EUROPEAN COAL AND STEEL COMMUNITY

REPORT

on the

conference on safety in coalmines

March 1957

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E U R O P E A N C O A L A N D S T E E L C O M M U N I T Y

R E P O R T

on the

CONFERENCE ON SAFETY IN COALMINES

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I N T R O D U C T I O N

1. The Resolution passed by the Council of Ministers on September 6, 1956, embodying the Council's decision, upon proposal by the High Authority, to call a Conference on Safety in Coalmines, laid down the terms of reference of the Conference as follows:

> "to put forward proposals to the Governments represented in the Special Council of Ministers, and to the High Authority, with the object of raising safety in the coalmines to the highest possible level."

To this end, the Resolution asked that the Conference should apply itself in particular to

(a) comparing the safety regulations now in force, in order to pick out those most appropriate in each field, and the structure and practical effectiveness, in regard to the application of these regulations, of the organization of safety services in the different countries;

(b) determining the best ways of ensuring that the regulations are continually adjusted to developing technical methods, and, with this end in view, making preparations for the establishment of a permanent body representing the six governments and presided over by the High Authority, this body to continue arranging for the necessary exchanges of information and to suggest to the governments the introduction of the most effective safety measures;

(c) determining suitable measures for ensuring permanent contact between the rescue centres in the different countries, in order to stimulate the action taken by each country in regard both to the improvement of the means at disposal and to the methods employed in rescue work.

2. The Conference held its first plenary session on September 24 and 25, 1956. It first adopted its Rules of Procedure, and then appointed four Committees whose terms of reference it laid down.

Committees 1 and 2 were to devote themselves to the study of technical problems: the allocation of subjects between them was worked out in the course of discussions between their respective

Bureaux.

The workers' group asked that attention should be given to possibilities for compiling and publishing accident statistics colliery by colliery and for making these comparable country by country, and the Co-Ordinating Committee accordingly instructed Committee 3 to study the lines on which it might be possible to compile co-ordinated statistics on accidents in Community countries.

The Co-Ordinating Committee also asked Committee 3 to examine the problem of disciplinary action to be taken in regard to breaches of safety regulations.

At the end of the September plenary session there still existed some difference of opinion as to the terms of reference of Committee 4, which was to deal with human factors. A majority of the delegates felt that its discussions should include the subject of the effect on safety of methods of payment and hours worked. A number of members, on the other hand, contended that this would be going beyond the terms of reference laid down by the Council for the Conference itself.

At its meeting on December 8, the Council decided that Committee 4 should deal equally with all human factors likely to have a bearing on safety, including the possible influence on safety of methods of payment and hours worked.

After these various points had been settled, the terms of reference of the four Committees were laid down as follows:

Committee 1

To study group accidents, taking into account developments in technical methods and concentrating particularly on extension factors, in the following fields: protection against underground combustion and fires, protection against firedamp, protection against dust.

Committee 2

To study group accidents, taking into account developments in technical methods and concentrating particularly on extension factors, in the following fields: mechanization and electrification, roof control, shotfiring.

Committee 3

To study the organization of rescue operations, of the safety services and of inspection for compliance with regulations, with a view to discussing measures to ensure co-ordination and increased effectiveness.

To study the lines along which comparable statistics on accidents and incidents might be worked out.

To study the system of disciplinary action to be taken in regard to breaches of safety regulations.

Committee 4

To study the human-factor problems, particularly introductory instruction and vocational training, methods of payment, etc., with a view to promoting the systems best suited to the prevention of accidents.

3. Each Committee organized its own working methods.

After a general discussion, Committee 1 instructed certain of its members, and a number of specially-qualified outside experts, to read introductory papers on the problems with which it was to deal. On the basis of these papers, it then framed draft recommendations, sometimes asking working parties to sub-edit these.

Committee 2 set up four working parties, on

Shotfiring,
Mechanization,
Electrification and
Rock pressure

respectively.

The recommendations worked out by these small groups were then submitted to the Committee.

Committee 3 split up its work into three stages. In order to obtain the necessary information on the present organization of safety services, inspection for compliance with regulations, and rescue arrangements, it drew up two questionnaires, one for the Governments and the other for the employers.

On the basis of the replies received, a general discussion was held, enabling the Committee to pinpoint anything which could or should be improved.

Finally, by means of detailed research, carried out mainly by small working parties, recommendations were drafted with a view to putting into practice the aims thus defined. All these recommendations were submitted to the Committee for approval.

Committee 4 took as a basis for its discussions information and suggestions submitted by its members, working documents prepared by the Secretariat and a number of studies issued by the High Authority and the International Labour Organization; its findings were then frequently gone over by special working parties.

4. The arrangement was that each Committee should meet four times in all, for two days at a time. Committee 1 met five times.

Meetings of working parties were held as required, in accordance with the progress and complexity of the work of the Committee concerned. There were a great many such meetings.

5. The Conference finally met in plenary session once more from February 4 to 7, 1957, to discuss the reports submitted to it.

6. It was not the intention of the Conference, any more than of the Committees, to carry out a systematic and exhaustive study of the problems at issue, since this would have involved the abstracting of far more literature and material than was reasonable in view of the shortness of the time available. The Conference preferred to base itself on the practical experience of its members, supplemented and clarified where necessary by the opinions of experts with a special knowledge of specific problems.

Nor did the Conference embody in its recommendations the rules already in force in the various Community countries, or those already contained in the Model Code of the International Labour Office.

7. In addition to a general recommendation concerning the I.L.O. Model Code, the Conference adopted a number of proposals on the

various problems dealt with by the Committees it had set up.

These may be grouped under three heads:

(a) recommendations which can be turned straight into regulations by the competent authority in each country;

(b) skeleton recommendations drawing the attention of the competent authorities to the desirability of framing regulations in certain particular fields;

(c) recommendations concerning research or further study.

The report has been so arranged, with regard to technical questions, that those recommendations which can be turned straight into regulations and those which call for further study before they can be embodied in the regulations are presented in two separate groups.

As regards inspection for compliance with the regulations and human factors, it was deemed more appropriate to group all recommendations relating to the same subject together, irrespective of whether they would normally fall into one or the other of the categories a) and b) mentioned above.

The Conference also sought to establish certain methods of taking action to implement its recommendations.

In particular, it asked that attention should be given to the question whether a multilateral agreement on safety ought to be drawn up, and specified its views on the composition of the permanent body referred to in the Resolution of the Council of Ministers of September 6, 1956.

G E N E R A L R E C O M M E N D A T I O N

I. L. O. Model Code

I. In drawing up regulations, orders and instructions concerning safety, the competent authority in each country should adhere to the principles set out in the Model Code of Safety Regulations for Underground Work in Coalmines (for the Guidance of Governments and of the Coalmining Industry) drawn up in 1949 by the International Labour Office.

II. In countries where there are more stringent regulations than those contained in the Model Code or in the recommendations adopted by the Conference on Safety in Coalmines, such regulations should remain in force.

III. It is desirable that the International Labour Office should adapt its Model Code to correspond with the latest technical developments.

The object of this recommendation, which was submitted by the French employers' delegate, is to induce the Governments to adopt the principles contained in the I.L.O. Model Code, so as to establish a common basis in the regulations of the different countries.

The Model Code is at present available only in English and French; it is therefore essential that German, Italian and Dutch translations should be prepared without delay.

I.L.O. is felt to be the organization best qualified to adapt its own Model Code in accordance with the latest discoveries and advances made in the technical field.

PART ONE

Technical Questions

Section One: GENERAL WORKING PLANS

It is necessary, in the interests of safety, that the coalowner should draw up general long-term and short-term plans of operations, and forward these in advance to the competent authority. These plans should incorporate all such details as may be necessary to enable the authority to judge their implications concerning safety.

Any amendments of importance should be intimated in good time to the same authority. The latter must be entitled, where necessary, to enter objections to the plans within a suitable time-limit.

The object of this recommendation is to induce the coalowner, firstly, to pay due regard to the safety aspect when drawing up his plans, and secondly, to keep the competent authority fairly fully informed as to future operations.

These plans must show the subdivision of the deposit, the amount of coal-getting that can be done without involving excessive emission of firedamp, the maximum number of men to be

employed in a single independent ventilating district, the extent of mechanization at the face, electrification, underground firefighting plans, etc., in such a way as to enable the competent authority to judge of any dangers which might be involved by the implementation of the plans.

The competent authority should not intervene unless it considers that there is prejudice to safety. The coalowner retains full responsibility for his plans.

Experience in four out of the five coal-bearing countries of the Community has shown that drawing up general working plans annually presents no practical difficulties. The competent authorities in these four countries consider such plans to be of great value for the safety of operations.

A French employers' representative objected that to oblige the coalowners to submit to the competent authority not only their long-term plans but their short-term plans, and such changes as might be made in the course of the year, would only result in a confusion of responsibility without raising the standard of safety in any way, and would seriously hamper the work of coal-getting. He stressed that the employers did not at all object to government supervision, which in any case existed already: they did, however, wish such supervision to be effective and not to interfere with their work.

The French, Belgian and Netherlands employers considered that the recommendation should be worded as follows:

"The Conference considers that prior to the starting of operations in a new coal seam or a new area of a pit which is being worked, the coalowners should draw up general plans of their proposed operations and communicate these to the competent authority.

"This communication must comprise all essential information and, in particular, the necessary plans to enable the authority to assess all aspects connected with general safety.

"The competent authority must be kept informed of any important changes made in these programmes."

The Conference decided to retain unchanged the wording of the recommendation on general working plans as quoted at the beginning of this Section, and to note the observations put forward by the French, Belgian and Netherlands employers' representatives.

Section Two: RECOMMENDATIONS ON SHOTFIRING

In order to refute a widespread idea that shotfiring is dangerous, the working party compared the total number of ignitions and explosions of firedamp and coal dust over the past ten years with the number of ignitions and explosions due to shotfiring operations. The comparative figures are given below.

	Explosions and ignitions		Explosions and ignitions due to shot-firing, in %	Killed		Injured		Shots fired (in 000,000)
	in all	due to shot-firing		in all	due to shot-firing	in all	due to shot-firing	
Germany(W.)	49	16	33	619[1]	30	295	34	141.7
France	54	10	18	113	49	479	115	217
Belgium	45	26	57	137	43	52	18	53.6
Netherlands	1	-	-	8	-	10	-	?
Italy	1	-	-	2	-	-	-	10
Saar	6	4	66	12	12	17	13	46.7
Total	156	56	36	891[1]	134	853	180	
United Kingdom	237	41	17	329	104	376	6	850[2]

[1] Incl. explosion at Grimberg colliery in 1946 (406 killed).

[2] Estimated figure, as 1955 figures were not yet to hand.

Although even on the basis of this comparison the number of explosions and ignitions due to shotfiring in the various countries may appear comparatively high, it must be borne in mind that shot-firing is a very widely-practised operation. If we compare the total number of shots fired (which, in the absence of statistics for certain countries, may be estimated at over 500,000,000) with the number of explosions and ignitions caused, the resulting figure of one explosion or ignition per ten million shots indicates a very high degree of safety, particularly when it is considered that any alternative method introduced involves new and unknown accident hazards. In the United Kingdom, where shotfiring is very much more generally employed, the rate is over twenty million shots to a single explosion or ignition. The Conference is accordingly of the opinion

that there is no justification for prohibiting shotfiring on grounds of safety. This is not, however, to be taken as implying that safety arrangements in regard to shotfiring could not be improved. With this end in view, new and safer solid explosives and better shotfiring methods could be devised. At the same time, shotfiring with the usual explosives could also be improved. The working party went into the causes of explosions in the different countries, and came to the conclusion that the factors mainly responsible are the use of rock explosives in unsuitable localities, the use of long-delay detonators, defects in the ignition circuit, and faulty shotfiring.

A. Recommendations which can be turned straight into regulations by the competent authorities

1) Shotfiring in stone workings where coal is present or there is danger from firedamp

1. - S

(a) In the development of stonedrifts in which the use of restricted explosives (dynamite) is authorized, the latter must be replaced by an explosive of greater safety against firedamp and dust on approaching a seam or a goaf.

The approach to a seam or a goaf must be clearly marked on the mine plans; if necessary, trial borings of appropriate length must be made in good time, in order to locate and prove the seams.

(b) This recommendation does not apply to shots fired to release mine gases (loosening shots) from seams liable to instantaneous outbursts of inflammable gas, wherever special regulations concerning this type of shotfiring are in force.

(c) In connection with the tunnelling of long stonedrifts, shotfiring dams can be recommended.

This recommendation was framed in view of the fact that in some countries restricted explosives (dynamite) are used for

stonedrifting operations, where the proportion of coal in the total cross-section does not exceed a prescribed percentage. This practice is considered to be dangerous, since even where only small bands of coal occur it is possible for firedamp or coal dust to be produced in such quantities that an explosion may result.

As regards coal dust, some delegates were of the opinion that itwas wrong to assume this to be a danger only when it had a volatile-matter content of over 12-15%. They based their view on recent experiments which have demonstrated that it is possible for coal dust to be ignited by explosives used for firing in stone even when the volatile-matter content of the coal is quite low. Although such ignitions are bound to be local only, and cannot lead to violent explosions, these delegates urged the Conference to bear in mind that they can produce appreciable amounts of carbon monoxide, and thus involve danger to the men.

The Conference, however, considered it desirable that the use of dynamite should be prohibited only in connection with the opening-up of seams or old workings.

The wording of paragraph (a) has been somewhat toned down. Most of the German delegates and the Belgian workers' representatives contended that systematic borings were best. The other delegates were in favour of the reworded recommendation, although certain of the French government and employers' representatives considered that the indications derived from the shothole drillings were sufficient for the purpose, and trial borings frequently pointless and ineffective.

2) Use of instantaneous and millisecond detonators in coal seams and adjacent strata

2. - S

(a) In view of the danger involved in delayed shotfiring (e.g. the danger of inflammable gas being released by the material brought down by an earlier shot), only instantaneous and millisecond detonators may be used in coal seams and the adjacent strata.

(b) When millisecond detonators are used in workings where there is danger from firedamp or coal dust, not more than one of

the delay stages should be omitted between two successive shots, and the number of stages must be kept to a minimum. The period of delay between two shots liable to affect one another must not exceed three intervals of delay.

This recommendation is intended to prevent the use of delay detonators in gassy or dusty workings, since it has been found that most explosions in such workings have been caused by delay detonators.

Although the use of millisecond detonators in itself reduces the danger associated with delay detonators to a minimum, care should still be taken to see that the period of delay between any two successive shots is as short, and the number of delay stages as small as possible.

3) Shotfiring circuit

3. - S

(a) The period of initiation must be as short as possible (4 to 10 milliseconds, according to the sensitiveness of the detonators employed).

(b) In the case of large rounds of 15 to 20 shots, the overall resistance of the series should be tested from the shotfiring station with an ohmmeter approved by the competent authority.

(c) Exploders must be approved by the competent authority and tested at least every six months with an oscillograph to see whether they still comply with the prescribed conditions.

This recommendation relates to the safety of the firing circuit. It transpires that a comparatively large number of shotfiring accidents can be traced to the shotfiring circuit, which is liable to electrical sparking that may well set off any firedamp or coal dust present if the period of initiation is long and the shotfiring cable inadequately insulated or in bad condition. The additional testing of the exploders with an oscillograph is intended to prevent misfires, which are always risky to deal with.

4) Protection of personnel during shotfiring

4. - S The times for shotfiring should be chosen so that the minimum number of persons are exposed to the dust produced and to the danger of an explosion or ignition of gas.

5. - S Where the workings offer the personnel insufficient protection against flying fragments from shots, or against gas and/or fumes, the provision of fixed or movable shelters is recommended.

The personnel must be protected not only from flying fragments produced in shotfiring, but also from shotfiring fumes and from any noxious gases released by a coal-dust or firedamp explosion, especially in the case of workings ventilated by forced ventilation from auxiliary fans.

These protective measures are needed where the men are not able to remain in the fresh air current during shotfiring. Even special ventilation of the most vigorous nature cannot altogether obviate the danger, since it is impossible to tell in advance how much gas is likely to be released.

The original wording of the recommendation on the desirability of employing fixed or movable shelters drew attention to the danger of instantaneous outbursts of firedamp and to the particular case of forced ventilation in workings using auxiliary fans. Some delegates would have preferred these additional points retained.

5) Shotfirers and supervisory officials

6. - S (a) Shotfirers must be qualified face workers or workmen who have completed an appropriate course of training. They must be given adequate and systematic training. Such training should carry a certificate valid for a defined period, and should be renewed at regular intervals.

(b) Training and refresher courses in shotfiring should also be provided for the supervisory officials directly concerned.

(c) The work of the shotfirer should be supervised by special supervisory officials (shotfiring deputies).

The manner in which shotfiring is carried out, and hence the safety of the operation, depends to a very considerable degree upon the training and sense of responsibility of the individual shotfirer. It is felt to be particularly important that they should have sufficient mining experience, which may be presumed to be the case with qualified face workers. Moreover, regular refresher courses are considered to be necessary, since it is constantly being found that the basic safety regulations are not observed.

Some delegates, in particular the Netherlands and Belgian employers' representatives, would have preferred the deletion of the words "valid for a defined period" in connection with the shotfirer's certificate, although they fully agreed that refresher training must be given to shotfirers at regular intervals.

The special supervisory officials mentioned in the recommendation are to keep an additional check on the shotfiring work purely and simply from the point of view of safety, independent of the coal-getting aspect. This is not meant to interfere with the normal supervision of shotfiring operations by the supervisor in charge of the working concerned.

In response to a suggestion by one of the French employers' representatives, the Conference agreed that shotfiring deputies need not be required to devote themselves <u>entirely</u> to the supervision of the shotfirers, although they would be specially responsible for this duty.

B. <u>Skeleton recommendations drawing the attention of the competent authorities to the desirability of framing regulations in certain particular fields</u>

7. - S

It is recommended that the competent authority in each country should specify the maximum quantity of each type of explosive which may be stored below ground for a stated period.

Regulations concerning the storage of explosive below ground are not yet in force in all the countries. It is felt to be necessary that definite figures should be laid down for the quantities which may be so stored and the length of time for which it is permitted to store them, according to the type of explosive involved and the atmospheric conditions below ground. No such action is required where, as is the practice in some countries, only sufficient explosive to meet each day's requirements is allowed to be stored below ground.

8. - S

The competent authorities in each country must specify in what circumstances shotfirers are required to use the safest explosives available (Belgium, sheathed S.G.P. explosives; Germany and Netherlands, sheathed safety explosives or ultra-safe explosives (Class III); France, improved coal-getting explosives for use with delay detonators, coal-getting explosives for instantaneous detonators; Italy, grisutina).

This is to be taken as referring in particular to a specified emission of firedamp per ton of coal produced, or to a specified firedamp content. The regulations should state the actual emission of gas and/or content thereof in the ventilation districts.

Owing to certain fundamental structural differences in the regulations of the various countries, it was not possible to lay down unequivocally in what circumstances the use of the safest explosives available in each country should be compulsory. For example, in some countries local conditions alone form the criterion, while in others the type of detonator is also taken into account.

9. - S

The method of payment for shotfirers and acting shotfirers should be such as to give these men a special incentive to see that shotfiring is carried out in accordance with the regulations. Their pay should be commensurate with their position of responsibility.

Section Three: RECOMMENDATIONS ON STRATA CONTROL

In discussing the question of strata control, the Conference fully realized the tremendous differences existing in the geological and mechanical conditions of the strata, and hence in the whole behaviour of the rocks in connection with underground mining operations. Consequently, the safety measures which need to be taken vary so greatly that it is difficult to put forward rules of general applicability. Indeed, the Conference came to the conclusion that where the strata conditions are particularly unfavourable it is not possible to lay down rules at all. Such cases are, however, determined by the actual nature of the strata, not by unsuitable mining methods. In the Conference's opinion, unfavourable conditions of this kind may be said to exist when the rock is insufficiently firm in relation to the stresses produced by the weight of the overburden and the additional stresses resulting from coal-extracting operations. None the less, it was felt that at any rate the Conference should state its view as to the safety measures necessary in such cases.

At the same time, even under normal strata conditions, a very high proportion of the accidents occurring in all countries are due to falls of rock or coal. Accordingly, the Conference considered it necessary to draw attention to such measures for improving the standard of safety in coalmines as can be proposed for general introduction.

A. Recommendations which can be turned straight into regulations by the competent authorities

1) Support: general

1. - SC

All workplaces below ground, particularly at prop-free faces, should be subject to special support and roof-control rules drawn up by the coalowner. These must be notified to the competent authority.

It was considered advisable to include specific mention of the prop-free face, in view of the importance of the matter in regard to safety.

The German delegation, basing themselves on a previous draft recommendation submitted by the Committee which had dealt with the question, went so far as to advocate making coal-winning from a prop-free face subject to special permission from the competent authority. The French delegation, on the other hand, stated that experience in the use of this method had been excellent as regards safety.

2) Face support

2. - SC — As the percentage of accidents due to falls of rock or coal is still very high, very special care must be taken to install supports (temporary or permanent) in the workings in good time.

3. - SC — Newly-started faces must be provided with support which will withstand additional orogenic thrusts and stresses due to the new operations (e.g. wood or steel chocks).

Where this type of support is used, the competent authorities must be notified, in conformity with Recommendation 1 SC above. The competent authorities must also be informed which are the workings concerned.

Newly-started workings involve special hazards as a result of the first settling of the main roof, since it is impossible to know what the behaviour of the roof strata in general, and the main roof in particular, is likely to be.

The workers' representatives, with the exception of those from the Netherlands, were in favour of a previous draft recommendation to the effect that newly-opened workings must be inspected by the competent authority.

4. - SC — At the faces, the props, their bearing surface, density, etc., must be adapted to the weight to be supported and the ultimate breaking strength of the rock.

The aim should be to make increasing use in future of steel props of permanently uniform

load-bearing capacity, involving the minimum of dependence on the care or otherwise with which they are placed in position by the propsetter.

The fact that the load-bearing capacity of the different face props used still varies considerably frequently leads to breaks in the roof, and consequently to accidents due to falls of rock. It is still very unusual to find steel props of exactly equal load-bearing capacity, eminently desirable though it is that they should be so designed. Accordingly, every effort should be made to develop and introduce props of this type.

5. - SC — In mechanized coal-getting cylinders used for shifting the conveyor should be staked not against the face support but against either the roof, or chocks, or any element not forming part of the regular face support.

6. - SC — Unless temporary props are set first, it is not advisable to withdraw props to enable a conveyor to be moved forward, and afterwards reset them, since the removal of props causes the roof to relax and leads to bad roof conditions.

7. - SC — When operations approach known main faults or worked-out panels, special measures should be instituted to cope with any additional pressure effects, water or gas.

The object of this recommendation is to ensure that all necessary action is taken in good time.

3) Coal-getting

8. - SC — The choice of coal-getting and stowing methods should be primarily governed by considerations of safety (falls of rock and coal, breaks in the face, firedamp emission, dust formation).

Some of the German workers' and government representatives wished to retain a reference to the caving system, specifying

that where this was to be practised the seam must not exceed a certain thickness or the dip a certain angle, while the strata must comply with certain requirements. The majority felt, however, that this would be to cast unwarranted asperions on a method which is widely employed without involving any particular difficulty.

9. - SC

At steep and semi-steep faces, the stowing material should be secured by installing wooden chocks (if necessary filled with debris) or pack walls between it and the roadway supports.

The stowing material must be brought into its permanent position without delay, and care should be taken to see that it is not left hanging in a dangerous position on an incline.

The object of the measure thus recommended is to prevent accidents from being brought about by the sudden collapse or sliding of stowing material which has been badly packed or left hanging in a dangerous position on an incline, as a result of which masses of rock are dislodged and bury men working at the faces or in the roadways.

10. - SC

Where the rate of advance (either in advancing or in retreating working) is high, the roof usually holds better, and there is accordingly less danger of falls of rock or coal. On the other hand, an excessive emission of firedamp or the danger of instantaneous outbursts may slow down the rate of advance.

Every effort should be made to establish technical conditions which will ensure an optimum rate of advance from the safety point of view.

11. - SC

In adjacent seams, the coal faces should be advanced in such a direction that coal-winning work in one seam will have as little adverse effect as possible on the other.

Coal-winnings and other workings must be so arranged as to be exposed to the minimum of disturbance from other faces being worked. Special care must be taken to see that these rules are strictly observed in gassy measures.

All coal-winnings produce in their immediate vicinity additional zones of rock pressure, to which other workings should not be exposed in view of the danger this involves of falls of rock and coal.

12. - SC So far as possible, pillars or stumps of coal should not be left behind in workings.

Pillars or stumps of coal left standing prevent the surrounding rocks from settling evenly, thus producing zones of over-pressure which can spread over considerable distances. Workings above or below such pillars or stumps are usually none too stable.

4) Gate-roads

13. - SC Special care should be taken to see that the passages between the face and the roadways are made as safe as possible. Where it is found necessary to remove props for the purpose of installing tipping stations or conveyor drive units or carrying out similar operations, the roof must first be carefully secured, e.g. by the longest carrying bars available, supported by special (jack) props.

The reason for this recommendation is that practical experience has shown a considerable proportion of accidents to result from falls of roof at the points mentioned.

14. - SC In gate-roads, the supports should resist the general lowering of the rocks only to the point where it is still possible for the whole of the strata to lower together with the surrounding rocks, without bed separation. This does not, however, apply to steep and

semi-steep formations, where the roof and floor strata have a tendency to slide, and rigid supports are, therefore, necessary.

The recommendation gives only the basic rules on the yielding support required, without committing the coalowners to the choice of a particular type.

15. - SC — All subsidiary roadways and junctions of whatever kind must be very carefully supported and constantly checked for pressure and movement effects.

16. - SC — Cavities in roadway roofs and sides must be tightly packed with incombustible material.

In the case of very deep cavities which it would not be safe to pack too tightly, it is recommended that incombustible padding of sufficient thickness should be inserted and the supports reinforced. Cavities should be made inaccessible even to safety lamps.

The object of this recommendation is not only to prevent fires and accumulations of firedamp, but also more particularly to reinforce the supports in such areas.

SUGGESTIONS CONCERNING POOR STRATA CONDITIONS

The Conference drew the attention of the coalowners to the following views, which were expressed by some of its experts in connection with poor rock conditions.

(a) Main cross-cuts should be driven in stress-free ground. For example, in certain cases, before a cross-cut is extended above or below a seam which has just been subdivided, it is advisable to work out a large panel in order to release pressure.

(b) Gate-roads should be exposed as little as possible to the advancing pressure at the face.

(c) For the same reason, old gate-roads should not be used for the purpose of working new faces.

When a coal face has been fully worked out, it should be considered whether pressure conditions are such as to make it advisable to complete support withdrawal in the gate-road. For working the next panel a new gate-road should be driven next to the old one, and the coal between the two should be extracted and the space packed as solidly as possible.

(d) The distance between two faces being worked at the same time should be great enough to ensure that work proceeding at one face will not adversely affect the other.

(e) Sharp bends in roadways should be avoided, since such localities are always vulnerable. Roadways should be driven in as straight a line as possible.

(f) In soft rock, roadway support should have as large a bearing surface as possible against both the roof and the floor, in order to reduce surface pressure and prevent the props from penetrating and fissuring the rocks.

(g) If the rocks adjacent to laterals and main cross-cuts are not very resistant, and their breaking load at normal pressure is less than the pressure at the depth concerned, it is advisable to employ continuous support suited to that pressure, e.g. brick walls, forming a sufficiently resistant lining.

In the gate-roads, the support cannot and should not resist the general subsidence of the roof: on the contrary, it should yield without too much resistance,

as otherwise the effects of pressure would concentrate round the roadway and lead to a break. The support must enable the roof strata to subside all in one piece, together with the adjacent strata, without bed separation.

This can best be achieved by setting on both sides of the roadway yielding supports of equal strength with very broad top and bottom surfaces. Pack walls on either side and wooden chocks filled with debris placed against the roadway sides are excellent for the purpose. In this way the roof pressure on both sides of the roadway is transmitted evenly to the floor without any lateral pressure or shearing stress.

By means of this type of support it is possible to keep roadways in level formation open without repairs for the duration of the coaling process, even in unconsolidated strata, provided there is no out-of-the-ordinary disturbance (tectonic faults, interference from adjacent workings, inrushes of water, etc.)

Section Four: VENTILATION AND FIREDAMP

A. Recommendations which can be turned straight into regulations by the competent authorities

1) Main fans

The main fans of a mine must so far as possible be erected in such a position that they cannot be damaged by an explosion or by fire. They must be fitted with automatically-recording pressure-gauges, and with automatic signalling devices giving warning of sudden stoppages.

In all mines, arrangements should exist which will ensure independently that, in the event of a breakdown in the normal ventilation system, there will be adequate ventilation to enable all workers to return safely to the surface.

Fans contributing to the main ventilation circuit must not be installed underground without special permission from the competent authority.

The Conference did not consider it necessary to insist that all main fans should be fitted with a speed or output-indicator, as it was not felt that this gave any additional guarantee of safety.

As regards gassy mines, Regulation 41,1 and 3 of the I.L.O. Model Code provides that every pit must have a standby fan available for immediate use, and that every main fan must be connected to two separate sources of power.

This may involve difficulties in the case of pits with cross-ventilation, where, for instance, a single pit has a number of peripheral upcast shafts, not all necessarily equipped with standby fans. Safety in such cases is guaranteed by the second paragraph.

As this draft regulation applies to all pits, gassy or otherwise, it also takes into account pits with natural ventilation. The draft accordingly mentions that arrangements must exist to counter any breakdown in normal ventilation, so as to enable all workers to return safely to the surface. The second paragraph further makes it necessary to examine beforehand the likely effect of any stoppage of a district fan in the main ventilation system.

The third paragraph refers only to fans contributing to the main ventilation circuit, and not to auxiliary fans.

2) Auxiliary Ventilation

> All workings in dead ends must be ventilated by special piping, which must be thoroughly airtight and provide adequate ventilation.
>
> The auxiliary fans should, as a general rule, be installed in that portion of the air-duct which is in the primary air current. The entire installation must be so constructed as to prevent any re-circulation of the air.
>
> The power supply to the auxiliary fans must not be interfered with by any re-laying of electric cables or compressed-air mains in neighbouring workings.
>
> In gassy mines or mines suspected of being gassy, the auxiliary ventilation must not be interrupted until after the entire personnel, with the exception of the men required for repairs, have been withdrawn from the ventilating circuit concerned.
>
> Following each stoppage, the auxiliary ventilation must be started up sufficiently in advance of the return of the personnel to ensure that normal ventilation (which must be checked by an inspection) has been restored.

The first paragraph provides that all workings in dead ends must be adequately ventilated by special airtight piping. This means, therefore, that it is allowable to have either forced or exhaust ventilation.

The second paragraph provides that, as a general rule, the auxiliary fans must be installed in the primary air-current, but does not disallow the practice (for instance where very long air-ducts are required) of placing the second fan outside the primary air-current, so long as the installation as a whole is so constructed as to prevent

any re-circulation of the air.

A Netherlands workers' representative objected to the insertion of the words "as a general rule" into the second paragraph. A French workers' representative spoke in favour of retaining the words complained of, provided a note was appended to the effect that if there was only one forcing fan, it must be placed in the primary air current. The Netherlands workers' representative accepted this suggestion.

