of the results, all the more so since for subsequent representation of the data with a view to evaluation and selection of ropes it is necessary to have a set of diagrams permitting comparison of the behaviour and service life of ropes as a function of the various influences.

In order to analyse the effects of the main factors affecting rope service life, sets of diagrams with different parameters were drawn up to represent the rope breaking strength curve or the rope strength as a function of the number of rolling operations. The set of diagrams thus obtained is shown in Figs. 17 and 18.

In the groups of diagrams 0 the loss of breaking strength is represented as a function of alternate bending for a certain combination of geometric or dynamic forces (forms).

In group I, the rope stresses are the parameters, and the various deflection angle combinations are plotted along the ordinates, e.g. Figs. 7, 10 and 14.

In group II the deflection angle combinations are the parameters and the various static and kinetic rope stresses are plotted along the ordinates; Figs. 8, 9, 11-13 and 15.

The abscissae of groups 0, I and II indicate the number of rolling operations (alternate bending).

The representation of group 0 permits comparison of the loss of breaking strength for different types of loading (geometric and synamic). The breaking strength loss curves are supplemented by reproduction of rope sections approaching renewal time, with indication of the residual breaking strength.

In case of normal static or kinetic loading (e.g. a certain deflection angle, the state of the groove or the roller diameter, a certain undulating stress), the graphs contain e.g. the following:

1. The breaking strength loss curves of the different types of rope
2. The strength of a given type of rope with various degrees of lubrication
3. The strength of a given type of rope coming from different manufacturers
4. The strength of a given type of rope with different types of twist
5. The strength of a given type of rope having different wire strengths
6. The variation in the dynamic factors with the geometric factors kept constant (Fig. 6), and vice versa.

Other variants are also possible.

The groups of diagrams I and II give the efficiency characteristics for overall loading ranges (general diagrams).

The groups of diagrams are subdivided in two ways:

In the mode of representation I/I or II/I, the strength of a single type of rope under different geometric and dynamic loading is compared.

In the mode of representation I/2 of II/2 the strength of different types of ropes subjected to the same loadings is compared.

In this set of diagrams for evaluation and selection of ropes we study to begin with, in groups I/1 and II/1, the different types of rope as regards their strength under various geometric layouts of the installation and different types of dynamic loading. To evaluate the ropes the differences due to the different lubrication and impregnation conditions, the groove deformation, the roller diameter, the rope temperature and the load frequencies are taken into account. The result of these examinations gives a selection of types of ropes which are then compared again in the groups of diagrams I/2 and II/2 as regards the various loading ranges, in order finally to obtain a type of rope suitable for the special operating conditions.

The set of diagrams is subdivided according to the supplementary loading factors such as those indicated in the table in Fig. 18.

A summary of both group 0 and of groups I and II is given in Figs. 19 to 21. The test data given are those obtained with the four-roller apparatus, so that in place of combinations of deflection angles (three-roller apparatus) only the deflection angles appear along the ordinates or as parameters.

3. Examination of load-bearing winding installations, in particular intermediate connection elements, based on the procedure using powder magnetised by a coil, or auxiliary magnetoscopy

The load-bearing parts of a winding installation, e.g. the rope, the brake gear and the main shaft of the winding engine, the intermediate connection elements, the suspension brackets of the machines, undergo quasi-static and kinetic loading during rope winding and haulage. Although very high safety factors are taken in calculating these parts from the statical viewpoint, material fatigue, corrosion, unfavourable configuration, etc., all cause permanent cracking which can lead to failure of the parts. The fact that the haulage of personnel is concentrated in the shaft and roadway winding installations, increases the dynamic stressing of these load-bearing elements per unit of time. This necessitates rigorous test conditions. A typical instance relating to intermediate connecting elements is detailed below.

The position, size and shape of cracks in iron and steel can be made visible by means of magnetic powder testing. In this test method the test piece is magnetised. The magnetic field thereby set up in the test piece is deflected by any cracks not running parallel with the magnetic lines of force. If the test piece is then sprinkled with a powdery ferromagnetic indicator or washed with a slurry of such an indicator, then the powder particles will collect along the crack and reveal a visible crack mark.

Tests were undertaken at the Rope Testing Office to determine the extent to which magnetic powder testing can be applied in the determination of cracks in intermediate connection elements. The tests were conducted using a magnetiser permitting induction of a permanent a.c. of 2 000 A maximum or d.c. pulses of 4 000 A maximum. Such a high-capacity magnetiser can also attain the magnetic field intensities required for reliable crack detection in the intermediate connection elements of heavy winding gear, if coil magnetisation or auxiliary magnetoscopy is employed. These two procedures are suitable in intermediate connection element examination since they do not pass current directly through the test piece. Such direct passage of current heats up the test piece surface at the contact points, which can result in local changes in structure.

The two processes applicable to examination of intermediate connections - coil magnetisation and auxiliary magnetoscopy - are illustrated in the Figures in this work.

In order to examine the ends of the splice strip and of the fork of a cross or of the shaft and the shaft/head connection of a main bolt, coil magnetisation is used (Figs. 22a, 22b, 23a). In this case a coil is placed around the

intermediate connection element to be examined, so as to set up a magnetic field in this component orientated along its length, to reveal the transverse cracks. To detect the radial cracks at the hole edges, an auxiliary magnetoscopic examination is undertaken by means of a high-voltage cable passed through the hole (Figs. 23a, 23b, 24b). This cable sets up a concentric magnetic field around the hole.

To detect the cracks, on both coil magnetisation and auxiliary magnetoscopy a suspension in kerosene or a special oil, of indicator fluorescent in ultra-violet light is used. The component to be examined is washed with this suspension during or immediately after magnetisation.

After magnetisation and washing, the intermediate connection element is examined under ultra-violet rays (Figs. 25a, 25b, 26).

The ultra-violet ray lamp shown in these Figures and fitted with an examination microscope, permits detection even of capillary cracks. As Fig. 27 shows, ultra-violet light examination clearly reveals bright edges of cracks by means of the fluorescent indicator.

Figure 1

Three-roller apparatus subjected to translatory movement for dynamic tests of roadway-haulage ropes