The third paragraph lays down that, in order to prevent any accumulation of firedamp auxiliary ventilation must not be interrupted for such purposes as, for instance, the re-laying of compressed-air mains in neighbouring workings.

The draft submitted to the Conference prohibited, in principle, the stopping of the auxiliary ventilation, and required that the personnel be withdrawn when it had to be stopped for repairs. This meant that auxiliary ventilation must not be stopped on Sundays, holidays or rest days. The French Government and employers' representatives and one of the Belgian employers' representatives considered that this recommendation was too strict and at the same time would not add to safety in non-gassy mines. They further stated that auxiliary fans working without supervision could cause fires.

The German and Netherlands delegations said that over the past thirty or thirty-five years they had not known of any fire caused by an auxiliary fan left working on a Sunday or rest day. On the other hand, in gassy pits the restarting of auxiliary fans after, for instance, a Sunday break could easily send a cloud of firedamp into the workings, in fact into several areas at once. A number of group accidents had been caused by the stopping and subsequent restarting of auxiliary ventilation.

The Conference adopted the wording quoted above, which does not state definitely whether auxiliary ventilation should or should not be interrupted, but specifies that if it is interrupted, all workers must have left the working and operations must not be resumed until normal ventilation has been restored.

3) Abandoned workings in gassy mines

Temporarily abandoned roadways and workings must be kept ventilated, unless they are sealed off and made inaccessible.

Permanently abandoned roadways and workings must be sealed off with stoppings as nearly airtight as possible. Any drawing-off operations must be carried out expeditiously and must not delay the construction of the stoppings.

All stoppings must be fitted with piping to enable gases from behind the stoppings to be sampled.

The space in front of the stopping must be kept clear, and regular tests must be carried out to check that the stopping is still airtight.

The construction of any stopping must be notified to the competent authority and its position marked on the plan.

Stoppings may only be opened with the consent of the competent authority.

As regards temporarily-abandoned roadways and workings the choice is left open between continuous ventilation and sealing with airtight stoppings.

The Committee concerned originally recommended that airtight stoppings should be made compulsory in the case of permanently-abandoned roadways and workings. The Belgian employers' representative on the Committee had submitted the following written reservation concerning this section of the proposed regulation:

"Insistence that airtight stoppings should be erected in all cases does not appear desirable. In many cases, it would in fact be impossible to make the stopping sufficiently airtight, since fissures in the rock strata could allow firedamp to escape at points sometimes a very long way from the stopping, where it was quite

impossible to check what was going on. In this way, under cover of the illusion of safety, situations can arise which are exceedingly dangerous because they go undetected, and are indeed undetectable."

The Conference came to the conclusion that it was very difficult to make a stopping completely airtight, and accordingly adopted the wording quoted, recommending that stoppings should be "as nearly airtight as possible."

As soon as it has been decided to erect a stopping, its construction must not be held up by any drawing-off work which may be necessary.

To facilitate the work of checking whether the stopping is airtight and testing the air behind it, the space in front of it must be kept clear, and piping must be fitted to enable gases from behind the stopping to be sampled and the pressure behind the stopping to be checked.

The reopening of a stopping is a critical moment, since there is the possibility that an explosive mixture of air and firedamp might be created locally. Samples of gas taken from immediately behind the stopping do not provide an indication of the state of affairs farther away. In any event, stoppings should only be reopened with the approval of the competent authority. This operation should, if possible be carried out on a Sunday or other rest day, with no personnel present who are not actually required for the purpose.

There was a pronounced difference of opinion as to whether it was to be laid down categorically that stoppings were only to be reopened when all personnel not required for the purpose had been withdrawn from the ventilating circuits affected (as recommended by the Belgian workers' representative on the Committee concerned), or whether the action to be taken should be left to the discretion of the competent authority in each case. The German delegation pointed out that it was not always necessary to withdraw the men from all the ventilating circuits concerned, since in many cases reopening a stopping did not necessitate such drastic action. They considered that individual cases differed too widely one from another, and that it should be left to the competent authority to lay down what

measures were to be adopted in each case. A majority of the Committee was in favour of the German delegation's view. The minority standpoint taken by the Belgian and French delegations and the Luxembourg workers' representative was expressed as follows:

"The Belgian and French delegations do not subscribe to the sixth paragraph of Recommendation S 175/2/56. They consider that what should have been recommended, in regard to the reopening of a stopping, was the withdrawal from the entire ventilating circuit concerned of all personnel not actually required for the reopening operation. They consider it insufficient to leave the competent authority to judge whether danger is involved or not, and to arrange for withdrawal accordingly. In support of this view they adduced the following points:

1. While it is true that a stopping can very often be reopened without danger, it is hardly ever possible to have available sufficient equipment to make quite sure that no danger is involved.

2. The reopening of a stopping is not an operation of frequent occurrence. Withdrawal, if prescribed, could not, therefore, seriously affect working costs.

3. If it is not wished to disorganize coal-getting operations it is always possible to choose a rest day for the reopening."

At the plenary session the Belgian and Italian delegations repeated that this reservation represented their opinion.

4) Compressed-air ejectors

Compressed-air ejectors in use underground must be properly placed in appropriate tubing of sufficient length to ensure that the distance between the ejector and the discharge point is not less than a specified minimum, to be fixed by the competent authority. The whole apparatus must be properly earthed.

In view of various accidents which have occurred as a result of the use of badly designed compressed-air ejectors, exact

specifications and instructions should be laid down concerning the manufacture and use of this apparatus.

The Committee concerned had suggested recommending that the minimum distance between the ejector and the discharge point should be fixed at 1.50 metres. The Conference, however, preferred not to lay down any exact figure, but to leave this to the discretion of the competent authority in each country. It therefore adopted the wording quoted.

5) Clearing-out of compressed-air mains

The clearing-out of compressed-air mains in gassy mines should only be undertaken provided

(a) the compressed-air valve is opened very gradually;

(b) every effort is made not to direct the air jet towards those points where firedamp is most likely to be present;

(c) it is ascertained that there is no accumulation of firedamp in the area immediately in front of the end of the air pipe.

This draft regulation was proposed by a French employers' representative in accordance with the instructive points emerging from an accident that had occurred in France. The aim is to prevent sparking in gassy surroundings during clearing-out operations.

A proposal was put forward to recommend that the mains should be earthed, in view of the risk of static electricity.

Since, however, this is a problem which has not yet been fully explored, the Conference felt that pending the results of the studies now in progress it would be premature to issue any such recommendation at present.

6) Ventilation inspection

A competent supervisor specially trained for the work must be made responsible for general ventilation and firedamp inspection

at each mine.

The supervisor in charge of each working place must at all times carry a flame safety lamp or other type of firedamp-detector.

Ventilation problems are becoming more and more important as workings become deeper and coal-getting operations more concentrated.

For thorough knowledge of ventilation and of firedamp emission and accumulation, and for the necessary study of all the various problems arising in this connection, it is essential to have men specially trained with this end in view (ventilation deputies). They must be made responsible for ventilation and firedamp inspection.

In order that the presence of firedamp may always be promptly detected, the supervisor for each working must at all times carry a flame safety lamp or other type of firedamp detector.

B. Skeleton recommendations drawing the attention of the competent authorities to the desirability of framing regulations in certain particular fields

1) Coal measures liable to instantaneous outbursts of firedamp

The Committee considers that in coal measures liable to instantaneous outbursts of firedamp and/or carbon dioxide, work should be carried out in such a manner as to facilitate the loosening of the ground, and the working of a particular group of seams should begin in a conveniently-selected protective seam.

On advancing towards a seam suspected of being liable to instantaneous outbursts, shaft-sinking and cross-cut drivage operations must be proceded by trial borings for the purpose of ascertaining the exact position of the seam. The shots must be so arranged that each advance leaves standing a

barrier sufficiently thick to prevent any instantaneous outburst, or that the seam is extensively bared by loosening shots.

Development workings in suspect seams must be opened up by means of loosening shots, unless it has been established, e.g. by effective trial borings, that there is no risk of an instantaneous outburst.

The practical details must be worked out by the competent authority after consultation with the enterprises.

There was a certain amount of difficulty in drafting this recommendation in such a manner as to make it applicable to the very widely-differing types of instantaneous outbursts occurring in France, Belgium and the Netherlands respectively. Those in France can sometimes be exceedingly violent; in the Netherlands, on the other hand, they are usually far less violent, and less drastic action in the form of trial borings is enough. At the same time, it is important to lay stress on the action to be taken in the different cases, as regards the conduct of operations, stone-development work when approaching a seam, and coal-development work.

Although a number of points remain to be cleared up concerning the problem of instantaneous outbursts, the Conference considers it necessary to state the principles to be observed in dealing with coal measures known as or suspected of being liable to such outbursts.

2) Permissible number of men per separate ventilating district

The competent authority in each country should specify a limit to the number of men working on the main shift in each separate ventilating district. For ventilation purposes, two districts are deemed to be independent when they have only the main intake and return airways in common.

The object of the recommendation is to limit the number of casualties in the event of a firedamp or dust explosion or a fire.

The recommendation leaves it to the discretion of each country to fix the maximum number of men allowed to be present on the main shift in each separate ventilating district. A definition is given of the term "separate ventilating district."

3) Classification

Even though mines are not actually classified as gassy mines, they must be regarded as suspect, and subjected, accordingly, to systematic atmosphere inspection.

All districts in which firedamp has been found to be present, in however small a proportion, must be still more thoroughly inspected. If firedamp is again detected, or appears to be increasing, the mine must be classified as gassy.

The desirability or otherwise of distinguishing in classification between definitely gassy and slightly gassy pits was discussed in considerable detail.

Such a distinction is made in some countries. This makes it possible, by means of careful supervision, to lay down particularly strict regulations for the really gassy pits, and to classify those where firedamp is not very much in evidence as slightly gassy, i.e. keep them working in accordance with special rules. The representatives of the countries concerned pointed out that where this distinction was not made, there was a tendency to tone down those regulations which should be the same for all pits. A single set of regulations was then inadequate for the definitely gassy pits, but unnecessarily stringent for most of the others; as some pits in which firedamp had been found in considerable quantities could not be classified, no special regulations could be laid down for them. Accordingly, if the distinction were made, there would be more pits classified and more action taken.

The list of group accidents shows, however, that the majority of firedamp ignitions and explosions occurred in slightly gassy pits. The proposal made to the Conference was therefore that the slightly gassy pits should be included under the regulations for definitely gassy pits and the distinction hitherto drawn between them done away with.

The Conference, after hearing the various views expressed, decided that the need for classifying all gassy pits under a single head was debatable, and accordingly rejected this proposal.

There are numerous examples to show that a pit which has long been considered to be non-gassy, can suddenly produce an emission of firedamp. Where this happens, the fact that the presence of firedamp is not immediately detected can have the most serious consequences. The first paragraph therefore specifies that "Even though mines are not actually classified as gassy mines, they must be regarded as suspect, and subjected, accordingly, to systematic atmosphere inspection."

The classification of a mine is a step frequently involving changes in working methods and the use of anti-firedamp equipment. The introduction of these changes takes some time. In order to ensure that such large-scale measures are not taken in consequence of a single isolated emission of firedamp, the recommendation has been supplemented by a paragraph reading as follows: "All districts in which firedamp has been found to be present, in however small a proportion, must be still more thoroughly inspected. If firedamp is again detected, or appears to be increasing, the mine must be classified as gassy."

Reclassification of a gassy mine as non-gassy is left to the discretion of the competent authority in each country.

4) Firedamp drainage

The systematic drainage of firedamp from the adjacent strata should be carried out in all mines where the firedamp content exceeds the permitted maximum with normal methods of ventilation. A network of special piping should be installed in such pits, and all necessary equipment should be available to ensure that firedamp drainage may be undertaken at any time.

Drainage is an effective method of reducing the firedamp content at the faces and in the return airways. In the interests of safety, it should be the rule in all pits where the firedamp content cannot be kept below the level at which the withdrawal of the personnel becomes imperative. Such pits must be provided in good time with all the necessary equipment and plant to enable firedamp drainage to be undertaken at any time.

5) Permissible firedamp content

> Except in the case of absolutely essential operations or rescue work, all personnel must be withdrawn from a ventilation circuit at any point of which the firedamp content as indicated by a flame safety lamp or approved type of detector exceeds 2% in the general body of the air.
>
> Any local accumulation of firedamp exceeding this percentage must be reported to the supervisor, who must take whatever action is necessary to eliminate it or seal it off.
>
> In coal-winnings, ventilation and work should be regulated, as far as possible, in such a manner as to ensure that the firedamp content in the general body of the air does not exceed 1%.

This difficult subject was on the agenda of each of the first three meetings of the Committee concerned, which is indicative of the differences in approach characterizing the regulations in the individual countries. After lengthy discussions, it was agreed by a considerable majority to adopt the draft recommendation fixing the permissible firedamp content measured in the main body of the air (above which all personnel must be withdrawn from the whole ventilating district concerned) at 2%.

The amendment by the Belgian workers' representative, supported by his French, German and Netherlands colleagues, proposing that this withdrawal level be reduced to 1%, was heavily defeated.

The Belgian employers' representative, on the other hand, considered the 2% figure too low, and submitted the following reservation in writing: "The Belgian employers' representative did not consider himself justified in voting for the resolution on permissible firedamp content, for the following reasons:

"1. The fixing of these limits in the different Community countries is based primarily on the limits which have been found by experience to be reasonable and practicable. It would be quite impossible to determine the exact safety coefficient to be required below the lower explosive limit of 5.5%. This is a matter of personal judgment and operational practicability. In any case, the safety coefficient varies from one country to another.

"2. In Belgium, emission of firedamp is considerably greater than in the other countries. The Mines Regulations do not specify the permissible content, but a directive from the Direction Générale des Mines has fixed the content necessitating the withdrawal of personnel at 3%. Experience has shown this figure to be a reasonable one. Moreover, no firedamp accident can be ascribed to the choice of this maximum, even though the Committee considers it too high.

"3. No distinction is drawn in the recommendation between low- and high-velocity air-currents. Obviously, a firedamp content of 2% in a still body of air is much more dangerous than one of 3% in a high-velocity air-current, where the air is adequately circulated and there is hardly any risk of stagnant air with an explosive firedamp content.

"4. All the firedamp accidents which have been described occurred at points where the firedamp content was as a rule small, and often in a still body of air. This is due to the fact that under such conditions the men are less alive to danger and safety-mindedness is less marked.

"5. Not only are the management and men in gassy pits more alive to danger, but it is necessary to take a number of precautions and protective measures unknown in slightly gassy mines, where the personnel may be taken completely by surprise, with disastrous consequences.

"6. In view of the foregoing, we feel that to limit the firedamp content at which personnel must be withdrawn to 2% is nothing but a meaningless gesture, which contributes nothing to safety, and may indeed detract from it in certain cases.

The only result of this measure in practice will be to jeopardize still further a large number of Belgian collieries which look like being unable to achieve integration in the Common Market. It may mean a complete stoppage in certain pits. Finally, in gassy workings it will no longer be possible to guarantee the men regular employment."

The second paragraph of the recommendation makes it obligatory to take immediate and effective action to deal with any local firedamp accumulations with a content of over 2%.

The third paragraph recommends limiting the minimum ventilation and the work in coal-winnings in such a way that the firedamp content in the general body of the air does not exceed 1%.

At the plenary session, a French workers' representative proposed that the last paragraph be reworded as follows:

"Furthermore, at all coal faces ventilation and work must be regulated in such a manner that the firedamp content does not exceed 1%."

This motion was supported by the German workers' and employers' representatives, the Belgian workers' representatives, the French delegation (with the exception of four government representatives), two Netherlands workers' representatives and the Italian delegation.

It was decided to retain the wording of the recommendation and to note this second point of view.

6) Minimum air quantity

The minimum quantity of air per independent ventilating district must not be based solely on the number of workers in attendance on the main shift, but should also allow for other factors such as, in particular, the tonnage worked, the atmospheric conditions and the amount of firedamp emitted.

The High Authority should draw the attention of the Governments concerned to this problem.

As a rule, existing regulations prescribe only a minimum quantity of air per worker. The Conference considers that this minimum quantity should also allow for other factors, such as, in particular, the tonnage worked, the atmospheric conditions and the amount of firedamp emitted.

At a meeting of the Committee concerned, the German government delegation asked that a second paragraph be added specifying that the Governments should have the problem studied in greater detail. The Belgian workers' representative, on the other hand, proposed that the High Authority and the Council of Ministers be asked to arrange for the problem to be studied by the permanent body representing the six Governments, with a High Authority nominee in the chair. A majority of the Committee expressed doubt as to whether the regulations on this point in the various countries had reached a stage where they could usefully be dealt with by the projected permanent body, and considered it preferable that the matter should be studied by the Governments.

The Conference approved this proposal.

7) General principles in regard to coal-getting

The mine should be laid out, and the methods of coal-getting and roof control selected, with due regard to the emission of firedamp and the danger this involves.

As a general rule, levels and seams should be worked in descending order, and efforts should be made to see that the position of one working does not adversely affect another, that there is no overconcentration of working faces within a limited area, and that the systematic extraction of coal immediately underneath a level or roadway is avoided, unless the deposit and the working conditions are such as to make this necessary, in which case proper ventilation conditions must be ensured.

This recommendation summarizes the principles to be observed when working gassy pits in order to prevent as far as possible an excessive emission of firedamp, as regards subdivision of the deposit, coal-winning and stowing methods, concentration of workings, position of one working in relation to another, etc. It will be for the coalowner to decide in each case, in proportion to the amount of firedamp emitted, how strictly these principles must be applied.

At the Plenary Session, a Netherlands employers' representative gave it as his opinion that it was going too far to ban altogether the systematic extraction of coal immediately underneath levels and roadways, an operation which he did not consider to involve any danger provided proper arrangements were made in regard to ventilation. After discussing the point, the Conference agreed to add the qualifying clause appearing at the end of the recommendation as quoted above.

Section Five: COMBUSTIBLE DUST

B. Skeleton recommendations drawing the attention of the competent authorities to the desirability of framing regulations in certain particular fields

1) General

In drawing up regulations, orders and instructions concerning the prevention of accidents due to combustible dust, the competent authority in each country should be guided by the principles contained in

(a) the recommendations on dust prevention and suppression in mines adopted by the International Labour Office in December 1952;

(b) the additional details on the main technical preventive measures furnished by the International Labour Office in November 1955;

(c) the findings of the Mines Section of the Congress on Surface-Active Products in September 1954,

in so far as they relate to the prevention and suppression of combustible dust.

By way of supplementing the principles laid down in the I.L.O. Model Code of 1950 in regard to the prevention of accidents due to combustible dust, various international meetings held since have brought up to date the recommendations concerning action to be taken in the matter of dust control. The meetings in question were held in Geneva from December 1 to 17, 1952, and from November 21 to 26, 1955, and in Paris from August 30 to September 2, 1954.

In practice, the measures recommended relate both to silicosis prevention and to the prevention of actual accidents attributable to combustible dust.

The Conference considers that when the competent authority in each country takes action in connection with coal dust it should, where this concerns the prevention and suppression of combustible dust, be guided by the principles set forth in the three documents issued by these meetings, which put the whole matter in a nutshell.

2) Resolution

The Conference hopes that the High Authority, in agreement with the International Labour Office, will place the following documents at the disposal of the Governments, for distribution to all bodies concerned with dust prevention and suppression (including works councils and safety and health committees):

(a) the recommendations on dust prevention and suppression in mines adopted by the International Labour Office in December 1952;

(b) the additional details on the main technical preventive measures furnished by the International Labour Office in November 1955;

(c) the findings of the Mines Section of the Congress on Surface-Active Products in September 1954.

In order to achieve results as quickly as possible, these three documents, which constitute a manual of sound practice in dust control, and also incorporate measures for combating silicosis,

ought to be distributed to all those with an interest in the matter. Accordingly, the Conference hopes that the High Authority, in agreement with I.L.O., will make these documents available in large quantities to the Governments of the Community for distribution.

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The Conference feels it should supplement the principles contained in the I.L.O. Model Code and the three additional documents in regard to dust control by a set of recommendations dealing with further points.

The first recommendations relate to the classification of mines or districts as regards the danger of dust explosion.

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* *

3) Classification

a) In the absence of detailed formulas, whose accuracy would still remain to be proved, the volatile-matter content may be regarded as the main element determining the degree of inflammability. It must be determined from pure coal, i.e. calculated on an ashfree dry basis, in conformity with the I.S.O. international standard.

The intricate formulas worked out for determining the degree of inflammability of coal dust with due regard for the characteristics of the dust (volatile matter, moisture, ash content, mineralogical composition, size of particles, etc.) have proved somewhat unreliable. In the absence of anything better, attention may be confined until further notice to determining the main element, volatile-matter content, provided this is done in a uniform manner in conformity with the I.S.O. international standard.

b) The classification of mines as dangerous from the point of view of dust must allow for the

degree of inflammability, for the amount of firedamp present, and for any other conditions affecting the dust hazard.

In addition to the existing criterion for the classification of a pit or district as gassy (volatile-matter content), this recommendation lays down a number of other criteria, including the amount of firedamp present and, in certain circumstances, other factors such as moisture. A pit which would normally be classified as dangerous from the point of view of dust with coal containing, for example, 14% volatile matter, is by these additional criteria dangerous with a volatile-matter content of as little as 13%, or even 12%, if firedamp is present; if, however, the coal is wet, the pit would not rank as dangerous unless the volatile-matter content was above 14%.

The German and Netherlands delegations did not agree that firedamp could be regarded as an additional criterion for degree of inflammability.

c) There must be only one classification for dusty pits and districts.

d) Classification must be made either by pits or by independent ventilating districts.

As regards dust, pits and districts must be classified simply as dangerous or not dangerous, and the classification must be made at least by seperate ventilating districts.

e) Pits and districts not classified as dusty but not far off it must be inspected regularly in order to make sure that the dust is still not inflammable. They should also be inspected whenever any change in the nature of the seam or the opening-up of a new seam is liable to render the dust inflammable. The results of

the inspection must be promptly communicated to the competent authority. In the event of their indicating a dangerous degree of inflammability, the pit or district in question must be reclassified immediately, and appropriate action taken without delay.

Changes in the nature of the seams in pits or districts not actually classified as dusty but not far off it may render the dust dangerous. To ascertain whether this is happening or not, it is necessary to make regular checks. As soon as it is considered that there may be danger from dust owing to such changes, or to the opening-up of a new seam, a special inspection must be made. Should it emerge from these inspections that there is in fact danger from inflammable dust, the pit or district must be classified forthwith.

f) Samples for classification or checking purposes must be taken from the seam, in accordance with rules laid down by the competent authority.

Regulations concerning sampling of coal from the seam vary from country to country. Unless and until they are standardized, the Conference's proposal must remain merely a recommendation in principle.

4) Prevention

Most of the recommendations concerning preventive action against the risks and consequences of dust ignition have already been dealt with in connection with problems concerning ventilation and firedamp or underground combustion and fires etc. It remained for the Conference to draw up two recommendations already partly contained in the I.L.O. Model Code, but framed in more general terms, viz:

a) Classified pits and districts must be equipped with a water-mains system for purposes of dust control.

b) Conveyor belts must be of sufficient width and in good condition. The number of metal fasteners used for jointing should be as small as possible, and where these are used, it is recommended that the joints should be sealed and vulcanized. In any event, every effort must be made to ensure that all jointings are as tight as possible.

Care must be taken to prevent conveyor belts from generating dust, by seeing that they are made sufficiently wide and kept in good condition. Vulcanized joints are recommended. Where metal fasteners are used, the belt should be in as few sections as possible, and the joints should, wherever possible, be sealed.

5) General neutralization

a) To prevent the propagation of dust explosions, recourse must be had simultaneously to general neutralization (whether by inert dust, spraying, binding or any other method of proved effectiveness) and to suitably-sited stone-dust barriers.

To prevent the propagation of dust explosions, the Conference recommends that recourse be had simultaneously to general neutralization and to stone-dust barriers.

Neutralization covers a number of different methods, including inert dust, spraying, binding with calcium chloride or sodium chloride, or any other method of proved effectiveness.

b) The prescribed minimum percentage of incombustible matter in dust must be fixed in proportion to the amount of firedamp present.

The percentage of inert material to be used for neutralization purposes must be fixed in relation to the percentage of volatile matter and in proportion to the amount of firedamp present.

c) For general neutralization (stone-dusting) with inert material the use of limestone and gypsum dust is recommended. The use of materials containing combustible matter, in however small a percentage, is to be prohibited.

For charging stone-dust barriers, limestone and gypsum dust are recommended. The use of material with a content of combustible matter of less than 5% may, however, be permitted.

The inert material used for general neutralization, and as far as possible for stone-dust barriers, should consist preferably of limestone or gypsum, which have the advantage of not contributing to silicosis. It is, however, pointed out by several delegates that many types of limestone tend to cake easily owing to the fact that as a result of the widespread use of water the atmosphere underground is becoming increasingly damp.

The concession permitting the use of materials containing less than 5% of inflammable matter on stone-dust barriers applies mainly to flue soot, which has the advantage of not being hygroscopic.

6) Stone-dust barriers

a) In order to limit the extension of any dust explosion occurring, all pits or districts classified as dusty, i.e. dangerous from the point of view of dust, must be divided into "isolated sections" (in parallel and/or in series) in such a way that a dust explosion

occurring in any one section cannot spread to another. Each such section must be provided at all its points of exit with some effective means for arresting the explosion.

In order to limit the spread of explosions, the Conference considers that the independent ventilating districts should, if possible, be divided into "isolated sections" provided at all their points of exit with some effective means for arresting an explosion.

b) The maximum number of men to be employed in any one "isolated section" during the main shift must be fixed by the competent authority.

In the same way as it recommended that the permissible number of men working on the main shift should be laid down for each independent ventilating district, the Conference further recommends that a maximum number be stipulated for each "isolated section".

c) The shelves of the stone-dust barriers must be erected across the roadway on rigid supports; they should be unstable enough to operate reliably and should preferably be collapsible.

As a result of numerous experiments and experiences in various countries, the Conference recommends certain measures to be taken to ensure that the stone-dust barriers operate reliably when an explosion takes place.

d) Permanent arrangements designed to arrest any possible dust explosion should be made in regard to coal-winnings in dead ends.

It is often difficult to be sure of getting rid of dust in dead-end workings. The Conference considers that for workings of this kind it is not enough to rely on, for example, the temporary measures taken in connection with shotfiring operations: permanent arrangements must be made to arrest any dust explosion. If these cannot be carried out in the actual working, they must be made in its immediate vicinity, in such a way that all exits from the working are fully protected.

Section Six - PORTABLE LIGHTING

1) Use of flame safety lamps

Flame safety lamps may be issued only to men thoroughly trained in their use, for whom it is absolutely essential to have such lamps available to detect the presence of firedamp or deficiency in oxygen.

The recommendation on firedamp detectors proposes that the use of flame safety lamps below ground should ultimately be discontinued altogether and approved firedamp and oxygen-deficiency detectors introduced instead.

The above recommendation on the use of flame safety lamps makes the point that they be used only to detect the presence of firedamp or deficiency in oxygen, and then only by authorized persons. They must not, therefore, be used for ordinary lighting purposes.

2) Construction of flame safety lamps

Flame safety lamps should be fitted with a locking device to prevent opening by unauthorized persons, and if they are fitted with a relighting device this should be of a perfectly safe type.

In order that there should be no temptation to relight a safety lamp which has gone out by opening it, lamps must be constructed in such a way that they cannot be opened below ground at all. It is not obligatory to have a relighting device, since a number of very gassy mines prefer to forbid relighting devices altogether, as these are not always without their dangers.

Section Seven: FIRES AND UNDERGROUND COMBUSTION

B. Skeleton recommendations drawing the attention of the competent authorities to the desirability of framing regulations in certain particular fields.

In most countries, measures for the prevention of underground combustion and mine fires are not embodied in regulations to any great extent. The Conference considers that it will be of value to lay down some general principles to be observed in this connection. These may serve as a basis for more detailed regulations to be drawn up by each country separately.

It may be recalled that "underground combustion" denotes spontaneous combustion of coal, while "mine fire" refers to combustion (usually fairly vigorous) of any material. Underground combustion may therefore give rise to pit fires.

1) Prevention of underground combustion

In the preparation and implementation of working plans relating to pits or districts subject to spontaneous combustion, care should be taken

1) to avoid everything which might give rise to spontaneous ignition, particularly
   (a) leaving behind in workings stumps or pillars of coal liable to be fractured by pressure;
   (b) leakage air currents;

2) to pack the stowing material as tight as possible. If this is not practicable, or if the caving system is used, tight packs must be built at the side of the airways with fine, non-inflammable material, or the slushing method, or any other suitable method of air-tight sealing, must be adopted;

3) to employ, for preference, retreating working where this does not involve danger from firedamp;

4) to carry out any drawing-off operations speedily and without interruption. Abandoned workings and roadways must be sealed off immediately with airtight stoppings fitted with piping to enable gases from behind the stoppings to be sampled.

In pits and districts which are considered dangerous as regards underground combustion, every effort must be made to avoid the formation of air currents of insufficient velocity and volume to counter the overheating they produce by oxidizing the coal. Accordingly, care must be taken not to leave behind stumps or pillars of coal liable to be fractured by pressure; stowing material must be packed tight against the roof, particularly in steep formations; where the caving system is used, tight packs must be built at the sides of the airways with fine, non-inflammable material, especially if the caving can affect any roof coal; retreating working is preferable to advancing provided there is no danger of an accumulation of firedamp; a special watch must be kept for leakage air currents at roadway junctions and ventilation bottlenecks (narrow channels, ventilation doors).

2) Detection of underground combustion

In pits and districts liable to spontaneous combustion, the carbon-monoxide content should be regularly checked in order to detect any incipient heatings in time.

To this end, it should be the practice, in the return airway of each working where coal-getting or drawing-off is going on,

(a) to measure the carbon-monoxide content daily with an approved detector which will indicate the CO content from 0.001% upwards, or record it with an approved CO-recording apparatus,

if available, unless another method is used which will detect incipient heatings equally effectively;

(b) to make a thorough analysis of the air and calculate the CO/O_2 ratio at least once a week.*)

In seams liable to spontaneous ignition, it is important, in order to prevent the development of combustion, that incipient heatings should be detected in time. To this end, the carbon-monoxide content in the return airways of all workings where coal-getting or drawing-off work is in progress should be measured daily. The portable detectors and recording instruments now in use indicate CO content to within 0.001%. Comparison of the daily measurements provides an indication of any incipient heatings. A still more accurate check is ensured by thorough analysis of the air in return airways carried out at least once a week, which makes it possible to calculate the CO/O_2 ratio. The variation of this ratio in relation to the basic ratio fixed for each return airway, under normal conditions prior to any incipient heating, provides a highly accurate check as to any danger of combustion.

Attention is drawn to the fact that the portable carbon-monoxide detectors used in Germany and the Netherlands, which give readings showing CO to within 0.001 %, are of a handy size and inexpensive.

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*) The formula for calculating this ratio is

$$\frac{CO.100}{(0.265\ N_2) - O_2}$$

CO - N_2 and O_2 are the contents shown by analysis; $(0.265.N_2) - O_2$ represents the oxygen used up or the difference between the oxygen content upstream the fire or combustion and the content actually found downstream.

The oxygen content upstream the fire or combustion is calculated by multiplying the N_2 content determined by analysis by the factor 0.265 (ratio of O_2 to N_2 in normal air). The usual percentage of oxygen in normal air (20.93%) cannot be used as a basis owing to the possible presence underground of other gases (CH_4, etc.), which reduce this usual percentage of oxygen (20.93%).

3) Prevention of fires in shafts

1) Downcast shafts should be provided with doors or shutters enabling the shaft-top to be closed quickly.

2) In all shafts, and particularly in downcast shafts, it is necessary

   (a) to replace without delay all wood linings and other wooden equipment, particularly in ladderway partitions, portal head-pieces over landings, etc., by fire-resisting material;

   (b) to provide equipment either for permanent spraying of inflammable sections, or for instantaneous sprinkling operated from the surface and landings;

   (c) to prevent any accumulation of grease or coal dust;

   (d) to replace all inflammable liquid in piping and hydraulic equipment by non-inflammable liquid.

3) In new shafts, and where possible in those being overhauled, it is advisable

   (a) to use fire-resisting material where possible for buntons;

   (b) to use, for preference, fire-resisting guides, or at least non-inflammable grease;

   (c) to use electric cables with fireproof covering;

   (d) to site the gas-drainage pipes in the upcast shafts, if at all possible;

   (e) to ensure that electric cables, compressed-air mains and gas-drainage pipes are kept well apart.

Arrangements must be made to prevent any fire on the surface from spreading below ground by providing the top of the downcast shaft with a device enabling them to be closed quickly, for example by means of shutters.

The ultimate aim, in connection with the prevention of shaft fires, should be to have all equipment in the shafts, and especially in downcast shafts, made of fire-resisting material. To this end, action must be taken without delay to do away with wooden elements in accessory equipment (in ladderway partitions, portal headpieces over landings, etc.), and with all inflammable liquid in piping and hydraulic equipment, and to prevent any accumulation of grease or coal dust. Until this has been achieved, devices should be installed for either permanent spraying or instantaneous sprinkling of inflammable sections.

Complete re-equipment with fire-resisting materials is not always possible in the case of old shafts. Even in new shafts and in those being overhauled, wooden guide rods may be preferred in order that it may be possible to use cage safety-catches (cage-arresters). Any propagation of a fire by such guides can be counteracted; recent research in Germany has, in fact, made it possible to use non-inflammable greases. In new shafts, and so far as possible also in those being overhauled, the outer covering of electric cables must be of material which will not propagate a fire, and the cables themselves must not be sited in the immediate vicinity of compressed-air mains or gas-drainage pipes. The latter should preferably be sited in the upcast shafts.

4) Prevention of fires in the neighbourhood of shafts

It is necessary to fireproof all landings of shafts and, over a distance of at least 75 metres from the centre of the shafts, all roadways leading up to them, as well as the connecting roads between two shafts and the doors in these connecting roads.

The minimum length of the roadways to be fireproofed, measured from the centre of the shafts, has been fixed at 75 metres.

5) Prevention of fires in workings

It is advisable

(a) to introduce fireproof support, so far as possible, in the drivage, overhaul and repair of main stonedrifts used for ventilating purposes and particularly in the main intake airways;

(b) to establish fireproof zones of adequate length in stonedrifts in which there are considerable lengths of wooden support or lagging;

(c) to prohibit absolutely the use of bundles of brushwood underground;

(d) to avoid any friction liable to produce dangerous overheating of conveyor belts, idler rollers, reversing drums or drive units, and to install only fire-resistant conveyor belts in future. Conveyor belts should be supervised when in operation and inspected at stated intervals after they have been stopped;

(e) to fit brakes with wide-rimmed brake-drums and fireproof brake-bands and brake-linings;

(f) to keep the use of welding equipment and blow-lamps to an absolute minimum, their use to be permitted only by special authorization of the competent authority.

The measures to be recommended for the prevention of fires in workings may be summed up as action to discourage the use, especially in intake airways, of all types of inflammable material, including in particular wooden supports and lagging, bundles of brushwood, brake-linings made of inflammable material, and inflammable conveyor belts.

At the Plenary Session, the French and Belgian employers' representatives contended that it was necessary to use bundles of brush-wood in certain circumstances, as for instance in a rising coal heading where the strata were weak, and which was subject to falls or

instantaneous outbursts, or to aid repairs following large falls in cross-cuts or roadways. They moved that subparagraph (c) be superseded by the following text:

"(c) to forbid the use of bundles of brushwood underground, except in the case of work for which its use is necessary on safety grounds."

The motion was supported by the Belgian Government and employers' representatives (with the exception of M. Gérard), by the French Government and employers' representatives, and by one German employers' representative.

Fire-resistant belts formerly had the disadvantage of being less durable than rubber ones. Appreciable progress has been made, however, and non-inflammable belts are now available which are just as good as the rubber type in this respect.

The Netherlands employers' representative expressed reservations as to the need for fire-resistant belting. In his view, the preventive measures observed in the Netherlands (device giving warning of any slipping of the belt, checking for any overheating of the idlers, yearly dismantling and cleaning of idlers) were adequate to prevent any danger of fire in rubber belting.

As regards the point whether it was premature to recommend that non-inflammable belts be used in future, the Conference voted, with only four dissentients, in favour of retaining the words "to install only fire-resistant conveyor belts in future."

6) Places where inflammable materials accumulate

Places in which transformers or circuit-breakers immersed in combustible oil are housed must be considered to be premises where combustible or inflammable materials accumulate, within the meaning of Regulation 54,4 of the I.L.O. Model Code, unless other efficient measures are taken to prevent the outbreak of fire.

Where it is not possible to arrange the places where inflammable or combustible materials accumulate in such a way that, in the event of fire, smoke is evacuated direct without spreading through roadways or working places, such places must be equipped with fireproof and hermetically-closing doors. If such places are not under constant supervision, fire detectors and automatic fire-extinguishing apparatus must be installed.

The Committee concerned felt that places where combustible or inflammable materials accumulate, within the meaning of Regulation 54,4 of the I.L.O. Model Code, should be taken as including premises housing transformers or circuit-breakers immersed in combustible oil. It is desirable that smoke from any explosion or fire on these premises should not be drawn into the workings.

Where it is not possible to provide a direct return airway, appropriate precautions should be taken in regard to places where such materials are likely to accumulate.

At the Plenary Session, the Belgian, Netherlands and French employers' representatives expressed doubts as to the effectiveness of the automatic devices referred to in the second paragraph of the recommendation.

7) Fire control

In pits liable to combustion, and in pits where extensive mechanization involves greater fire hazards, the following firefighting facilities should be provided:

(a) a network of water mains under pressure throughout the underground workings, including staple-pits. This network should be so designed as to ensure a supply of water sufficient for the purpose of extinguishing any fire which may occur. Standardized hose connections should be fitted at regular intervals;

(b) stores of firefighting equipment and material (including cars for moving it quickly) near the downcast shaft, and if necessary at other suitable points in the pit;

(c) materials required for constructing the fire stoppings, or where necessary the preliminary work for such stoppings;

(d) effective fire extinguishers, or supplies of incombustible dust which will not harm the health of the personnel, at all particularly dangerous points and workplaces in the pit.

In such pits, a competent supervisor should be placed in charge of the firefighting arrangements prescribed by the I.L.O. Model Code, and be made responsible for the instruction of the men who would be called upon to take action in the event of a fire.

The object in such instruction should be to ensure that any fire is tackled as early as possible by the men on the spot with all the means available, and to prevent any tendency to panic.

Firefighting facilities should be provided in pits liable to combustion and in pits where the fire hazard is greater owing to extensive mechanization and, more particularly, to large-scale electrification.

A competent supervisor should be placed in charge of firefighting arrangements, and made responsible for the instruction of the personnel employed on this work. This instruction should above all aim at keeping the men prepared for prompt action, and should inspire them with confidence in the firefighting equipment provided.

8) General fire-prevention and firefighting measures

A fire-fighting plan incorporating all measures to be taken in the event of fire should be prepared for every pit, and annexed to the general working plan.

The competent authority in each country must draw up general directives for the prevention and combating of underground combustion and mine fires. It is further recommended that appropriate arrangements be made for an exchange of views and experience among the Community countries concerning the prevention and combating of underground combustion and mine fires.

The general working plan drawn up annually by the collieries should have annexed an underground firefighting plan, showing in particular the positions of the stores of firefighting equipment, sand, etc., the water-mains network with the diameters of the mains and valves, the preliminary work and material for stoppings, the fire-proof zones, etc.

The competent authority in each country should issue directives for the prevention and control of underground combustion and fires. Arrangements should be made for exchanges of experience in this connection among the Community countries.

9) Telephone connections

In every pit telephone connections must be provided between all important working places underground and a round-the-clock service for contacting the main surface departments.

It is obviously of value to have telephone connections between the important working places underground and the main surface services.

Section Eight: RECOMMENDATIONS ON ELECTRIFICATION

A. Recommendations which can be turned straight into regulations by the competent authorities

1. - E

Up to a distance of at least 50 metres from the working faces, the rated voltage in coal-workings and stone-and-coal development workings should not exceed a limit to be laid down by the competent authority. In other underground workings it should not exceed 7,200 V. In the case of lighting systems, however (with the exception of D.C. trolley-wire lighting), the rated voltage should not exceed 250 V, and in that of auxiliary portable lamps 42 V.

It must be emphasized that these rules require to be reviewed frequently in the light of any changes in connection with new electrical machinery, installations and cables. The voltage ranges laid down are those in force in Western Europe generally.

As no agreement was reached as to the maximum voltage range permissible in coal-workings and stone-and-coal development workings up to a specified distance from the working face, or the methods to be employed in measuring voltage (between phase and neutral in France, between phases elsewhere), the Conference preferred to make the competent authority in each country responsible for fixing such a maximum.

2. - E

In systems of over 660 V the earth-fault current in the event of a fault should be as small as possible or limited to as small a value as possible by appropriate apparatus.

In the event of a fault, the faulty section should immediately be automatically disconnected, or at least the earth-fault indicated by an indicating relay.

In systems of between 42 and 660 V the same should apply, but instead of the earth-fault

indicating relay an insulation-measuring set fitted with a visual and audible alarm should be used. For lighting installations a visual indicator is sufficient.

The defect in the insulation should be traced as quickly as possible by specialist staff and repaired within a reasonable time. Should this not be feasible, the faulty parts should be disconnected from the supply.

The first paragraph of this recommendation relates to devices employed in high-voltage systems in order to reduce any current to earth to a minimum.

3. - E

(a) Only such circuit-breakers or fuses should be used as have a breaking or rupturing capacity adequate to withstand the maximum short-circuit stresses which can arise at the point where they are installed.

(b) All electrical equipment should be capable of withstanding, for the clearance time of the series circuit-breakers or fuses, the maximum short-circuit currents arising at the point where it is installed, so long as the short-circuit is not actually in the equipment itself.

(c) Circuit-breakers and fuses should be so chosen and/or adjusted that they will rapidly and positively come into operation even with the weakest s.c. current[1] which can arise in the system or part of a system to be protected.

This recommendation deals with similar protective measures against the effects of short-circuits, with due regard for the sizes, capacity rating and other characteristics of all the electrical equipment employed, and more particularly of the circuit-breakers. To this end, it is necessary to determine the maximum and minimum s.c. currents either by calculation or by switchboard tests.

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[1] Short-circuit producing an arc.

4. - E Newly-laid flexible lighting or power cables must be provided with protective screens which will cause the current to be cut off in the event of dangerous deterioration.

This recommendation was adopted after a detailed discussion on the stage now reached in the development of protective screens. A good deal was said about the advantages and disadvantages of the different types of screen, but it was decided not to formulate any definite recommendation on their introduction in practice. Some of the French delegates contended that no such screen was necessary for lighting installations of less than 250 V.

5. - E Armoured cables must have a covering of sufficient mechanical resistance, and must be earthed.

6. - E The outer serving of armoured cables must be of a type which cannot possibly help to spread a fire. The same applies to the covering of flexible cables. All new cables should be constructed to comply with these requirements.

It was generally agreed that this recommendation could be implemented forthwith, since flameproof coverings are already being manufactured in considerable quantities. As regards the insulating materials used inside the cables, reference is made to the point in Recommendation 12, which, in more general terms, calls for special efforts in research.

7. - E Should it be necessary for technical reasons to use inflammable oil, the amount should be kept to a minimum, and effective precautions taken to prevent any risk of fire from leakages. Such precautions should include the provision of fireproof lining, support and lagging where the plant concerned is installed, of automatic indicators showing the temperature of the oil and the emission of decomposed gases, and of fire-curtains and fire-extinguishers.

8. - E

Oil-filled electrical equipment should not be used either on coal faces or in their immediate vicinity. In roadways this type of equipment should always be fixed.

New capacitors and transformers installed below ground should not contain any inflammable oil.

These two recommendations should be read in conjunction with Recommendation 13 E, which is to the effect that endeavours must be made to restrict the use of inflammable insulating materials and to develop non-inflammable ones.

The second recommendation was adopted by the Conference on the understanding that it should refer specifically to new capacitors and transformers, since in older equipment it is not always possible simply to substitute the one type of oil for the other.

One of the German government representatives pointed out that there was no need to prohibit the use of inflammable oil in transformers so long as the precautions referred to in the previous recommendations were duly observed.

9. - E

In all shafts and roadways, both armoured and flexible cables must be so laid as to avoid so far as is at all possible any deterioration by mechanical effects or corrosion.

This recommendation was adopted in its somewhat general form in view of the obvious difficulty of imposing binding rules on cable-laying which would cover all the different types of working, the different types of cable and the possible variations in operating conditions. No place in any shaft can be fully protected from possible damage by cages out of control, particularly since cables are as a rule supposed to be so placed as to be accessible at all times for inspection purposes.

The Plenary Session in discussing this recommendation made it clear that the words "so far as is at all possible" refer to the technical limitations: no economic consideration must ever be allowed to prejudice safety.

10. - E

The installation, maintenance and inspection of electrical plant and equipment underground should be the responsibility of an adequate staff of electricians trained for the purpose and with sufficient experience of mining operations.

In the performance of their duties, these electricians should work under the supervision of an appropriate number of foremen electricians, who have given proof of their suitability for the responsibility incumbent upon them.

Electricians must be thoroughly trained in their trade and sufficiently familiar with mining operations generally. When the point was discussed in the Plenary Session, certain apprehensions were expressed lest clashes between the competencies of the colliery supervisory personnel and the supervising electricians might have an adverse effect on safety. To obviate any such possibility, the recommendation makes it clear that foremen electricians should be empowered to issue instructions to the electricians only in connection with their special duties.

B. Skeleton recommendations drawing the attention of the competent authorities to the desirability of framing regulations in certain particular fields

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The specifications to which armoured and flexible cables for use below ground must conform, according to the purpose for which they are intended, should be laid down by the competent authority of the country.

The type number or description of the cables conforming to these specifications should be established in detail.

The manufacturers should indicate the type on delivery, and should guarantee that the cable complies with the relevant specifications.

Standards should be laid down as to the mechanical strength required of flexible cables.

It is considered to be exceedingly important that the armoured and flexible cables should really be capable of withstanding the rough usage to which they may be subjected. While not specifying in detail the requirements in respect of each type of cable, the Conference felt it to be desirable that such specifications should be framed and prescribed by the competent authority in each country, and all cables certified as being in conformity with them.

One of the workers' representatives expressed the opinion that all the recommendations on electrification should be re-examined by the High Authority, as he considered them still inadequate.

Section Nine: RECOMMENDATIONS ON MECHANISATION

A. Recommendations which can be turned straight into regulations by the competent authorities

1) Winding and man-riding: signalling systems in shafts

1. - M

(a) In all main shafts, and in all staple-pits where man-riding is carried on regularly on a considerable scale, electric signalling devices must be installed. As far as possible, shafts where man-riding is not carried on regularly should also be provided with electric signalling devices.

(b) The electric signalling installations should be so designed that it is impossible to signal at the same time from two or more landings.

(c) Where new electric signalling systems are to be installed (particularly those with relays), it is recommended that they should be provided with a continuously-recording insulation-measuring instrument, or in simpler instances with a continuously-operating indicating instrument for the supervision of insulation.

(d) Electric signalling systems connected with intermediate landings should be provided with an emergency signalling device enabling an emergency signal to be transmitted to the winding engineman from any landing at any time.

(e) Existing electric and mechanical signalling systems should as far as possible be supplemented by telephone installations.

These recommendations are based on the generally-accepted view that electric signalling in shafts is preferable to mechanical signalling from the safety standpoint.

The restrictive words "where man-riding is carried on regularly on a considerable scale" are intended to exempt the winding installations in staple-pits where not more than two or three men are lowered and raised regularly. These are mostly distant and unimportant staple-pits in which it would not always be possible to be sure of maintaining the necessary supervision of electric signalling systems, so that in these special cases the simpler mechanical signalling is also safer.

For the same reason, some delegates, including the French and Belgian employers' representatives, would have preferred the second sentence in paragraph (a) deleted.

The need for emergency signalling devices, referred to in paragraph (d), is the corollary to paragraph (b), emphasizing that there must be no possibility of signalling simultaneously from two or more landings. The signalling devices at the different landings will not operate until the cage is in their immediate vicinity. Should a cage break away, or any other irregular circumstance occur in the shaft, it would thus no longer be possible to stop the cage from an intermediate landing.

With regard to paragraph (b), one of the Belgian government representatives mentioned that in Belgium there are certain mechanical signalling devices which also preclude simultaneous signalling from more than one landing.

The telephone installations recommended in the final paragraph are intended to be supplementary to the shaft signalling systems. Their purpose would be to ensure that in an emergency it will be possible to summon or halt the cage at any time from any landing, and also that the banksmen and winding engineman can be told anything they need to know in connection with the winding operations. Accordingly, the telephone should be partially independent of the main underground telephone system.

2. - M

Where two or more decks at a single landing are used simultaneously in man-winding, the signallers at the main loading point should be automatically locked until all the other decks have signalled that they are ready.

This does not apply to synchronized signalling systems. Where these are used, the signallers at each deck must be included in the system.

2) Man-riding installations in shafts

3. - M

As regards existing electric signalling installations, it is recommended that in all ventilation shafts where man-riding is carried on regularly on a considerable scale there should be an interlocking device connected with the winding engine, which will lock the winding brake during man-riding, so long as any one of the shaft gates is left open.

The object of the locking device is to prevent the cage from being set in motion at the wrong moment, e.g. to ensure that no-one enters it just when the winding engineman has received the signal and is starting up. Numerous accidents, most of them fatal, have been caused in this way.

This recommendation was adopted subject to certain reservations, as the devices referred to have not yet been adequately tried out.

4. - M

For every man-riding installation in a shaft or staple-pit, there should be a device independent of the main installation which will enable the men to be raised from any point in the shaft.

This device should be of a type which can be used by men wearing breathing apparatus.

This additional installation is for use whenever the main winding machinery is out of order, to enable the men to be brought up from landings or other points in the shaft where the cage has broken down. A ladderway, or preferably an auxiliary winding installation in the case of deep shafts, is considered to be sufficient. It should be suitable for use by men wearing breathing apparatus, in order that rescue teams may be able to descend the shaft in case of need.

3) Shaft-sinking

5. - M

In shaft-sinking operations, the guides for the kibbles should reach down at least as far as 50 metres above the bottom of the shaft.

If a ladderway is not installed at the same time from the start of the sinking operations, an emergency winding installation should be provided, operated by means independent of the power used for the main winding engine.

4) Cables

6. - M

In staple-pits and upcast shafts with a high relative moisture content in the atmosphere, and in wet shafts, new ropes with galvanised wires should be used, unless galvanization is undesirable owing to particularly corrosive elements in the air or the water.

Winding ropes attached to drums or reels may be lubricated instead of galvanized.

7. - M

Fixed working platforms in shafts must be assessed for maximum load plus an adequate safety margin before they are installed. One assessment for each type is sufficient.

The material employed for constructing platforms, especially timber, should be examined periodically for quality and safety.

This recommendation is the outcome of an accident in which an unsound platform collapsed, killing or injuring ten miners. The reference to an "adequate safety margin" means that it is necessary to take into account an additional safety factor which may be fixed by the competent authority in each country.

The insistence in the second paragraph on the periodic examination of the material used in constructing platforms presupposes in general that such material is stored permanently at definite points and employed only for the purpose referred to.

5) Conveyors

8. - M Man-riding on armoured or similar conveyors must be prohibited.

Man-riding on armoured conveyors has been the cause of numerous serious and fatal accidents in the past, such conveyors being exceptionally powerful. In all countries where man-riding on armoured and similar conveyors is still permitted, it should therefore be strictly forbidden. The "similar conveyors" referred to comprise single and double-chain conveyors, with the exception of disc-retarding (flight) conveyors.

9. - M In connection with armoured and similar conveyors, contrivances must be developed which will enable such conveyors to be stopped from any point alongside.

Where face conveyors are not yet fitted with such contrivances, it must be possible to stop them at any time by a signal.

In view of the special danger involved by the armoured or chain conveyor, it is best if they can be stopped from any point, whereas in the case of other face conveyors a simple signalling system is considered sufficient.

10. - M The drive heads of conveyor belts should be either constantly under the surveillance of an attendant, or equipped with a contrivance which will stop the belt automatically as soon as there is excessive slipping on the driving drum.

This recommendation is intended to provide against the fire hazard involved by the use of belts, whether from the overheating of fixed rollers or from the overheating of the belt itself due to excessive slipping at the drive end.

6) Internal-combustion engines below ground

11. - M Fixed internal-combustion engines should not be allowed in underground workings.

The only movable internal-combustion engines allowed should be Diesel engines. The quality of the Diesel fuel used should be in conformity with the standards approved by the competent authority.

The object of this recommendation is to keep the use of Diesel fuel below ground to the absolute minimum.

It is necessary to lay down certain standards as to the quality of the Diesel fuel used below ground, in regard to such points as degree of inflammability and liability to give off noxious fumes in its exhaust gases.

12. - M

Where Diesel fuel is used in locomotives and vehicles not running on rails, precautions should be taken to ensure that no fuel is spilled during filling.

In the case of larger quantities of fuel, filling should be carried out only on special fireproof premises which can be hermetically sealed off in the event of fire, and are connected to the return airway in such a manner that the air current does not pass back through points where men are at work.

13. - M

Diesel-engine vehicles must be equipped with portable fire-extinguishers.
It is further recommended that a carbon-dioxide fire-extinguisher be fitted to the engine, enabling carbon dioxide to be injected into the air-inlet and exhaust pipes and sprayed under the bonnet.

14. - M

(a) To ensure that the amount of exhaust CO in the air current is kept below the danger level, the competent authorities should prescribe certain measures in connection with the use of Diesel engines below ground, including regular examination of the exhaust

gases, limiting of the effective power of each type of engine, fixing of a minimum current of air, etc.

(b) Where there is a danger of sudden accumulations of firedamp in haulage roads used by locomotives, the latter must be equipped with devices enabling the air inlet to be shut off instantaneously.

The measures recommended are intended to eliminate, or at any rate drastically curtail, the danger from the carbon monoxide in the exhaust gases where Diesel engines are used.

By limiting the effective power of each engine (e.g. by restricting the fuel intake) it is possible to ensure maximum combustion, and consequently minimum carbon-dioxide formation.

Care must always be taken to guarantee sufficient dilution of the CO in the air in haulage roads by fixing a minimum air quantity.

At all events, the exhaust gases need to be constantly checked, since they become more and more toxic as the engine becomes older.

Since the CO content of exhaust gases is liable to exceed the permitted maximum proportion in the atmosphere when firedamp is also present, it is recommended that in gassy districts where unforeseeable accumulations may occur at any time, a stopping mechanism should be provided enabling the driver to shut off his engine immediately. Merely to cut off the fuel supply is not considered to produce the desired effect "immediately" in such circumstances.

7) Travalling below ground

15. - M Loading-points and similar places where the travelling road crosses the track and where mine-cars are constantly being set up and/or moved about during operations, and points in conveyor roads where it is necessary to cross the belt, should be bridged over to ensure safe crossing.

16. - M

Every effort should be made to ensure that a travelling road is at all times left along the face.

This recommendation is complementary to the prohibition of man-riding on armoured conveyors. It is worded rather loosely in order to allow for differences in thickness between one seam and another, and also for differences between the various methods of coal-getting. Where the method permits, however, the travelling road should be cut between the face and the conveyor.

8) Locomotive haulage

17. - M

New locomotives and other self-propelled vehicles must have covered cabs, and must be so constructed that the driver has a sufficient view of the track from his seat, in whichever direction he is travelling, without leaning out of the cab.

Locomotives already in use must be converted to conform with these requirements. Those which cannot be so converted must be either withdrawn from service within a maximum time-limit to be laid down by the competent authority, or used only on those roadways which afford sufficient clearance above and on either side to make accidents unlikely.

The numerous locomotive accidents which have occured in recent years have shown that special attention needs to be devoted to improving visibility from the cabs of locomotive and other vehicles.

In addition, the driver must be adequately protected. The workers' group would have preferred to fix forthwith a time-limit of five years within which locomotives not conforming with the requirements specified would have to be withdrawn. Ultimately, however, they agreed with the majority that it was impossible to fix any such time-limit without knowing the exact number of locomotives to be replaced and the proportion of such locomotives to the manufacturers' production potential, which varies from country to country.

18. - M

(a) All locomotives must be provided with side-friction brakes, which should be powerful enough to ensure maximum braking efficiency on the part of the brake blocks. Where the mine-cars are also fitted with brakes, the braking-power of the locomotive may be reduced in proportion.

(b) The maximum load to be hauled by any one locomotive should be fixed in relation to the maximum speed and to the average gradient of the road, in such a manner that the braking distance with a mean coefficient of friction of 0.17 does not exceed a given length.
For main-road locomotives travelling at 4 metres per second, a braking distance of 80 metres can as a rule be considered sufficient.

(c) All locomotives, with the exception of small low-speed types, must be equipped for travel in either direction with electric headlights which can be dipped from the driver's seat.
The headlights must ensure adequate illumination over the entire braking distance.

The requirement to the effect that braking distances should be as short as possible presupposes that the brakes used are sufficiently strong and powerful, and that there is a restriction on the tonnages which may be hauled.

One of the Belgian government delegations mentioned that accidents had been caused by drivers reversing the wheels in order to brake more sharply. He urged that some contrivance be developed to prevent such action.

The whole of the braking distance considered to be practicable in these circumstances must be illuminated by the headlights of the locomotive, in order that any obstructions may be seen in time. As a general rule, 4 lux is considered a sufficient intensity.

Paragraph (c) was amended, with the agreement of the Plenary Session, to exempt small low-speed locomotives, which use portable lamps. Not threat to safety could possibly be involved by this exception.

19. - M

All locomotives should also be fitted with sandboxes which will operate when travelling in either direction.

20. - M

All locomotives and other self-propelled vehicles should be fitted with devices which will prevent their being set in motion by any unauthorized person.

New locomotives and other vehicles should as far as possible be fitted with devices which will ensure that they can be set and kept in motion only when the driver is at his post.

The object of this recommendation is to prevent accidents from being caused by unauthorized persons setting vehicles in motion. The Conference considered that the devices referred to in the first paragraph could be adapted to fit existing locomotives.

New models should be equipped with devices designed in accordance with the second paragraph, to prevent drivers from starting the vehicle from outside. Furthermore, it is necessary to ensure that drivers are not endangered by the moving vehicle if they leave it while it is in motion.

21. - M

Points and ventilation doors in busy roadways should be so constructed as to make it possible to operate them from the locomotive.

The ventilation doors should furthermore be fitted with a contrivance which will give warning of the approach of the locomotive before they open.

Points and ventilation doors operated by remote control should be installed so that the driver is not tempted to jump from the locomotive while it is moving and run in front of the driverless train.

Since with remote control there is the danger that men coming from the other direction may be injured by doors opening unexpectedly, they must be given warning of the approach of a train.

22. - M

(a) Single-track haulage roads, sidings and junctions frequently used by main-road locomotives, and approaches to stations, must be provided as far as possible with visual signals. To avoid confusion, all such signals should be in the same colours (the colours used for traffic signals). The men must obey the signals when walking in these areas, unless a separate travelling road of at least 60 cm. clear width is provided for them.

(b) The use of reflector-type markers to draw attention to obstructions or to work in progress along the track should be encouraged.

The object of this recommendation is to improve safety conditions for the haulage personnel and men who spend their time along main lines much used by locomotive-hauled trains.

The colours used for the visual signals should have the same meaning everywhere, to prevent misunderstandings. As far as possible the colours should be those used for traffic signals above ground.

In order that the special reflector-type markers recommended may be still better seen, they should be so designed as to reflect even diffused light.

23. - M

(a) In new levels, for installations of over 280 V the minimum height of the trolley wire must be 2.50 metres, and for installations of under 280 V 2.20 metres, above the top of the rails.

Where the height is less, in new levels, guarded wires or the two-wire trolley system must be used.

(b) In gassy mines, trolley-wire installations must not be used in return airways or in workings ventilated by auxiliary fans.

(c) In gassy mines, no coal-getting must be performed within a specified protective zone on either side of the track dictated by local conditions. If coal-getting operations have taken place in this area prior to the laying of the track, trolley locomotives must not be introduced until some time has elapsed.

(d) Trolley locomotives must run only in roads where the velocity and volume of the air current are sufficient to prevent the accumulation of firedamp.

The recommendation on trolley haulage take into account the most essential safety considerations to be borne in mind when these facilities are installed. The aim in fixing the heights for the trolley wires is to reduce the risk of contact with live conductors to a minimum.

One of the French employers' representatives stated, however, that in France voltages of up to 600 V were allowed in wires only 2.20 metres up, and that no adverse effects on safety had resulted (only one accident in four years). Experience in Germany, on the other hand, suggested the contrary.

A French government representative expressed the view that a voltage limitation was pointless since the danger of electrocution already existed at a voltage of 280 V.

One of the Belgian government representatives proposed that the recommendation should be extended to include the following paragraph:

"To reduce sparking at the current-collectors (trolley arms), these should be duplicated where a pantograph is used, or comprise a collector-shoe of appropriate length in the case of poles."

The recommendations on the boundary of the protective area and the ventilation of the haulage roads are intended more particularly to prevent the accumulation of firedamp in the trolley-roads.

The French government and employers' representatives and two of the Belgian employers' representatives were in favour of deleting paragraph (d), which they considered to be unnecessary.

24. - M

(a) Along the main haulage roads, regular man-riding should be by means of tubs specially fitted out for the purpose. In roads where the trolley wires are left live during man-riding the tubs must be covered over. On stretches much used by men travelling singly, tubs of the type referred to must be coupled to trains hauling materials.

(b) Tubs used for man-riding only must be so constructed that no unintentional movement by the men can cause any part of their body to project beyond the edge of the tub.

The size of the coal-winnings and the degree of mechanization are now such that quite considerable numbers of men have to pass along the tracks even outside normal shift changes. The consequent increased risk necessitates additional measures to protect these men, including in particular the use of special tubs. Man-riding tubs hauled by material-carrying trains must be so constructed that there is as little danger as possible of derailment or of one tub mounting on top of another.

B. Skeleton recommendations drawing the attention of the competent authority to the desirability of framing regulations in certain particular fields.

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25. - M

Man-riding on continuous conveyors in level or inclined roads should be permitted only subject to special rules laid down by the competent authority. These must specify, among other things, the amount of space to be kept clear above and on both sides of the conveyor, the speed at which it may travel and the construction of the stopping-places for entering and alighting.