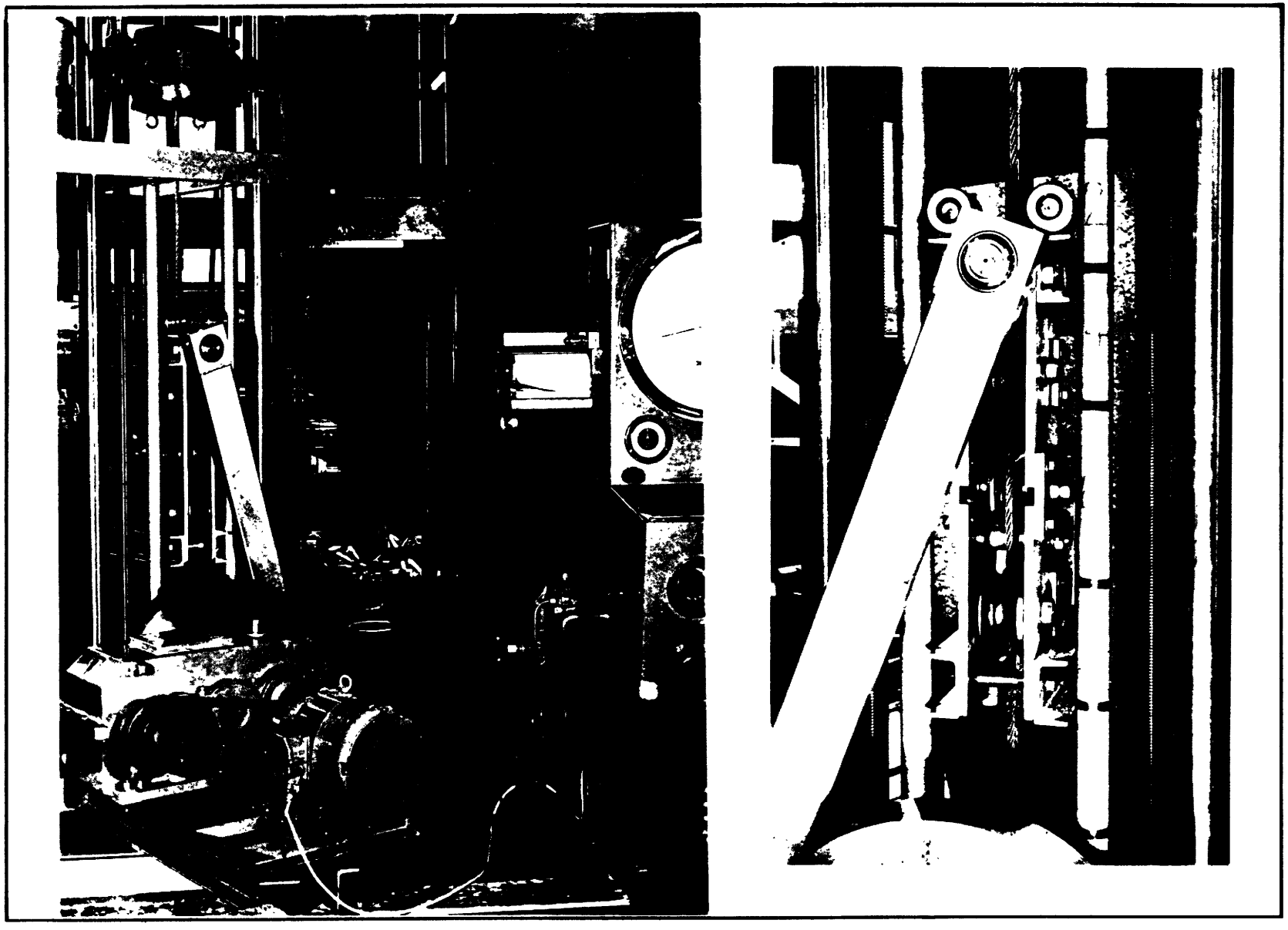


Figure 2

Four-roller apparatus

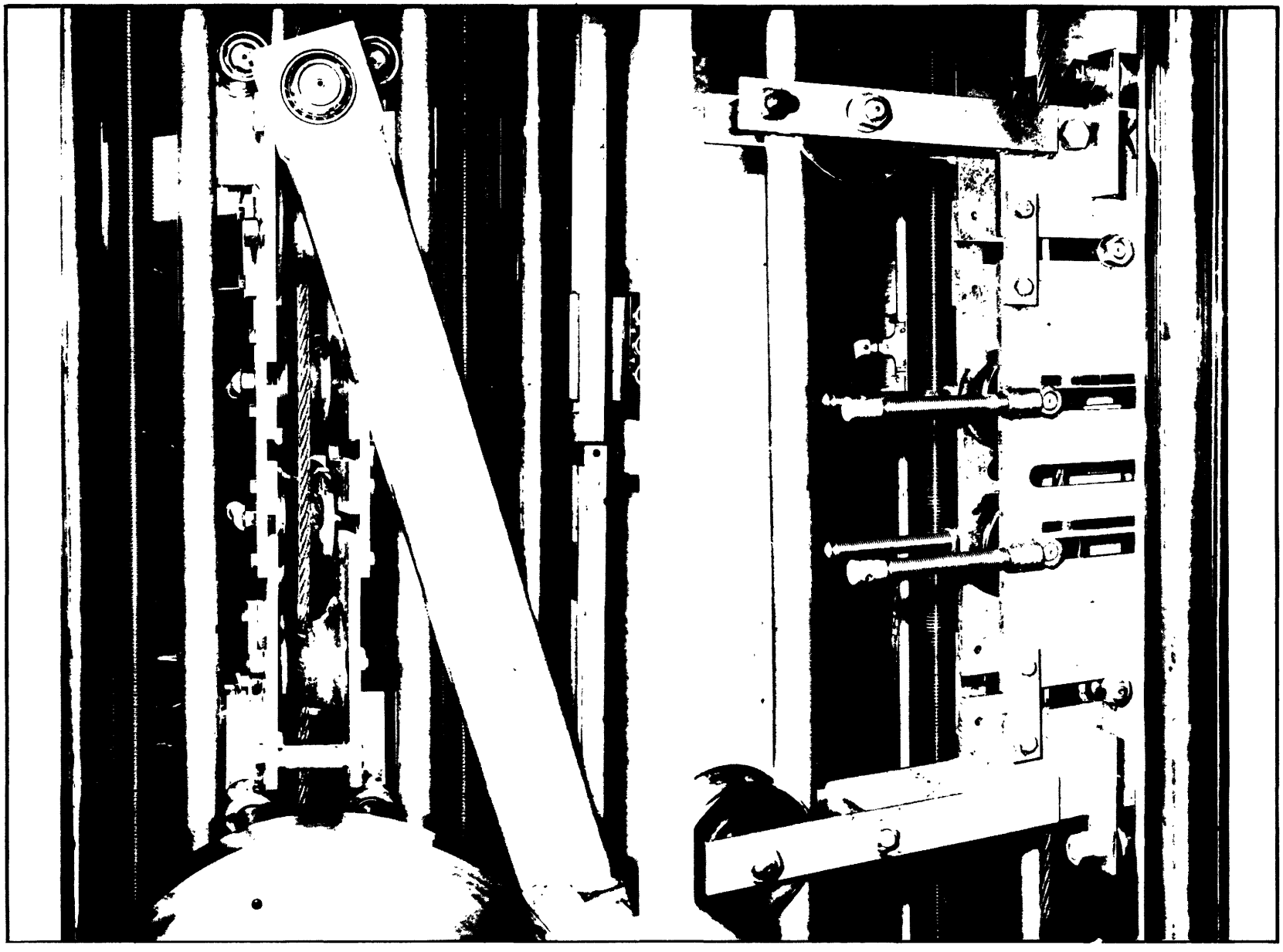


Fig. 3 **Rotating rope and roller test-brake for roadway/haulage ropes**

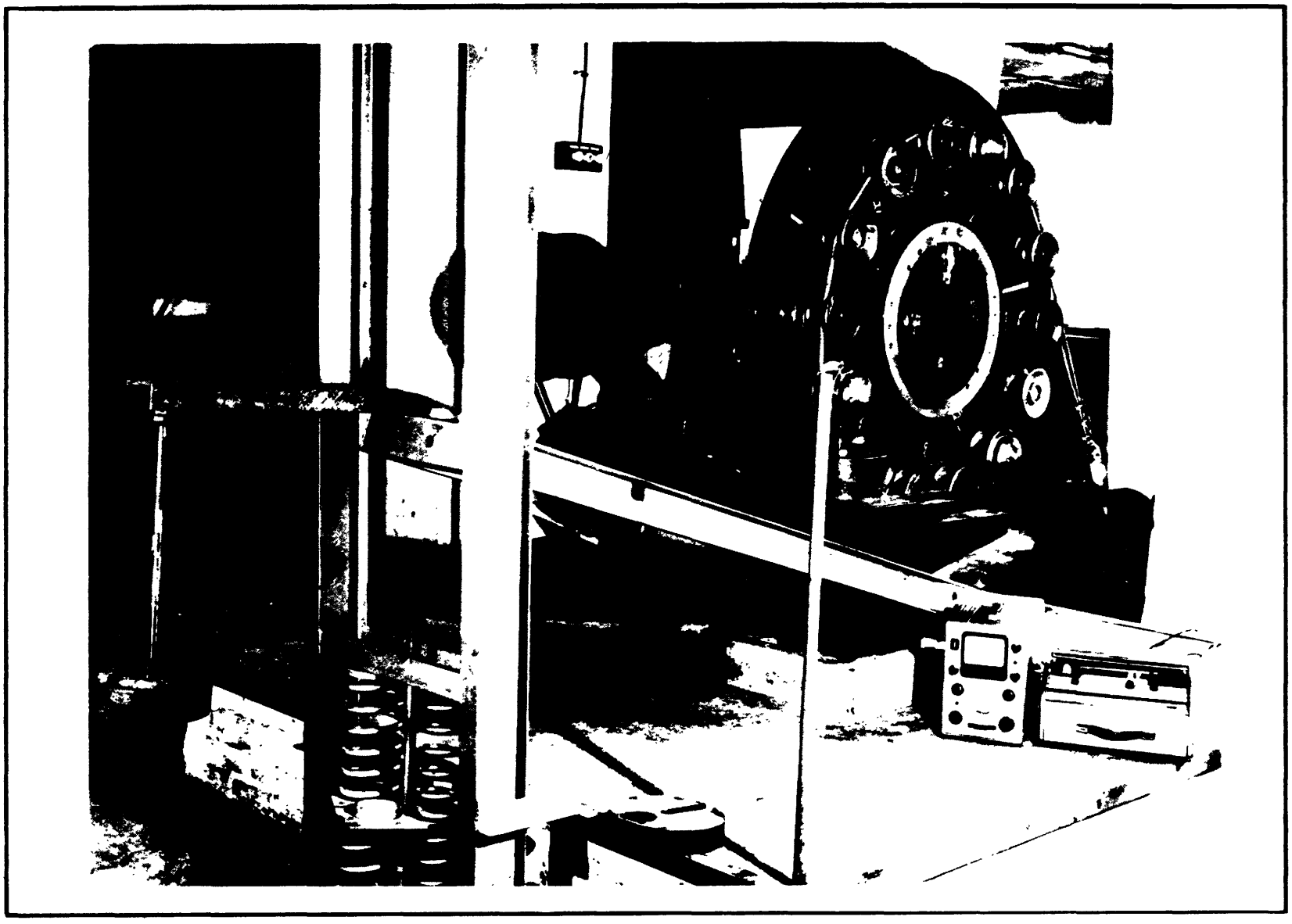


Figure 4

Rotating dynamic test apparatus for ropes and rollers

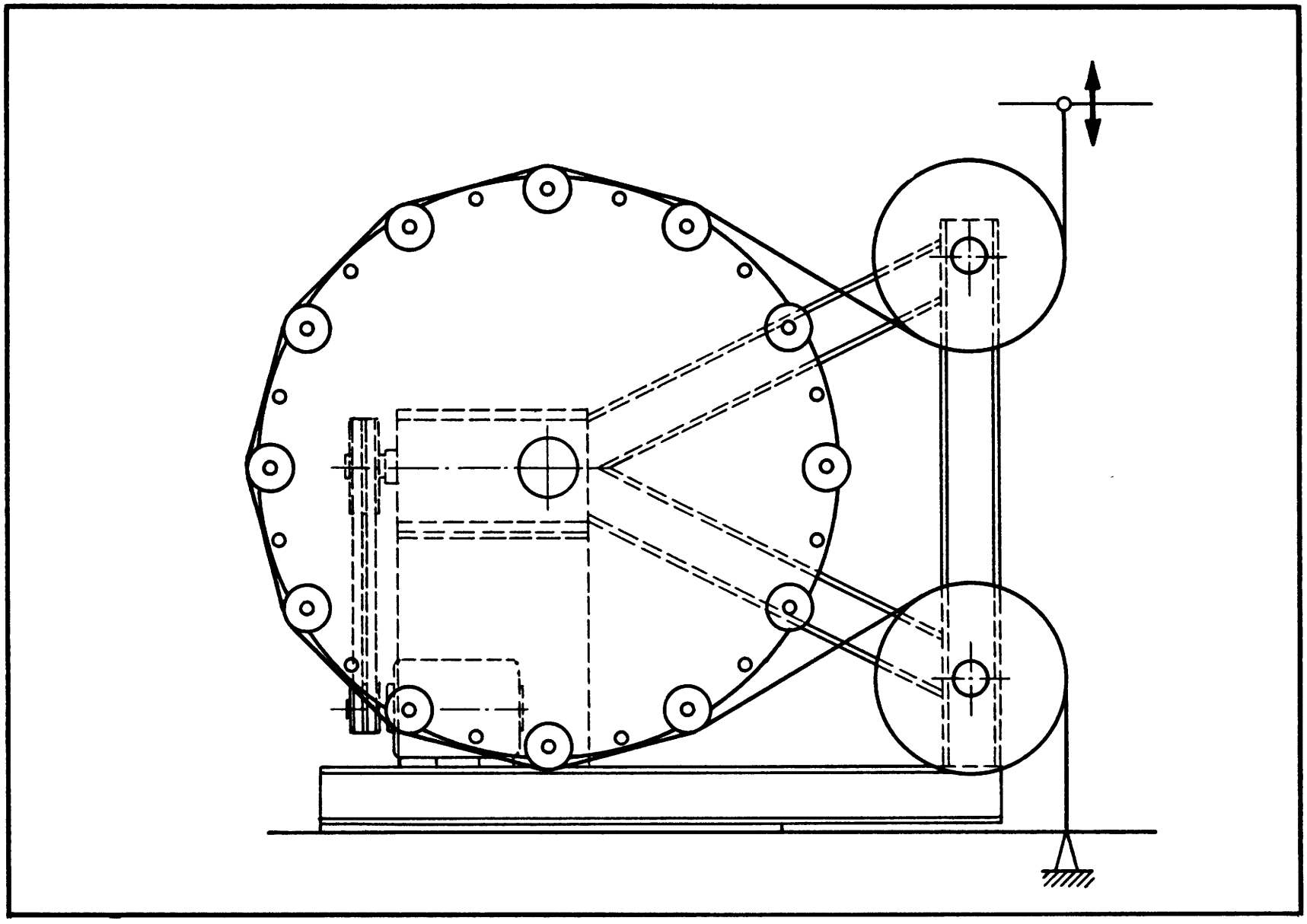


Figure 5

Testing area for rope-driven roadway conveyances in the basement of the Seilprüfstelle

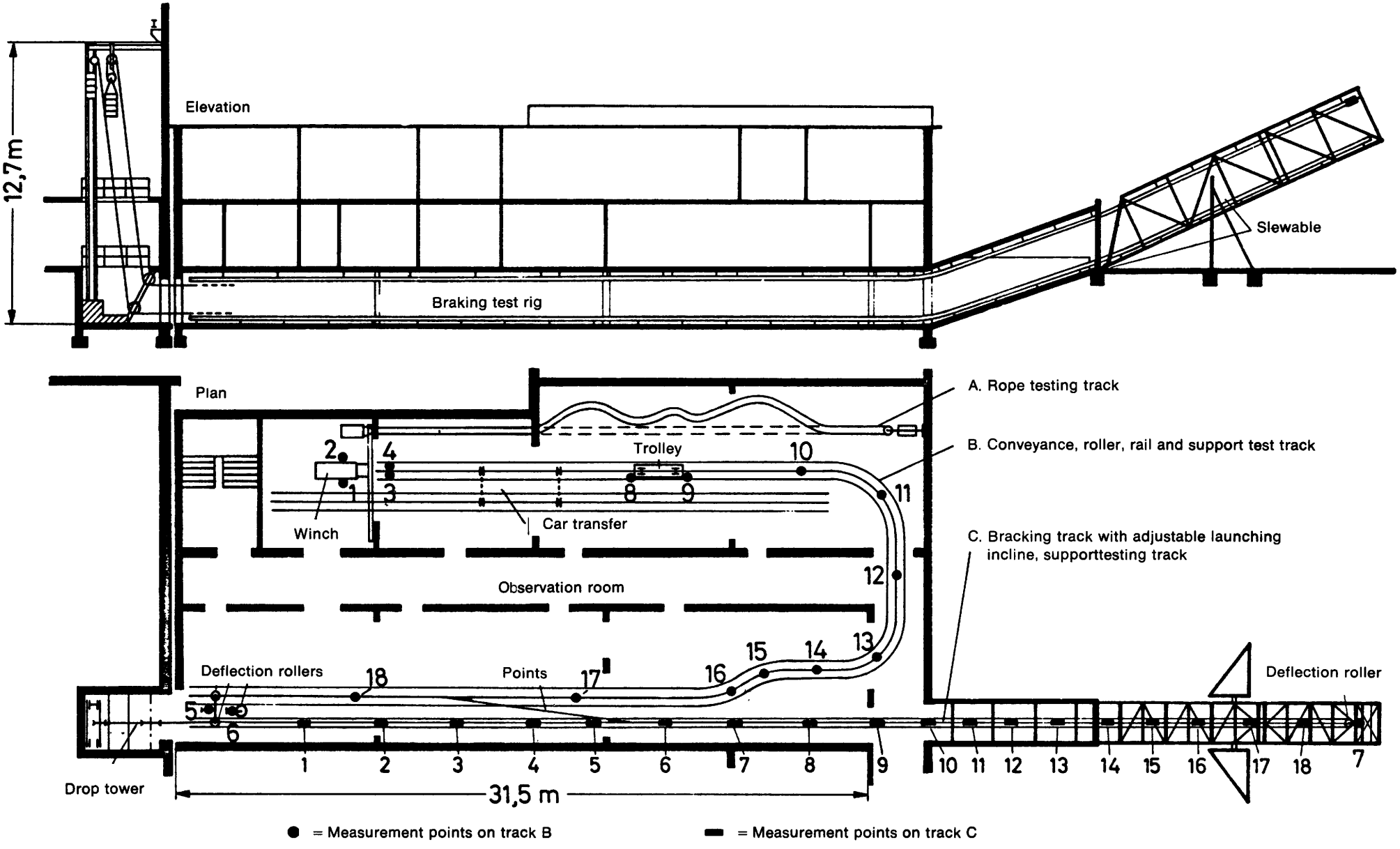
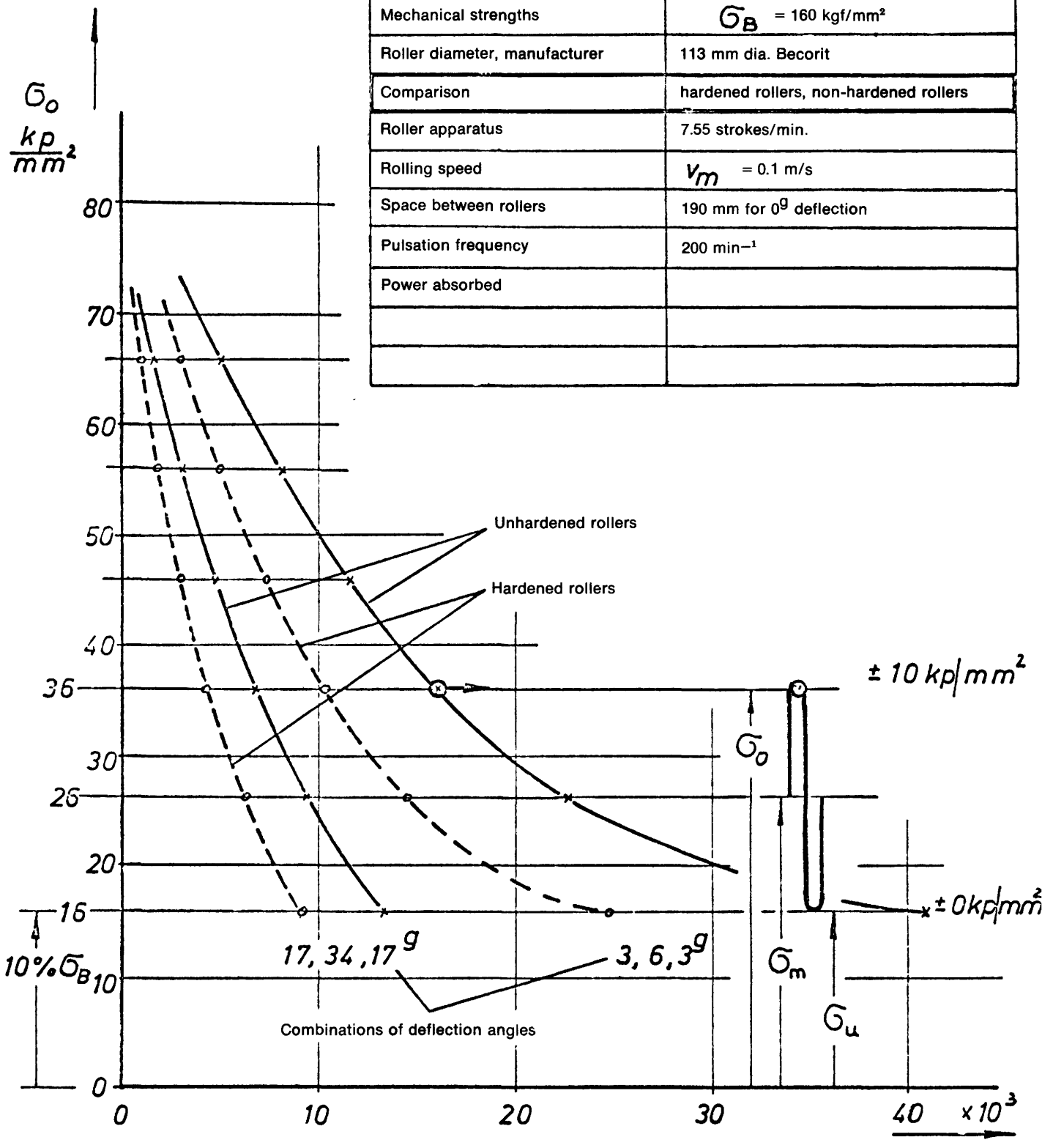


Figure 6

Stress diagram system

Name of group	(II/1/Bg)
Rope characteristics	(Warrington)
	13 mm dia. bright
Mechanical strengths	σ_B = 160 kgf/mm²
Roller diameter, manufacturer	113 mm dia. Becorit
Comparison	hardened rollers, non-hardened rollers
Roller apparatus	7.55 strokes/min.
Rolling speed	v_m = 0.1 m/s
Space between rollers	190 mm for 0^g deflection
Pulsation frequency	200 min^{-1}
Power absorbed	



Alternating bending (3.roller apparatus)

Figure 7 **Strength of a Seale rope under various geometric and dynamic stresses**

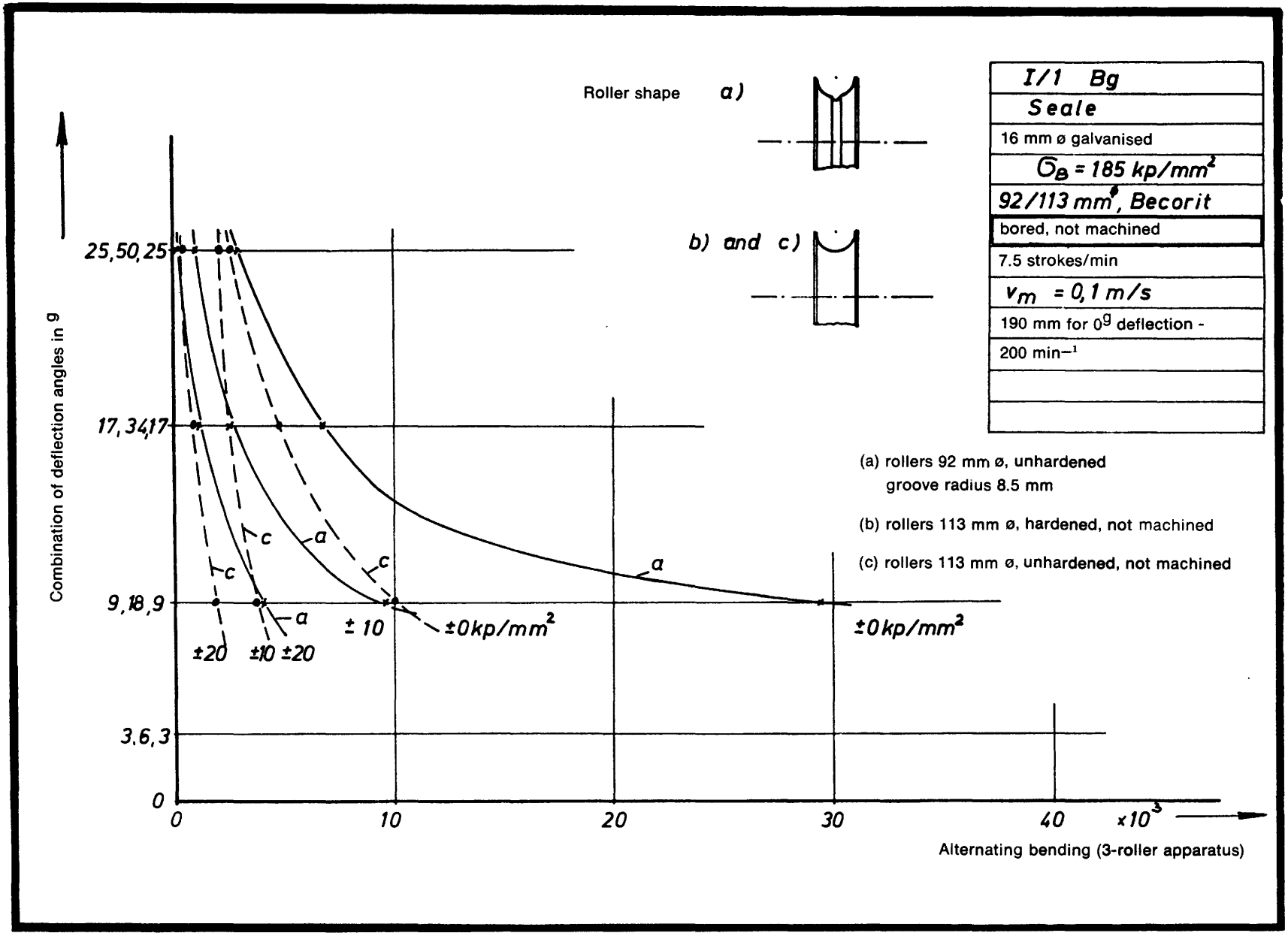


Figure 8

Strength of a Seale rope under various dynamic stresses and a supplementary stress