Since in long roadways man-riding on conveyors is a common practice, even where this is prohibited, special safeguards should be provided by the competent authority to ensure that where it is permitted it shall involve no danger.

26. - M Haulage of materials on continuous conveyors should be subject to rules adapted to local conditions.

The danger associated with the haulage of materials on conveyors is generally recognized. Since the safety measures required depend almost entirely on local conditions, it is impossible to frame general regulations on the subject. Special care should, however, be taken to ensure that any projecting material is automatically put back into a safe position.

27. - M In the planning and construction of loading-points and landings of shafts and staple-pits, care must be taken to ensure that the men working there are not endangered by the loading, haulage and winding operations.

This recommendation is intended to ensure that in the planning of loading-points and landings due account is taken of the siting conditions, and all the machinery and control levers are so placed as to afford maximum safety for the personnel employed there. Only in each individual case, however, will it be possible to decide the extent to which allowance will be made for this factor.

28. - M All staple-pits should if possible be provided with man-riding apparatus, and man-riding in such pits should be authorized.

This recommendation is due to the recognition that -- frequently in defiance of instructions -- men are sometimes lowered and raised without authorization in staple-pits. As it is difficult to keep an effective check on such practices, all staple-pits should if possible be equipped with man-riding apparatus, and man-riding there should be authorized.

29. - M In ventilation shafts which are showing the effects of continuous mining operations, or in which there is excessive wear and tear on the

guide-rods, the guides should be examined at regular intervals with an appropriate testing apparatus.

The object of the regular examination recommended should be to detect in good time any deterioration of the guide equipment in order that it may be repaired before the danger becomes more serious.

30. - M The use below ground of all inflammable oils, with the exception of lubricants and Diesel fuel, should be discontinued as far as possible, even for mechanical purposes, such as the operation of hydraulic equipment, couplings, tub-decking plant, props, etc.

PART TWO

Inspection for compliance with the Regulations

Section One: SAFETY DEPARTMENTS AND THE ORGANIZATION OF SUPERVISION WITHIN THE ENTERPRISES

1) Safety departments in enterprises

In regard to the operation, structure and responsibilities of the safety departments within the enterprises, the Conference would make the following recommendations:

A. 1. Enterprises must organize safety departments, their structure to depend on the particular features of each enterprise.

2. In any event, however, there must be at every colliery a member of the staff or a department responsible for all matters relating to safety.

B. 1. There should be in each country an Act or Regulation making it compulsory for every enterprise to set up at least a safety department.

2. Furthermore, minimum requirements should be laid down concerning

(a) the duties and functions of such a department;

(b) the qualifications and abilities needed by its staff;

(c) the general principles on which it is to be organised (to be implemented in accordance with practical experience, in co-operation with the Mines Inspectorate).

C. The colliery manager should be responsible for selecting the officers and personnel of the safety department.

In the view of the German Government and workers' representatives, the Belgian Government and workers' representatives, the Italian and Luxembourg delegations and the Dutch workers' representatives,

> the colliery manager should consult the bodies representing the workers' interests in the enterprise before taking any decision in this regard.

The Belgian and German employers' representatives, the French Government and employers' representatives and the Dutch Government and employers' representatives

> did not consider it desirable to go so far. They did, however, feel that it would be advisable for the colliery manager to make sure, particularly from the men's representatives, that the safety personnel appointed would be acceptable to the men.

D. 1. There should be an adequate number of safety personnel, and they should work full time on safety and health, to the exclusion of all other duties. In cases where this is not practicable, exceptions should be made only with the approval of the Mines Inspectorate.

2. Safety personnel, of whatever grade, should be given rank and pay equivalent to those of operational personnel with the same qualifications.

E. The jurisdiction of the safety department should cover all problems relating to safety and health and not merely inspection for compliance with safety laws or regulations.

F. The task of the safety department should be to study and to prepare -- if necessary in co-operation with specialist staff from the operations side whose work has a bearing on safety, -- all measures to be adopted with regard to safety, to submit them to the colliery management and to check whether the management's decisions are being implemented.

The safety department must, however, have the right to decide itself on the action to be taken in the event of imminent danger, provided it notifies the management later.

G. Besides the safety department, specialist staff on the operational side may be made responsible for certain matters of particular importance in connection with safety. Like the operational staff generally, these men should be administratively independent of the safety department, but they should work in intimate co-operation with it.

The management must make all appropriate arrangements to avoid any conflict of authority between the safety and operational departments.

H. The work of the safety department should come under the sole authority of the colliery management.

This principle is not to be taken as encroaching on the rights of the Mines Inspectorate and the safety committees within their respective competencies, as there should, indeed, be every co-operation between them and the safety

departments.

I. It is recommended that exchanges of information be organized among officers of the safety departments of the different collieries. It is further considered that the Mines Inspectorate should take part in such exchanges from time to time.

Such exchanges should be arranged not only at pit, coalfield or national level, but also at Community level.

A number of delegates felt that more should be done in this field than merely organizing exchanges of information within the various countries or within the Community, as this would be likely to remain too academic.

Stressing that to be all the time inspecting the same pits with the same regulations and the same working habits was not calculated to keep those engaged on the supervision and improvement of safety arrangements up to the mark, they urged that

meetings should be organized to discuss safety problems; in connection with these there should be visits to underground workings, centered on safety arrangements, similar to the conducted underground tours and training periods organized by the collieries in connection with technical training. The object of such visits would not, of course, be to check whether the regulations were being properly complied with, but to demonstrate how they worked out in practice and fitted into the everyday work, and to provide food for thought.

At national level such meetings could be organized by the employers and the Mines Inspectorate, and at Community

level by the High Authority itself, either by setting up a special department for the purpose, or by making it the responsibility of the permanent body which was under discussion by the Council of Ministers.

The Conference accepted these views. In this connection the High Authority would emphasize that it has always been concerned to do more than merely provide working documents, and that it is most anxious that experts should have direct contact with actual mining practice and conditions. It will, of course, go into the matter most carefully, but trusts that the recommendation will not be regarded as binding.

2) Organization of the supervision of safety arrangements within the enterprises

The German delegates mentioned that in Germany, over and above the regulations concerning the safety departments, it was legally obligatory for all members of the supervisory staff, of whatever grade, to have been approved by the Mines Inspectorate before appointment, such approval being subject to withdrawal at any time.

They considered that this requirement was of outstanding importance in regard to safety policy.

A similar arrangement exists in the Netherlands, where, although the supervisory staff do not actually have to be approved by the Mines Inspectorate, the employers are obliged to submit to the Inspectorate a full list of such staff in their enterprises.

The Conference considers that

A. 1. The coalowner must place every underground workplace or working and all work carried out below ground under the management, direction, supervision or responsibility of persons whose functions and obligations must be clearly defined and communicated to the competent authority,

2. Every member of the managerial or supervisory staff to whom such duties are assigned must possess the appropriate qualifications as recognized by the competent authority.

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The tables following provide a summary of the information assembled by the Conference on the safety departments of the collieries.

Safety departments within the enterprises

	Belgium	France	Saar	Germany	Italy	Netherlands.	United Kingdom
1. Special departments dealing with safety matters within the enterprises							
(a) at pit level	(1) Safety officers belonging to safety departments are responsible for these duties. (2) Safety and health committee consisting of members of safety department appointed by management and members nominated by workers and employees.	Safety supervisors, on staff of safety departments, responsible for these duties.	Responsibility for safety in the various sectors is borne by special-duties deputies (Funktionssteiger)	A safety officer at each pit responsible for matters of safety and health. May have one or more assistants according to size of colliery. Special arrangements: Dortmunder Bergbau A.G. (1) Self-preservation advisers who have to ensure that the men work in accordance with the mines regulations and observe the safety rules. (2) Accidents committee, under chairmanship of the safety officer, and consisting of: - 2 members of management and of works council; - 3 self-preservation advisers.	Sulcis coalfield: Safety body at each colliery. La Thuile coalfield: Special safety committee for each pit.	Safety personnel (deputies and overmen), belonging to safety department, are responsible for matters of safety and health.	The National Coal Board have their own safety organization which now includes over 600 special safety appointments. There are a Chief Safety Inspector at industry level, Divisional and Area Safety Engineers and Colliery Safety Officers at pit level
(b) at enterprise level	Safety department, headed by a manager and comprising all safety personnel in all the pits.	(1) Special department dealing with safety matters in all colliery groups in major coalfields. (2) Similar special department for each coalfield	Safety in Mines Division of the General Mines Directorate (Oberbergworksdirektion).	Big enterprises or groups of collieries have at their head offices a safety department, headed by a chief safety officer (who is often at the same time the vocational-training officer). Special arrangements: Dortmunder Bergbau A.G. Accidents committee, under chairmanship of Technical Director of enterprise.		Safety department, headed by a safety manager and comprising all safety personnel in all the pits.	
(c) at industry level	(1) Staff responsible for introductory instruction and vocational training. (2) Provincial committees on safety and health in the mines. (3) Institut d'Hygiène des Mines, Hasselt.	(1) Central safety organization of the Charbonnages de France, which inspects and co-ordinates safety measures in the various coalfields. (2) Research and study centre of the Charbonnages de France, carrying out research and study work on health and safety.	Special safety departments of Bergbauberufsgenossenschaft the Mutual Accident Insurance Association for the Mining Industry).	(1) Safety department of Steinkohlenbergbauverein, Essen. (2) Meetings of chief safety officers, organized by Bergbauberufsgenossenschaft (Mutual Accident Insurance Association of the Mining Industry).			

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
2. Acts or Regulations on which organization of safety departments is based	(1) Regent's decree of September 25, 1947, concerning (a) special departments in enterprises; (b) safety and health committees in enterprises; (c) provincial committees. (2) At industry level; organized by the enterprises.	(1) No Act or Regulation requiring organization of safety departments. (2) Research and study centre set up pursuant to Nationalization Act and under Enactment of January 16, 1947.	Statutory Mines Regulations and Directives of the Mines Inspectorate (Bergpolizeiverordnung des Oberbergamts or Vorschrift des Oberbergamts), or administrative provisions.	Appointment of safety officers obligatory under Mines Regulations (Section 323 of the B.P.V.) of July 1, 1953.	None	None	N.C.B. have a duty under Coal Industry Nationalization Act, 1946, to secure the safety of their employees.
3. (a) Administrative structure and staffing of safety departments	At enterprise level: Operations manager; Safety officer; Assistant At pit level: Safety overman; Safety deputies 1 or 2 per shift; Assistants (2 or 3 per pit or district)	At coalfield level: Directorate-General; Coalfield safety engineer At group level: Group safety engineers At pit level: Safety supervisors (a) for compliance with safety regulations and protective measures; (b) for special duties (ventilation, explosives, dust)	Special-duties deputies (Funktionssteiger) come directly under the authority of the operations (technical) manager.	At enterprise level: Technical Department; Chief Safety officer At pit level: Safety officers; Assistants	Sulcis coalfield Central Administration Colliery management Safety engineer Special safety personnel La Thuile coalfield Colliery manager Underground manager and his assistants; Safety Committee	Safety departments come directly under colliery management.	Safety Branch at headquarters of N.C.B. and similar arrangements at Divisional and Area levels. There are also Colliery safety officers, who are directly responsible to the Colliery Manager but also have a responsibility to the Area Safety Engineer, who in turn has a responsibility to the Divisional Safety Engineer, who again is responsible to the Chief Safety Engineer.
(b) Responsibilities of safety departments	(1) Inspection for compliance with regulations concerning safety, health and hygiene. (2) Action to remedy causes of danger, if any.	(1) To study working conditions from the safety angle. (2) To propose appropriate safety measures. (3) To inspect for compliance with safety orders.	(1) Responsible for safety arrangements in their particular field throughout the mine.	(1) Inspection of installations and workings (including outside contractors' work) for compliance with safety regulations. (2) Submission of inspection reports to management.	Sulcis coalfield Safety departments' responsibilities laid down in internal Rules and Regulations for Accident Prevention in the Sulcis Mines.	Act in an advisory and supervisory capacity in connection with all operational departments in consultation with the heads of these depart-	

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
3.(b) (contd.)	(3)To propose certain action to the colliery manager. (4)To advise the supervisory staff and the men, and see that the safety instructions and orders are carried out. (5)To inculcate and encourage safety-mindedness among the personnel. (6)To draw up inspection and accident reports and establish any conclusions emerging. (7)To take part in the training of new entrants from the safety angle. (1)	(4)To deal with matters concerning (a)ventilation; (b)firedamp detection; (c)use of explosives; (d)dust control (silicosis and dust ignition). (5)To inspect and supervise safety equipment and winding ropes. (6)To organize rescue operations. (7)To take part in training of personnel from safety angle. (8)To deal with accident statistics and inquiries into accidents.	(2)To organize safety measures in co-operation with district deputy. (3)In the event of danger, to take any action indicated on his own responsibility, such action to be then notified to operations (technical) manager.	(3)Inspection for availability and use made of all accident-prevention equipment and protective measures against occupational diseases. (4)Improvement of installations and working methods from safety point of view. (5)Instruction of men, individually or in groups; on safe working methods. (6)Analysis and interpretation of accident statistics and results of inquiries into accidents, with a view to proposing practical remedial action. (7)Care of casualties. (8)Submission of accident reports and attendance at official inquiries into accidents. (9)Compilation of accident statistics. (10)Implementation of all measures laid down for protection of personnel from occupational diseases and other dangers to health.	Safety department has to supervise and inspect the following: ventilation; sprinkling; stone-dusting; firedamp-detection and heat-measurement; electrification; rescue operations; checking of safety equipment. La Thuile coalfield Safety committees are responsible for establishing causes of accidents; studying action to be taken to prevent them; encouraging all preventive safety measures.		
(c) Organic and functional liaison with other departments	(1) Operations manager Head of safety department / Underground manager (2)Safety measures have to be taken without delay: (a)safety officer informs member of underground operations staff; (b)he makes out a report informing the entire executive staff of his observations; (c)he sends a special report to the head of the safety department specifying the action taken.	Safety departments never encroach on field of operational (technical) departments, which have sole responsibility for framing and implementation of safety and preventive measures.		(1)Safety officer takes his instructions exclusively from colliery management. (2)He is entitled to issue operational orders on the spot only in the event of imminent danger, and must inform the colliery manager forthwith of any orders so issued.	Safety departments in the Sulcis collieries, although administratively and operationally independent in each pit, are working in close co-operation with the other departments for both normal and emergency duties.	In the event of any disagreement, the management has the last word.	There is constant liaison with all Technical Branches and Departments. A Headquarters Safety Conference meets regularly for the pooling of experience, under the Chairmanship of the Chief Safety Engineer and attended by all the Divisional Safety Engineers.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
	Head of safety department and underground manager inform operations manager, who either confirms or alters instructions given.						
4. Relations between safety departments and outside bodies concerned with industrial safety	(1) Annual report on operation of department to Divisional Director of Mines. (2) Mines inspectors and worker-inspectors supervise operation of safety department. All necessary documents are forwarded to them. (3) Safety department is in contact as regards safety measures to be instituted with representatives of special organizations with which enterprise has agreement regarding inspection of installations, plant, etc. (4) In the event of disagreement within the safety committee as to action to be taken, committee may refer to Mines Inspectorate. Mines Inspectorate can request safety committee to assist in work of establishing causes of unsafe conditions and to study preventive measures.	(1) Relations with outside bodies a are the affair of the management, which bears sole responsibility. (2) Safety departments assist management in this field.	Special-duties deputies are appointed subject to agreement of Mines Inspectorate (Bergaufsichtsbehörde), but remain under authority of colliery management.	(1) Like colliery as a whole, safety officers come under Mines Inspectorate. (2) Some Bergämter (Regional Inspectorates) organize independently additional meetings of safety officers in their areas for the pooling of experience.	Liaison between safety department and Mines Inspectorate is through colliery management.	Colliieries' safety departments are in contact with one another and maintain liaison with (a) the national mining authority in the Netherlands (State Mines Inspectorate) and elsewhere (Belgium, Germany); (b) the Labour Inspectorate of the Netherlands; (c) research stations in the Netherlands (State Mines) and elsewhere (Belgium, France, Germany, U.K.); (d) the Safety Institute, (Veiligheids-instituut), Amsterdam.	There is very close liaison between the Board's Safety Organization, the Mines Inspectorate, and other interested bodies both at Headquarters and Divisional level. Regular meetings are held at which safety questions are discussed.
5. (a) Method of selecting and training safety personnel	(1) Selected by colliery manager from personnel with necessary technical knowledge and adequate knowledge of legislation. (2) Instructed and trained by head of safety department and his assistants. Given advanced training at meetings and study periods organized by outside bodies.	(1) Selected by management. (2) Kept informed of innovations, tests and research in connection with safety. Safety supervisors are trained by safety engineers.	Either workmen with special aptitudes and trained in special courses (ventilation deputy, shotfiring deputy, etc.), or skilled technical personnel selected on strength of their experience (accident deputy, lampman).	(1) Selected from personnel with academic or Mining College training and adequate experience of practical mining conditions. (2) Special training courses for safety officers organized by Steinkohlenbergbauverein since early 1956.	Safety personnel selected according to certain criteria as to skill and/or reliability, and trained on the job.	Selected from specially qualified colliery personnel; trained by safety department (personal contact with safety officers, lectures, study periods, etc.).	The Safety Personnel are recruited from practical mining men. Their selection so far as possible is based on their qualifications and aptitude for the particular job. Normally there is no special training, but it is hoped in the future to arrange special courses for safety staff.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
(b) Is personnel engaged full-time or only part-time on safety duties?	(1) Head of safety department Generally full-time job with no other duties. Sometimes occurs that in a highly-concentrated enterprise not producing very large tonnages underground manager and head of safety department are the same man. (2) Safety personnel Always full-time.	(1) Safety engineer Generally full-time job with no other duties. In smaller units, may have additional duties (vocational training, etc.). (2) Safety personnel Always full-time.	Special-duties deputies do not perform any other duties.	Safety officers may be assigned other duties only with authorization from the Bergamt.	Safety personnel are employed exclusively on safety duties.	Safety personnel deal only with matters of safety and health.	Safety personnel are employed full-time on safety work.

Section Two: FRAMING OF REGULATIONS AND INSPECTION FOR COMPLIANCE WITH THEM

The methods employed in the different Community countries in framing safety regulations and the organization of inspection by the official departments of the Mines Inspectorates for compliance with these regulations were examined by the Conference, which arrived at the following conclusions:

A. 1. Since in the pits and their surface buildings and installations safety is a single integrated element, yet presents two separate aspects, the technical and the social, it is considered that the work of the Mines Inspectorate should be so organized as to take this fact into account.

It is, therefore, felt to be essential that safety, health and technical inspection in the mines should be carried out by one and the same inspection service, the inspectors to have all the qualifications required for this purpose.

The departments and organizations which have to study the inspection reports and to take action accordingly must be answerable only to the Minister responsible for the mines. The Minister will, where appropriate, inform his colleagues of observations made on matters concerning them and either arrange with them, or leave it to them to decide, what action, if any, is to be taken.

This text is not to be read as meaning that inspection duties may not be allocated to different officials within the Inspectorate according to their particular qualifications.

The Italian Government and workers' representatives felt unable to approve this text, since they considered that it would tend to integrate the general industrial inspectorate into the Mines Inspectorate.

2. The Conference is of the unanimous opinion that where authority or partial authority concerning safety in mines is delegated by the Minister, it should be delegated only to the Mines Inspectorate.

   The Mines Inspectorate should, however, inform the national, regional or local authorities, to such extent as may be deemed necessary, of the action taken in virtue of this delegation of authority.

B. The Conference considers that no exemption must be granted if it involves a decrease in safety. Where exemptions are granted, compensatory measures should as a rule be instituted, i.e. stricter safety or inspection arrangements, or both.

   The authority responsible for making the relevant Acts or Regulations should mention whether or not special exemptions may be granted for limited periods. It should designate the body authorized to grant them and to specify the conditions attaching. It should, furthermore, lay down the disciplinary action to be taken in the event of infringement.

   It is desirable that there should be consultation between the employers and the workers regarding any exemption. The German delegation drew attention to the fact that in Germany it is compulsory for the employers to consult the workers in such cases.

   The Conference considers it essential that in any event the bodies representing the workers' interests within the enterprise should be notified of all exemptions granted during the period concerned.

   At regular intervals, the body empowered to grant exemption should make a return of all exemptions granted during the period concerned.

C. It is necessary that the implementation of safety regulations should permit of adaptation to the particular conditions prevailing in individual enterprises. This adaptation is brought about by means of special instructions.

In certain cases, enterprises are obliged by the regulations to issue instructions; in others it is left to their own initiative.

The Conference recommends that when such instructions are drawn up by the employer, the latter shall consult the safety committee on which the workers are represented.

The instructions thus drawn up should be approved by the Mines Inspectorate where such approval is specifically required by the regulations; in all other cases they need merely be notified to the Inspectorate.

D. 1. The Conference regards it as desirable that all Councils and Committees assisting the Minister responsible for the mines and dealing with safety matters should include representatives of the employers and of the workers.

2. In any event, the Conference is of the unanimous opinion that qualified representatives of the employers and of the workers should be consulted whenever a regulation is to be enacted or amended.

3. Having stated these principles, the Conference considers that it should be left to the national authorities in each country to settle the practical details of implementation.

The Conference considers that the effectiveness of inspection as to compliance with safety regulations depends to some extent on the number of persons engaged on such duties full-time and the frequency with which their inspections are carried out.

The table overleaf provides a summary of the information on this subject assembled by the Conference.

WORK OF THE MINES INSPECTORATE
IN COALMINES UNDERGROUND

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		Germany	Belgium	France	Saar	Italy	Netherlands
1953	Workers underground [1]	335 100	107 900	158 200	38 100	7 600	30 000
	Persons engaged on inspection : Inspectors	96	36	26	10	9	3
	Assistants	60	-	55	7	4	(2) 11
	Workers' delegates	23	66	198	-	-	8
	Inspections underground by inspectors	12 115	1 903	509	682	97	308
	assistants	13 263	-	1 697	1 290	24	2 069
	workers' delegates	5 227	13 948	30 577	-	-	1 913
	Pits inspected	156	141	162	18	9	12
	Underground workers per inspector	3 490	3 000	6 084	3 810	844	10 000
	per assistant	2 150	3 000	2 816	2 240	585	2 000
	per workers' delegate	14 600	1 600	798	-	-	3 750
	Average number of inspections underground per inspector	126	53	19	68	11	103
	per assistant	163	53	30	116	9	158
	per workers' delegate	227	211	154	-	-	239
	per person otherwise engaged on inspection	171	155	118	116	9	187
	Average number of inspections per pit	196	112	202	110	13	358
1954	Workers underground [1]	331 400	103 700	151 500	37 700	6 900	30 600
	Persons engaged on inspection : Inspectors	91	36	26	10	9	3
	Assistants	54	-	58	7	2	(3) 9
	Workers' delegates	23	66	195	-	-	8
	Inspections underground by inspectors	12 039	2 023	561	762	135	263
	assistants	12 585	-	1 861	1 141	4	1 613
	workers' delegates	5 664	13 870	30 242	-	-	2 175
	Pits inspected	156	138	162	18	11	12
	Underground workers per inspector	3 640	2 900	5 826	3 770	767	10 200
	per assistant	2 285	2 900	2 612	2 220	627	2 550
	per workers'delegate	14 400	1 600	777	-	-	3 800
	Average number of inspections underground per inspector	132	56	18	76	15	88
	per assistant	170	56	32	112	12	156
	per workers'delegate	246	210	155	-	-	272
	per person otherwise engaged on inspection	180	156	115	112	13	202
	Average number of inspections per pit	194	115	201	106	13	338
1955	Workers underground [1]	328 800	101 800	142 500	37 200	5 700	30 600
	Persons engaged on inspection : Inspectors	94	35	26	9	6	3
	Assistants	55	-	60	9	2	11
	Workers' delegates	24	65	184	-	-	8
	Inspections underground by inspectors	12 100	2 121	530	747	208	290
	assistants	12 530	-	1 774	1 882	2	2 133
	workers' delegates	5 860	13 468	29 139	-	-	2 275
	Pits inspected	156	131	150	18	9	12
	Underground workers per inspector	3 500	2 900	5 480	4 100	950	10 200
	per assistant	2 200	2 900	2 375	2 050	713	2 200
	per workers' delegate	13 700	1 500	775	-	-	3 800
	Average number of inspections underground per inspector	129	61	20	83	35	97
	per assistant	165	61	30	146	26	173
	per workers' delegate	224	207	158	-	-	285
	per person otherwise engaged on inspection	176	156	116	146	26	214
	Average number of inspections per pit	195	119	208	146	23	392

1) High Authority Statistical Bulletin No 6, November 1956.

2) 12 assistants, but one was off sick for most of the year concerned.

3) 11 assistants, but two were off sick for most of the year concerned.

The figures in the accompanying table, although interesting in themselves, do not greatly facilitate country-by-country comparison of the effectiveness of inspection for compliance with safety regulations.

The Conference considers that such a comparison cannot be carried out on a statistical basis, and requires permanent co-operation between the bodies responsible in each country.

The Conference recommends, however, that

A. 1. strong representations should be made to the various Governments to raise, if necessary, the number of inspection appointments (inspectors, assistants and workers' delegates), which would make it possible to increase the number of inspections.

2. those employed on safety inspection should be in a position where they cannot be influenced in any way, either directly or indirectly, by the enterprises.

The Conference considers, however, that the effectiveness of inspection for compliance with safety regulations also depends on the ability of the inspection personnel.

Accordingly, it feels that

A. 1. Inspection personnel should be required to have practical experience of mining conditions. This does not appear particularly difficult to achieve as regards inspectors' assistants and workers' delegates. As regards the inspectors of mines themselves, on the other hand, it does not appear to be possible until the difficulties which the Mines Inspectorates are at present encountering in recruiting and keeping their staff have been overcome.

2. The Conference is of the unanimous opinion that a revision of the status of the entire Mines

Inspectorate staff is imperative. It is desirable that the Governments concerned should see to it that the standing of the personnel of the Mines Inspectorate is such as to ensure satisfactory recruitment and retention of staff. In return, it is felt that the Government may reasonably require them to work in the Inspectorate for a stated minimum period, and to engage full-time on their inspection duties.

3. The Conference considers that the Mines Inspectorate should organize regular refresher courses for inspectors' assistants and workers' delegates, in order to ensure that their technical training is always adequate to what is required of them.

The tables following provide a summary of the information assembled by the Conference on the framing of regulations and on inspection for compliance with them.

A. Authorities responsible for the Mines

(For official names, titles, etc , see Table 8)

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1. (a) Minister responsible for the Mines (Inspection of safety measures)	Minister of Economic Affairs.	Minister of Economic Affairs and Finance; State Board of Industry and Commerce.	Minister of Economic Affairs, Transport, Food and Agriculture.	Minister of Economic Affairs of the Länder Governments.	Minister of Industry and Commerce.	Minister of Economic Affairs.	Minister of Power.
(b) Other supervisory responsibilities borne by this Minister	Economic supervision, particularly regarding State aid to collieries: this is given subject to certain conditions which Ministry of Economic Affairsmust see are duly observed.	State Board of Industry and Commerce Administrative matters (concessions, etc.). State Board of Economic Affairs Economic and financial matters in connection with mines.		Economic and social supervision.	Issues prospection permits and grants mining concessions; decides dates of expiry; accepts waivers of permits and concessions; authorizes transfers of same. Supervises general functioning of mining industry; studies its problems from technical, economic and statistical standpoint.	Supervises working conditions of personnel above and below ground. Responsible for administration of State Mines.	General responsibility for securing the effective development of coal and coal products as sources of fuel and power.
2. Acts and Regulations concerning inspection of safety measures in mines	Coal Mines Act of April 21, 1810, and subsequent Acts co-ordinated by Royal decree of September 15, 1919, and subsequent orders of amendment.	Act of April 21, 1810, as amended up to August 1956; from August 1956, Decree 56/838, of August 16, 1956, containing the Mining Code.	Prussian General Mining Act of June 24, 1865.	General Mining Acts in the various Länder.	Act of March 30, 1893, and Orders of June 18, 1899, January 10, 1907, and July 3, 1921.	Coal Mines Act of 1903; Mines Regulations of 1939; Regulations of 1947 as to electrotechnical installations and use of Electricity in Coal Mines.	Minister's responsibility for inspection of safety measures in mines stems from section 144 of the Mines and Quarries Act of 1954. His general responsibilities for safety and other matters stem from section 1,1 of the Ministry of Fuel and Power Act of 1945.
3. Other Ministers who have jurisdiction in matters concerning mines.	Minister of Labour and Social Insurance, for for regulation of terms of employment; special legislation on mineworkers' social security.	Minister in charge of Social Affairs (Labour and Social Security) jointly responsible with Minister responsible for mines for inspection of working conditions; manpower; miners' delegates; social security.	Minister of Labour for social affairs, particularly medical and insurance matters (regional industrial medical officer) in connection with occupational diseases.	Federal Minister of Labour and Länder Ministers of Labour for legislation concerning working hours; youth welfare.	Minister of Labour and Social Insurance for social and trade-union questions (implementation of collective-bargaining agreements and legislation on social insurance and assistance, trade-union grievances).	None.	Minister of Labour and National Service, responsible for safety in factories, and to the extent that certain premises associated with mines may legally be regarded as factories, safety measures on these premises are the responsibility of the Minister of Labour and National Service.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
4. Powers of Minister in regard to associated and ancillary activities of the mines	Powers of Minister responsible for the mines, Permanent Deputations and Governors of Provinces cover also surface installations. Briquetting-plants and pithead power-stations come under general regulations on protection of workers, but are subject to supervision by Minister of Economic Affairs. In regard to matters listed under 3 above, supervision is carried out by Minister of Labour and Social Insurance.	Premises associated directly with collieries always come under the Minister responsible for the mines. Ancillary activities (briquetting-plants, power-stations, coke-ovens) fall some within jurisdiction of Mines Regulations and so of Minister responsible for the mines, and others of general industrial code, and so of Minister of Labour.	Powers of Minister of Economic Affairs are the same for associated and ancillary premises as for underground workings.	Services and premises directly associated with collieries also come under the mining authorities controlled by the Ministers of Economic Affairs of the Länder Governments.	Screening, sorting and washing-plants and briquetting-plants come under Ministry of Industry and Commerce. Ministry's jurisdiction also extends to pithead power-stations serving the collieries only, and to surface transport facilities on colliery premises. Power-stations designed to supply the general grid, even if situated at a pithead, come under Ministry of Labour with inspection through Labour Inspectorates. Surface transport facilities outside colliery premises come under Ministry of Transport with inspection through Motorized Transport Inspectorates.	Minister of Economic Affairs has same jurisdiction (by Order in Council) over associated and ancillary premises as over the collieries themselves, provided premises are integrated with surface operations or installations of colliery. Exceptions provided for in Royal decree of January 30, 1953, come within the provisions of existing labour legislation.	Minister's responsibility for safety at coal mines extends to all places above and below ground embraced in the statutory definition of "a mine and its production.
5. Statutory powers of authorities responsible for the mines	Legislative power is vested in the King. The powers of the Government and the Minister in regard to mines are conferred upon them by the Coal Mines Acts (see 2 above) and Acts relating to terms of employment and social security.	Mines (Inspection) Regulations issued in the form of Orders in Council, following report by Minister responsible for the mines, under Article 85 of the Mining Code (Code Minier).	(a) Ministers - frame major orders; - issue mines (inspection) regulations; - approve explosives and certain equipment. (b) Oberbergamt (Divisional Inspectorate) - issues directives on safety in mines; - grants authorizations and exemptions.	Statutory powers of Oberbergämter Divisional Inspectorates stem from the Mining Acts in force in the Länder; they relate only to technical, safety and health matters and to safeguarding of coal deposits.	Statutory powers conferred by Acts and Orders mentioned under 2 above, and vested in Government.	Regulations have to be issued by Order in Council. Crown can direct Minister of Economic Affairs and Inspector-General of Mines, for implementation of certain requirements, to frame regulations in greater detail, or where appropriate to grant (subject to certain conditions) exemptions or authorizations as provided for by the Order in Council.	There are no Government regional boards or departments with responsibilities for safety in coal mines.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
6. Administrative organization for mines (a) specialized Board (b) Mines Inspectorate (c) special departments dealing with particular aspects (d) regional Boards or Departments	(a) Mines Directorate, part of Central Mines Administration. (b) Inspectorate-General of Mines. (c) Survey Department; Explosives Department; Coal Economy Department; National Mines Institute. (d) four Mining Divisions.	(a) Mining and Iron and Steel Directorate. (b) Inspectorate-General of Mines. (c) None. (d) 14 Mining Districts.	(a) Mines Division of Ministry of Economic Affairs. (b) Oberbergamt (Divisional Inspectorate). (c) None. (d) 3 Bergämter (Regional Inspectorates).	(a) -Mines Division of Federal Ministry of Economic Affairs; -Mines Directorates of Länder Ministries of Economic Affairs. (b) Mines inspection prerogative of each Land; performed by Oberbergämter. (c) None. (d) Bergämter are answerable to Oberbergämter.	(a) Directorate-General of Mines. (b) Technical inspection under (a). (c) Survey department; chemical department. (d) 14 Mining Districts.	(a) Mining Department of Ministry of Economic Affairs. (b) State Mines Inspectorate. (c) None. (d) None.	(a) See 5 above. (b) Mines Inspectorate is part of Ministry of Power and is thus independent of National Coal Board. (c) Ministry of Power is divided into several functional administrative divisions, of which the Safety and Health Division is the one concerned with safety in coal mines. No special departments. (d) Ministry of Power has a regional administrative organization, but this is not concerned with safety in mines.

B. Councils and Committees: framing of mines (safety) regulations

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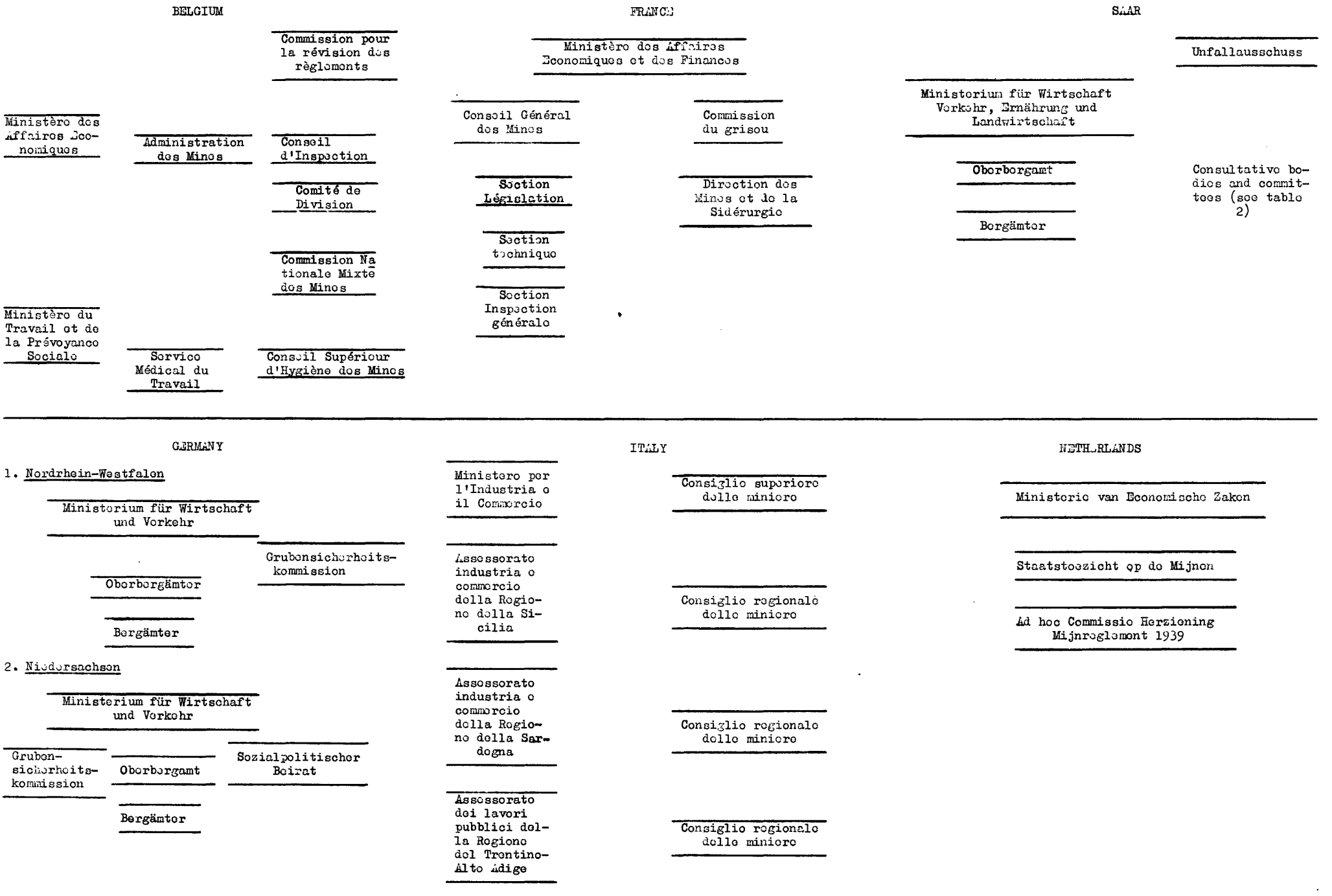
	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1. Councils and Committees assisting Minister responsible for the mines	A. Mines Regulations Revision Committee (a) Composition 19 members, viz. 7 from Central Mining Authority; 1 from I.N.M.; 1 from I.N.I. CHAR.; 5 inspectors designated by coal-owners' associations; 5 workmen's inspectors designated by workers' organisations. (b) Terms of reference -to prepare revision of mines (safety) regulations; -to propose technical measures to improve safety; -to propose to Minister standards for approval of explosives and certain equipment; -to be consulted on all technical matters relating to safety in mines. (c) Assistance from employers and workmen 5 representatives of each. (d) Ministerial decree of December 4, 1897, superseded by Royal decree of December 10, 1953. B. Joint National Mines Commission (a) Composition 1 chairman and 1 vice-chairman independent of collieries' interests; 1 secretary and 1 assistant secretary, clerks; 15 full members and deputy members representing employers. 15 full members and deputy members representing workmen. (b) Terms of reference -To fix general wage basis; -To discuss general terms of employment; -To assist government authorities in preparing and enforcing social legislation; -To avert, or mediate in, disputes between employers and workmen; -To promote training of apprentices.	A. General Mining Board (a) Composition 20 members, all inspectors-general of mines. 3 departments, viz. - for administrative and social matters; - for technical and economic matters; - for general inspection. Chairman is the Minister (b) Terms of reference To give its views to the Minister on all matters concerning mines, and in particular on draft safety regulations and action to implement them. (c) Assistance from employers and workmen None. (d) Order of November 18, 1810, now subject to further Order of May 11, 1953. B. Firedamp Commission (a) Composition 43 members at plenary assembly, 18 of whom belong to permanent department. Plenary assembly consists of 16 members of Mining Authority; 8 principals and lecturers of mining colleges; 2 members of Académie des Sciences; 3 members of Explosives Board; 8 members representing employers; 3 members of Charbonnages de France study and research centre; 3 members representing manufacturers of explosives and electrical anti-firedamp equipment.	Coalmining Accidents Commission (attached to Oberbergamt) (a) Composition Berghauptmann (Inspector of Minos) as chairman; 2 workmen's representatives; 2 employers' representatives. (These 4 members appointed for 5 years) (b) Terms of reference Commission meets after every major accident to investigate and discuss accident in light of details emerging from official inquiry. (c) Assistance from employers and workmen. Yes.	A. Mines Safety Committee of Ministry of Economic Affairs and Transport, Land North Rhine/Westphalia (a) Composition - Representatives of mining authority; - representatives of employers; - representatives of workmen, all appointed by Minister. (b) Terms of reference Consultative body to Minister, as highest mining authority as regards all matters concerning safety in coal mines. (c) Assistance from employers and workmen Yes (see (a) above). (d) Order by Minister of Economic Affairs and Transport. B. Mines Safety Committee, Land Lower Saxony (now being set up) (a) Composition -Representatives of mining authorities; -employers; -workmen. (b) Terms of reference Consultative body to mining authority (Oberbergamt at Clausthal-Zellerfeld).	A. Mines Board (a) Composition 1 chairman, appointed by Government, 26 members, viz. 7 permanent members from Mining Authority; 19 elected members, viz. 5 legal and economic experts; 5 survey and mining experts; 2 representatives of the mining industry; 2 representatives of workmen; 1 representative of mining engineers and industrial experts; 4 representatives of Ministry of Interior, Ministry of Finance, Ministry of Works, Ministry of Transport. (b) Terms of reference To advise Minister on cases specified by Acts and Regulations, especially in connection with appeals to Ministry of Industry against orders by Prefects in interests	No permanent consultative bodies or Committee to assist Minister in framing safety regulations. There is, however, an ad hoc Commission for the revision of the Mines Regulations of 1939, set up by Ministerial decree of December 12, 1955. (a) Composition 22 members, viz. Inspector General of Mines, chairman; 4 other Government representatives; 7 employers representatives; 9 workmen's representatives; chairman of Appeals Board. Commission has five committees consisting of members elected from among its number. (b) Terms of reference To advise the Minister in connection with the complete revision of the 1939 Mines Regulations. (c) Assistance from employers and workmen Yes (see (a) above). The Commission can also co-opt experts on to its Committees.	No Standing Councils or Committees directly concerned with Safety Regulations or with specific functions. There are numerous committees on various aspects of safety in mines, but a list of these is unlikely to be of assistance for the purposes of this questionnaire.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1. (contd.)	(c) Assistance from employers and workmen Yes. (d) Order in Council of June 9, 1945, and Royal decrees of July 27, 1946, and June 22, 1948. C. Health in Mines Board (Conseil Supérieur d'Hygiène des Mines) (a) Composition Five departments, viz. -industrial health; -technical questions; -physical and chemical research; -medical research; -organization of competitions. Officers of each department are a Chairman and either one or two Secretaries. Officers of the Board are the Chairman, Vice-Chairmen and Secretaries, and the Chairmen of five departments. (b) Terms of reference See Document S 95/56. (c) Assistance from employers and workmen The Board and its departments may consult any person of special competence in a particular matter being dealt with. (d) Regent's decree of December 6, 1945.	(b) Terms of reference -To advise the Minister on matters of safety in regard to firedamp, combustible dust and the use of explosives; -to advise on the approval of anti-firedamp equipment and of explosives for use in gassy or dusty mines. (c) Assistance from employers and workmen Employers only. (d) Ministerial order of July 16, 1907; at present, orders of May 16, 1955, August 9, 1955, and February 4, 1956.		(c) Assistance from employers and workmen Yes (see (a) above) (d) Decree of Ministry of Economic Affairs and Transport.	of safety and health conditions in mines; to advise Minister on all questions which he is asked; to submit proposals and recommendations to Minister. (c) Assistance from employers and workmen Yes. (d) Decree of January 27, 1947.	(d) Ministry of Economic Affairs order of December 12, 1955.	
2. Councils and Committees at regional level	A. Divisional Committee in each Mining Division (a) Composition Divisional Director and inspectors for the Division. One or more workmen's delegates to the Divisional Inspectorate may be co-opted. (b) Terms of reference To study the material assembled on all accidents occurring, and work out what safety measures it judges to be desirable. B. Inspection Committee meeting in Brussels (a) Composition Director-General of Mines, Inspector-General, Divisional Directors. (b) Terms of reference To study the material assembled on accidents which indicate that the regulations in force need to be amended or supplemented; to co-ordinate the conditions for authorizations and exemptions in respect of safety regulations.	No official organization at regional level, but in point of fact the head of the Mining Division convenes the inspectors to study material assembled on accidents which have occurred.		-Technical Supervisory Office for Mining Machinery and Equipment (Technische Ueberwachungsstelle für Grubeneinrichtungen = TUG; Technical Supervisory Board (Technischer Ueberwachungsverein = TUV); -Saarbergwerke Shotfiring Training Centre at the College of Mines (Schiessausbildungsstelle der Saarbergwerke bei der Bergschule, Saarbrücken). Saarbergwerke Central Rescue Station (Hauptrettungsstelle der Saarbergwerke); -Testing Gallery of the Mining Industry (Berggewerkschaftliche Versuchsstrecke), Derne, Dortmund; -Cerchar Testing Gallery (Institut d'Essai), Verneuil; -State Health and Infectious Diseases Institute (Staatliches Institut für Hygiene und Infektionskrankheiten); -Mutual Accident Insurance Association for the Mining Industry (Bergbauberufsgenossenschaft); etc.	None.	Following institution of three autonomous areas (Sicily, Sardinia, Trentino/Upper Adige), three regional committees were set up. A. Sicily Regional Mining Board of the Assessorate for Industry and Commerce (Consiglio regionale delle miniere presso l'Assessorato Industria e commercio), with 14 members, including 2 employers', 2 workmen's and 2 mining engineers' and experts' representatives. B. Sardinia Regional Mining Board of the Assessorate for Industry and Commerce (Comitato regionale delle miniere presso l'Assessorato Industria e commercio), with 17 members, including 2 employers' and 3 workmen's representatives. C. Trentino/Upper Adige Regional Mining Board of the Public Works Assessorate (Consiglio regionale delle miniere presso l'Assessorato ai lavori pubblici), with 11 members, none of them either employers' or workmen's representatives.	None	None

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
3. Part played by Councils and Committees (a) in drafting and periodical redrafting of Acts, etc., on safety inspection	(a) Committees have nothing to do with framing of legislation. They act in consultative capacity in framing of regulations.	(a) General Mining Board (Conseil Général des Mines) advises on Bills, decrees, orders and directives of importance in connection with safety in mines. Firedamp Committee is consulted only on orders in connection with firedamp, dust or explosives.	(a) Proposals for amendment of regulations.	(a) The two safety committees are consulted during examination of questions of principle in connection with safety in mines.	(a) Mines Board (Consiglio Superiore delle miniere) is responsible for general revision of new safety regulations to supersede those in force since 1907.	(a) Commission referred to in subsection 1 is required to advise on the full revision of the 1939 Mines Regulations.	None.
(b) in authorizing general and special exemptions from Acts, etc.	(b) Committees have nothing to do with this. If regulations allow, however, special exemptions can be granted by Divisional Director of Mines. If there is no provision to this effect in regulations, exemptions cannot be authorized.	(b) Special exemptions not explicitly provided for in regulations and not of a type to be granted by local mining authorities have to be approved by Minister on recommendation of General Mining Board. Board has delegated this power to Inspectorate-General. General exemptions are granted by ministerial order on recommendation of General Mining Board.	(b) Expert opinions.	(b) None.	(b) No provisions for exemption of any kind is contained in the present safety regulations. In certain cases, Chief District Safety Engineer can issue still stricter rules, against which appeals may be lodged with Ministry of Industry, which then decides after consultation with Mines Board.	(b) None.	(b) None.
(c) in authorizing use of explosives and of equipment requiring to be approved in advance	(c) Committees have nothing to do with this. Explosives for use in mines have to be approved by Minister. Anti-firedamp equipment is approved by Director-General of Mines.	(c) Explosives Authorization is by ministerial order on recommendation of Firedamp Committee and General Mining Board. Anti-firedamp equipment Authorization is by ministerial order either simply on recommendation of Charbonnages de France study and research centre, or on recommendation of Firedamp Committee, or on recommendation of Firedamp Committee and General Mining Board.	(c) Expert opinions.	(c) None.	(c) Licences to employ explosives are issued by Ministry of Interior in accordance with regulations on observance of public safety laws.	(c) None.	None.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
4. Consultation of employers and workmen in the framing of safety regulations	(a) Employers' and workmen's representatives sit on Committee revising Mines Regulations. (b) Orders concerning either preventive or emergency measures to be instituted for the preservation of public safety, health and order, the preservation of the pits, the efficiency of the mining operations, the safety and health of the mineworkers, and the safeguarding of property and of essential water supplies at the surface. are issued after consultation with the Joint National Mines Board (C.N.M.M.).	There is no provision for such consultation in respect of regulations, nor are consultations systematically organized. They do, however, take place in connection with very important regulations (e.g. redrafting of General Code as promulgated by decree of May 4, 1951).	When regulations are to be drafted, employers, and when appropriate workmen, are invited to state their views and submit suggestions.	By consultation with coalowners' and mineworkers' organizations.	When safety regulations are being drafted, the employers' and workmen's representatives on the Mines Board are heard, and other experts from the same groups are consulted on special points.	Before issuing more detailed regulations, under the Mines Regulations of 1939 and the Regulations of 1947 as to Electrotechnical Installations and Use of Electricity in Coal Mines, Inspector-General of Mines has to hear views of managements of collieries concerned.	Under the Second Schedule to the Mines and Quarries Act of 1954, Minister of Power must publish in draft any Safety Regulations he proposes to make. Interested parties have a right to object to the draft; such objections must be referred for independent arbitration. This is the formal statutory procedure, but in fact, all proposed safety regulations are discussed before this stage with all interested parties. Draft Safety Regulations are discussed in particular by a Consultative Committee including representatives of the National Coal Board (the employers) and the workers. This Committee was set up in pursuance of the Coal Industry Nationalization Act, 1946.

5. Diagram showing general organization of Mining Authorities and their consultative bodies and committees



	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1) Mines Inspectorates	Mines Inspectors (Ingénieurs du Corps des Mines), assisted by mines surveyors; technical staff; workmen's delegates to Mines Inspectorate.	Inspectors of Mines Inspectorate (Ingénieurs du Corps des Mines) and inspectors of State Public Works Departments (Ingénieurs des Travaux Publics de l'Etat) (T.P.E. Mines).	Oberbergamt (Div. Inspectorate) Bergämter (Reg. Inspectorates)	In Land North Rhine/Westphalia and Land Lower Saxony, Oberbergämter (Div. Inspectorates) and Bergämter (Reg. Inspectorates)	Mines Inspectorate (Corpo delle Miniere) is responsible for all inspection of coalmines and other mines and quarries.	State Mines Inspectorate. (Staatstoezicht op de Mijnen)	Her Majesty's Inspectorate of Mines and Quarries is a part of the Ministry of Power.
2) Acts, etc. under which Inspectorates were set up	Law of April 21, 1810; Royal decree of March 26, 1953, as amended by Royal decree of April 22, 1955, for Mines Inspectors. Royal decrees prescribing establishment of surveyors and technical staff. Law of April 11, 1897, as superseded by law of August 16, 1927, and amended and supplemented by laws of May 5, 1929, April 26, 1933, and July 20, 1955, for workmen's delegates.	Law of November 18, 1810, as amended by decrees of December 24, 1851, June 24, 1910, and March 27, 1950, for inspectors of Mines Inspectorate. Decree of December 24, 1851, as amended by decrees of July 18, 1907, March 9, 1912, and June 16, 1923, for Public Works inspectors.	Prussian General Mining Act of June 24, 1865.	General Mining Laws of the individual Länder.	Basic Mining Law of 1859.	Mining Law of April 21, 1810; mining law of 1903 and Mines Regulations of 1939.	The Inspectorate had its origin in Acts passed about one hundred years ago but all previous Acts are repealed by the Mines and Quarries Act, 1954, which empowers the Minister of Power to appoint the Mines Inspectorate.
3) Organization and personnel of Inspectorates	Central Mines Administration (Administration Centrale des Mines) headed by a Director-General. (a) Headquarters 1. Four Boards, on mining laws and regulations; classified establishments; social questions; general matters. 2. Explosives Department. 3. Survey Department. 4. Coal Economy Department. 5. National Mines Institute. (b) Outside services: 1. Inspectorate General of Mines. 2. Four Mining Divisions. 3. Eight Mining Districts.	Inspectorate General of Mines (Inspection Générale des Mines) headed by an Inspector-General. (a) Headquarters: 1. Inspectorate-General, consisting of 5 Mining Divisions. 2. Safety and Health Division. (b) Regional and local services 1. 14 Mining Districts. 2. 37 Sub-Districts. 3. 168 Sub-Divisions.	1. Oberbergamt headed by a Berghauptmann (Chief Inspector) and by his permanent representative, the Oberbergamtsdirektor (Deputy Chief Inspector). Consists of (a) safety department; (b) technical department; (c) training and economic affairs department; (d) mining law department; (e) surveying and damage department. Heads of departments together with Chief Inspector and his deputy form collegiate body.	1. Oberbergämter are headed by a Berghauptmann whose Deputy, an Oberbergamtsdirektor, is head of the side dealing with compliance with regulations. Consists of (a) technical department; (b) training and economic affairs department, (c) legal department; (d) surveying and damage department. Heads of departments together with Chief Inspector and Deputy Chief Inspector form collegiate body.	Technical departments of the Directorate-General of Mines, which is headed by a Director-General. Those are (a) Mines Department 1. Safety inspection. 2. Inspection for compliance with regulations. 3. Solid and liquid fuels. 4. Other mines and quarries. 5. Statistics. (b) Survey Department (c) Chemistry Department (d) Fourteen Mining Districts	State Mines Inspectorate comprises (a) Operations Department; (b) Electricity and Equipment Department; (c) Medical Department; (d) Labour Questions Department. and is staffed as follows 1 Inspector-General, 2 Mines Inspectors, (operations), 1 Mines Inspector (electrical and mechanical engineering).	The organization of the Inspectorate is shown in the accompanying chart. The total number of personnel at present in posts is about 150. Some fifteen of these are stationed at headquarters in London, the remainder being in the coalfields.

C.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
3.) (contd.)	Outside services responsible for inspection are staffed by 1 Inspector-General, 4 Divisional Directors, 9 Chief Inspectors (Directors), 4 Principal Divisional Inspectors, 30 mines inspectors, 9 mines surveyors, 1 technical assistant, 66 workmen's delegates, 19 administrative employees, i.e. 143 persons in all while establishment totals 161. These services are eleven mines inspectors, three technical assistants, four administrative employees, below strength.	In addition to Inspectors-General (Ingénieurs Généraux), responsible for general inspection in a particular Mining Division, Inspectorate consists of 16 Chief Inspectors, 3 Deputy Chief Inspectors, 3 regular mines inspectors, 170 Public Works Inspectors, i.e. 226 persons in all.	2. Three Bergämter, coming under Oberbergamt, and each headed by a Regional Chief Inspector (Bergamtsleiter). Div. and deg. Inspectorates (Oberbergamt and Bergämter) consist, in addition to the Berghauptmann, of 1 Oberbergamtsdirektor 2 Oberbergräte, 1 Oberbergrat surveyor, 3 Bergamtsleiter, 9 Bergräte or Bergassessoren, 9 Revierinspektoren, 3 technical assistants i.e. 28 persons in all, while establishment totals 31. Inspectorate is three Bergräte or Bergassessoren below strength.	2. Bergämter under an Oberbergamt. In Land North Rhine/Westphalia there are 1 Oberbergamt in Dortmund, with 21 Bergämter; 1 Oberbergamt in Bonn, with 7 Bergämter. In Land Lower Saxony there is 1 Oberbergamt in Clausthal-Zellerfeld, with 1 Bergamt for hard-coal mines. In addition to these authorities responsible only for the coalmining industry, there are Oberbergämter and Bergämter for the other extractive industries, e.g. the iron-ore mines.	Mines Department at present consists of 6 Inspectors-General 21 Chief Inspectors, 22 inspectors and principal inspectors, 49 assistant inspectors, 92 mining experts, 13 draughtsmen, i.e. 206 persons in all, while establishment totals 244. The Department is 35 inspectors and principal inspectors, 3 assistant inspectors, below strength.	1 Mines Inspector (medical problems) 2 principal technical assistants 10 technical assistants 1 assistant for labour questions, 10 administrative employees, i.e. 28 persons in all.	

4) a. Grades and posts; average age	(a)	Average age[1]
	Dir.-Gen.	50-55
	Insp.-Gen.	50
	Div. Dir.	50
	Ch.Insp./Dir.	45
	Principal Insp.	35-40
	Insp.	25
	Surv.	25-30
	Wkr. Del.	35-40

1) on appointment

(a)	Average age
Insp.Gen. (3 grades)	62
Ch. Insp. (5 grades)	44
Insp. (3 groups, 8 grades)	28
P.W. Insp. (4 groups) / P.W.Asst.Insp. (4 groups)	42

(a)	Average age
1. Oberbergamt	
Bghptmann	50
O.Bgamtsdir.	50
Oberbergrat	50
Bergrat (legal)	40
Oberbergrat (surveying)	53
Bergassessor	28
Inspector	56
2. Bergamt	
Erster Bergrat	40-50
Bergrat and Bergassessor	30-50
Revierinsp.	30-60

(a)	Average age
Oberbergrat	53
Bergamtsdirektor	52
Bergrat	38
Inspektor	50

(a)	Average age
Insp.Gen.	58
Ch.Insp.	52
Hd.Insp.	49
Insp.	44
Asst. Insp.	31
Ch. Eng.	58
Hd. Eng.	52
Ldg. Eng.	47
Eng.	50
Draughtsmen.	31

(a)	Average age[1]
Mines Insp.	40-45
Tech.Ass.	30-40

1) on appointment

(a)	Average age
Ch. Insp. / Deputy Ch. / Insp. / Div.Insp.	57
Senior Dist. Insp.	53
Dist. Insp.	50
Insp.	53