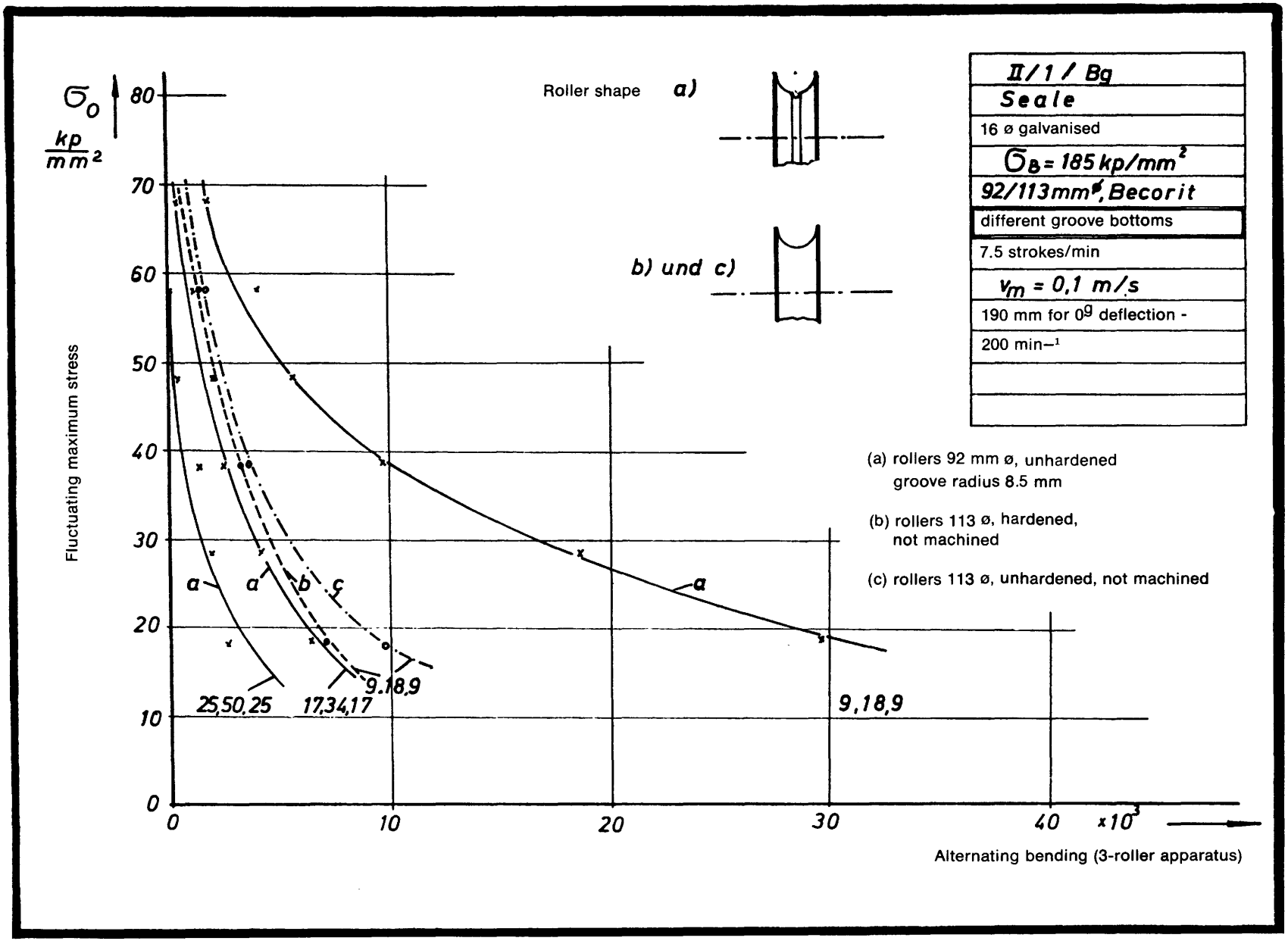


Figure 9

Strenghth of a Seale rope under various dynamic stresses and two supplementary effects

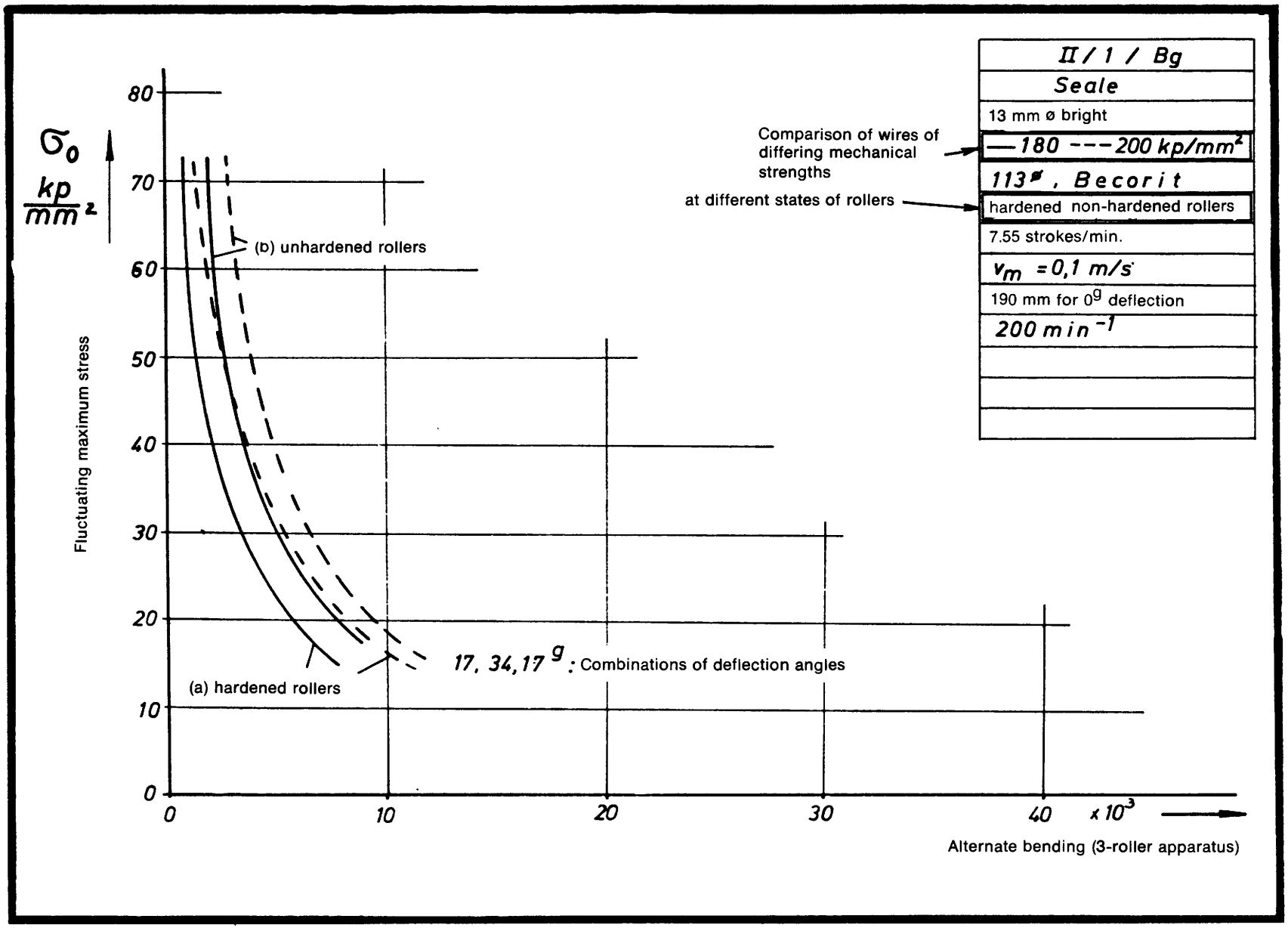


Figure 10

Strenght of a Seale rope under various geometric and dynamic stresses; parameter: oscillation aplitude

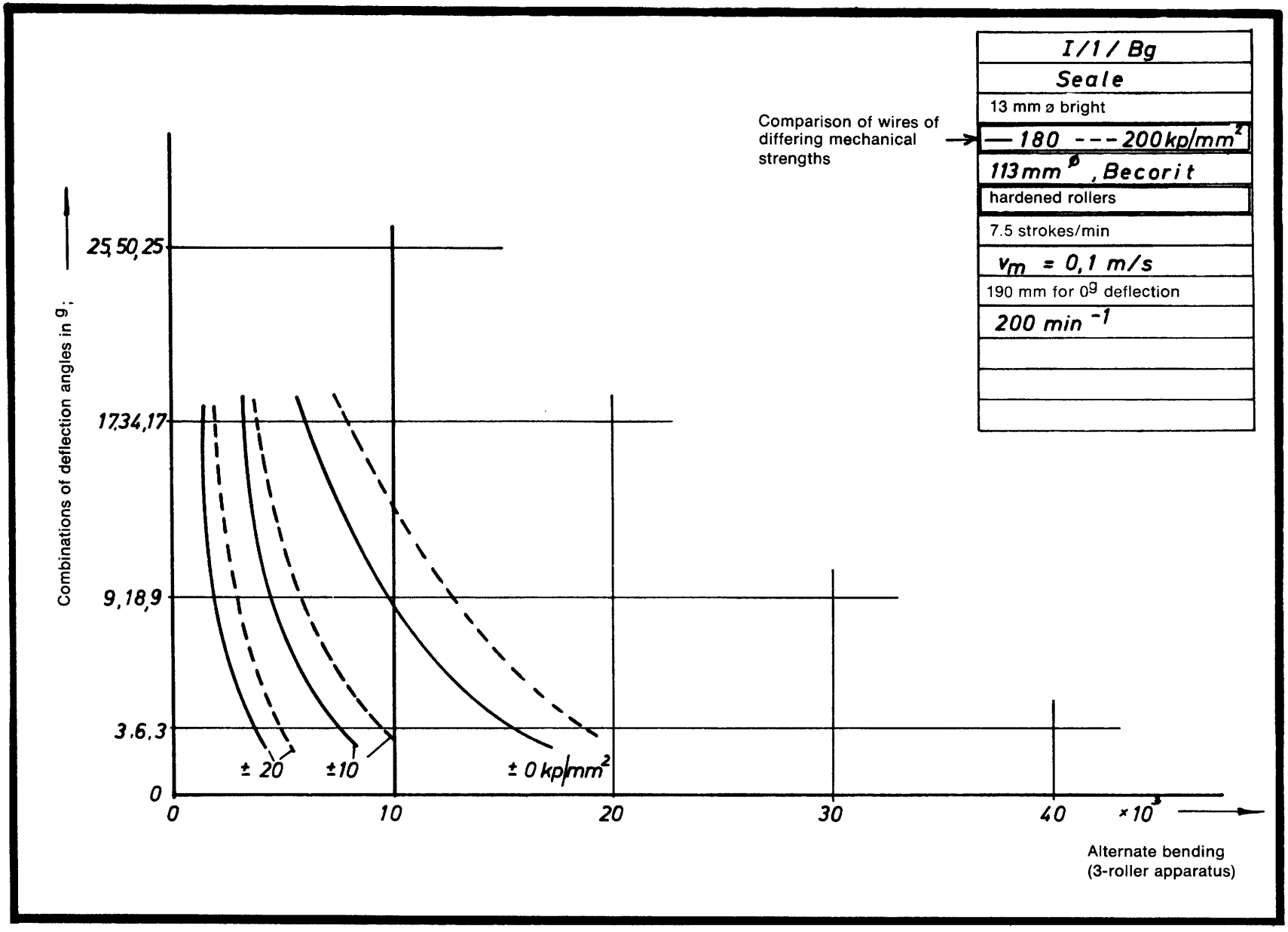


Figure 11

Strength of a Seale rope under various geometric and dynamic stresses; parameter: combination of deflection angles

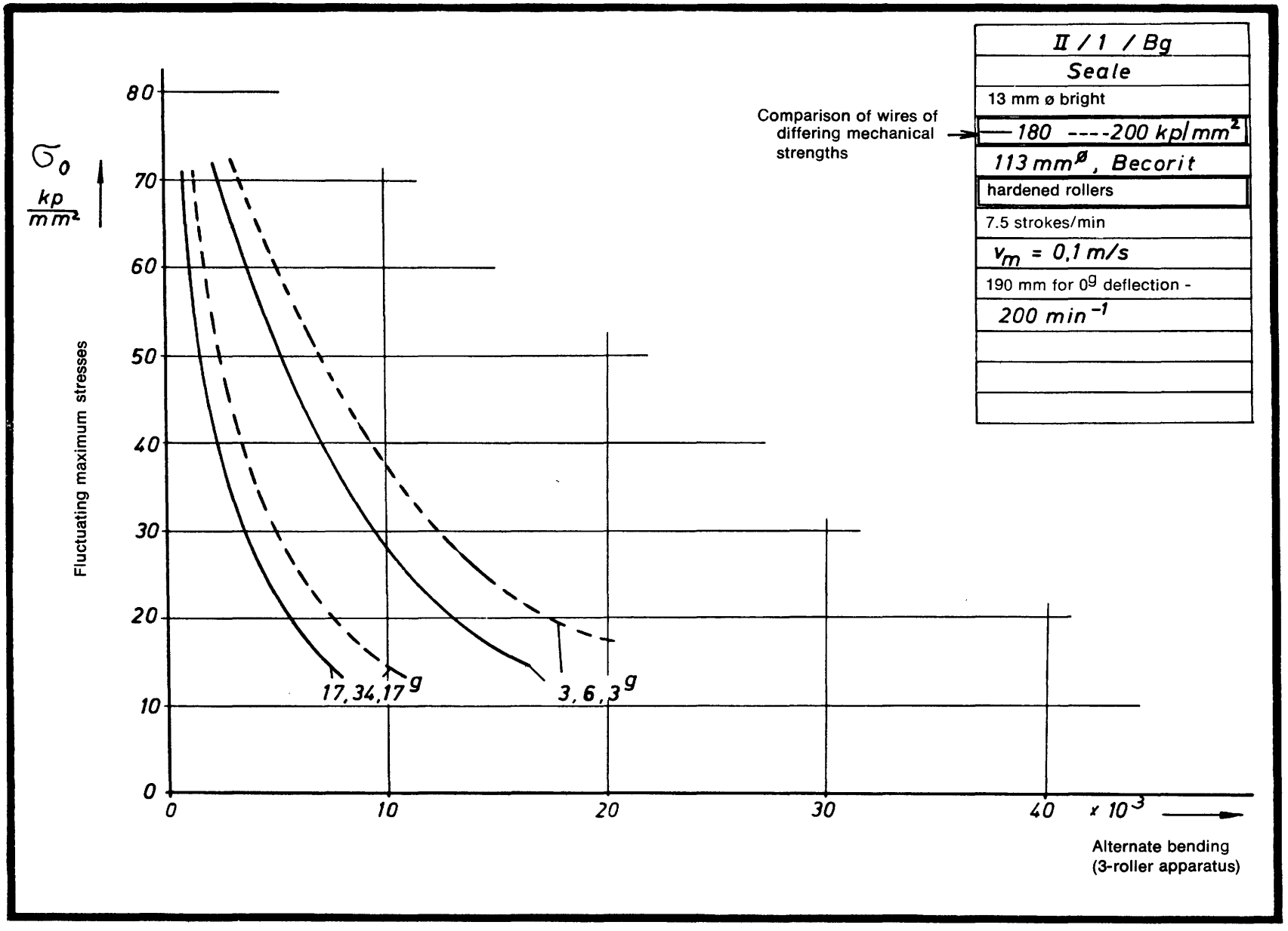


Figure 12

Strength of a Warrington rope under various dynamic stresses and two supplementary effects