C.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
4) (b) Recruitment and conditions of appointment	(b) Mines inspectors are recruited exclusively by direct competition, open to those holding recognised degree in mining engineering. Mines surveyors and technical assistants are recruited either by direct competition, or by competition for promotion to upper grade open only to officials already on staff who hold surveyor's diploma and are sworn surveyors. Workmen's delegates to the Inspectorate must be Belgian nationals aged between 30 and 48 inclusive; have worked for 10 years in one or more branches of mining operations below ground; have obtained six marks out of ten in an examination for ability; be nominated by the workers' organizations. Appointments are for four years, and are renewable up to the age of 56.	(b) The following may be appointed as regular inspectors (3rd class) : junior inspectors who have completed a training period of two years at the National College of Mines, Paris, and passed the examinations at the end of this period; (in the proportion of one-tenth of the appointments) candidates admitted to sit the professional examination open to Public Works inspectors. Four-fifths of the junior inspectors are recruited from among the students of the Polytechnical College, according to grading in the final examination, and one-fifth from among the inspectors and assistant inspectors of the State Public Works Department who have held that post for five years and are admitted to the National College of Mines, Paris, by a special competitive examination for men in this group. Two-sixths of the Public Works assistant inspectors are recruited from among candidates who have passed a competitive examination; one-sixth from among technical mining assistants from the collieries who have passed a professional examination, and three-sixths from among former students of the Colleges of Mines at Douai and Alès who have come out among the top three in their class.	(b) Higher ranks Qualified mining engineers who have passed a probationary period as Bergreferendar and sat a State examination entitling them to hold a State post at a colliery (Assessoreinführung). Legal advisers and mine surveyors have different training. Inspecting staff Selected from among experienced deputies holding final certificate of approved mining college.	(b) Appointment by advertisement of vacancies: technical personnel in higher grades must hold university diploma of mining science and must have spent several years in a Land administration; inspecting personnel must have final certificate of a mining college and several years' practical experience.	(b) Inspectors are originally recruited by competitive examination open to all engineers who have qualified in any specialist branch at an Italian University. Those who have passed the examination must if they are not yet specialists in the mining branch, follow a two-year specialist course at an Italian University with a Faculty of Mining Engineering. Mining experts are recruited by competitive examination open to all graduates of industrial and surveyors' institutes. Only those holding the diploma or one of the four mining institutes are exempted from attending a one-year course of theory and practice there.	Officials of the State Mines Inspectorate are recruited from personnel of the mining industry having already been engaged on similar duties. Mines Inspectors are recruited from among mining engineers. To be appointed a technical assistant the worker concerned must have held the rank of district supervisor in the mining industry, which means that he must hold the final diploma of the College of Mines.	No remarks.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
4.(c) Inspectors' independence of managements	Apart from the various restrictions contained in the State Employees' Code (in particular on the acceptance of assignments or employment in connection with private profit-making transactions), members of the Mines Inspectorate (Corps des Mines) are forbidden to have any interest, direct or indirect, in any colliery which they are called upon to inspect. The activities which colliery surveyors and technical assistants are not allowed to combine with their posts are laid down in the State Employees' Code. The State Employees' Code also specifies the restrictions applying to workmen's delegates, in addition they may not sit either on conciliation boards, or on industry and labour boards, or on any legislation body or on any provincial or communal council. They may not hold any position in any trade-union organization.	Inspectors' independence of managements is guaranteed by the fact that they are State officials. Moreover, no Mines Inspector can obtain his discharge in order to enter a public or private concern if during the past five years he has had to inspect that concern and/or assist in arranging or concluding transactions with it.	No special provisions. General requirements in respect of civil servants also apply to Mines Inspectors as regards ensuring their independence of colliery managements.	Their independence is ensured by provisions in the Civil Servants' Code.	Independence of officers of Mines Inspectorate is ensured by provisions in the Civil Servants' Code.	Inspectors' independence is guaranteed by the fact that they are civil servants appointed by the Crown.	Inspectors are independent of National Coal Board; they are employed and paid by the Government.
5. Powers of inspectors and their assistants	(a) They must exercise the powers vested in the Mines Inspectorate under the mining laws and the regulations on safety in mines. (b) Should the preservation of a pit, the efficiency of the operations or the safety and health of the workers appear to be in danger, the Divisional Director of the coalfield must report to the Governor of the Province and propose suitable action. (c) In cases of imminent danger, the Mines Inspector must ask for all necessary action to be taken. Either the Governor of the province or the District Administrator must see to it that the action is duly taken. (d) In cases of imminent danger as a result of non-observance of a safety regulation, the workmen's delegates to the Inspectorate must confer on the spot with the Operations Manager, and any action indicated by them following this discussion must be taken forthwith by the Operations Manager.	(a) They are required to exercise safety inspection under the authority of the minister and the Prefects. (b) If mining or exploratory operations at a pit are of a nature to endanger public safety, the preservation of that or any other pit or the safety or health of the mineworkers, the Prefect, upon proposal by the Inspectors, will arrange for the necessary action to be taken. (c) In cases of imminent danger, the Mines Inspector must request the local authorities to arrange for such action as he may deem necessary to be taken forthwith.	(a) Inspectors visit all premises to see whether regulations are being complied with. In cases of serious infringement, Director of Bergamt may order operations to be discontinued. (b) In the event of an accident at a pit, Bergamt investigates causes. In the event of any loss of life, it forwards a factual report, the findings of the inquiry and other evidence to the public prosecutor's department. Directors of Bergämter are auxiliary members of that department and are obliged to bring a charge in cases of serious infringement.	(a) To carry out regular inspections and spot-checks for safety in all underground workings. (b) To request elimination of any shortcomings discovered, or suspension of operations where acute danger is found to exist. (c) To issue safety directives in the event of imminent danger. (d) To institute official inquiries into both individual and group accidents, and the auxiliaries of public prosecutor's department, to bring a charge when necessary.	(a) Officers of Mines Inspectorate are responsible for carrying out inspections and seeing that legal requirements are complied with. They are also empowered, when necessary, to lay down additional rules concerning safety. (b) In the event of an accident, coal-owner must immediately notify Chief Inspector of his mining district. Chief Inspector must investigate causes, and file and report to the legal authorities.	(a) When general safety, or safety above or below ground or during drilling operations is in danger, action ordered by Inspector-General of Mines, after consultation with the management or foreman of drilling operations, must be taken at once. If danger is imminent, action must be taken at once as prescribed by any officer of Mines Inspectorate. Such measures must be confirmed, amended or countermanded by Inspector-General of Mines.	Under the Mines and Quarries Act, 1954, Inspectors have power to enter any mine (or Central Rescue Station) at any time and inspect it or anything thereat. They may also make any examination or inquiry that is necessary to see whether the Act and regulations are complied with, and may ascertain any matter which they think affects safety, including in particular the circumstances of any reportable accident. Further, they have power to require answers to questions, to take samples, to impound apparatus, to inspect documents, etc. Under several other provisions of the law, they are also given in relation to individual mines powers of direction, etc., on specific subjects; in general, the exercise of these powers is subject to arbitration in cases of dispute.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
5.(contd.)	c)In the event of a serious accident (group or otherwise), the Mines Inspectors and worker delegates conduct just inquiries on the spot into the causes of the accident. The Mines Inspector then draws up an official record including his own findings and the evidence assembled. In an appended report to the Divisional Director of Mines, he gives his views on causes and on any responsibility involved. When the Divisional Committee has studied these documents, the Divisional Director forwards the Inspector's official record to the public prosecutor's department, together with his own comments and any proposals regarding proceedings against third parties.	(d)In the event of an accident, the mayor and police officials, in co-operation with the Mines Inspector, take all appropriate action to eliminate danger and prevent any further consequences. (e)Infringements of safety regulations are recorded in reports drawn up either by Mines Inspectors or by police investigators. Top copies of all such reports are sent to the Public Prosecutor of the Republic.	(c)In cases of imminent danger, the Director of the Bergamt must take forthwith whatever action may be necessary to avert it, without consulting the colliery owner. (d)In the event of a serious group accident, the Director of the Bergamt directs the rescue operations: he must give the necessary instructions both for actual rescue work and for eliminating any further danger, and see that they are carried out.	(c)To direct all rescue operations and other measures required to eliminate serious danger to the mineworkers' life and health and to the safety of the mine as a whole.	(c)In the event of serious group accidents, the Inspectorate reserves the right to have additional inquiries made by a committee of experts selected from among its most highly qualified members, together with University professors.	b)Any accident which has caused death or injuries resulting in disablement for six weeks or longer must immediately be notified to the Inspector-General of Mines and to the workers' delegate authorized to inspect the pit concerned. Provided no danger is involved, everything must be left exactly as it was found when the accident took place until an officer of the State Mines Inspectorate has authorized repair operations. Witnesses must be enabled to give evidence on the days and at the times specified by the representative of the State Mines Inspectorate.	In cases of imminent danger, Inspectors have wide powers whereby they can impose any prohibitions or requirements necessary for safety. They have similar special powers in regard to danger resulting from the use of electricity and danger from inrushes of gas, water, etc. Colliery managements are required to report to the Inspectorate any accident involving death or serious injury. After an accident has been reported, the Minister may direct an inspector to make a special report (this is usually only done for an accident of special importance or interest), or he may direct an inspector or other competent person to hold a public inquiry.
6.Inspectors' powers of authorization and exemption	The Divisional Director of Mines exercises the powers conferred on the Mines Inspector by law and regulations on safety in mines. He decides in regard to applications for approval of equipment to be installed in underground workings, declarations of colliery surface installations, and requests for exemptions from safety regulations.	The powers granted to the local mining authorities regarding authorizations and exemptions in respect of the General Regulations are specified in the Regulations themselves in each Section for which such authorizations and exemptions may be made. The powers are vested either in the Chief Inspector of Mines or in the Prefect (who may delegate them to the Chief Inspector of Mines).	Authorizations are granted either by the Oberbergamt or by Bergmeister, according as may be required by law or regulations. Exemptions are normally granted by the Oberbergamt, except where Bergmeister are specially authorized to grant them	Oberbergmeister and Bergmeister have power to grant authorizations and exemptions in respect of safety regulations. The powers are defined by law and by directives on safety in mines.	The present safety code does not allow Mines Inspectors any direct power of authorization or exemption in respect of existing regulations. Such powers devolve on the Prefect of the Province, who issue his own decrees upon proposal by Mines Inspectors. Exemptions are possible only on a very limited scale.	Power to grant authorizations and exemptions is vested either in the Minister or in the Inspector-General of Mines according to the circumstances specified in the 1939 Mining Code. All authorizations and exemptions are granted conditionally, and may be withdrawn.	Inspectors are given powers of authorization, exemption, etc., in relation to individual mines, by many specific provisions of the 1954 Act and the regulations.

7) Diagram showing General organization of Mines Inspectorates

BELGIUM

Ministère des Affaires Economiques

Administration des Mines
1 Directeur général

Administration Centrale

Service Central
a) Législation et réglementation minière
b) Etablissements classés
c) Questions sociales
d) Affaires générales

Service des Explosifs

Service géologique

Economie charbonnière

Institut National des Mines

Inspection Générale
1 Inspecteur général
1 Ingénieur en chef Direct.
1 Géomètre vérificateur
1 Agent administratif

4 Divisions Minières
4 Directeurs divisionnaires
4 Ingénieurs principaux div.
.. Ingénieurs des Mines
.. Agents techniques
18 Agents administratifs

8 Arrondissements miniers
8 Ingénieurs en chef Direct.
30 Ingénieurs des Mines
8 Géomètres des Mines
66 Délégués-ouvriers

FRANCE

Ministère des Affaires Economiques et des Finances

Inspection générale
1 Inspecteur général
Chef de l'Inspection

5 Divisions minéralog.
5 Inspecteurs généraux

Service d'Hygiène et de Sécurité minière
2 Ingénieurs en chef
2 Ingénieurs des Travaux Publics de l'Etat

Direction des Mines

14 Arrondissements minéralogiques
14 Ingénieurs en chef des Mines

37 Sous-Arrondissements
37 Ingénieurs des Mines

168 Subdivisions
168 Ingénieurs des Travaux Publics de l'Etat

SAAR

Ministerium für Wirtschaft, Verkehr, Ernährung und Landwirtschaft

Oberbergamt
1 Berghauptmann
1 Oberbergamtsdirektor
2 Oberbergräte
1 rechtskundiger Mitarbeiter
1 Oberberg- und Vermessungsrat
2 Hilfsarbeiter (Bergassessor und Bergrevier-Oberinspektor)
3 Techniker
22 Verwaltungsbeamte

3 Bergämter
3 Bergamtsleiter
6 Bergräte
9 Revierinspektoren
10 Verwaltungsbeamte

GERMANY

Wirtschaftsministerium, Land Nordrhein-Westfalen
Wirtschaftsministerium, Land Niedersachsen

Oberbergamt
1 Berghauptmann
1 Oberbergamtsdirektor (head of Polizeidezernat)

Technische Fachdezernate
each 1 Oberbergrat
Bergräte
Bergassessoren

Dezernate für Fragen der Ausbildung und Wirtschaft
Oberbergräte

Juristische Dezernate
Oberbergräte

Dezernate für Markscheidewesen und Bergschäden
Oberbergräte
Vermessungsräte

Verwaltung

Bergamt
1 Oberbergrat
2-3 Bergräte, Bergassessoren
2-3 Amtsmänner, Inspektoren
1 Grubenkontrolleur
Büropersonal

1 Oberbergamt in Dortmund, with 21 Bergämter

1 Oberbergamt in Bonn, with 7 Bergämter

1 Oberbergamt in Clausthal/Zellerfeld

ITALY

Ministero dell'Industria e del Commercio

Direzione generale delle miniere
1 Direttore generale

Servizi amministrativi
(a) Contenzioso
(b) Minerali vari
(c) Combustibili
(d) Personale
(e) Studi e legislazione

14 Distretti minerari
13 Ingegneri capi
13 Ingegneri principali
25 Ingegneri
1 Perito capo
7 Periti principali
60 Periti

Ispettorato per la sicurezza
3 Ispettori generali
1 Ispettore capo

Ispettorato "Polizia mineraria"
1 Ispettore generale
2 Ingegneri capi
3 Ingegneri principali

Ufficio dei combustibili solidi e liquidi
1 Ingegnere capo
1 Ingegnere
1 Perito capo
3 Periti

Ufficio degli altri minerali e cave
1 Ingegnere capo
1 Ingegnere
1 Perito

Statistiche
1 Ingegnere capo
1 Ingegnere principale
1 Perito capo

Servizio geologico

Servizio chimico

NETHERLANDS

Ministerie van Economische Zaken

Staatstoezicht op de Mijnen
1 Inspecteur-Generaal

Mijnbouwkundige Afdeling
2 Inspecteurs der Mijnen
1 Mijntechnisch Hoofdambtenaar
8 Mijntechnische Ambtenaren
1 Mijnmeter

Electrotechnische en Werktuigkundige Afdeling
1 Inspecteur der Mijnen
1 Mijntechnisch Hoofdambtenaar

Medische Afdeling
1 Inspecteur der Mijnen

Afdeling voor Arbeidszwesties
1 Ambtenaar

Administratieve Afdeling
10 Administratieve Ambtenaren

UNITED KINGDOM

Ministry of Power

Chief Inspector of Mines

2 Deputy Chief Inspectors

Deputy Chief Inspector for Special Duties, i.e. roof and allied subjects, and dust

Stationed at Headquarters

1 Principal Medical Inspector
1 Deputy Medical Inspector

1 Principal Electrical Inspector
1 Deputy Principal Electrical Inspector
1 Senior Electrical Inspector

1 Principal Mechanical Engineering Inspector
1 Deputy Principal Mechanical Engineering Inspector
1 Senior Mechanical Engineering Inspector

1 Principal Inspector for Special Duties
1 Senior Inspector for Special Duties
1 Inspector for Special Duties

1 Senior Inspector of Quarries

Divisional Inspector (One for each of the eight Divisions)

Stationed in Coalfields

Senior District Inspectors (for all but the smaller Districts: there are on the average 3 Districts in each Division)

Medical Inspectors | Quarry Inspectors | Electrical Inspectors | District Inspectors | Mechanical Engineering Inspectors | Horse Inspectors | Inspectors for Special Duties

Inspectors

Section Three: PARTICIPATION BY WORKERS IN SAFETY INSPECTION

Association of the workers with safety inspection takes two possible forms:

(a) inspection at enterprise level by personnel representatives on, for instance, the safety and health committees;

(b) inspection at Inspectorate level by workers' delegates appointed on proposal by the trade unions or elected by the workers.

Bearing this point in mind, the Conference would put forward the following suggestions:

1. At enterprise level, the workers should be associated with safety inspection through an appropriate representative body responsible for all matters relating to safety and health, which must be consulted on all general problems arising in this connection.

   The authority of this body should not extend over too wide an area, as it should remain in the closest possible contact with actual health and safety conditions in the pits.

The Conference further recommends that arrangements be made

(a) to study, in regard to countries where such bodies are not yet in existence, whether they should be set up, what their functions should be, and over what area their competency should extend;

(b) to examine, in regard to countries where such bodies are already in existence, whether their functions and competency conform with the general principles just stated, whether they operate effectively, and whether improvements cannot be made.

This should be done according to whatever procedure is deemed most appropriate in each country, and representatives of the employers' and workers' organizations and delegates from the Mines Inspectorates should be asked to participate.

B. 1. At Inspectorate level, it is considered that, for the association of the workers with safety inspection to be fully effective, a number of closely-linked requirements must be fulfilled. As regards workers' delegates engaged on safety inspection,

(a) it is essential that they should have the full confidence of their fellow-workers;

(b) they must also be of proved competence, and every effort must be made to ensure that they possess adequate knowledge of mining conditions and regulations;

(c) they must be available in sufficient numbers.

In the Conference's view, no one of these requirements should be allowed to take priority over the others.

2. In view of the differences which exist between the systems in force in the countries of the Community as regards the position of the workers' delegates in relation to the Mines Inspectorate (method of appointment, powers, subordination), the Conference considered that any attempt to alter the system would be a somewhat complicated matter,

which is better left to the discretion of the various countries themselves. It is, however, essential that due account be taken of the following recommendations, which have been approved unanimously by the Conference.

Workers' delegates engaged on safety inspection under the Mines Inspectorate must

(a) work solely and wholly on safety inspection, to the exclusion of all other duties and appointments (e.g. personnel representatives);

(b) be independent of the enterprises they are called upon to inspect;

(c) possess the essential knowledge and capability before taking up their duties;

(d) be given thorough training and regular refresher courses;

(e) be paid at the same rate as operational underground workers with the same qualifications.

The Mines Inspectorate must see to it that these conditions are fulfilled.

C. It is considered that foreign workers should be allowed to participate in safety inspection on the same terms as nationals of the country concerned.

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The tables following provide a summary of the information assembled by the Conference on the various ways in which the workers participate in the supervision of safety arrangements.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1. Manner in which workmen assist in safety supervision	Supervision is by : (a) workmen's representatives elected to colliery safety and health committees; (b) workmen's delegates to Mines Inspectorate.	Supervision is by workmen's elected delegates. Below ground: safety delegates, substitute delegates Above ground permanent surface delegates, substitute delegates.	Supervision is by the safety delegates and the workmen's representatives on the works council who are members of the collieries' accidents committees.	Supervision is by : (a) workmens' representatives elected in persuance of Law on constitution of enterprises; (b) Workmen's inspectors of the Bergämter appointed upon proposal by I.G.-Bergbau.	Italian legislation does not provide for direct co-operation by workmen in mines inspection There is a National Accident Prevention Organisation (E.N.P.I.). The principal collieries also have accident-prevention committees on which the workmen are represented.	Supervision is by workmen's inspectors appointed by the Mijnindustrieraad (Coal Industry Council) upon proposal by the mine-workers' unions.	The workmen's associations at the mines have a right to appoint representatives to carry out safety inspections.
2.(a) Orders, Directives, etc., under which these arrangements were originally made	Regent's decree of September 25, 1947, concerning safety and health committees. Law of April 4, 1897, superseded by law of August 16, 1927, as amended and supplemented by laws of May 5, 1929, April 26, 1933, and July 20, 1955, for worker-delegates to Mines Inspectorate.	System of mineworkers' safety delegates instituted by law of July 8, 1890, as amended by laws of March 25, 1928, and June 5, 1938; decrees of May 2 and June 12, 1938; ordinances of January 20 and May 24, 1945; laws of March 7 and August 2, 1949. System of permanent surface delegates instituted by Article 27 of decree of June 14, 1949 (Miner's Code); their status defined by decree of March 11, 1949.	The setting-up of works councils is laid down in the Law of July 7, 1954, on constitution of enterprises. System of safety delegates instituted by Oberbergamt directives of September 15, 1951.	Law on constitution of enterprises.	E.N.P.I. is recognized by law of December 19, 1952. No legal provisions requiring the setting-up of accident-prevention committees. Agreements to that effect may, however, be concluded between employers' and workers' organisations.	Section XVII of 1939 Mines Regulations.	This right was first conferred by Acts of Parliament passed during the last century. The present provision is in Section 123 of the Mines and Quarries Act, 1954.
(b) Participation by foreign workers	Foreign workers can stand for election to safety and health committees on same terms as Belgian nationals. They cannot become delegates to Mines Inspectorate.	Foreign workers can vote in election of such delegates provided they (a) have no past convictions; (b) hold a privileged resident'd card; (c) can show a record of six years worked in French mines (three years for workers from frontier areas); (d) are on the latest payroll. They cannot stand for election.	No provision for special measures to bring foreign workers into safety inspection arrangements.	No provision for special measures to bring foreign workers into safety inspectors arrangements.		No provision for special arrangements enabling foreign workers to participate with Dutch nationals on equal footing in safety inspection.	There is no provision for special measures to bring foreign workers into these arrangements, but equally there is no discrimination against this.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
3.(a) Special knowledge required of workmen's representatives.	Workmen's delegates to Mines Inspectorate must have worked for 10 years in one or more branches of underground operations and have obtained 6 marks out of 10 in an examination.	Workmen's safety delegates must have worked not less than ten years in the pits, including not less than three as qualified miners and not less than five in the area they represent or a similar neighbouring area. Permanent surface delegates must have worked not less than ten years in the pits, including not less than three as qualified surface workers and not less than five in the area they represent or a similar neighbouring area.	Safety delegates must have been qualified hewers for not less than three years, or have spent three years in their particular trade (after completion of their vocational training)	Workmen's representatives must be miners with several years' practical experience. Elected representatives must be qualified deputies. Workmen's inspectors are appointed upon proposal by trade union. (I.G.B.)	Workers on safety committees must be fully acquainted with mining operations.	Workmen's inspectors must be Dutch nationals; be not less than 30 years of age; have worked for the past 10 years below ground, including not less than 4 years as qualified hewers in Netherlands mines.	Each representative on inspection work must have at least 5 years' practical experience of mining.
(b) Training and refresher courses		Miners' safety delegates must attend refresher courses arranged by the Mines Service in order to improve their knowledge in connection with safety in mines.	Officials of the Bergämter at stated intervals organize lectures for supervisory staff, which are also attended by safety delegates and workmen's representatives.	Bergämter organize regular accident-prevention courses.		Meeting with Mines Inspectorate representatives once a fortnight.	One of each pair of representatives must be employed at the mine, and is therefore engaged part-time on safety inspection; the other is sometimes a full-time workmen's inspector.
(c) Whether engaged on any other work.	As State employees, workmen's delegates must comply with the restrictions contained in the State Employees' Code on the acceptance of other work. Moreover, they may not be members either of conciliation boards, of industry and labour boards, of legislative bodies, or of any provincial or communal council. They may not hold any position in any trade-union organization.	Safety delegates and permanent surface delegates are also responsible for reporting any breaches of regulations on employment of women and children, on working hours and on the weekly break. When the area which a delegate represents is not large enough to demand his full-time attention, he may also work as a miner or in any other capacity except as a licensed victualler. The miners' safety delegates are at the same time personnel delegates.	Members of the works council have other duties outside their safety work (social affairs, wages, personnel matters).	Their duties form part of the responsibility of the works council.		Workmen's inspectors also intervene in the event of social disputes.	
4. Average size of area covered by one delegate	Number, extent and limits of areas covered by delegates to Mines Inspectorate are specified in Royal decree of February 2, 1955, which fixes number at 66. There is one delegate to two pits.	The area allotted to each miner's delegate consists of a group of shafts, roadways and workings which come under a single coal-owner and can be thoroughly inspected in not more than six days. Exceptions may be made to this rule where more than 1,500 workers are employed in the area concerned.	Members of the works council are not responsible for any particular area of their colliery. Safety delegates are responsible only for the area for which they were elected. Below ground there is one delegate to each deputy's district; above ground one delegate to every 200 men or so.	Each representative is responsible for two to three deputies' districts.	Safety committee's competency covers the colliery to which it belongs.	Eight workmen's inspectors, two to every three pits.	There is a standing panel of representatives for each mine

E. Workmen's contribution to supervision of safety measures

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
5. Powers of investigation	Each delegate makes at least 18 inspections per month in the underground workings of the area he represents. It is his duty -to examine for compliance with requirements of workers' safety all underground workings in coalmines and all surface installations directly concerned in mining operations; -to assist in investigation of accidents and ascertaining of their causes; -to report to Mines Authority any breaches of the labour laws and orders which inspectors are required to see are complied with.	Workmen's safety delegates have to carry out: -statutory bi-monthly inspections of all shafts, roadways and workings in their area; -inspections following serious accidents; -tours with Inspectorate representatives should the latter request it. In the course of all these inspections, delegates must confine their attention to technical safety matters. Permanent surface delegates have the same powers of investigation in regard to the surface installations and services.	Workmen's representatives and safety delegates have - to ensure that action is taken to eliminate dangers to safety and health; - to help mining authority by means of suggestions and information; - to see that laws on protection of workers and regulations on safety in mines are complied with. To this end safety delegates have to tour the area they represent twice a month, accompanied by a supervisor. Safety delegates and workmen's representatives are not entitled to issue instructions.	Workmen's representatives have a right to inspect pits and make notes, but not to give any instructions regarding action to be taken. A member of the colliery council is consulted in all official inquiries into accidents or other matters. Colliery council must also be consulted by management in connection with any request concerning safety.	Within E.N.P.I. there is a national centre of colliery officials, experts and industrial health and safety specialists, known as the Italian Safety Officers' Centre (Centro Italiano Addetti alla Sicurezza or C.I.A.S.). Its function is -to promote the organization of safety departments and the setting-up of accident-prevention committees in the enterprises; -to facilitate discussions and pooling of experience; -to encourage meetings between safety officers, technical specialists and accident-prevention experts.	Workmen's inspectors are responsible -for keeping a regular check on underground operations in the pits for compliance with health, safety and labour requirements; -for investigating any accidents involving one or more deaths or injuries entailing disablement for approximately six weeks.	The workmen have a right to have any part of a mine and its equipment inspected at least once a month by two of their representatives acting together; one of the two, at least, must be employed at the mine. They have a further right to have the site of any reportable accident inspected by such a pair of representatives; this inspection may extend to any other part of the mine, or to any apparatus thought to be connected with the cause of the accident, and may include the taking of air, dust or watersamples. Workmen's representatives may also inspect documents such as reportbooks. All these are minimum rights and owners and workmen's associations are free to make agreements conferring further rights.
6. How and to whom observations are submitted	After each inspection, delegate records the route taken and main points noted in a register supplied by Mines Authority, and kept available at colliery for consultation by management and workers. Colliery manager and workmen have a right to enter their remarks on the delegate's observations in the same register.	Points observed by delegates in the course of each inspection are recorded by them the same day, or at latest the following day, in a special register supplied by the coalowner and kept available at pithead for consultation by workers. Coalowner may enter his own findings and remarks on the delegates' observations in the same register.	Any defects or deficiencies found by workmen's representatives must be first reported to supervisory staff concerned and to colliery manager. If managements action is considered inadequate, safety delegates and workmen's representatives may then write or telephone to Bergamt.	Workmen's representatives, like all other workers, have a right to get in touch either verbally or in writing with the mining authority.	Observations, remarks and suggestions by committees and workmen are submitted to colliery manager and discussed by accident-prevention committee.	Workmen's inspectors submit weekly report to Inspector-General of Mines. They also report on their findings at meetings held fortnightly by Inspector-General of Mines.	After carrying out an inspection, the workmen's representatives must enter a report of the matters ascertained in a statutory report book. A copy of this report must be sent to the Government inspector, and another copy must be kept posted for 24 hours in a conspicuous place at the mine.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
6. (contd.)	Delegate forthwith sends a copy of his remarks in the register to the mines inspector indicated to him for the purpose.	Copies of both entries are forthwith sent by their respective authors to the Prefect, who forwards them to the head of the mining district.				At each mine a register is kept in which workmen's inspectors enter their observations after each inspection.	
7. Action taken a. in normal way b. in cases of imminent danger	a. Divisional Director takes such action as is necessitated by the points noted in workmen's delegates' reports of their inspections of underground workings and surface installations. b. Where necessary or urgent, delegates inform management of the measures they consider should be taken at once. They then immediately notify mines inspector. In cases of imminent danger caused by non-observance of a safety regulation, they discuss the matter on the spot with operations manager or his authorized representative. Any action indicated by workmen's delegates following this discussion must be taken promptly by operations manager. Such measures are compulsory until rescinded or amended by mines inspector, who must give a ruling within 24 hours.	a. Head of mining district receiving delegate's remarks from Prefect compares them with coalowner's observations and decides whether special instructions should be given to coalowner, whether the facts should be examined immediately on the spot, or whether matter can be put off till next inspection. He then gives appropriate directions to regular inspector. b. In cases of imminent danger, delegate must immediately notify coalowner or his representative on the spot, in writing, and report the matter without delay to mines inspectors to enable them to take action if necessary.	a. Bergamt receiving workmen's representative's report first examines the facts, and then where necessary causes appropriate action to be taken. b. In cases of imminent danger head of Bergamt makes necessary decisions at once, without previously consulting coalowner.	a. Local mining authority examines facts and orders such action as may be necessary. b. In cases of imminent danger, a special order is immediately issued.	a. Management, after examining proposals from committees, safety officers and workmen, discusses and introduces measures suggested. b. In the cases of imminent danger, action is taken by management, which must inform appropriate mining authority forthwith.	a. Inspector-General of Mines is kept informed by means of reports submitted to him by workmen's inspectors. b. Where there is considered to be danger to general safety, or to safety either above or below ground, or during drilling operations, coalowner must inform workmen's inspector forthwith.	Any action following a report is a matter to be decided according to the circumstances, by the manager or the Government inspector.

Section Four: DISCIPLINARY ACTION IN THE EVENT OF BREACHES OF SAFETY REGULATIONS

In the view of certain members of the Conference, public opinion tends to attribute mining accidents either to inadequate regulations or to failure to take the prescribed disciplinary action.

1. The Conference considers that the general regulations constitute a code which can only be amended in the light of experience and of the development of technical methods.

Pending such major revisions, however, directives, instructions and notices are issued adjusting or supplementing the regulations on certain points.

> The Conference recommends that all directives, instructions and notices adjusting or supplementing the general regulations should be transmitted without delay to all those affected.

2. The Conference notes that in all the countries of the Community disciplinary action is provided for, both by the actual laws of the land and by the rules, agreements and/or regulations in force within the enterprises, in respect of breaches of safety regulations and directives.

The Conference's information is that infringements are reported even when no accident has actually resulted, and that the disciplinary action provided for is generally taken.

> The Conference recommends that, in the event of an accident, the Mines Inspectorate should list all breaches of regulations emerging in the course of the inquiry, whether or not they have any direct bearing on the accident.

3. The Conference then considered whether it was advisable to press for more severe legal penalties.

It notes that with regard to certain breaches of regulations it is sometimes difficult to fix responsibility in view of the varied and ever-changing conditions of work in the pits.

A. 1. The Conference therefore desires that the prosecutions requested by the Mines Inspectorate following particularly flagrant and clearly proven offences, which greatly affect general safety, should lead to appropriate penalties.

2. In most other cases, the disciplinary action provided for within the enterprise, if taken forthwith, at whatever level, is an effective deterrent so long as it is applied rigorously, while affording those involved every guarantee against arbitrary action.

B. At the same time, disciplinary action, although indispensable, is not the most effective method of improving safety, and a study of the causes of accidents shows the human factor to be all-important.

Greater safety can be attained primarily through a detailed study of working methods, through proper training of the personnel, and through full co-operation by all concerned in creating safety-mindedness.

The granting of bonuses in enterprises where the personnel have conducted themselves in a manner calculated to prevent accidents can also be an extremely effective means of improving the standard of safety.

PART THREE

Human Factors

Section One: INTRODUCTION

The Conference considers that systematic accident prevention should not be confined to disposing of the material causes, but should also be aimed at detecting and eliminating or attenuating the causes associated with human factors.

In view of the time-limits set for the Conference, it did not undertake any studies to establish whether or not particular human factors are likely to affect safety, but confined itself to suggesting practical measures which, in the light of its members' experience, it considered to be a contribution to safety. Accordingly, in a number of cases it decided to propose that measures already in force in certain countries should be adopted on a general scale.

The Conference's recommendations are set forth in the sections following. They have been re-arranged in groups in accordance with the plan printed overleaf, so as to facilitate their practical application.

Adaptation of the Worker to his Job

Reception arrangements for new workers
Medical and psychological examination
Medical and psychological supervision
Methods of observing and assessing individual miners at work
Vocational training

Working Conditions

Physical aspects of the environment
Psychological and sociological aspects of the environment
- Labour relations
- Problems in connection with foreign workers
- Working climate within the enterprise

General working conditions
- Methods of payment
- Working hours

Special living and working conditions
- Housing
- Transport
- Meals

Family and Social Background

Family and social problems, in particular those connected with foreign workers

Accident-prevention Methods

Section Two: GENERAL RECOMMENDATION
CONCERNING THE HUMAN ASPECTS OF SAFETY

The Conference decided to adopt without further discussion, and recommend, all the chapters of the International Labour Office Report on Safety in Coalmines (Geneva, 1956) dealing with the human aspects of safety, and Resolution No. 44 on Safety in Coalmines adopted unanimously by the Coal Mines Committee of the International Labour Organization at its Sixth Session (Istanbul, May 1956).

Section Three: RECEPTION OF NEW WORKERS

(1) Value of reception arrangements

1. Proper reception arrangements make for increased safety. They save time in getting the worker started on his job, get him into right and safe habits from the very beginning, ensure that each man's responsibilities and duties are clearly defined and understood, help to obviate misapprehensions and misunderstandings which so often lead to difficulties, make for greater stability of the personnel, and foster good relations within the team and between supervisory staff and workers. For these reasons, reception methods will be successful in so far as they are employed by the departments responsible in a general atmosphere of satisfactory labour relations. This correlation, which has already been observed in those Community enterprises which maintain systematic reception arrangements, has an excellent effect on safety.

(2) Aims and objects of reception

2. The object of having a special reception system is to facilitate the adaptation of the newcomer by reducing the material and psychological difficulties bound up with any change of employment or surroundings, and to help to avert the devastating effect on safety which can result from inexperience and maladjustment. The objectives in reception work are primarily of a psychological nature, and must be clearly distinguished from the measures designed to ensure the adaptation of the worker to his job and his vocational training.

(3) Types of entrant and types of reception

3. The problems arising, and consequently the reception methods employed, differ according to the type of entrant, and to the structure and size of the enterprise.

4. Thus a distinction must first be made between personnel newly taken on (juveniles or adults), personnel returning to the industry after a prolonged absence, and personnel undergoing transfer or promotion. Among the actual newcomers, who form the main category, it is further necessary to distinguish between those recruited individually and those recruited collectively. Finally, a distinction must be drawn between men who have been recruited locally, men from areas some distance away from the enterprise, and men recruited abroad.

In particular, individual reception of boy workers should be based on the same principles as that of newly-recruited adults.

5. Reception should thus take three main forms, viz. reception in the country of recruitment and in the country of employment, reception on arrival at the colliery, and reception during the period of adaptation to the job.

(4) Responsibility for reception

6. The concept of responsibility for reception must be considered with due regard for the differences in situation referred to in the foregoing subsection.