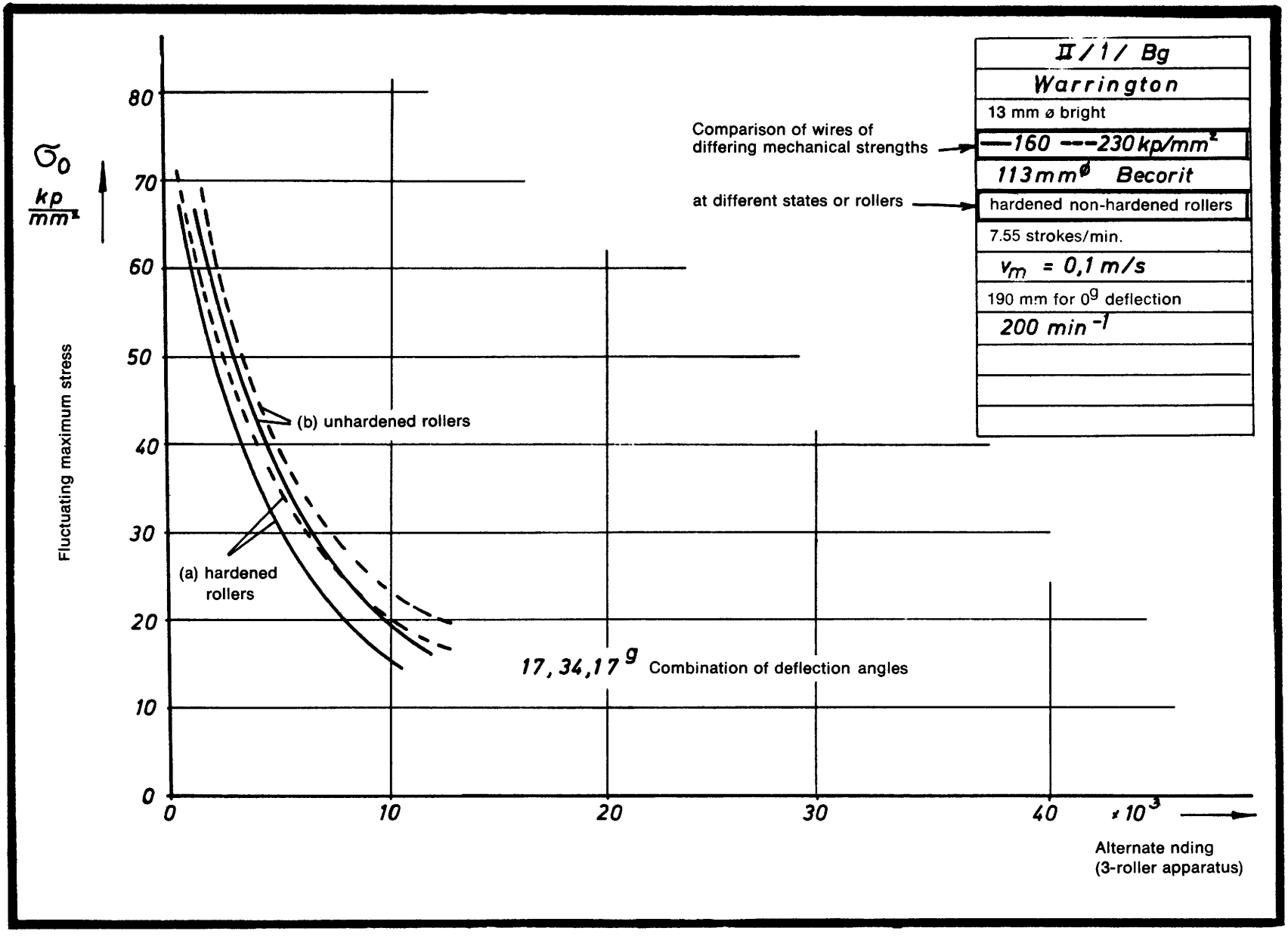
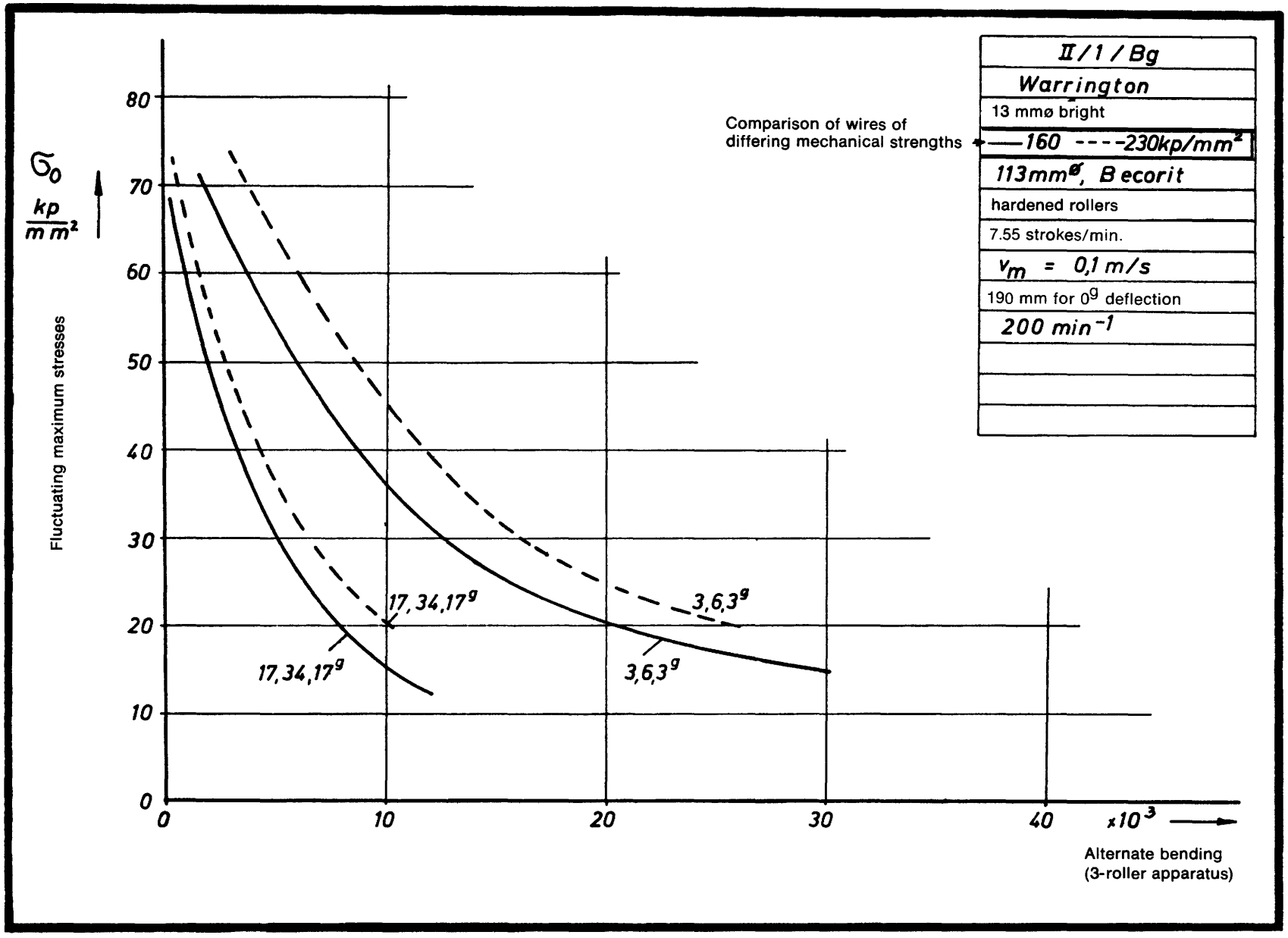


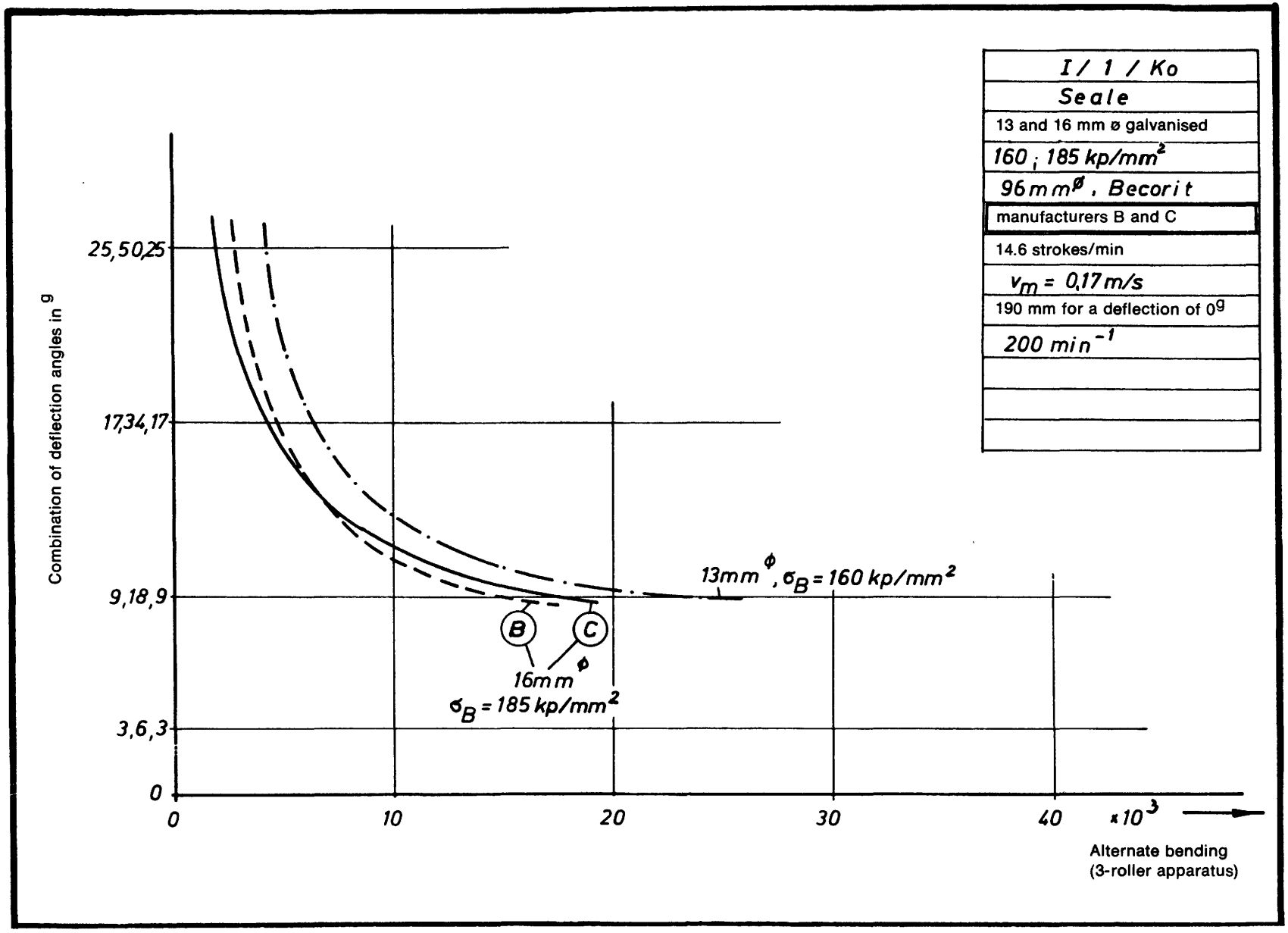
Figure 13

Strength of a Warrington rope under various geometric and dynamic stresses; parameter: combination of deflection angles



Strength of two ropes of same type but of different manufacturers under various combinations of deflection angles and an oscillation amplitude of ± 5 kgf/mm²

Figure 14 **Comparison with rope of same type, of 13 mm ø σ_B = 160 kgf/mm²**



Comparative strength of ample and poor lubrication for a Seale-Warrington rope; σ_g not constant - constant angle of deflection

Figure 15

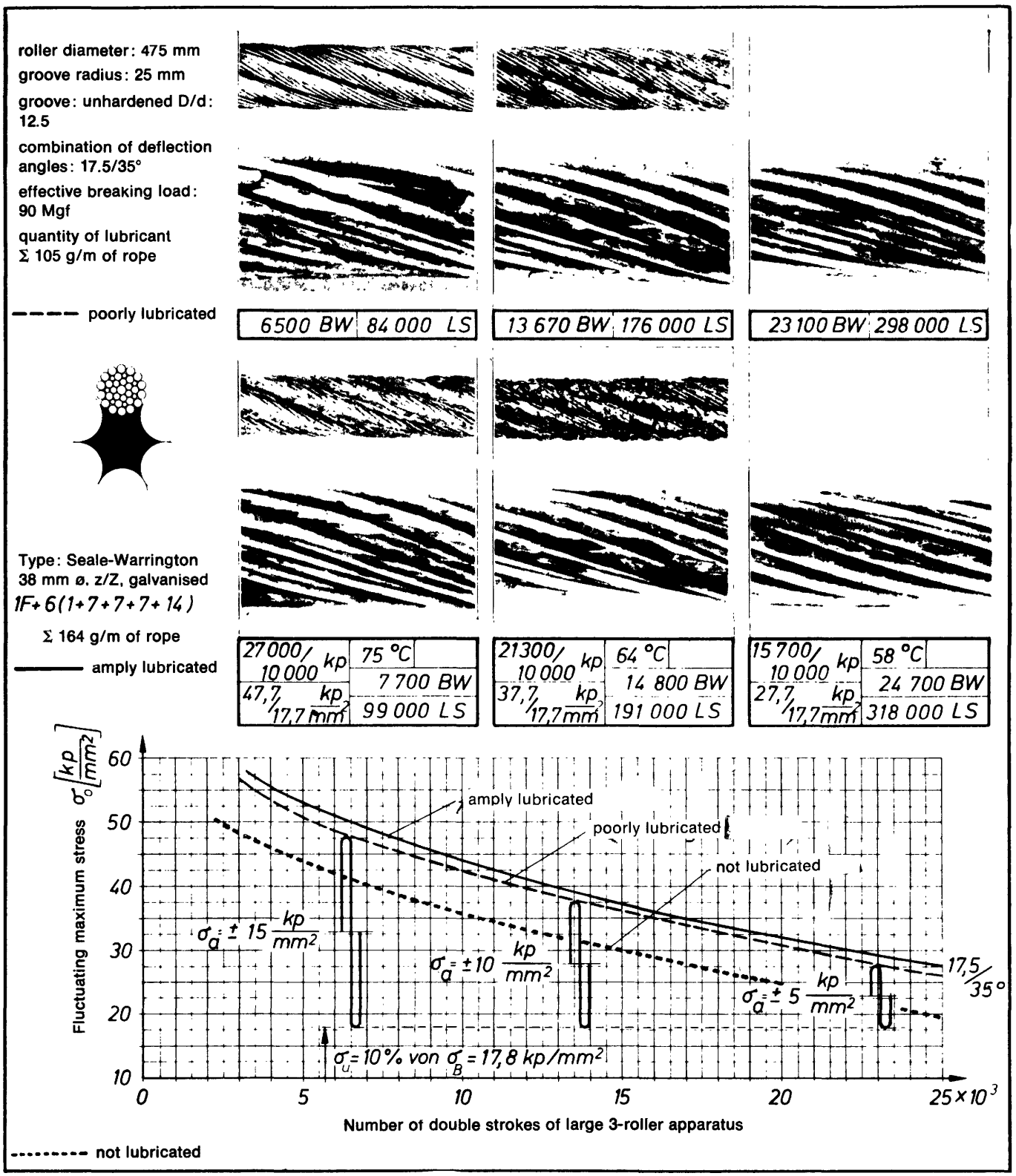


Figure 16

Curve of loss of strength at rupture, for various dynamic loads of ropes and same geometric deformation

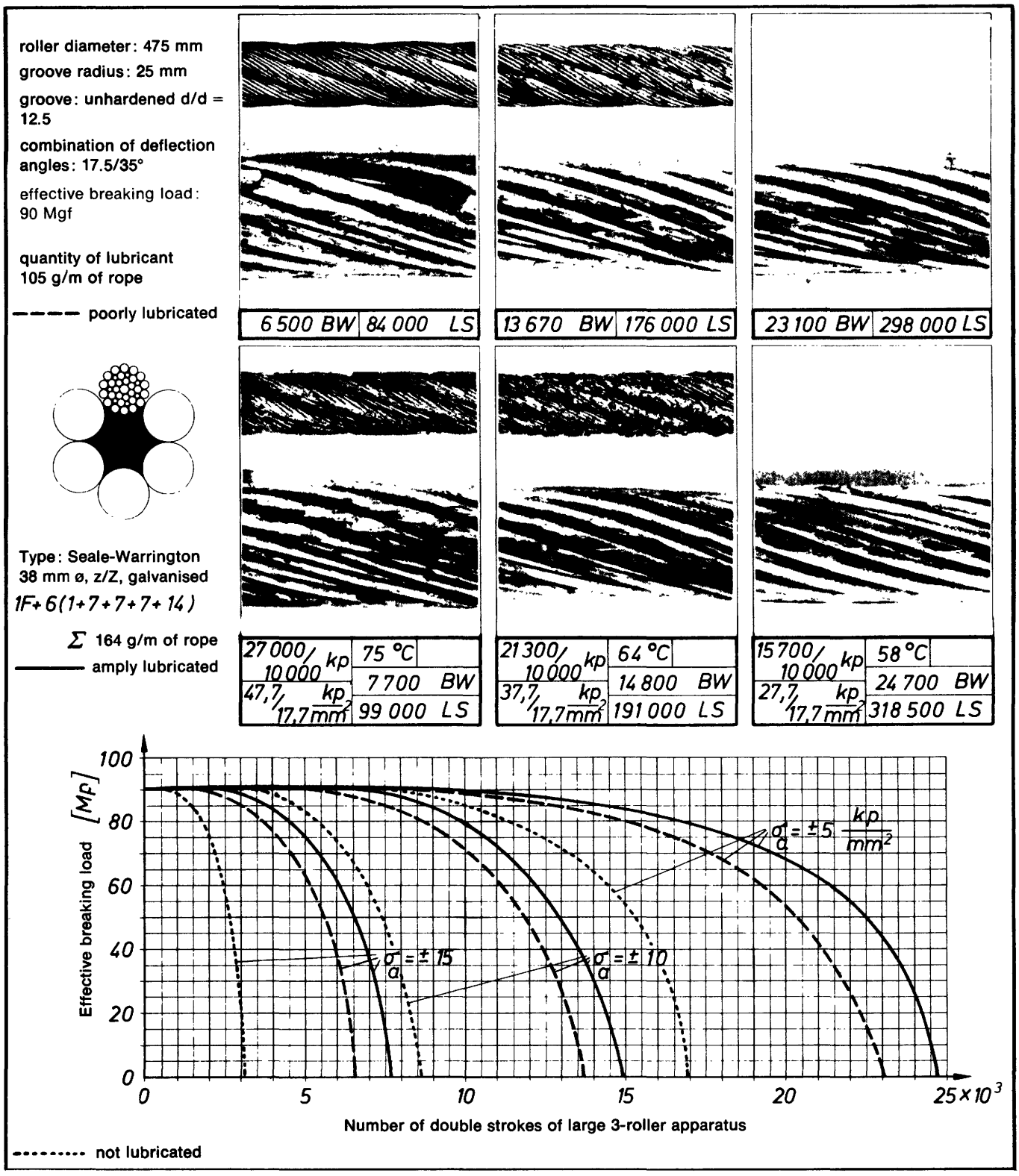


Figure 17

Organisation chart for quantitative comparison of factors affecting rope service life

A Basic stresses

1) geometric (roller diameter 1.1
(deflection angle 1.2

2) dynamic (static 2.1
(kinetic 2.2

3) starting data
4) groove shape
5) material St 52.3
6) fluctuating minimum $\delta_u = 0{,}1\ \delta_B$

B Modes of representation	C Principal groups	A single combination of stresses 0			Overall diagrams for stressing sectors = E			
					I Ordinate: deflection angle		II Ordinate: fluctuating stress	
	D Subgroups	breaking 0/1	bending 0/2	torsion 0/3	Parameter differences I/1	I/2	Parameter differences II/1	II/2
F Supplementary Stress e.g. 7 type of rope 8 roller shape, 9 roller base, 10 lubrication								