7. Outside the enterprise, where men have been recruited some distance away (either in the same country or abroad), and more particularly in the case of collective recruitment, responsibility for the reception organizations set up in the country of recruitment and/or employment should be shared as may be deemed most suitable between the local or national authorities and the employers. It is recommended that the workers should also be associated with these activities. Under no circumstances should responsibility for reception arrangements be delegated to outside commercial bodies.

8. Within the enterprise, the reception services are the responsibility of the employers. It is recommended that they should be organized in co-operation with the trade unions.

Every enterprise or group of enterprises should have a special reception department on a permanent basis, working in co-operation with the other social services and with the vocational-training department, which have themselves a contribution to make as regards reception. Reception cannot, however, be carried out satisfactorily by one single specialized department: it requires an atmosphere of mutual understanding and co-operation all round, particularly from the supervisory staff, who need to be specially trained for this purpose.

(5) Practical reception methods: organization

9. In the country of recruitment, especially in the case of collective recruitment, it is necessary to organize "assembly centres" responsible for seeing that, in areas where workers are recruited on a considerable scale, they are given material and moral assistance (lodging, administrative formalities, etc.), medical examination to ensure that they are physically fit for work in the pits, adequate and unbiased information concerning their future life as miners, including its hazards, and if possible a certain amount of guidance. The Committee concerned recommends in particular that in the case of collective recruitment in a country of emigration, the country concerned should see that its assembly centres receive migrant workers under the most favourable material and moral conditions and provide such workers with appropriate information on the life awaiting them.

10. In the country of employment, it is necessary to organize "reception centres," with responsibility mainly for helping the migrant workers over the initial stages and channelling them forthwith to the reception departments of the collieries. Where no such reception centres exist, the enterprises concerned must start their reception work from the moment

entrants coming from a distance first arrive at the station, to ensure that they and their families are given all the assistance they may need to enable them to settle in.

11. Finally, the enterprise must have a reception department for both native and foreign workers, in order to establish a welcoming atmosphere, and to facilitate the adaptation of the newcomers to their new living and working conditions.

This department must help the men with the necessary engagement formalities, see that they become properly familiar with the colliery, and continue to look after them during the period of adaptation.

(6) Practical reception methods: facilities

12. The process of acquainting the newcomers with the set-up and working of the enterprise, carried out by the methodical employment of appropriate measures, is more effective if it is arranged with the assistance of senior workers. In the case of foreign workers, all necessary action should be taken to dispose of language difficulties and to facilitate the psychological and social adjustment of the men concerned to their new living and working conditions and surroundings.

To this end the reception department should provide the newcomers with information, in a language they understand, on the collieries, the workers' organizations and the conditions regarding work and, particularly, safety, and should establish contact with the services dealing with the workers, especially the social services. Workers speaking a language other than that of their future environment should be received by representatives able to understand them and make themselves understood by them.

13. Adaptation to work at the colliery is a process extending over a certain period of time, lasting anything from a few weeks to several months, during which the reception department should maintain contact with the newcomers in order to give them all necessary assistance, for instance by visiting them and arranging meetings for them. During the same

period, the departments with which the newcomers are in contact, and particularly the social services, should take up and extend the work of the reception department. Finally, in the department to which he is ultimately appointed, the newcomer's superiors and fellow-workers should give him whatever help he needs and a welcome which will make it easier for him to settle down well to his job.

Section Four: MEDICAL AND PSYCHOLOGICAL EXAMINATION MEDICAL AND PSYCHOLOGICAL SUPERVISION

1) General Recommendation

1. As the psychological and pathological condition and the intelligence and character rating of the personnel can affect safety, measures concerning the medical and psychological examination and supervision of workers should be introduced generally.

Medical examination of mineworkers prior to their engagement and to any important change of job should be made compulsory, such examination to be supplemented if necessary by a psychotechnical or equivalent examination in respect of jobs calling for special physical and/or psychical qualities.

The examination should be carried out by a specially-appointed medical practitioner possessing the requisite qualifications and working in conditions which make it possible for him to perform his duties entirely on his own responsibility and in complete independence. In the case of mass recruitment of foreign workers, a thorough medical examination should be carried out prior to departure from the country of origin.

In addition, the Governments should encourage the establishment and extension of colliery medical services, and more particularly of arrangements adapted to the working conditions in mines for giving first aid quickly to workers injured in the course of their work.

Suitable medical, and if necessary psychotechnical, supervision should be carried out regularly and systematically, to ensure that each worker is always in a fit state to perform his duties in a normal manner; where a worker is found unfit to do so, such worker should be assigned to more suitable duties, so far as possible at the same colliery.

2) Aims and objects of medical and psychological examination

2. Pre-entry medical and psychological examination is carried out in the interests of the subjects and their fellow-workers. Its

primary object is to put each worker to the most suitable job, having due regard to the risks attaching to coalmining and the working conditions in the mines and taking into account the possibilities offered by the internal organization of the enterprise. It also aims at detecting any contra-indications in respect of certain types of work and preventing potential accidents by examining with special care for certain physical or psychological conditions likely to entail increased risk.

3. The pre-entry examination should not be confined solely to the physical and pathological side on the basis of a medical examination, but should if necessary include the use of applied psychology with the object of ascertaining the character and mental abilities of the subject.

3) Entrants undergoing medical and psychological examination

4. In view of the ever-present and widely-varying hazards in coalmines, medical and psychological examination should not be confined, as is frequently the case in other industries, to men assigned to strenuous or dangerous occupations: it should be extended to the entire personnel, carried out with due thoroughness and attention to detail, and based on special, carefully defined criteria.

4) Medical and psychological services

5. Every enterprise or group of enterprises should have a medical service and an applied-psychology service, each with proper facilities and equipment at its disposal. These services should work in close co-operation as regards pre-entry examinations (and subsequent supervision); it would also be of value to institute or extend co-ordination among the various medical services and among the various applied-psychology services.

6. Medical examinations must be carried out by qualified medical practitioners experienced in industrial medicine in collieries and working in consultation with specialists in the various branches of

the profession whenever necessary. Psychological examinations must be carried out by competent psychologists with adequate knowledge of the structure of the enterprise, the environment and the working conditions.

7. The medical practitioners and psychologists concerned must have full professional independence and full responsibility in conducting their examinations and making diagnoses. They must be given every facility for calling in specialists in doubtful cases, while the employer must retain full responsibility as to whether or not he engages an applicant on the basis of the fitness grading certified by the medical practitioner and psychologist.

5) Aims and objects of medical and psychological supervision

8. Medical and psychological supervision should be carried out periodically throughout the worker's career, with the object of making sure that he is at all times fit for his job from the safety point of view, of helping to get him employed on the right type of work at different stages in his career, and of protecting his health generally. Supervision should cover both the medical and the psychological aspects.

6) Practical methods of medical and psychological supervision

9. In the case of juvenile workers, special attention must be given to their regular supervision, with the object of watching their physical development and assessing their adaptability to conditions in the pit. They should be re-examined at least once a year.

10. In the case of adult workers, all personnel should be re-examined at regular intervals, with particularly frequent and systematic checks on those employed on strenuous, dangerous or unhealthy work, and on any men of weakly constitution, in bad health or showing predisposition to illness. All transfers or promotions involving an appreciable change in working habits must be preceded by re-examination to detect any contra-indications and help to ensure that the subject will be put on to work suited to him. If any

contra-indication as regards underground work is found, the worker must be given more suitable work, so far as possible at the same colliery. In carrying out this medical supervision, the doctor should take into account the conditions under which the man has to work.

11. The medical and psychological reports made out in connection with these examinations must be preserved and used in accordance with the rules of professional secrecy in force in each country.

Section Five: METHODS OF OBSERVING AND ASSESSING INDIVIDUAL MINERS AT WORK

1) General Recommendation

1. Many accidents can be prevented by care in the appointment and adaptation of the men to their jobs. This form of prevention is the main object of reception, medical and psychological examination and supervision, and vocational training. Constant efforts must however be made, using all other available means, to check whether the men are in fact satisfactorily placed and adapted.

2. Inasmuch as various specialists have to observe the men at work and/or make assessments concerning them, more particularly in connection with time and motion studies, job analysis, job evaluation, etc., it has been found that, although essentially of a technical and economic nature, these special work-study methods offer excellent opportunities

for detecting dangerous situations, practices and equipment,

for checking whether the man is properly adjusted to his work, and consequently,

for introducing certain preventive and remedial measures designed to improve safety.

All those concerned with safety (managerial and supervisory staff, medical practitioners, psychologists, safety engineers, etc.) should be associated with the employment of these work-study methods. They would thus be enabled, quite apart from the regular tours of inspection and leaving it to the specialists actually to implement the methods concerned, to extend their knowledge of the men's working conditions and behaviour, and to submit their views with the object of ensuring greater safety.

3. In the course of their regular duties, the managerial and supervisory staff have the opportunity of keeping a constant check on whether the men are properly placed in, and adapted to, their jobs. Their attention should, therefore, be drawn to this aspect

of their responsibilities, in order that they may make any suggestions they consider necessary as to the transfer of men to more suitable work or further vocational training.

Section Six: VOCATIONAL TRAINING

1) Aims and objects and general recommendations

1. Thorough vocational training for both workers and supervisors is essential if there is to be the maximum degree of safety in coalmines. Each individual must be given training appropriate to the job assigned to him, and no-one must be allowed to work on his own until he has been suitably trained and passed as qualified for the job.

2. Training is an indispensable part of the enterprise's activity for ensuring rational production conditions and maximum productivity, and the introduction of appropriate training schemes generally encourages a better working climate.

The safety side is an integral part of all training, and indissociable from vocational training proper, and all vocational-training schemes must take due account of safety requirements, and must include safety instruction and familiarization with the rules and regulations relating to the protection of the workers.

3. In view of the differences from one country to another as regards the structure of the coalmining industry and the system of education, it would be difficult to standardize the training systems. Efforts should, however, be made to ensure that the qualifications of personnel once trained are comparable.

2) Training requirements

4. In the interests of safety and productivity, and with due regard for technical progress in the collieries, training should be carried out methodically, employing

systematic, carefully-adapted training schemes based on accurate job analysis beforehand, and providing for periods both of theoretical and of practical instruction;

skilled instructors specially trained in the use of educational methods adapted to the type of training required, employed full-time on teaching and instruction and not connected with the production side, and responsible for a limited number of trainees;

suitable instructional facilities and equipment, making it possible to provide instruction in progressive stages, initially away from any real danger, then outside the pressure of actual production, and, above all, in an atmosphere of confidence.

Systems and methods of vocational training should be based, in particular, on the general principles set forth in Resolutions Nos. 13 and 46 adopted by the Coal Mines Committee of the International Labour Organization at its Second and Sixth Sessions.

5. Every enterprise or group of enterprises of sufficient size should have a training department responsible for organizing and co-ordinating training schemes in line with the enterprises' requirements.

3) Types of training

6. The main types of training are:

training of juvenile recruits (full systematic training; shortened training);

training of adult workers (intensified training);

training of specialists and technicians, e.g. underground electricians and mechanics, machine operators, etc. (full or supplementary training);

training of managerial staff, particularly supervisory personnel; training of instructors.

7. Further training (or "follow-up training") is of great importance. While the original training provides the basis, only practice and experience can make the worker complete master of his trade. There should, therefore, be constant efforts for the further training of all concerned, and more particularly of the managerial staff, who must be prepared to play their part and whose duty is to help the workers, both juveniles and adults, to retain and further develop the safety habits inculcated during training.

On safety grounds alone, it is necessary to organize special training and/or adaptation courses every time there is a change in coal-getting methods or new mining equipment is introduced. In particular, the training given to the workers must be consolidated and supplemented throughout their career whenever any technical change of note is introduced.

4) Full systematic training of juveniles (apprenticeship)

8. As the systematic training of boys is regarded as the basic means of ensuring safety in mines, such training must be provided in specialized apprenticeship centres for a minimum period to be fixed in each country. There should be a sufficient number of these centres to meet the requirements of the collieries.

9. Every colliery of sufficient size should have an apprenticeship centre providing three years' training for boys entering at the age of 14 to 15. The theoretical instruction should be given in classrooms and in a surface training gallery, and the practical side in and at specially reserved training faces below ground. On completion of his apprenticeship the trainee should be given a proficiency certificate. Following their apprenticeship the boys should be specially supervised for some months, and it is desirable that they should be formed into groups from time to time to undergo further training.

5) Shortened training for juvenile workers

10. Wherever it is not possible to send boys to an apprenticeship centre, they should be given systematic training including theoretical instruction at the surface and practical instruction in a surface training gallery and at reserved training faces. Upon completion of such courses, they should receive a certificate of proficiency, and should subsequently be specially supervised for some months.

6) Apprenticeship contract

11. Where boy workers accepted for training (full or shortened) are given an apprenticeship contract, this document should specify the type of training they are to receive.

7) Intensified training of adults

12. Although intensified training of adults is as a rule dictated by circumstances, and as such is normally shorter than systematic apprenticeship, it must nevertheless be adequate. In general, intensified training should be entrusted to qualified instructors who, by reason of their experience, are able to assume responsibility for training and to be answerable for the type of work each man is to be given and the date at which he is deemed ready to start. These instructors should be full-time specialists and must not have anything to do with the production side.

13. Every adult entrant must be given systematic training according to a detailed programme drawn up in advance and falling into the following three stages:

(1) systematic intensified preliminary training, to be given by qualified instructors at special centres above and below ground, and lasting not less than two to four weeks when the teaching methods employed are those suited to intensified training;

(2) follow-up training supplementary to the intensified preliminary training, provided at training faces, and lasting not less than six weeks when the teaching methods employed are those suited to intensified training; during this period, the trainee to work under an instructor responsible at a single face for three to six trainees (but not more), the instructor in no circumstances to have any connection with the production side;

(3) a period during which the trainee is employed in easy workings under suitable supervision.

Promotion from one stage to another should be made on the advice of a responsible instructor, and promotion from stage 3 to regular production work on the advice of the supervisors or inspectors.

14. On completion of stage 2 of this intensified training for adult workers, the trainee should receive a certificate of proficiency stating the type of training received.

15. Where no system of training by qualified instructors in accordance with the principles referred to in subsection 13 above has yet been introduced, the "worker-and-mate" system (with a senior worker initiating newcomers) may be used only as a temporary arrangement pending the introduction of the methodical training outlined above. Where this situation obtains, training should fall into two stages:

(1) systematic intensified preliminary training to be provided by qualified instructors and lasting not less than two to four weeks when the teaching methods employed are those suited to intensified training;

(2) follow-up training by the "worker-and-mate" system, designed to supplement the intensified preliminary training, and lasting not less than three months to one year; so far as possible the ratio of trainee to skilled miner under this system should be one-to-one.

16. The skilled worker instructing newcomers must be primarily concerned with teaching his "mate," not (so far as his wages are concerned) with production. Wherever this type of training is still practised, the work the new entrants are set to do (especially those with non-mining backgrounds) should be carefully graded to enable them to adapt themselves to the job as time goes on, so as to prevent any over-taxing of their capacity or psychological reaction detrimental to safety.

8) Training of specialists

17. As regards electricians, locomotive-drivers and all other personnel with collective responsibilities, or engaged on especially responsible work, the "worker-and-mate" training system should be forbidden, and appointment to such jobs should be subject to selection for ability.

Shotfirers must be given adequate and systematic vocational training. Such training should carry a certificate valid for a specified period only, and should be repeated at regular intervals.

Training and retraining in shotfiring should also be provided for the supervisory staff immediately concerned.

9) Training of managerial staff, with special reference to supervisory personnel

18. The managerial and supervisory staff hold a key position in regard to accident prevention, and must undergo particularly thorough training. However long and carefully the worker is trained, the value of his instruction would be quickly lost if actual working conditions were unsuited for the application of the safety rules taught him. This is indicative of the importance attaching to "safety-mindedness" and efficient action on the part of the supervisory staff. A considerable proportion of their training should therefore be aimed at ensuring that they are thoroughly familiar with the safety regulations and accident-prevention measures and qualified to carry them out.

19. The training and further training of the supervisory personnel are therefore of outstanding importance to the maintenance of safety, and should not only cover the technical aspects of the work but also prepare the supervising staff to take their full share of responsibility for leadership and safety.

20. Appointments to the supervisory staff should normally be made only upon completion of a course of special training, consisting either of intensive training periods lasting several months, or of periodic instruction spread over a number of years, or a combination of the two. In all these cases, the training provided must include not only advanced technical training but also special instruction on work organization, on leadership and on accident prevention. To this end, there should be an adequate number of supervisors' training-centres (first-stage training). A certificate of proficiency should be conferred upon completion of the supervisor's training.

21. Promotion to the higher grades of the supervisory staff must be preceded by special advanced training, taking the form either of intensive training periods, or of periodic instruction, or both. To this end, each country should have one or more training-centres for the higher supervisory appointments (second-stage training).

10) Training of instructors

22. Training can only be provided effectively by specially-selected staff trained in the use of instructional methods suitable for teaching coalmining subjects, and paid without regard to any contribution to production.

23. In particular, the instructors, who must be sufficient in number in proportion to the trainees, must be given special training for their duties by highly-qualified teachers. This special training should, in particular, include instruction on juvenile and adult psychology and coaching in the use of educational methods adapted to the various types of training given at the mines, and a certificate of proficiency should be conferred upon the completion of the course.

24. The establishment of an instructors' training centre in each country constitutes an effective means of ensuring the proper training and follow-up training of instructors and the development of instructional methods and supervision as to their application, as well as of examining all problems connected with vocational training. However, the Italian delegation's proposal that it should be made compulsory to establish a central instructors' training-college in each country did not meet with unanimous approval.

11) Participation by workers' organizations

25. The trade unions should be associated with the organization of vocational training.

Section Seven: PHYSICAL ASPECTS OF THE ENVIRONMENT

1. In view of the effect which they have on the miner's state of health, - both physical and mental- certain physical factors of the environment in which the men work may have a bearing on safety.

2. Of these factors, special attention should be given, with a view to studying their effects on safety, to

- lighting
- noise
- dust
- humidity
- poisonous gases
- temperature
- ventilation
- vibration
- characteristics of the coal measures

3. A considerable amount of work has been done in this field for many years by the enterprises in the various countries. This work must be continued with a view to improving existing ways and means of combating any adverse effects of these factors. In addition, investigations could usefully be undertaken at Community level concerning the influence of these factors on safety. Such investigations should be aimed more especially at ascertaining the effect of these factors on the workers' physical fitness (deterioration), on their faculties (more or less permanent degeneration) and on the sensory thresholds (narrowing) and at providing suitable remedies.

Action to counter the effects of these physical factors could consist, more particularly, in reducing the discomforts caused by their existence, and in introducing remedial and protective measures, either individual or collective.

4. Complaints attributable to the effects of physical factors inherent in the environment should rank as occupational diseases.[1)]

1) See footnote on next page

1) A Belgian employers' representative, however, made certain reservations in regard to this recommendation, on the following grounds: "In Belgium, pensions and allowances are administered by the collieries themselves in accordance with a system which is different from the more limited system of compensation for certain occupational diseases in force in other countries and industries." In connection with this observation, the Italian workers' representative declared that "these reservations cannot be considered as applying to compensation for occupational diseases to Italian miners at Belgian collieries, inasmuch as the system now in force in Belgium imposes certain interdependent conditions as to age and length of employment which immigrant workers can fulfil only in exceptional cases."

Section Eight: PSYCHOLOGICAL AND SOCIOLOGICAL ASPECTS OF THE ENVIRONMENT

1) General Recommendation

1. Various psychological and sociological aspects of the environment can have a definite influence upon safety. It was, however, difficult to arrive at any definite conclusions on the subject within the time-limits which had been set and it is, therefore, desirable that

2. inquiries should be made in the Community with the aim of ascertaining the degree of this influence, and of working out suitable remedial action.

2) Working climate in the enterprise

3. It is apparent that a sound and stable working climate within an enterprise is a factor likely to have a considerable influence on the accident rate.

4. Elements in such a climate which are worth noting with regard to accidents include

   a) the adverse effect of frequent changes from one enterprise to another ("fluctuation"), as regards both adjustment to technical changes and general adjustment to the environment;

   b) the good effect of interest taken by the colliery manager in the personnel generally and in accidents befalling it in particular. The awareness of such interest, where it is present every minute of the men's working day, is likely to keep the personnel alive to the importance of individual accident-prevention efforts;

   c) the good effect of easy and natural relations with the management.

3) Labour relations

5. Good labour relations have a favourable influence on safety, and should be established and maintained among the workers themselves, between the workers and management, and between the workers' organizations and the employers. The I.L.O. Report on Safety in Coal Mines published in 1956 says on this point: "Many people, both within the coalmining industry and outside it, consider it is of first importance that in the interests of safety, good relations at the mine level should be established. We do not propose to deal here with the measures for ensuring relations based on trust, marked by mutual respect and the desire to establish constructive co-operation. It will be enough to say that it is for the mine manager and the deputy to convince the mineworkers that they have a genuine concern for safety and to avoid strained relations, and it is for the workers' delegates to bring their loyal co-operation. Systems of joint consultation can be very useful whether their functions are restricted to safety questions or whether they are of a general character; the setting-up of such machinery and its effective operation is of great importance. In this connection, it is essential that daily contacts between workers and management staff should be based on the principle that everything which is prejudicial to good relations should be avoided."

4) Miscellaneous factors

6. In regard to relations with management and their influence on the working climate, it is desirable that attention be devoted to the study of certain factors such as the number of supervisors and workers, and that appropriate studies be undertaken

7. to determine the influence on safety of the working climate in an enterprise.

5) Problems in connection with foreign workers

8. The employment of foreign workers poses many problems. Special language arrangements for foreign workers are of particular importance.

9. Wherever foreign workers are employed in coalmining they should be given the opportunity to acquire an adequate knowledge of the language of the country in which they are working. Such knowledge affects safety, inasmuch as it helps to prevent misunderstandings between one miner and another and between miners and supervisory staff.

10. The following measures would appear to be essential to this purpose:

a) foreign workers should be given instruction in the language of the country of reception for a suitable period, according to prevailing circumstances, such instruction to include in particular technical mining terms and expressions, and the instruction period to count as paid working time;

b) on every shift on which foreign workers are employed there should be at least one interpreter available, for so long as they are not able to make themselves properly understood in the language of the country;

c) so far as possible, the instructors in charge of the training of foreign workers should have an adequate knowledge of the workers' language as well as that of the country of employment;

d) so far as possible, every team should include at least one worker with an adequate knowledge of both languages;

e) the enterprises must provide foreign workers with translations of the safety and operational rules and regulations free of charge;

f) it is further recommended that the enterprises should provide foreign workers with translations of all other technical documents of value in connection with their further training.

Section Nine: METHODS OF PAYMENT

The Conference discussed whether methods of payment could, as such, or by the way in which they are applied, have an effect on safety.

1) Factors influencing the development of the concept of piece-work

1. An analysis of the manner in which the concept of piece-work has developed, and of the place which it has come to take in the wage-structure as a whole, reveals that this development has been influenced by economic and technical factors and by a concern for safety. The economic and technical factors include the growth of mechanization and the increased importance to the colliery manager of co-ordinating the tempo of work in the various sectors of the enterprise: as a result of these the piece-work system has in a number of instances been dropped or substantially cut. Another factor is the change in production methods, which has affected the types of piece-work (by individuals, by small teams, by large teams). Concern for safety is due to apprehension lest piece rates, particularly as applied in some cases, should place the stress on output to such an extent that the men might be encouraged to take risks or to overwork themselves to the detriment of safety.

2) Points with regard to the possible effect of piece rates on safety

2. Where workers paid at piece rates are responsible for the safety arrangements themselves and the safety duties are not paid at the same rate as the piece-work, this is likely to involve them in a pecuniary loss where they do take proper safety measures.

3. If a worker encounters unexpected difficulties on the job, he runs the risk of an abnormal drop in his wages, and in order to offset this may be tempted to work in a manner liable to cause an accident. This is one of the reasons why in various countries all workers are guaranteed a minimum wage whatever happens; where this figure represents an adequate proportion of the regular wage, such an arrangement is considered to reduce the risk.

4. If certain jobs are unduly strenuous or poorly adapted to circumstances, piece rates could result in the worker's trying to do too much to be altogether safe. Safety would, in addition, be affected by the consequent deterioration in the working climate of the mine. The regulations concerning the terms on which piece-work contracts are to be concluded can avert such consequences if they guarantee the workers proper discussion of their contracts and the possibility of appealing to the workers' organizations. The same applies to all statutory or contractual rules and regulations relating to the settlement of grievances or disputes.

3) Method of payment of supervisory staff

5. The pay of the supervisory staff should be fixed in such a manner as to enable them to bear their full share of responsibility regarding safety without suffering any disadvantage in regard to their wages.

6. The workers' representatives submitted a joint proposal to the effect that supervisors should not be concerned in any way with production, while the French employers' representatives considered that supervisors should concern themselves both with the output of the men under them and with safety.

4) Method of payment of shotfirers

7. In a number of countries shotfirers are not paid at piece rates. Shotfirers should have a financial interest in seeing that shotfiring is carried out in accordance with safety regulations, and their position of responsibility in regard to safety should be duly remunerated.

5) Recommendation on payment for piece work [1]

8. Irrespective of any consideration of principle as to the relation between the piece-work system and safety, it would

1) The workers' representatives, while supporting this recommendation, remained opposed to all forms of individual piece rates, and, in a lesser degree, to piece rates for small teams. The employers' representatives, on the other hand, felt that individual and small-team piece rates could not be proved to be definitely dangerous, and could therefore be retained.

seem that certain details of the manner in which this wage system is applied have a potential influence on safety, particularly where the various elements on which it is based are not perfectly balanced.

9. It is, therefore, necessary to observe the following principles when adopting this system:

a) When he is paid at piece rates, the worker must be able to take all necessary safety precautions without thereby incurring any loss in wages. The piece-rate paid must therefore allow for the time taken up by safety duties carried out in accordance with regulations. In order to facilitate this for all concerned, the Conference recommends the High Authority to prepare a comparative survey of methods now used in the various member countries to make allowance for safety duties in the calculation of piece rates.

b) Piece rates must be fixed in such a way as to enable the ordinary worker to earn a normal wage during the statutory hours of the shift without overtaxing his strength.

c) Piece rates must be clearly explained to, and accepted by, the men.

d) With due regard to the customs and laws of the country concerned, contact should, if necessary, be established with the men's trade-union representatives. Means should be discussed with them of dealing at the appropriate level with any disputes arising concerning piece rates.

In all cases where those employed on piece work include a considerable proportion of foreign workers, special care should be taken to ensure that the latter are suitably represented at such discussions.

e) To ensure that no workers are obliged by unexpected difficulties on a job to overtire themselves or to take additional risks for fear of otherwise losing too large a sum out of their wages, there should be laws or collective-bargaining agreements specifying the conditions for payment of a minimum wage.

10. It is recognized that piece-work necessitates particular alertness to safety on the part of the supervisory staff. The training and rates of pay of the supervisory staff should be specially fixed to allow for this.

Where one of the men is given special responsibilities for a team in regard to safety, the piece rates paid him must make allowance for the time he has to spend on safety duties.

11. It is, in particular, essential that only men who have undergone adequate vocational training should be put on piece work.

Section Ten: WORKING HOURS

1) General Recommendation

1. From the point of view of safety the essential problem in connection with working hours is fatigue, which when it reaches an abnormal pitch is obviously likely to affect safety.

2. The problem of fatigue is bound up with (a) normal working hours, (b) hours actually worked, (c) the amount of work done during normal working hours and hours actually worked, and (d) the special conditions associated with difficult or unhealthy jobs.

2) Normal working hours

3. As regards normal working hours, the employers' representatives consider that the present hours observed in workings which are not abnormally difficult or unhealthy are well below the accepted fatigue limit. The workers' representatives urge that the present hours be reduced, arguing that this would definitely cause a drop in absenteeism: absenteeism frequently means that the miners in attendance have to work overtime, and that there is increased risk owing to the use of insufficiently-trained personnel as substitutes.

4. At all events, the normal working hours per day, per week and per year should be fixed in a manner most likely to make the work easier, reduce fatigue and ensure better recuperation through rest. The problem of adjusting daily habits as a result of transfer to another shift, particularly the night shift, must be taken into consideration.

5. Rest periods are of some importance. In the course of every shift there should be at least one break long enough to enable the men to take a meal. When, however, additional breaks are allowed in consideration of the particularly unhealthy conditions in certain workings, these should not be taken in combination with the regular break, but should be specially arranged in a manner best suited to counter unhealthy effects.

As a general rule, the regular break should be observed in the actual workings by all personnel present, and the loading and conveying machinery stopped at the same time. Outside these workings and their immediate vicinity, however, and more particularly in the haulage and winding sectors, the break may be taken in rotation.

3) Hours actually worked

6. Special attention should be paid to the effect of overtime on safety. In most countries, overtime is forbidden by law except when necessitated by incidents occurring in the course of the work, or for reasons of safety. Moreover, should the men themselves ask to do overtime they ought to be prevented, in their own interests.

In view of the abnormal strain it imposes on the men, overtime work is a source of danger, and the work should, therefore, be organized in such a way that all jobs can ordinarily be completed during the statutory hours of the shift, overtime to be allowed only when it is a question of taking precautionary measures to avoid the occurrence of incidents during working, or for urgent safety reasons.

4) Amount of work done

7. Any reduction in working hours must in no circumstances call for a greater effort from the men during the reduced number of hours resulting. Methods of payment must be properly applied in such a way as to allow for such short individual rest periods as may be required during work. Although mechanization means that there is no longer necessarily the same correlation between working hours and physical fatigue, it is nevertheless important to make due allowance for fatigue, both physical and nervous.

5) Difficult and unhealthy working conditions

8. Endeavours should be made to frame appropriate regulations in respect of the special conditions associated with difficult or unhealthy work. In the arrangement of working hours allowance should be made for extra fatigue due to the difficult or unhealthy character of certain workings, particularly those where the temperature is unusually high.

Section Eleven: SPECIAL LIVING AND WORKING CONDITIONS

1) General Recommendation

1. In order to ensure the greatest possible degree of safety for everyone concerned, the men should be helped to keep fit. In particular, efforts must be made to work out the best ways and means of improving certain living and working conditions as regards meals, housing and transport, which can react noticeably on the men's health, and especially on their liability to fatigue. The good work already done in this direction by enterprises in Community countries should be kept up.

2) Meals

2. It is essential that all miners, both above and below ground, be offered facilities for obtaining adequate and nourishing food, and enabled to consume it under conditions making for satisfactory assimilation. To this end, particular attention should be paid to the food problems of unmarried workers especially those of foreign nationality. It is important to advise the men, and to provide suitable domestic science instruction for their wives, and even prospective wives.

3. In particular, arrangements should be made to ensure that those working under special conditions (e.g. high temperatures, humidity) are provided with facilities for obtaining food suited to the physiological needs resulting from such working conditions.

4. In addition, endeavours should be made to ensure that foreign workers are able to obtain food similar to that to which they were accustomed in their own country, at the same time taking into account the special needs resulting from their work.

5. The measures already adopted to combat alcoholism should be kept up. Enterprises are recommended to provide their personnel with healthy drinks.

3) Housing

6. Housing policy should be based on the following principles:

All miners should be housed within a reasonable distance from their work, in accommodation adequate to their requirements and those of their families. Social amenities (shopping, educational, cultural and religious facilities) should be provided in proportion to the size of the population. Housing should be allocated on as practical a basis as possible, with the object of integrating miners' families into the population of the area as a whole.