Table and abbreviations of rope evalution and selection diagrams

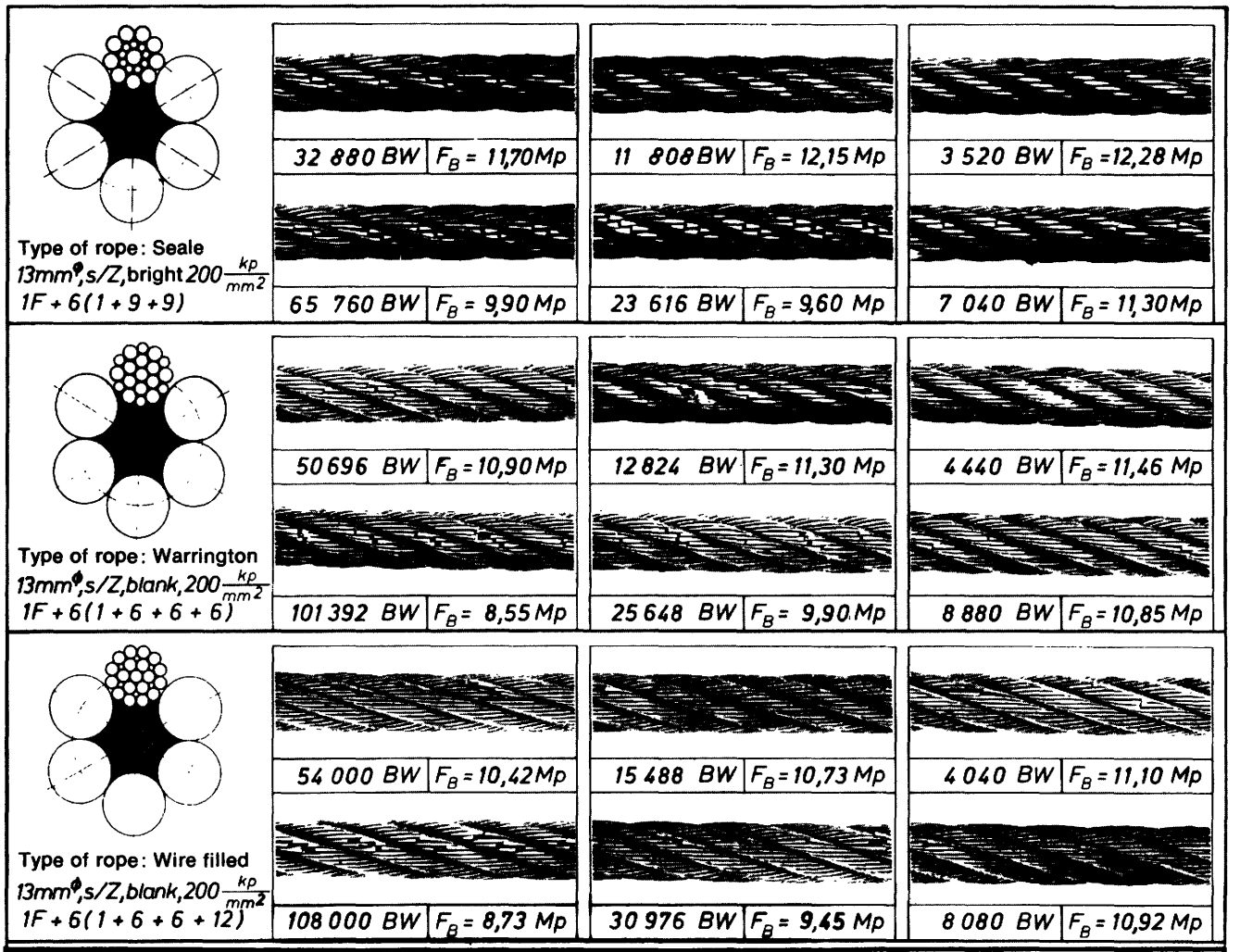
Figure 18

1	Basic loading			Geometric (roller dia. and deflection angle) and dynamic (fluctuating stresses) loading						
2				Strength characteristics for a single combination of stresses (forms)			Strength characteristics for complete stressing sectors (summary diagrams)			
3		Main group		0			I		II	
		Subgroup		Rupture	Bending 0/2	Torsion 0/3	I/1	I/2	II/1	II/2
4	Representation in diagram			Loss curve	Loss curve	Loss curve	Same type of rope, different loading	Comparison of different types of ropes	Same type of rope, different loading	Comparison of different types of ropes
5		Abscissae		Alternative bending	Alternative bending	Alternative bending	Alternative bending	Alternative bending	Alternative bending	Alternative bending
6		Ordinates		Breaking load	No. of bends as % of starting values	No. of torsions as % of starting values	Combination of deflection angles	Combination of deflection angles	Fluctuating stress	Fluctuating stress
7		Parameter	Symbol				Parameter : fluctuating stress	Parameter : type of rope; subparameter; fluctuating stress	Parameter : combination of deflection angles	Parameter : type of rope; subparameter : combination of deflection angles
8 9 10 11 12	Supplementary loading : Factors : quantitative determination of other factors influencing the rope service life, comparison of factors.	Rope type details such as : Length of twist Strand separation Type of twist Wire strength	Ko	0/1 type	0/2 type	0/3 type	I/1 type	I/2 type	II/1 type	II/2 type
13		Simple bending (Roller sheave)	B_e	0/1 s.b.	0/2 s.b.	0/3 s.b.	I/1 s.b.	I/2 s.b.	II/1 s.b.	II/2 s.b.
14		Alternate bending (3 or 4 roller apparatus)	B_w	0/1 a.b.	0/2 a.b.	0/3 a.b.	I/1 a.b.	I/2 a.b.	II/1 a.b.	II/2 a.b.
15		Groove structure	R	0/1 groove	0/2 groove	0/3 groove	I/1 groove	I/2 groove	II/1 groove	II/2 groove
16 17		Groove bottom material (state of material)	Bg	0/1 bottom	0/2 bottom	0/3 bottom	I/1 bottom	I/2 bottom	II/1 bottom	II/2 bottom
18		Energy transmission	Kr	0/1 energy transm	energy 0/2 transm	energy 0/3 transm	I/1 energy transm	I/2 energy transm	II/1 energy transm	II/2 energy transm
19		Nature and quantity of strand lubrication	L	0/1 s.l.	0/2 s.l.	0/3 s.l.	I/1 s.l.	I/2 s.l.	II/1 s.l.	II/2 s.l.
20		Impregnation agent for rope core	S	0/1 imp	0/2 imp	0/3 imp	I/1 imp	I/2 imp	II/1 imp	II/2 imp
21		Service lubrication	N	0/1 lubs.	0/2 lubs.	0/3 lubs.	I/1 lubs.	I/2 lubs.	II/1 lubs.	II/2 lubs.
22		Operating temperature	T	0/1 temp	0/2 temp	0/3 temp	I/1 temp	I/2 temp	II/1 temp	II/2 temp

The supplementary loading is indicated in the group name in cases of comparison of this type of loading.

Other explanatory data on the diagrams are given after the column "supplementary loading".

Figure 19a **Curves of loss of strength at rupture. Set of diagrams 0/1**



Dynamic rope load: σ_a	± 0 kp/mm²	± 10 kp/mm²	± 20 kp/mm²
Geometric deformation D/d = 8.7 — deflection angle	6°	6°	6°
roller ø	113 mm	113 mm	113 mm
groove radius	36 mm	36 mm	36 mm
Comparison of supplementary factors			

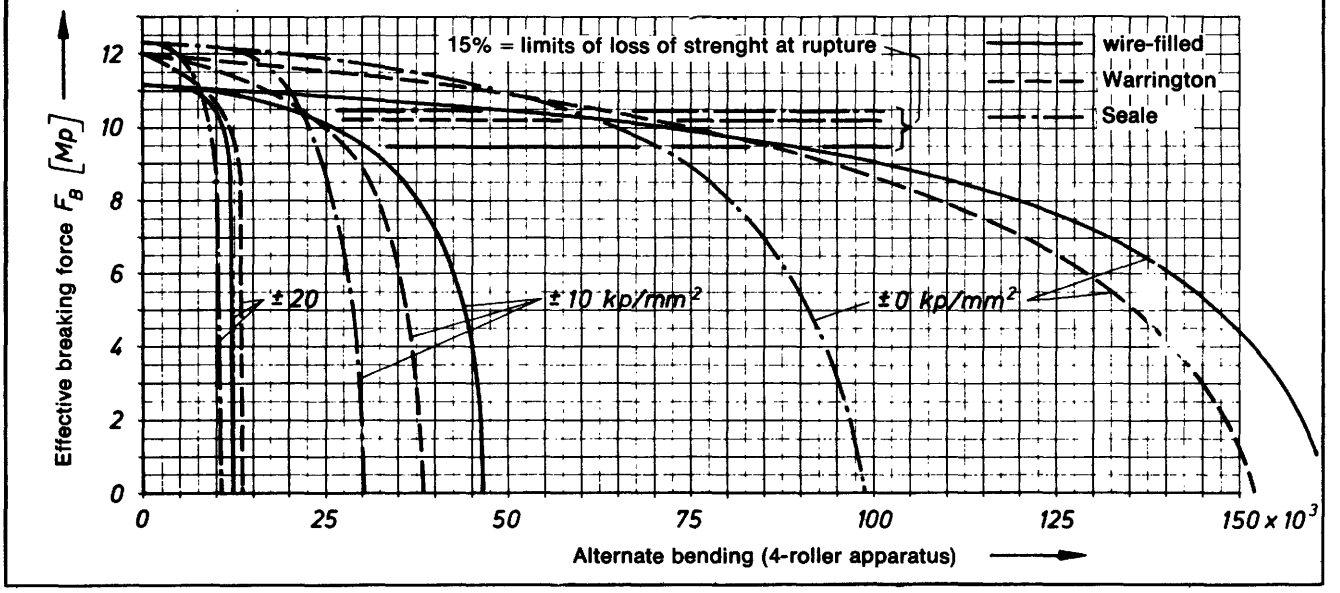
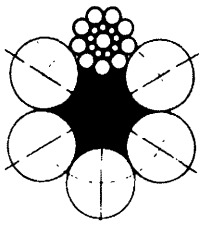
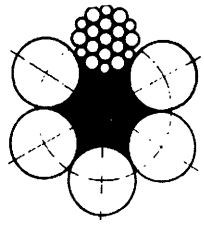


Figure 19 b **Curves of loss of strength at rupture. Set of diagrams 0/1**



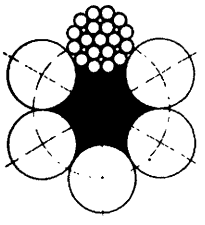
Type of rope: Seale
13mm$^{\phi}$, s/Z, bright, 200 $\frac{kp}{mm^2}$
1F + 6(1 + 9 + 9)

579 BW | F_B = 12,15Mp	270 BW | F_B = 12,20 Mp	152 BW | F_B = 11,75 Mp
1158 BW | F_B = 7,8 Mp	540 BW | F_B = 10,70Mp	304 BW | F_B = 11,90 Mp



Type of rope: Warrington
13mm$^{\phi}$, s/Z, blank, 200 $\frac{kp}{mm^2}$
1F + 6(1 + 6 + 6 + 6)

4296 BW | F_B = 11,30 Mp	2928 BW | F_B = 11,15 Mp	1240 BW | F_B = 11,18 Mp
8592 BW | F_B = 9,30 Mp	5856 BW | F_B = 10,90 Mp	2480 BW | F_B = 10,45 Mp



Type of rope: Wire filled
13mm$^{\phi}$, s/Z, blank, 200 $\frac{kp}{mm^2}$
1F + 6(1 + 6 + 6 + 12)

6496 BW | F_B = 10,82 Mp	3000 BW | F_B = 10,78 Mp	1320 BW | F_B = 10,65 Mp
12992 BW | F_B = 8,04 Mp	6000 BW | F_B = 9,57 Mp	2640 BW | F_B = 10,04 Mp

Dynamic rope load: σ_a	± 0 kp/mm^2	± 10 kp/mm^2	± 20 kp/mm^2
Geometric deformation D/d = 8.7 — deflection angle α	18^g	18^g	18^g
roller Ø	113 mm	113 mm	113 mm
groove radius	36 mm	36 mm	36 mm
Comparison of supplementary factors			

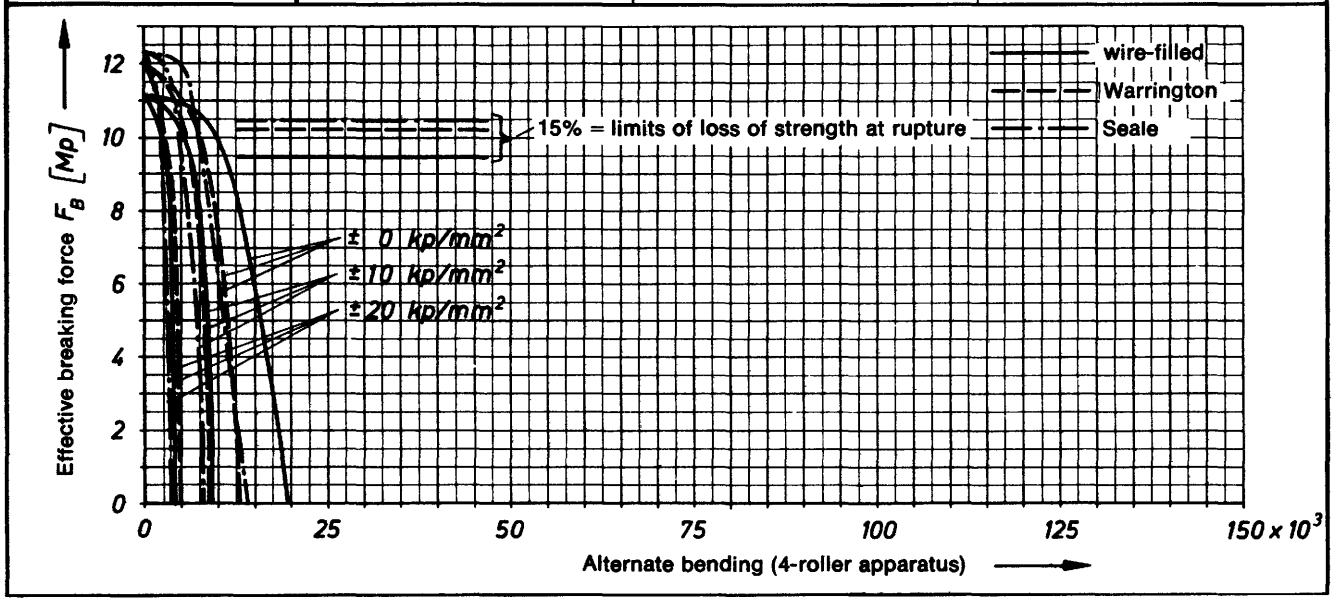
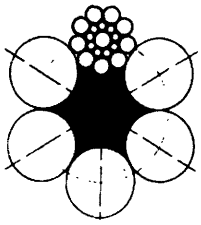
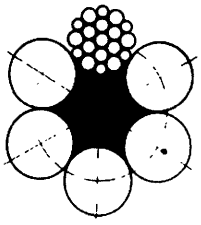


Figure 19 c **Curves of loss of strength at rupture. Set of diagrams 0/1**



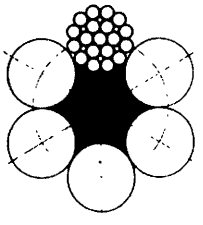
Type of rope: Seale
13mm ϕ, s/Z, bright 200 $\frac{kp}{mm^2}$
1F + 6(1 + 9 + 9)

1 848 BW | F_B = 12,20Mp	1 288 BW | F_B = 12,25Mp	528 BW | F_B = 12,25Mp
3 696 BW | F_B = 9,50 Mp	2 576 BW | F_B = 10,45 Mp	1 048 BW | F_B = 11,60 Mp



Type of rope: Warrington
13mm ϕ, s/Z, blank, 200 $\frac{kp}{mm^2}$
1F + 6(1 + 6 + 6 + 6)

2272 BW | F_B = 11,53 Mp	1488 BW | F_B = 11,25 Mp	560 BW | F_B = 10,82 Mp
4 544 BW | F_B = 9,54 Mp	2976 BW | F_B = 10,20 Mp	1120 BW | F_B = 10,48 Mp



Type of rope: Wire filled
13mm ϕ, s/Z, blank, 200 $\frac{kp}{mm^2}$
1F + 6(1 + 6 + 6 + 12)

3336 BW | F_B = 11,20 Mp	1920 BW | F_B = 11,10 Mp	464 BW | F_B = 11,05 Mp
6 672 BW | F_B = 9,42 Mp	3840 BW | F_B = 8,97 Mp	928 BW | F_B = 10,87 Mp

Dynamic rope load: σ_a	± 0 kp/mm²	± 10 kp/mm²	± 20 kp/mm²
Geometric deformation D/d = 8.7 — deflection angle ∢	36°	36°	36°
roller Ø	113 mm	113 mm	113 mm
groove radius	36 mm	36 mm	36 mm
Comparison of supplementary factors			

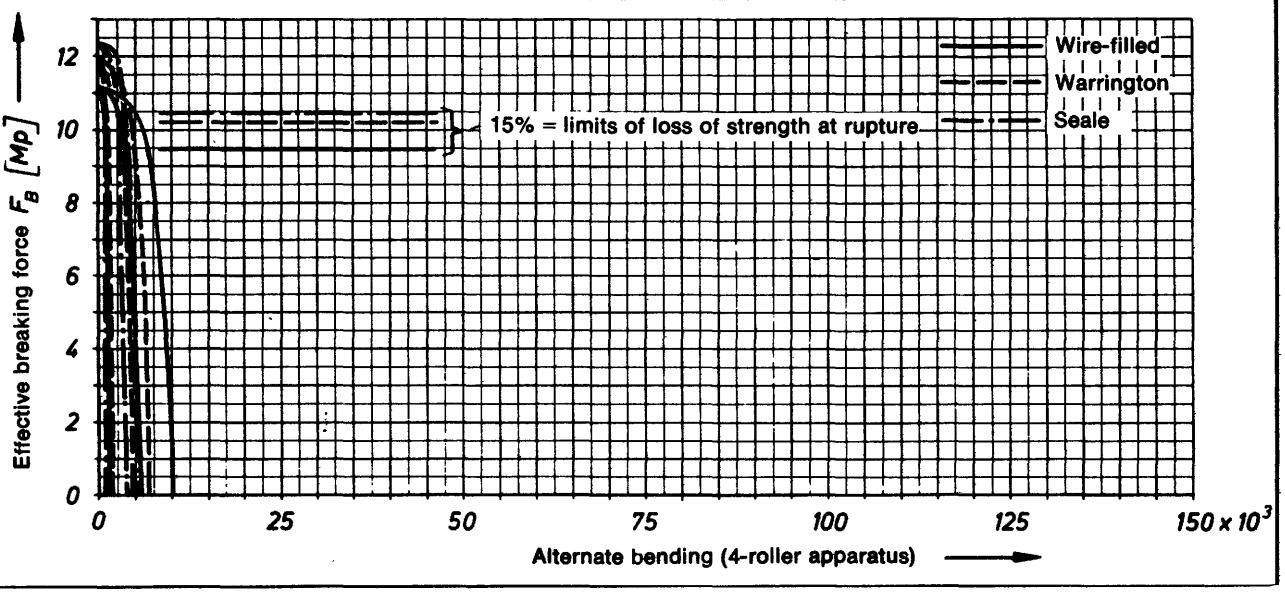


Figure 20

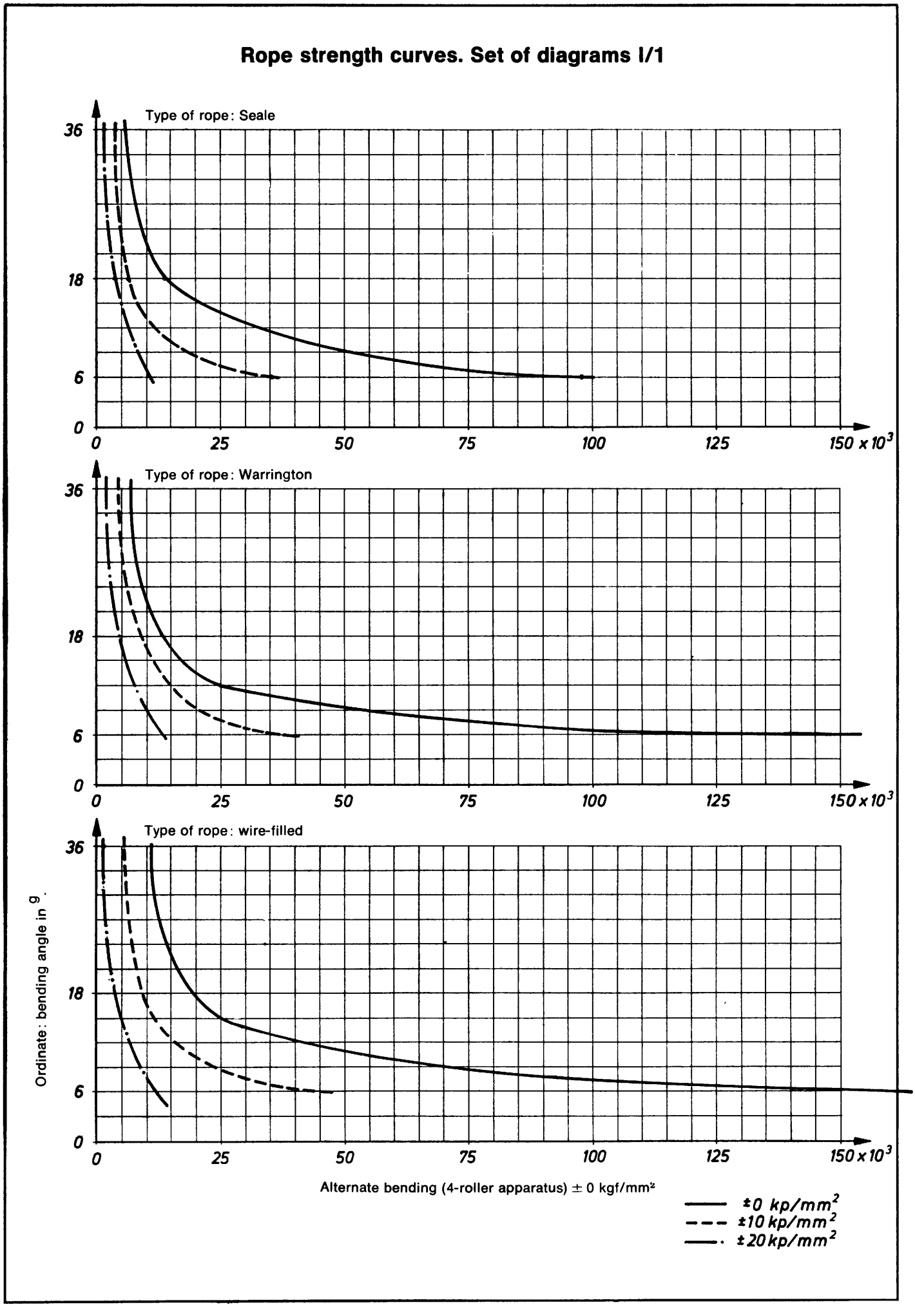
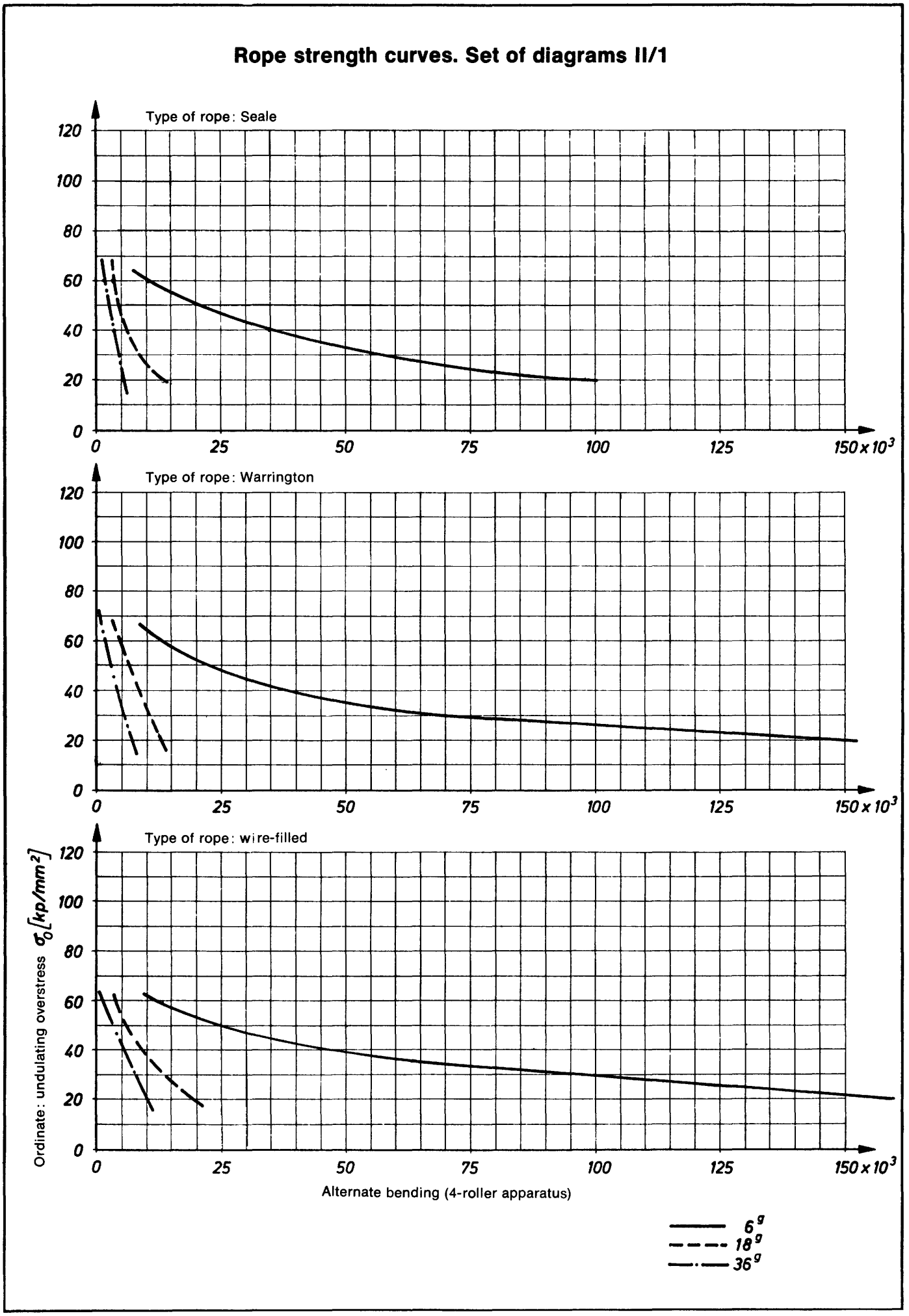

Rope strength curves. Set of diagrams I/1
Type of rope: Seale
Type of rope: Warrington
Type of rope: wire-filled
36
18
6
0
0
25
50
75
100
125
150 x 10³
Ordinate: bending angle in g.
Alternate bending (4-roller apparatus) ± 0 kgf/mm²
±0 kp/mm²
±10 kp/mm²
±20 kp/mm²

Figure 21

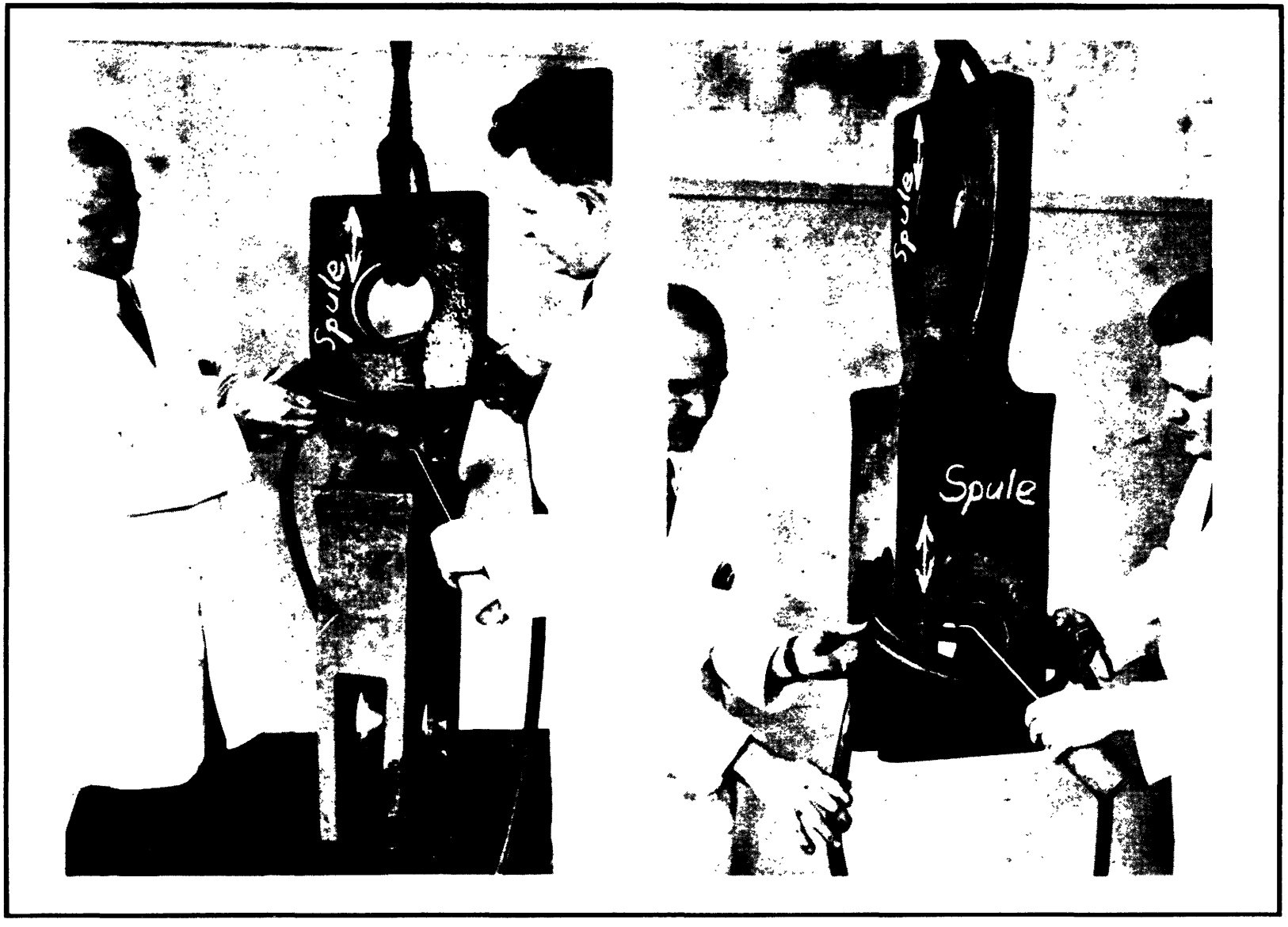

Rope strength curves. Set of diagrams II/1
Type of rope: Seale
Type of rope: Warrington
Type of rope: wire-filled
Ordinate: undulating overstress σ_0 [kp/mm²]
120
100
80
60
40
20
0
0
25
50
75
100
125
150 x 10³
Alternate bending (4-roller apparatus)
6 g
18 g
36 g

Intermediate connection element testing by magnetised powder

Figure 22 a

Magnetisation and washing of splice strip and of fork of a cross

Figure 22 b

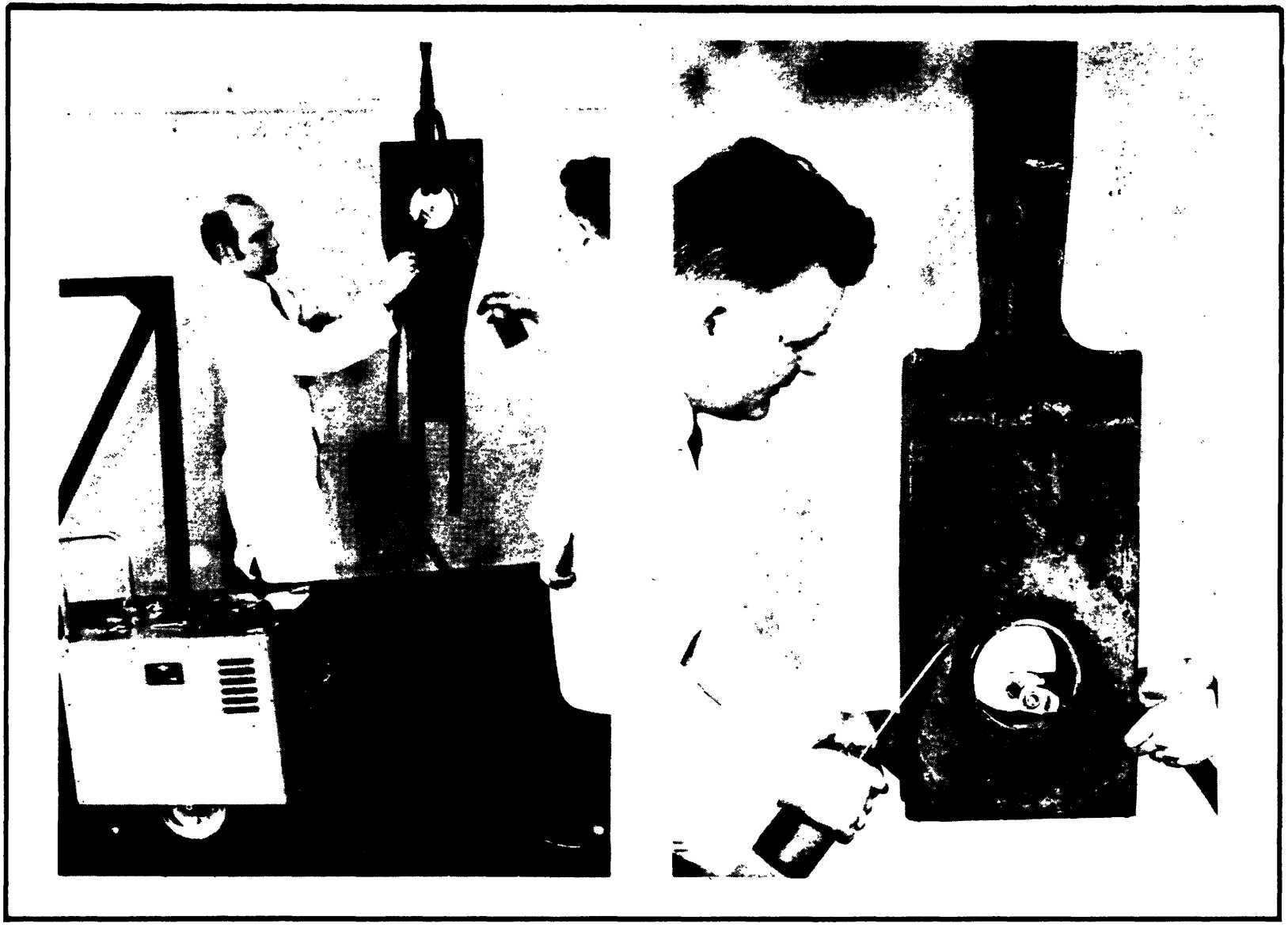


Intermediate connection element testing by magnetised powder

Figure 23 a

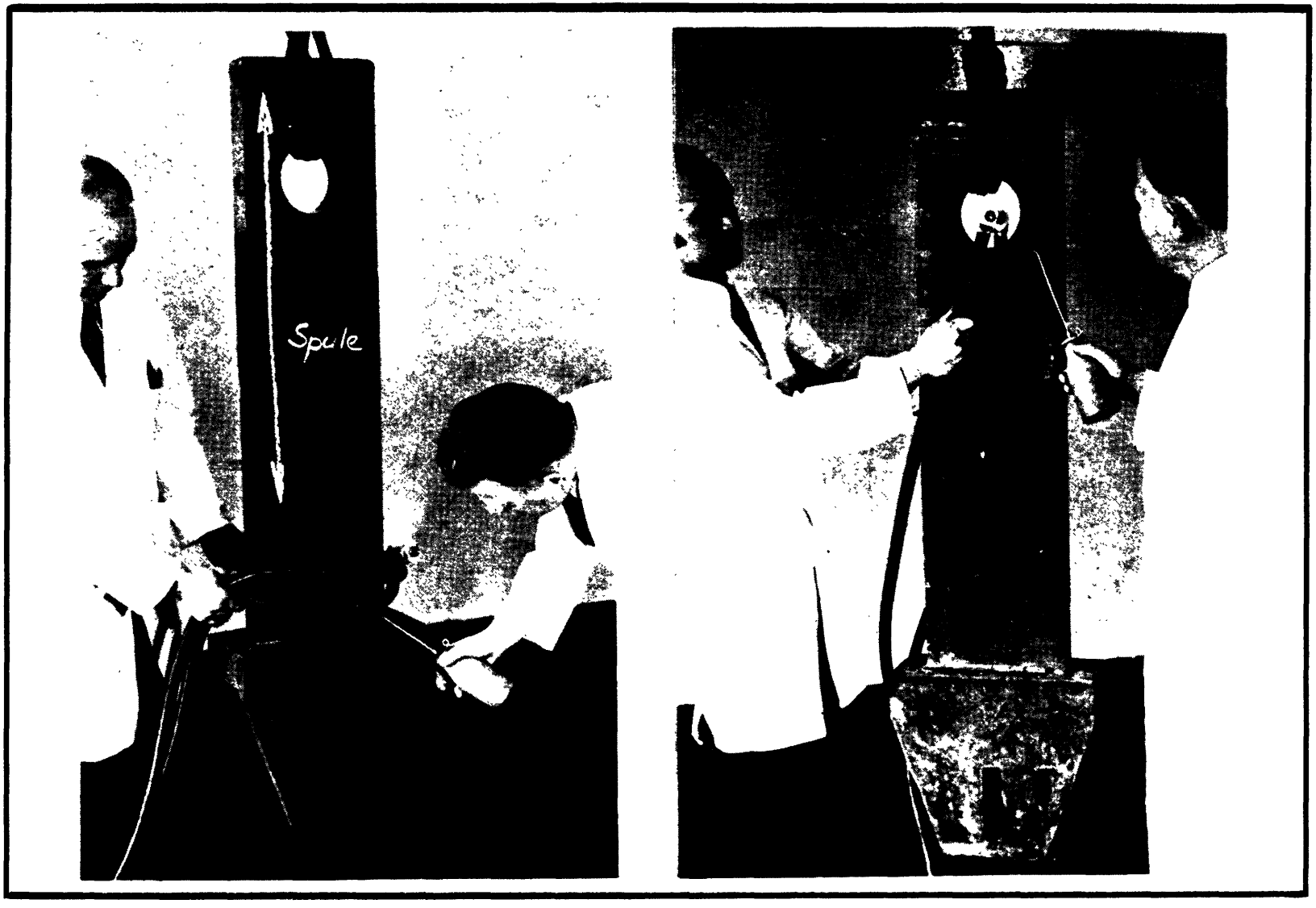
Magnetisation and washing of hole edges of a cross

Figure 23 b



Intermediate connection element testing by magnetised powder

Figure 24 a — Magnetisation and washing of a main bolt: — Figure 24 b



a) hole edges;

b) shaft and shaft/head connection.

Intermediate connection element testing by magnetised powder

Figure 25 a

Examination of washed cross to detect cracks under ultra-violet rays

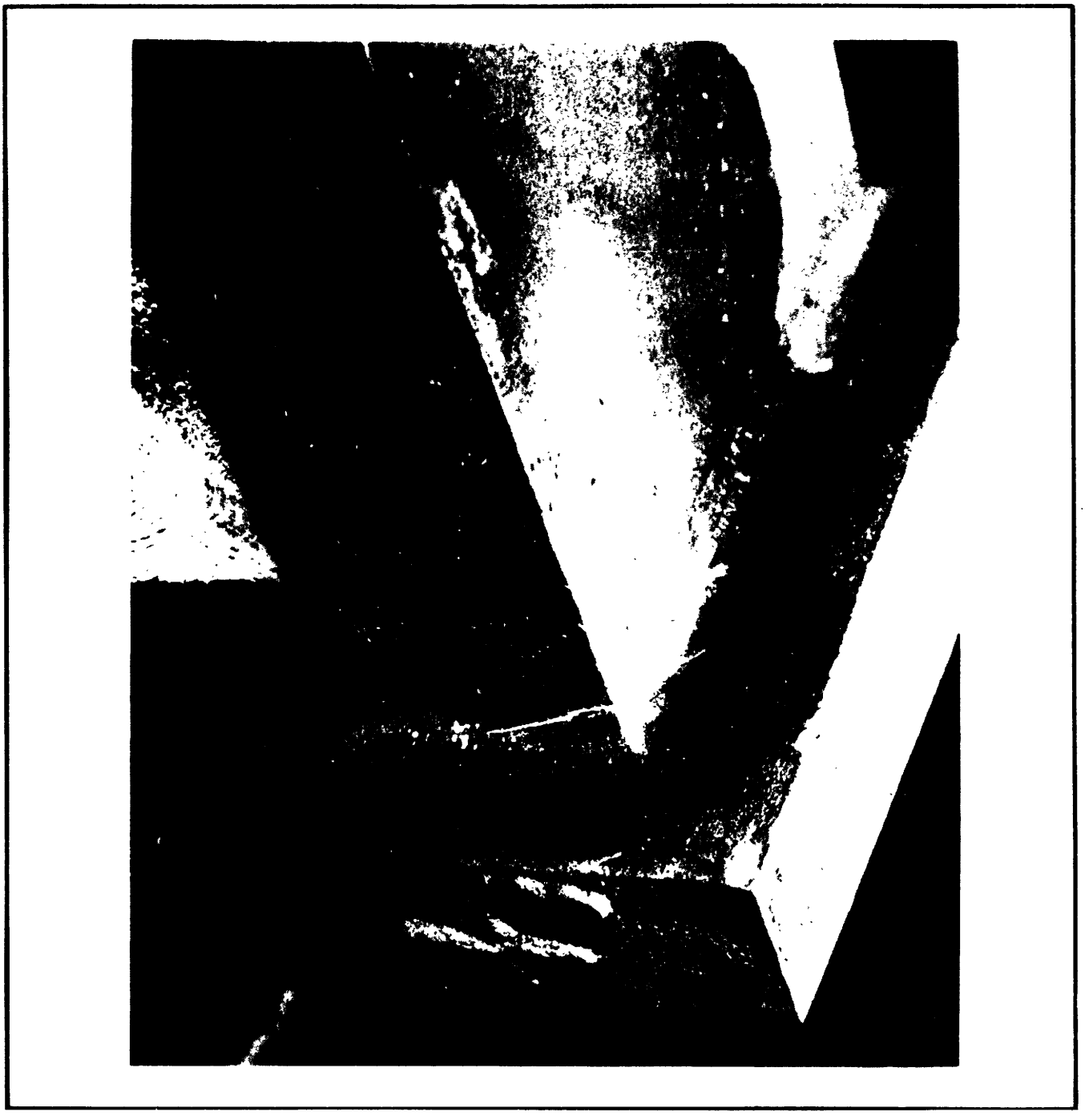
Figure 25 b

Intermediate connection element testing by magnetised powder

Figure 26 Examination of washed main rod to detect cracks under ultra-violet rays

Intermediate connection element testing by magnetised powder

Figure 27 Examination of a crack in the main rod under ultra-violet rays



ANNEX VI

AMENDMENTS TO THE MINES SAFETY AND HEALTH COMMISSION'S RECOMMENDATION OF 20 APRIL 1960 ON THE PREVENTION OF MINE-SHAFT FIRES BY WATER-SPRAYING *(1)*

(1) Second report of the Mines Safety Commission (June 1961, page 26).

In conformity with a decision by the Mines Safety and Health Commission on 26 April 1968, a sub-committee of the Working Party drew up a draft amendment to the Commission's recommendation of 8 April 1960 concerning the prevention of mine-shaft fires by water-spraying. The object of these amendments was to draw attention to the relative value of the curves in the diagrams given in the recommendation, and also to make two additions to the fire-fighting equipment.

Further trials in Germany and Belgium and also in Czechoslovakia have not in fact completely confirmed the accuracy of the air current force in the charts attached to the recommendation. After new cold spraying trials in Belgium and investigations by specially appointed experts, it appeared necessary to insert in the recommendation the following amendments and definitions, which were proposed by the Working Party on "Rescue Arrangements, Mine Fires, and Underground Combustion" to the Commission on 10 March 1972, and adopted by the Commission on 11 July 1972. The Commission wanted a note made to the effect that these amendments did not affect the prefatory remarks to the recommendations and particularly the following remark *(1)*:

> "These principles are to be observed only in cases in which the spraying down of water from a surface installation has been included in the fire-fighting plans".

1. Amendments to the Commission's recommendation No 199 of 8 April 1960 (pages 26 to 49 of Second Commission Report June 1961)

The chart annexed to the recommendation gives the increase in air pressure, per 100 metres of shaft height resulting from the sending down of water into an air-intake shaft, as a function of the air-current speed and for different volumes of sprayed water; the quantities of water are expressed in litres per minute per square metre of shaft cross-section.

There have been few incidents from which to check the accuracy of the chart proposed by the Commission to calculate the effect which water falling down a shaft has on air-current speed.

On the basis of the limited amount of information gained from these incidents the experts reckon that the monogram gives an indication of the effects of spraying which is accurate enough for practical purposes.

During spraying, the air-current forces caused by the spraying must be expected to be between 10 and 30% lower than the figures given in the monogram, according to the equipment in the shaft concerned; a shaft with hardly any equipment would give a reduction of 10% and a shaft with a good deal of equipment a reduction of 30%.

During the start up period which varies from 5 to 10 minutes depending on the mine, the effect of the water on the air flow is considerably less than when the spraying is in full flow.

It should be noted, however, that this initial period is noticeably longer than the time it takes the water to reach the bottom.

The experts consider that more exact values for the coefficients mentioned above cannot be obtained unless some further theoretical and practical work is done.

2. Additions to the recommendation

(a) The spraying of a return air shaft (or an air intake shaft when fire has caused reverse ventilation) may be less effective if ledges hold the water as it runs down

---

(1) Second report of the Mines Safety Commission (June 1961, page 26).

and may even become completely ineffective if the air speed is greater than 10 m/sec.

Therefore at each filling station of every main shaft a fire point should be provided such as spraying ramps, hoses, or equivalent apparatus.

This apparatus should be operated either from the filling station or the shaft outlet.

(b) When a fire breaks out in an air intake shaft below a part where work is in progress the heat may be so intense as to reverse the air flow and drive some of the smoke to the work area. For this reason 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.

This apparatus should not necessary 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.

ANNEX VII

MEMORANDUM ON INFORMATION NECESSARY FOR THE EXAMINATION OF COAL-DUST EXPLOSIONS OR IGNITIONS OF FIREDAMP IN MINES

(Adopted by the Mines Safety and Health Commission, 6.2.73)

1. Locality of the explosion zone

1.1. Description of the working(s) involved in the incident

Designation of the seams, workings, preparatory workings in coal, cross-cuts

1.2. Volatile matter content of the coal

Firedamp content per ton of the coal in situ and method used to determine it

Ash content, sulphur content

Seam thickness, stratigraphic structure of the seam

Illustration of a seam profile, including the surrounding rock and parallel seams

Illustration of a seam section in the vicinity of the underground workings involved in the incident

2. Operating conditions in the working

2.1. General information regarding the characteristics of the underground workings involved in the incident (preparatory workings in the districts, in the faces, winning work, heading operations, etc.)

Information regarding deployment of men at the time of the explosion

2.2. For winning workings: working to the strike or to the dip, advancing or retreating faces, stowing methods, length of face, dips, face heights

Types of cutter-loader

Amount of coal won daily in cm

Use of explosives, type of explosive, illustration of a plan of the workings in each seam indicating the limits of the solid coal and of the stowed area, together with any residual pillars which may be left in the seams being worked either above or below (in the roof up to 200 m away, in the floor down to 100 m away)

2.3. For the preparatory workings in a district of a face :

Daily advance in cm, seam section at the front surface, dip of the seams, use of heading machines, work with explosives, type of explosive

2.4. For other types of underground working :

Purpose of the underground working, use of special machines, work with explosives, type of explosive

2.5. For robbing operations :

Use of prop-withdrawal devices, use of explosives, type of explosive

2.6. Information regarding transport, for example : coal haulage roads, roads for inward transport of stowing material, of supplies, use of rail tracks, conveyors, monorails

2.7. Types of support used

Cross-section in m^2 in the zone involved in the incident

- in the face
- in the gate-road
- in the cross-cuts, etc.

3. Ventilation conditions in the explosion zone *(1)*

3.1. Main air current, ventilation district current, current of air not passing through the workings (air branches)

Diagonal air currents (non-uniform air currents, unstable air currents)

3.2. Intake airways, return airways auxiliary ventilation - aspirating or blowing

Ventilation controlling equipment (air doors, control doors, etc.)

Methane drainage installations, results

3.3. Results obtained by investigations of ventilation (even if of earlier date)

3.3.1. Ventilation measurements carried out before the explosion (in the case of measurements made before the explosion, indicate the date) :

- in the ventilation district (near intake and return)
- at the air entry point into the face
- at the air exit point from the face
- at the (assumed) focus of the explosion

3.3.1.1. Quantities of air expressed in m^3/min or m^3/sec

3.3.1.2. Air velocities m/sec

3.3.1.3. Firedamp content in the air current indicating the type of methanometer used (firedamp-testing lamps to the extent they may permitted)

3.3.1.4. Accumulations of firedamp which may possibly be present :

information regarding the site and size of the accumulation, possible layers of firedamp at roof level :

information regarding location and size of the layers, in particular in the boundary zones around the face or the goaf of other workings (see point 22), any instantaneous outbursts of gas which may have occurred

3.3.1.5. Dry-bulb temperature, wet-bulb temperature, moisture content of the air in %

3.3.1.6. Local static pressure in mm WG or in kg/m^2

3.3.1.7. Barometric pressure recorded on the day before the explosion

3.3.1.8. Make of firedamp calculated in m^3/min, for winning workings in addition the coal production in m^3/tonne

3.3.1.9. Calculated pressure differentials (differentials in static pressure between two measurement points) in mm WG or in kg/m^2; figure indicating resistance of the underground working to the passage of the ventilation current

3.3.2. Reconstitution of the ventilation situation on the basis of the data in point 3.3.1. and following points, accompanied by transcription on a ventilation plan of the ventilation arrangements before the explosion, making due allowance for leakages

3.3.3. Any disturbance in the ventilation which may have occurred shortly before the explosion had their effects on the firedamp make, these disturbances not having been allowed for in the measurements covered by points 3.3.1. and following

3.3.3.1. Disturbances of the ventilation which may have occurred and modifications resulting therefrom in the direction of the ventilation currents

---

(1) This information can usefully be supplemented by a schematic diagram indicating the direction of ventilation and the air quantities; the plan may also indicate the situation of explosion barriers and of zones treated with stonedust or salt pastes, together with those places where the main mechanical or thermal effects of the explosion were observed and the places where the victims of the explosion where found.

3.3.3.2. Possible or probable modifications in the air quantities and air velocities

3.3.3.3. Causes of the disturbances or modifications in the ventilation conditions

3.3.3.4. Repercussions of the modified ventilation conditions on the firedamp make

3.3.4. If possible or necessary :

ventilation measurements carried out after the explosion as shown under point 3.3.1.

3.3.4.1. As for point 3.3.1.1.

3.3.4.2. As for point 3.3.1.2., with the addition of possible modifications in the direction of ventilation

3.3.4.3. As for point 3.3.1.3.

3.3.4.4. As for point 3.3.1.4.

3.3.4.5. As for point 3.3.1.5.

3.3.4.6. As for point 3.3.1.6.

3.3.4.7. As for point 3.3.1.7.

3.3.4.8. As for point 3.3.1.8.

3.3.4.9. As for point 3.3.1.9.

3.3.5. If possible or necessary :

Results of measurements and calculations of ventilation based on the data covered by point 3.3.4. and following, after indication on a ventilation plan of the devices intended to control the ventilation, which had been destroyed by the explosion

3.3.6. If possible or necessary :

Results of a ventilation calculation carried out on a computer (analogue or digital) on the basis of definite or probable input data covered by point 3.3.1. and following and 3.3.4. and following

Record of the weak points in the ventilation system, influence of the weak points on the formation of accumulations or layers of firedamp

Influence of the disturbances covered by point 3.3.3. on the formation of accumulations or layers of firedamp

4. Coal-dust in the working zone and the dust-suppression measures provided

4.1. Sources of dust make :

Winning machines, firing of rounds of shots, falls of coal, etc.

4.2. Quantity of dust deposited (heavy, medium, weak) :

4.2.1. At the face entry on the air return side

4.2.2. At the face entry on the air intake side

4.2.3. In the return airways

4.2.4. In the haulage roads (air intake)

4.2.4.1. Due to the coal haulage systems

4.2.4.2. Due to the accumulations occurring at the conveyor-discharge points

4.2.5. In the other roadways involved in the incident

4.2.6. Moisture content of the floor and surrounding walls of the roadways :

dry, moist, very moist

4.3. Dust-suppression measures

4.3.1. Dust-suppression methods actually used

4.3.1.1. In winning :

Water infusion in the solid coal, spraying, fine spraying of water onto the winning machines, etc.

4.3.1.2. In the roadways involved in the incident : spraying, wetting, crusts of salt paste, removement by shovel or by aspiration devices, stonedusting, salt pastes, etc.

4.3.2. Checks carried out before the accident to monitor the application of the dust-suppression measures covered by point 4.3.1.

- sampling and measurement methods
- frequency of checks, time elapsed since the last check
- location of sampling points
- result of the checks : quantities of dust, rate of stonedusting, moisture content, etc.

4.3.3. Actual preventive measures, as noted subsequently

4.3.3.1. In the working districts involved in the incident

4.3.3.2. In the roadways involved in the incident

5. State of the explosion barriers before the explosion

5.1. Methods of constructing the explosion barriers :

5.1.1. Explosion barriers with inert dust

5.1.1.1. Main or secondary explosion barriers (distributed explosion barriers, to the extent that such distinctions are made)

5.1.1.2. Types of explosion barrier : indication of the method of construction

5.1.1.3. Materials used in making the barriers, dimensions and arrangement of the platforms in the barriers (length, width, situation in the roadway cross-section)

5.1.1.4. Description and dimensions of the supports and the components of the platforms ensuring the appropriate degree of instability

5.1.1.5. Number of platforms, distance between platforms

5.1.1.6. Nature of the inert dust, theoretical amount in kg or in litres :

- per meter of platform length
- per platform
- per square metre of roadway cross-section (indicate the total area of cross-section)

5.1.1.7. Time elapsed since the last replacement of the dust

5.1.1.8. Special features in the actual design of the explosion barrier

5.1.1.9. Actual quantity and characteristics of the dust (effect of humidity)

5.1.2. Water barriers

5.1.2.1. Description of the barriers

5.1.2.2. Theoretical and actual quantity of water

5.2. Zones of intense neutralization associated with the explosion barriers

5.3. Position of the explosion barriers affected

5.3.1. Position of the explosion barriers nearest to the focus of the explosion, distances from this focus, from the workings, from the ventilation branches or from angle turns in the roadways

5.3.2. Situation of the other explosion barriers, distances between them, distances from branches in the roadways

6. Course of events during and effects of the explosion or ignition

6.1. Presumed cause of the explosion

6.1.1. Presumed causes of ignition (most probable causes)

6.1.2. If the explosion was initiated by an ignition of firedamp, presumed extent of the accumulation or layer of firedamp

6.2. Any involvement of coal-dust

6.2.1. Sources of considerable dust make and major deposits of dust between the source of origin of the explosion and the first explosion barriers

6.2.2. Presence and site of carbonized coal-dust

6.2.2.1. Quantity of carbonized coal-dust deposited

6.2.2.2. Nature of the carbonized deposits : crusts, beads, dust

6.2.2.3. Presence of coke beyond the first explosion barrier

6.3. Mechanical effects

6.3.1. Pressure and blast wave (static and dynamic pressure)

6.3.1.1. In the zone of explosion development, possible slow ignition (without pressure)

6.3.1.2. In the main zone of action of the explosion, pressure in kg/cm^2 to the extent that it was possible to calculate or estimate it

Direction of the blast force of the explosion

6.3.1.3. Damage caused to the supports; to the ventilation doors, to general equipment, to the transport systems - as a result of the pressure or the blast force

6.3.1.4. Effects of the pressure on the persons present

Pulmonary lesions, major injuries, number of fatalities due to mechanical effects

6.3.2. Velocity of propagation of the explosion (order of magnitude, either calculated or estimated)

6.3.2.1. In the explosion development zone

6.3.2.2. In the vicinity of the explosion barrier

6.4. Thermal effects

6.4.1. Roadways affected by the flames

6.4.1.1. Characteristics of the flame effects after the explosion : e.g. - coke, colour changes, scorched areas, heated areas, fires without production of flame, open fires, effects on electrical cables and items made of synthetic materials (in particular, of conveyor belts, ducting, tubes, hoses)

6.4.1.2. Sites showing indications of persistent combustion of a rich mixture, e.g. wood carbonized to a considerable depth

6.4.1.3. Sites showing medium-degree combustion

6.4.1.4. Sites where combustion was demonstrated by microscope examination in the laboratory

6.4.1.5. Total length of roadway affected by the flames

6.4.1.6. Number of persons burned, number of fatalities resulting from burns, either immediately or subsequently

6.4.2. Point of extinction of the flames. Cause of the extinction :

(a) shortage of combustible material

(b) action of natural humidity

(c) by reason of the action of the preventive means covered by point 4.3.1.

(d) by reason of the action of explosion barriers

6.4.2.1. Estimate of the volume of gas, assumed to be pure methane, which burned

6.5. Action of the fumes

6.5.1. Intoxication in the return airway leading from the explosion

Number of fatalities and number of persons poisoned

Carboxyhaemoglobin count in the blood

6.5.2. Intoxication in the air intake or in other regions of the ventilation districts

6.5.2.1. As a consequence of the passage of the explosion in the other ventilation districts

Number of fatalities and number of persons poisoned

Carboxyhaemoglobin rate

6.5.2.2. As a result of reversal of ventilation

Number of fatalities and number of persons poisoned

Carboxyhaemoglobin rate

7. Efficacy of the explosion barriers : - Indicate the effective action of each explosion barrier

7.1. Correct (platforms upset, flame extinguished in the vicinity of the barrier or shortly thereafter)

7.2. Limited (platforms upset, flame not extinguished and flame passed the barrier, or certain platforms were not upset)

7.3. Zero (platforms not upset although the flame passed the barrier)

8. General conclusions

8.1. Indicate : the roadways in which stonedusting was used to neutralize the dust, or this was done by wetting, salt pastes and the means used were effective or were not effective

8.2. Indicate : the causes attributed to the failures of certain explosion barriers - either dust or water barriers

8.2.1. Unsuitable design. For example : inadequate degree of instability of the platforms, bad arrangement of the platforms across the cross-section of the roadway, ...

8.2.2. Bad locating of explosion barriers in the workings

8.2.3. Insufficient quantity of dust or water

8.2.4. Bad quality of inert dust

8.2.5. Accumulations or layers of firedamp around the explosion barrier

8.2.6. Explosion too weak

8.2.7. Excessively high rate of propagation of the explosion

8.2.8. Other causes of failure

Reasons for changes

1. Modification of the title of the memorandum

This modification is called for because the memorandum must have an obligatory character for the investigation of all the ignitions of methane, since it is not only investigations of short flamings and puffs of methane which can give results and which can lead to decisions which are of considerable importance in connection with mining safety.

2. Regarding point 1.1. of the memorandum

The expression "faces involved in the incident" must be replaced by the expression "underground workings involved in the incident"; an ignition of a mixture of air and coal-dust or firedamp does not necessarily originate in a face; it can also occur in an unoccupied mine working which is consequently not to be considerd as a face.

3. Regarding point 1.2.

The modification makes it possible to characterize the properties of the coal better.

4. Regarding point 2.1.

Improvements intended to provide a more precise description of the underground workings involved in the incident.

5. Regarding points 2.2. - 2.5.

Under point 2.2., it is now required to provide a plan of the workings seam by seam to obtain more precise information regarding possible emissions of firedamp, starting with the situation around the boundaries of the solid coal and the stowed area, together with possible residual pillars left in the seams worked either above or below.

The three new subdivisions of point 2.2. serve to explain questions similar to those listed under the old point 2.2., but now deal respectively with preparatory workings, other underground workings and robbing operations.

6. Regarding the note to point 3

The expression "explosion barriers with stonedust" is to be replaced by the more general expression "explosion barriers".

7. Regarding point 3.1. - 3.3.6.

The new form of words serves to give a better indication of the ideas covered here. The new form of words of points 3.3. and 3.3.1. - 3.3.6. is intended to ensure that the reports of investigations on an explosion provide the available data (air quantities, air velocity, methane content, ventilation control devices, static pressures and levels of resistance to the passage of the air current by the underground workings), so that this information can be used as a starting-point to reconstitute the ventilation situation as it existed before the explosion. In addition, it is also possible - as envisaged under points 3.3.3. - 3.3.5. - to determine if required the ventilation as it was after the explosion, and finally, by means of this reconstitution and a plan indicating the ventilation devices destroyed by the explosion - taken together with calculations made by an analogue or digital computer - to pinpoint the weak points in the ventilation system and their effect on the accumulation of ignitable mixtures of gas and air.

8. Regarding point 4.2.4.

These distinctions were drawn with respect to the make of dust in the haulage roads, since coal-dust is not produced only at conveyor-discharge points; it also occurs on other haulage devices (chain conveyors) which produce coal-dust, and the effect of these devices must be taken into account.

9. Modifications applied to points 5-7 are intended to improve the comprehensibility of the text and its style, and these improvements are consequential upon the changes made in the preceding points.

ANNEX VIII

REPORT ON TRENDS IN THE USE OF EXPLOSIONPROOF ELECTRICAL APPARATUS FOR NOMINAL VOLTAGES ABOVE 1 100 VOLTS - SITUATION AT THE BEGINNING OF 1972 - AS WELL AS CONCLUSIONS AND RECOMMENDATION

(Approved by the Mines Safety and Health Commission, 6.2.1973)

CONTENTS

I. Introduction

In the Resolution regarding the elimination of oil from resistances, condensers, transformers, circuit-breakers and contactors used underground in mines *(1)* adopted by the Mines Safety and Health Commission on 9.12.1958, the Mines Safety Commission noted that it was not possible to eliminate completely the use of oil for circuit-breakers and contactors underground, for voltages over 1 100 volts.

In consequence of this, the Mines Safety and Health Commission considered that - with a view to eliminating the fire risks resulting from presence of oil - research should be continued into the development of electrical apparatus requiring only a small portion of oil or without any oil at all for these voltages.

The Working Party on electricity was instructed to carry out a detailed investigation in this field.

The resultant report, entitled "Report on firedamp-safe electrical apparatus for nominal voltages over 1 100 volts" was approved by the Mines Safety and Health Commission of 16.10.1964 *(2)* and the Working Party was instructed to produce periodical reports on trends in this field.

The report referred to contained an investigation - particularly with a view to eliminating oil - on firedamp-safe electrical apparatus for nominal voltages over 1 100 volts either already in existence or being developed, together with a report on its utilization as currently practised in the Member States.

II. Trends during the period 1964/71 and present situation *(3)* in the Community countries *(4)* and the United Kingdom

Comparison of the situation at the end of 1971 with the situation which existed when the 1964 report *(2)* was drawn up (observing the same report layout) gives the following picture :

Belgium : In accordance with the new regulations which came into force at the beginning of 1970, the category of protection known as "Increased safety (e)" is acceptable. In addition, all the cut-off devices - old and new - which contained more than 75 litres of oil must be declared to the Mines Inspectorate, who can refuse to allow the use of this apparatus or can impose conditions suitable to each particular case.

New purchases of circuit-breakers for nominal voltages above 1 100 volts should preferably be drawn from types of apparatus which contain a small quantity of oil or are airfilled. However, the large number of oil-filled (30-40 litres of oil) cut-off devices makes new purchases relatively rare.

Federal Republic of Germany : The number of cut-off devices with a large quantity of oil *(5)* currently in use is falling off, while the number of circuit-breakers containing a small quantity of oil is undergoing a relative increase, as is also the number of water-filled circuit-breakers.

The Mines Inspectorate are no longer issuing permission for the purchase or construction of circuit-breakers containing a large quantity of oil.

The gas tube device (gas switch) *(6)* did not become widely introduced.

---

(1) See First Report of the Mines Safety and Health Commission, pages 7 and 8.
(2) See third Report of the Mines Safety and Health Commission, Annex VIII, pages 391-404.
(3) Situation at beginning of 1972.
(4) See the statement of the earlier situation, described in the 1964 report, Chapter VII.
(5) "Oelkesselleistungsschalter" (oil-container power switch) (100-120 litres of oil).
(6) This is a circuit-breaker under a gas produced by the decomposition of an active substance under the effect of an electric arc (see 1964 report, Chapter IV, para. 2a).

The use of cut-off devices filled with sulphur hexafluoride is envisaged.

Air-filled contactors have been taken into service in recent years.

The development of a vacuum contactor has recently been successfully concluded; practical application is envisaged.

France : The number of oil-immersed circuit-breakers is undergoing a constant decrease. The number of air-break circuit-breakers has remained virtually constant during the reporting period. As far as new purchases are concerned. preference is given to devices operating in sulphur hexafluoride. This latter type proved its worth during the period 1964-1971.

Oil-immersed contactors are not used.

Italy : All the circuit-breakers used at voltages above 1 100 volts are water-filled. Such circuit-breakers were also in use in Italy in 1964, contrary to the statement made in the 1964 report *(1)*.

Netherlands : The category of protection "increased safety" has been accepted by the Inspectorate. The use of circuit-breakers containing 30-40 litres of oil continues, and the number in existence is undoubtedly large, but the number in service has fallen off considerably by reason of the recent pit closures.

United Kingdom : For the past five years no contactors have been purchased to work underground that contain oil, but some are still in service having a low oil content.

At voltages superior to 1 100 volts the normal voltage in use is 3 300 volts. There are approximately 2 000 air-break contactors in use for motor drives at this voltage.

Approximately forty contactors employing the vacuum interruptor are in use, these in the main being operated on reversing duty.

III. Conclusions

In respect of the circuit-breakers, it will be observed that the conclusions contained in the Report of 1964 *(2)* 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.

The number of cut-off devices using large quantities of oil now in service has been considerably reduced, to some extent as a result of pit closures. Although this trend has been counteracted by reason of the large stock of devices thus becoming available, the number of circuit-breakers using only a small quantity of oil or no oil at all has however risen in both absolute and relative terms.

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.

---

(1) Second Report of the Mines Safety and Health Commission, Annex VIII, pages 391-404.
(2) See Third Report of the Mines Safety and Health Commission, Annex VIII, pages 391-404.

IV. Recommendation

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.

DOCUMENTATION

The following documentation can be obtained without charge from the secretariat of the Mines Safety and Health Commission, 29, rue Aldringer, Luxembourg :

1) "Report on firedamp-safe electrical apparatus for nominal voltages above 1 100 volts," dates 1964 (available in all the Community languages);

2) Documentation of firedamp-safe air-break circuit-breakers for 3 300 volts, used in the coal-mines of the United Kingdom (available in English, German and French);

3) Documentation on firedamp-safe high-tension circuit-breakers without safety oil, used in the French coal-mines (available in English, German and French).

ANNEX IX

BIBLIOGRAPHY OF THE WORK OF THE MINES SAFETY AND HEALTH COMMISSION

I - TECHNICAL PROBLEMS

A - Mine rescue

1. Organisation 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, 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);

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 IXa, November 1966).

4. Rescue with borehole

- List of specialists for borehole rescue work and equipment available in Community countries (8th Report of the MSHC, Annex III, June 1971)

B - Fires and underground combustion

1. Shaft fires at great depth

- Recommendations 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);

- 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. Ventilation

- 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 stabilisation of ventilation (6th Report of the MSHC, Annex III, September 1969);

3. 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 Road way 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);

- 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).

4. Fire-resistant fluids

- Report on the establishment of criteria for fire-resistant fluids used 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).

5. 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).

6. 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).

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 coalmines 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 Health and Safety Commission on 20 June 1969 on the characteristics and electrical protection of cables supplying mobile machines (coal cutters, loading machines etc.) used underground in coalmines in the Community countries (8th Report of the MSHC, Annex IX, June 1971).

Bibliography

- 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 MSHC, Annex X, July 1972)

- Report and conclusions on overvoltages caused by lightning (9th Report of the MSHC, Annex XI, July 1972)

D - Winding 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).

E - Combustible dusts

- Report on work done on the neutralization of combustible dusts and dusts barriers (7th Report of the MSHC, Annex VIII, September 1970).

F - 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).

II. 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-cutting and getting machinery and roadway drivage (8th Report of the MSHC, Annex VIII, June 1971);

III. HUMAN FACTORS

A - 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).

B - 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);

- Recommendations on the psychological and sociological factors affecting safety (3rd Report of the MSHC, Annex XIII, November 1966).

C - 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).

OFFICE FOR OFFICIAL PUBLICATIONS OF THE EUROPEAN COMMUNITIES
Boîte postale 1003 – Luxembourg
6078