For unmarried workers specially-adapted hostels should be provided, equipped with suitable educational and cultural facilities.

Migrant workers should be enabled to find suitable accommodation fairly quickly.

4) Transport

7. The transport problem is closely bound up with the question of housing, but certain attitudes adopted by some workers in social connections occasionally involve refusal to make a suggested move which would shorten their journey.

Group transport should be so organized as to ensure that journeys are as short as possible, that the workers travel in comfort, and that there is proper co-ordination with any other existing forms of transport.

Efforts should be made to reduce accidents during transport, by improving travelling conditions and by educating the men in regard, in particular, to road safety.

5) Miscellaneous

8. Attention is finally drawn to the disastrous consequences which may ensue when workers find themselves in difficulties as a result of excessive purchases on the instalment system. It is, however, for the national legislation to afford protection to individual citizens in these cases.

Section Twelve: FAMILY AND SOCIAL BACKGROUND

1. The family and social background has an influence upon safety. It is, however, often difficult to ascertain the degree to which safety is thereby affected, and the enterprise is not entitled to interfere in the private lives of its personnel.

2. There should be social services to give the men any assistance they may require. Such services, which are already provided by most collieries, can help to improve the quality of the men's social and family life by encouraging the organization of cultural activities and recreation, assisting private ventures in this field, and helping to educate the men and, more particularly, their wives and prospective wives.

Section Thirteen: PSYCHOLOGICAL ACCIDENT-PREVENTION METHODS

1) Aims in psychological accident prevention

1. The standard of safety can only be raised if all concerned are fully aware of their own personal responsibility in the matter, possess the practical knowledge to enable them to help, and are at all times willing to do everything possible to avert accidents. Consequently, it is necessary to carry on a psychological campaign, mainly of an educational nature, within the enterprise, in order to develop and maintain safety-mindedness and to provide every member of the personnel with the practical means required for assisting in accident prevention from the human point of view.

2) Principles in psychological accident prevention

2. The principles to be observed in employing psychological accident-prevention methods are as follows:

a) Prevention comprises all the material and psychological means employed to reduce the risk of accidents. It is based on the methodical detection of hazards, carried out by means of preventive inspections, the study of accidents and job analysis. It is put into practice by the introduction of accident-prevention plans concerning equipment, behaviour and safety-mindedness.

b) The organization of safety measures is entirely the concern of the coalowner, through the managerial and supervisory staff.

c) If psychological accident-prevention methods are to be effective, they must be

(i) based on prior acquaintance with the risks to be countered;

(ii) actively supported by the entire personnel and the workers' organizations;

(iii) continually developing;

(iv) impressed on all members of the personnel through the appropriate channels;

(v) extended beyond the actual working environment.

Safety-mindedness is, moreover, dependent upon good general discipline, and more generally upon the existence of a spirit of co-operation throughout the personnel.

d) In accident-prevention work, properly co-ordinated use should be made of all appropriate means of instruction, information and publicization, whether with a view to influencing particular individuals, particular groups of men or the personnel generally.

3) Psychological methods to be used in accident prevention

3. The psychological accident-prevention methods employed in various countries may be divided, for the sake of convenience, into instruction, information, publicization and stimulation.

4. Instruction applies to particular individuals or groups, and includes

a) safety instruction given in the course of the various types of general or technical training provided for juvenile or adult workers (at school, in apprenticeship centres and technical colleges, or within the enterprise); it should be distinguished from the technical training proper provided for the personnel, although technical training is itself one of the most effective methods of ensuring safety;

b) instruction on accident prevention covering certain categories of personnel, and members of the health and safety committees, which should be provided by means of study conferences or courses of lectures;

c) instruction of the supervisory staff on accident prevention in order to enable them to establish and maintain safety-mindedness, provided more particularly by special study conferences, by training in job analysis from the safety angle, and by examination and analysis of accidents which have occurred, and further including training in preventive inspection and in the drawing-up of accident reports;

d) instruction through safety orders (explained by the chargeman, entered in the equipment and tools register, and handed out individually), either for newcomers or whenever new methods or equipment are being introduced;

e) periodic talks on safety to individuals or groups (by the safety officer, the supervisor, the lodge officials, the medical officer, etc.).

5. Information, publicization and stimulation are employed sometimes for particular individuals and groups, and sometimes for the personnel in general.

6. The means used in dealing with individuals or small groups are as follows: personal issue of safety documents (calendars, diaries, journals, pamphlets or personally-addressed letters), interviews with each man concerning his safety grading (commendation, reprimands), penalties imposed by the competent bodies, public or private awards (bonuses, letters of commendation, posting on notice-board), systems of individual or group safety bonuses, collective framing of prevention methods.

7. Methods applied in regard to the personnel in general include lectures (general safety matters, accidents within the enterprise, cost and repercussions of accidents), safety days, safety campaigns, safety competitions, bill-posting (safety posters, posting-up of accidents, statistics, etc.), exhibitions (temporary or permanent), publication of articles (in house organ, technical Press, local Press),

publication of minutes of meetings of health and safety committee, production of films and film strips on safety, systems of collecting suggestions for improvements to safety arrangements.

8. There are various other methods capable of directly or indirectly influencing safety, including, in particular, all improvements made to the material environment on the job.

4) Bodies concerned with psychological accident prevention

9. Psychological accident prevention should be carried on with the co-operation of (a) the managerial staff at all levels, (b) the accident-prevention department responsible for drawing up the accident-prevention plans, (c) specialized bodies or departments with a concern in the matter, such as the health and safety committee, the medical department, the psychological department, the social services, the training department, the various social-security associations, etc., (d) employers' and workers' organizations, and (e) the entire personnel, who should be actively associated with the prevention side.

10. Furthermore, the national mining authority should encourage and co-ordinate the introduction of psychological accident-prevention measures, by means both of personal contact and of the enforcement of Acts and Regulations.

PART FOUR

Research, Studies and Information

Section One: GENERAL ARRANGEMENTS CONCERNING STUDIES AND RESEARCH

The Conference considers that research in connection with safety in coalmines must go through three stages, viz.

(a) research proper, carried out at the research centres;

(b) the translation of the results into practical terms;

(c) the general application of research results throughout the industry.

In short, it is a matter of first getting the idea clear, then getting it practicable, and finally getting it over.

The Conference has, therefore, adopted the following recommendations:

A. 1. The Conference is unanimous in recommending that contacts between the different research centres in the Community should be intensified, in order that they may all be better acquainted not only with the results obtained, but also with the research projects in hand, which is a prerequisite for a better co-ordination of their work.

2. It further considers that under no circumstances should research relating to safety in mines be hampered by lack of funds.

Accordingly, all the members are agreed in recommending

(a) that the governments should see to it that the research centres are adequately financed, and should help to increase the financial resources for this purpose by all appropriate means where this proves necessary;

(b) that the High Authority should take an active part, under Article 55 of the Treaty, in the development of research on safety.

B. The Conference also recommends that there should be adequate co-operation between the research organizations and all sectors of the coalmining industry proper,

(a) in order to adapt the results obtained in the laboratories and testing-stations to practical needs;

(b) in order to encourage the application of these results and publicize them more widely.

C. The Conference finally recommends that the research organizations should maintain close contact with the enterprises, the workers, and the Mines Inspectorate, e.g.

(a) by arranging meetings at which speakers would outline research programmes and describe the results achieved;

(b) by intensifying the work of keeping everybody in the industry fully informed, not only through specialized publications, but also by publicizing results in papers reaching the mass of the workers (colliery house organs, trade-union journals, etc.);

(c) by inviting the enterprises, the trade unions and the Mines Inspectorate to propose special subjects for research, and to submit particular problems to organizations specializing in the field concerned.

D. The Conference recognizes the valuable work done by the safety and health research organizations set up by the mineowners.

It is, however, of the opinion that research on health and safety problems forms an integral part of the measures designed to protect the lives and health of the mineworkers and should, therefore, be the concern also of the Governments.

The tables following provide a summary of the general organization of scientific research in connection with coalmining and safety in the mines.

D. Bodies responsible for scientific research in connection with coalmines and safety therein

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1. Special bodies responsible for research	a) Institut National des Mines, dealing purely with matters of safety in mines; b) Institut National de l'Industrie Charbonnière, dealing indirectly with matters of safety in mines; c) Institut d'Hygiène des Mines, dealing purely with matters of health in mines.	a) Centre d'Etudes et de Recherches des Charbonnages de France; b) Station d'Essais et de Surveillance des Câbles (cable testing and inspection station), Lens; c) Centre d'Etudes et de Recherches Médicales Minières, Sin-le-Noble, specially responsible for questions in connection with silicosis; d) research carried out direct by colliery departments in the coalfields.	No special bodies for this purpose in the Saar. When necessary, advice is asked from Dortmund-Derne or Verne[illegible] (Cerchar) testing [illegible]	a) Westfälische Berggewerkschaftskasse (Westphalian Mining Industry Fund), Bochum; b) Versuchsgrubengesellschaft (Testing Galleries Association, Ltd.), Dortmund; c) silicosis research centre of the Bergbauberufsgenossenschaft, Bochum; d) dust research centre of the Steinkohlenbergbauverein, Essen e) various research bodies set up as required to study individual questions.	Scientific research in connection with coalmines and safety therein is the responsibility of the University Mining Institutes. There are also private testing-stations for explosives.	a) Central Testing Station of the State Mines (Centraal Proefstation van de Staatsmijnen), which is also being used by privately-owned mines; b) Dust Study and Silicosis Research Institute; c) Testing-stations for electrical installations and equipment.	There is one Government body responsible for scientific research into mining safety, and for testing; this is known as the Safety in Mines Research Establishment and is part of the scientific organization. The National Coal Board has its own research bodies and also sponsors research by outside organizations.
2. (a) Orders, Directives, etc. governing their institution and operation	Law of April 5, 1923, and Royal decree of December 18, 1929, for Institut National des Mines. Law of August 13, 1947, and Regent's decree of March 5, 1948, for Institut National de l'Industrie Charbonnière. Institut d'Hygiène des Mines is a private body.	Cerchar the only body set up by law. Its Articles, dated May 13, 1947, and approved by the Minister, were fixed in accordance with nationalization act and of Article 15, subsection 9, of the decree of January 16, 1947, fixing the status of the Charbonnages de France.	None.	With the exception of the testing galleries associations required by law, and of the ad hoc research bodies, all such institutions are [illegible] and maintained by the employers.	Institutes come under Ministry of Public Education	None of these bodies was set up under any law or regulation.	The Coal Industry Nationalization Act, 1946, lays down the responsibilities and functions of the Safety in Mines Research organizations.
(b) Their functions	Institut National des Mines Responsible for all research [illegible]	Cerchar is required (a) to institute or		Responsible for	[illegible]		

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
3.(a) Administration	Institut National des Mines is administered by a Board of Management consisting of the Director-General of Mines and the Director of Institute, 5 members representing coalowners' associations, 5 members representing workers' organizations, 6 technical or scientific representatives, 3 mines inspectors. Institut National de l Industrie Charbonnière is administered by a Board of Management consisting of 5 members appointed by employers, 2 members appointed by workers, 5 members appointed by Ministers responsible for Mines and Re-Equipment, 2 members from the Mines Authority, 1 member with delegated power from the Minister of Re-Equipment, 3 members appointed by I.R.S.I.A. (scientific research). Institut d'Hygiène des Mines is administered exclusively by employers.	Cerchar enjoys considerable technical independence within and under the Charbonnages de France. It is administered by a Technical Director-General and a Scientific Director-General.	None.	With the exception of the Versuchsgrubengesellschaft, all the institutes are administered by the coalowners. In the Versuchsgrubengesellschaft, the Government and workers are represented on the Board of Management.	Institutes come under Ministry of Public Education. Testing-Stations are mostly attached to explosives works.	Central Testing-Station is run by State Mines Directorate.	Research questions are kept under review by the Safety in Mines Research Advisory Board, a non-statutory body appointed by the Minister, whose members include representatives of the Ministry, the employers, the workmen, and eminent mining engineers and other technical experts.
(b) Financing	Institut National des Mines is financed from the proceeds of the testing fee; subsidies by the State, the province of the commune; donations or grants from companies, associations and private individuals. Institut National de l'Industrie Charbonnière is financed from a State subsidy; a royalty per net ton produced, the amount of which is fixed annually by the King. Institut d'Hygiène des Mines is financed by the employers, and also receives a small State subsidy.	Cerchar is financed by the collieries. Centres at Sin-le-Noble and Lens are administered and financed by the Houillères du Bassin du Nord et du Pas-de-Calais.		Institutes are financed by coalowners. Versuchsgrubengesellschaft is financed 1/3 by Federal Government, 1/3 by Government of Land North Rhine/Westphalia, 1/3 by Bergbauberufsgenossenschaft.	Institutes are financed by the State. Private Testing-Stations are financed by the enterprises controlling them.	Central Testing-Station is financed by State Mines. Tests which it is asked to carry out for outside enterprises are paid for by thos enterprises	Government research is financed from Parliamentary votes by virtue of Section 42(2) of the Coal Industry Nationalization Act, 1946.
(c) Approximate amounts involved	Institut National des Mines State ... ... Bfr. 2,200,000 Fédération Charbonnière 1,000,000 Testing fees 200,000 Bfr. 3,400,000 Institut National de l'Industrie Charbonnière State ... ... Bfr. 9,000,000 Royalty (Bfrs 0.30) 9,000,000 Bfr.18,000,000	Approximate sum involved for Cerchar is Ffr. 1,000m., of which some 25% goes on direct research in connection with safety and health.				Cost of running Central Testing-Station: 1955 Hfl. 180,000 1st six months 1956 Hfl. 197,000	At present the approximate annual net cost is £250,000. The N.C.B. research effort is financed from the Board's general revenues; the total cost of research initiated by the Board was over £1,000,000 in 1955.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
4. Participation by State, province and/or employers in administration and financing of bodies not controlled by central authorities	See 3 above	Programme of operations and budget is drawn up by Study and Research Committee, on which State is represented by Vice-Chairman of Mines Board, Director of Mines, a representative of the Centre National de la Recherche Scientifique. Safety research programmes are submitted to the Firedamp Commission.	None	See 3 above	None	See 3 above	See 3 above

Section Two: TECHNICAL RESEARCH

1) Firedamp-detectors

Accurate, reliable and safe automatic detectors for measuring concentrations of firedamp must be made available to the personnel in order to enable them to make all statutory tests for firedamp in the air.

Flame safety lamps, when intended to be used to measure concentrations of firedamp, must be issued only to qualified officials and workmen who have been properly instructed as to their use, dangers and care.

Research aimed at providing the personnel with accurate, safe, practical and robust devices (other than flame safety lamps) which automatically indicate the firedamp content of the air should be encouraged by the High Authority. The same recommendation applies to research on devices indicating the oxygen content.

Research with a view to developing recording apparatus and warning devices (alarms) indicating firedamp content and having the above-mentioned features should also be continued. This research should receive encouragement from the High Authority.

The first two paragraphs aim at superseding the use of flame safety lamps for firedamp-detection so far as possible by flameless methanometers. The flame safety lamp, even when used by carefully-instructed personnel, has been the cause of numerous firedamp explosions. It is felt, therefore, to be desirable that it should be done away with, if not altogether, at any rate as the normal type of firedamp-detector. Unfortunately, there is as yet no handy portable detector which could at the same time replace the safety lamp for the purpose of indicating deficiency of oxygen in the air underground. Existing models of flameless methanometer are too expensive and not sufficiently robust for introduction on a more general

scale.

For this reason, the High Authority should encourage research with a view to providing the personnel with accurate, safe, practical and robust devices (other than flame safety lamps) which automatically indicate the firedamp content of the air. The use of the flame safety lamp cannot be discontinued altogether unless research also makes it possible to develop a safe and practical instrument indicating oxygen deficiency.

The features which the firedamp-detector must possess are laid down as follows:

(a) it must be accurate: content shown, between 0 and 5% of firedamp, to be within ± 0.1% of the actual content, whatever the surrounding conditions (humidity, atmospheric pressure, temperature, dust concentration, other gases);

(b) it must be safe and reliable: instrument to be an approved type of device safe in firedamp, not ordinarily liable to failure, desirable also that, if it stops functioning normally, this should be instantly apparent to the operator;

(c) it must be handy: instrument to be as small as possible, light and easy to handle, to register instantaneously, to be easy to read whatever the firedamp content to be measured, to allow of extensive use without requiring special maintenance or adjustment by an expert, to be suitable for the attachment of a sampling device enabling the actual measurement of the firedamp content to be carried out elsewhere, and to be easy to reset to zero;

(d) it must be robust: instrument to stand up to conditions below ground, particularly to shocks and rough handling;

(e) it must be inexpensive: price to be reasonable, so that the apparatus can be introduced on a fairly general scale.

Furthermore, attention should be given to the development of another device which will give warning automatically as soon as the oxygen content drops below 18%, and which embodies the features listed under (b) to (e) above.

Research aimed at developing instruments recording firedamp content and/or giving warning of its presence, and possessing the same characteristics as to quality, etc., should be continued.

2) Carbon-monoxide self-rescuers

The Committee concerned draws attention to the large-scale use of carbon-monoxide self-rescuers in one Community country. In view of the fact that this apparatus is not absolutely safe in all circumstances, and affords protection only against carbon monoxide, it is urgently necessary that research be undertaken to make available to personnel effective, light and practical individual equipment affording full protection for at least one hour, or preferably two. Such research should be encouraged by the High Authority.

The desirability of providing all underground workers with self-rescuers was discussed at some length. There were two schools of thought in the matter,

the one, represented by the French expert, putting forward considerations to the effect that while a fire was developing this apparatus could only be used for a comparatively short space of time, and that it afforded no protection against oxygen deficiency, while in the event of an excess of carbon monoxide the heat produced made the wearing of the mask unbearable,

the other adducing the results of six years' experimenting in pits all over Germany, which reveal that 272 miners were able to escape wearing these self-rescuers, while it is practically certain that at least 10% of this number would have lost their lives without them. No casualties have been attributable to the use of the self-rescuer.

Experience in Germany has shown that in coalfields where the nature of the deposit is such that the men are exposed to increased danger from fire they are glad to have their self-rescuers and do not neglect to have them handy. Experience in another country, however, is that in coalfields where the fire hazard is not such an apparent danger the average miner does not observe sufficient self-discipline to make sure that on the rare occasions when a fire does occur he will have the apparatus readily at his disposal.

In these circumstances, and considering that this apparatus does not guarantee 100% protection in all cases and that it offers protection only against carbon monoxide, the Committee concerned felt that it should confine itself to drawing attention to the fact that this type of self-rescuer is widely used in one Community country, and recommending that research should be undertaken with High Authority encouragement, with a view to perfecting a light and practical device, which would give full protection and could be adopted on a general scale.

At the Plenary Session, the workers' representatives submitted the following motion:

> "Until such research has produced tangible results, each underground worker should be issued with one of the self-rescuers at present available."

This motion was supported by 56 delegates. The Conference added the words "... and should be instructed in its use."

One of the French employers' representatives expressed the following reservation in respect of the motion:

> "While some men have been saved by the self-rescuers, others have been saved without them, and there have been cases where even the self-rescuers did not prevent loss of life. It is quite possible that at some future date men may actually die because they wear these masks. Their use can therefore hardly be made compulsory: all that is really desirable is that the men should be told what to do when using the self-rescuers."

3) Determination of degree of inflammability

The criteria for the degree of inflammability in dust and the methods for determining that degree of inflammability, for instance by the development of appropriate apparatus, should be studied jointly by the Governments with a view to their standardization. Such studies should be encouraged by the High Authority.

The criteria for the degree of inflammability in coal dust and the methods of determining it vary at present from one country to another, and even from one coalfield to another within the same country. A joint study is necessary to ascertain whether these variations are justified by the differences in the nature of the deposits, or whether it would be of value to have them standardized. The High Authority should encourage research for the development of an apparatus with which the degree of inflammability can be determined.

4) Dust-extraction plant

Research for the purpose of developing practical, safe and effective dust-extraction plant, particularly for the purpose of removing dust from the sides and roofs of the roadways, should be continued. Such research should be encouraged by the High Authority.

Experiments have been carried out in several countries with dust-extraction plant for removing dust from the roadways, and also from the haulage installations (conveyor belts, chutes, loading-points). These machines still have certain practical defects, and are not guaranteed absolutely safe. The Conference requests that the High Authority should encourage research with a view to perfecting them.

5) Remote control of stone-dust barriers

Research aimed at still further increasing the effectiveness of stone-dust barriers and other methods of arresting explosions, particularly stone-dust barriers operated by remote

control, should be further pursued. This research should be encouraged by the High Authority.

Experiments and research are in progress in various countries with a view to increasing the effectiveness of the means employed for arresting explosions. It is desirable that these should be continued. The Committee concerned felt that, in the same way as the electric current is in some cases automatically cut off when an instantaneous outburst occurs, efforts could be made to develop devices for operating stonedust barriers or spraying equipment by remote control as soon as a dust explosion occurs.

6) Further development of solid explosives

10. - S It is recommended that every means should be employed to promote the further development of solid explosives and of the other shot-firing methods working with liquids or gases under high pressure, such as air, water, carbon dioxide, etc.

While it has been found that none of the present shotfiring methods such as Cardox, Airdox and the like can altogether supersede the solid explosives, it is felt nevertheless that the development of such methods should be encouraged, with particular emphasis on their adaptation to operating conditions. The improvement of the solid explosives should also be furthered as far as possible: considerable progress has been made recently in this very connection by the development of Class III ultra-safe explosives.

11. - S The directors of the testing galleries in the different countries should as speedily as possible standardize and perfect the methods (which have been in the development stage for some considerable time) for testing explosives and blasting appliances.

The standardization of the methods employed in testing solid explosives and blasting appliances should cover more particularly all testing of the degree of protection offered against coal dust

and firedamp, and of the transmission capacity, inflammability and combustibility of the explosives in the shothole.

7) Manufacture and use of armoured and flexible cables

13. - E In connection with the manufacture of armoured and flexible cables and their use below ground, research work and other efforts should be continued with a view to replacing inflammable insulating materials such as rubber, jute and impregnated paper by non-inflammable, or at least fire-resisting, materials such as Neoprene, glass wool or P.V.C.

This recommendation links up with recommendation No. 6 concerning the outside covering of armoured cables. The suggestion is that inside the cables certain insulating materials should be employed which have already been developed for specific purposes, and have also been tried out underground. A majority of the Conference felt that practical experiments in this connection had not yet reached a stage enabling the general use of such materials to be recommended. In particular, it is not so far possible to construct flexible fireproof or fire-resisting cables measuring up to the requirements of recommendation 4 as regards the protective screen. Such screens are frequently made of inflammable rubber. One of the Italian government representatives, however, expressed the view that, irrespective of any research work being carried on in this field, the use of such cables could be recommended forthwith.

The Conference stressed its interest both in the cable-manufacturers' research activities and in the coalowners' endeavours to try out these cables, with the object of deciding which types were best suited for use underground and of introducing these on a general scale wherever possible.

8) Replacement of inflammable oil in electrical equipment used below ground

13. - E Efforts should be made to replace the inflammable oil in electrical equipment used below ground by non-inflammable fluids

which will retain their properties under normal working conditions, such as chlorenated derivatives (e.g. pyranol, chlophene, etc.), or to use pulverulent insulating materials, inert gas or air and take all necessary precautions where the equipment is used in an atmosphere in which firedamp is present.

Research work with this end in view should be intensified.

This recommendation gave rise to a discussion on the properties of non-inflammable oils. The principle involved was that such oils can be used in place of ordinary oil in transformers and capacitors, but that in switchgear this is not possible because of decomposition induced by the electric arc, and of the insufficient protection against corrosion. It was felt necessary in the last paragraph to draw attention to the special desirability of carrying on research in regard to insulating materials and non-inflammable oils.

9) Examination of winding ropes

31. - M. Methods of examining winding ropes during operation (e.g. with electromagnetic rope-testers) should be further developed.

The object of this recommendation is to promote the development of methods of examination which the colliery personnel themselves can use and interpret. Such methods are of considerable importance, especially in connection with stranded ropes, since breaks in the wires inside ropes of this type are not easily detected by the usual method of examination.

10) Testing of shaft guides; construction of guide rollers

32. - M The development of devices for testing shaft guides should be aimed at producing apparatus which can be easily handled by the personnel examining the shafts.

This recommendation is intended to encourage the perfecting of devices (particularly accelerometers) which can then also be

entrusted to shaftmen not specially well versed in their use.

33. - M Additional improvements should be made in the construction of roller guides, and if found suitable these should be put into use in new winding and man-riding installations in ventilation-shafts where the cages run on guide-rods.

The advantage of roller guides is that there is less wear and tear on the guide rods, and consequently greater safety in manoeuvring the cages.

11) Continuous conveyors

34. - M The development of non-inflammable or fire-resistant conveyor belts should be speeded up by every available means. In so far as such belts have already been developed in the different countries to a point where they can be put into use, endeavours should be made to have them adopted throughout the industry.

The importance to safety of non-inflammable and fire-resistant conveyor belts is manifestly enormous. The discussion revealed, however, that the safety factor is not yet absolutely up to requirements in all the countries, so that additional work will definitely be necessary in this connection.

12) Neutralization of Diesel-engine exhaust gases

35. - M. With regard to Diesel engines, the development of suitable means for neutralizing the injurious fumes in the exhaust gases emitted should be actively pursued.

In the course of the past few years action has been taken in the various countries to develop special chemicals and catalysts which will definitely eliminate the carbon monoxide contained in exhaust gases, even over a fairly extended running period. Every effort should be made to encourage such research.

13) Replacement of inflammable oil in mechanical equipment

36. - M. Research should be continued with the object of developing incombustible fluids to be used in place of inflammable oils for mechanical purposes, e.g. in hydraulic equipment, couplings, tub-decking plant, props, etc.

14) Stopping devices for armoured and similar conveyors

37. - M. In connection with armoured and similar conveyors, devices should be developed which will enable such conveyors to be stopped from any point alongside.

Stopping devices for the conveyors at present in use are generally operated by a pull-wire, and are often somewhat unreliable from the point of view of safety. It would therefore be of value to give every preference to electrically-operated devices.

15) Safety considerations in the design of mechanical equipment

38. - M. The coalmining enterprises should induce the manufacturers to design their mechanical equipment from the outset in such a way as to make due allowance for safety requirements, so as to ensure that no-one can be caught in, or otherwise injured by, moving parts.

The authorities in the different countries, as well as the Model Code, already lay considerable stress on the provision of protective devices. The point of this recommendation is, however, that such devices should be designed by the manufacturers as integral parts of the equipment, not as appliances to be fitted to it subsequently.

16) Designing of coal-cutting and getting machines producing less dust

39. - M. Attention is drawn to the I.L.O. documents of December 1952 and November 1955, which state that the production and dispersal of dangerous dust by coal-cutting and getting

machines should be reduced to a minimum, and that the coalowners and research centres should work in close collaboration with the manufacturers to ensure that the machines are designed as far as possible with this end in view.

This recommendation is intended to draw attention, in view of the special danger represented by silicosis, to the I.L.O. recommendations on the prevention and suppression of dust, which are not yet sufficiently widely known.

17) Devices for stopping haulage winches

40. - M. Devices for stopping haulage winches should be developed or improved, to ensure that no-one can be dragged on to the rope-winding drums.

The stopping devices recommended would be required to ensure that anyone caught in a loop of rope would not be dragged on to the drums. The recommendation thus calls for additional protection over and above the devices referred to in the previous recommendation.

18) Mine-car couplings

41. - M. New couplings for mine-cars should be so designed that they can be handled without risk.

They should be constructed in such a manner as to be suitable for use in conjunction with the usual hook couplings.

Coupling accidents have been so numerous that new types of mine-car coupling are having to be designed. It is not yet certain whether these have proved completely successful under normal operating conditions.

So far the process has been hampered by the fact that no means could be found of combining the new couplings with the older type still in use. It is hoped that this will be achieved by new models specially designed with this end in view.

19) Cage-arresters (butterfly or bell catches)

Following a point made by one of the Italian government representatives, the Conference went in some detail into the desirability of recommending that research be actively pursued in connection with cage-arresters. However, no recommendation was adopted to this effect, the reason being that a great deal of research has already been carried out without satisfactory results. Against the instances in which the cage-arrester has operated effectively, there are an equal number of cases in which it has led to accidents. As matters now stand, the use of a cage-arrester can give satisfactory results with wooden guide rods, but not with steel, and it should be banned where rope guides are employed.

The Conference was, however, assured that the technical departments were giving all due attention to research on this device.

Section Three: RESEARCH, STUDIES AND INFORMATION CONCERNING HUMAN FACTORS

1) General Recommendation

Much investigation and research would have been necessary to enable the Conference to reach definite conclusions and to work out what action could be taken in connection with human factors affecting safety. Accordingly, it is suggested that efforts be made to ascertain scientifically the exact extent to which safety is in fact influenced by the various human factors (physical, psychological and sociological), and the effect of the different preventive measures already introduced or to be introduced.

Such arrangements could be promoted, co-ordinated or furthered by the High Authority in accordance with Article 55 of the Treaty, which provides that "the High Authority must encourage technical and economic research concerning .. workers' safety," and that "the High Authority may initiate and facilitate the development of such research work:

(a) by encouraging joint financing by the enterprise concerned, or

(b) by earmarking for that purpose any grants it may receive, or

(c) .. by earmarking for that purpose funds derived from the levies."

The object should be to frame conclusions applying at Community level and of a nature to be of practical assistance to the Governments, enterprises and/or employers' and workers' organizations. In view of the number of different branches of scientific study involved and the intricate nature of the problems to be dealt with, it is particularly desirable that there should be properly co-ordinated co-operation among the various bodies concerned.

The Conference is fully aware of the information and research work being done in this field by the High Authority, but it desires nevertheless to draw attention to the importance of certain further action described in the subsections following (some aspects of which are mentioned earlier in this Report).

2) Reception of newcomers

It is desirable that material should be disseminated on the organization and operation of the best reception arrangements now in existence in Community enterprises, and, so far as possible, on the results obtained.

3) Medical and psychological examination
Medical and psychological supervision

Action should be taken

(a) to assemble, study and circulate material on arrangements and achievements in the various countries in regard to the medical and psychotechnical or equivalent selection and guidance of mineworkers;

(b) to develop or promote research concerning the influence on safety of physical psychological and sociological factors, and in particular those factors relating to (i) group psychology, (ii) fatigue, (iii) the adjustment of daily habits necessitated by any transfer from one shift or job to another, and (iv) the worker's past employment record; this specific research to be pursued simultaneously in groups of collieries in the different countries, where appropriate in conjunction with the work already being done along more general lines by certain government departments.

4) Physical aspects of the environment

Studies should be instituted or continued concerning the influence of the physical aspects of the environment on safety. The main aspects are lighting, noise, dust, humidity, poisonous gases, temperature, ventilation, vibration, and characteristics of the coal measures. The aim of such studies should be, in particular, to ascertain the effect of the physical factors concerned in producing deterioration in the workers' physical capacity, more or less permanent degeneration of their faculties, and narrowing of the sensory thresholds.

5) Psychological and sociological aspects of the environment

Arrangements should be made to study certain factors such as the ratio of supervisors to workers, with a view to improving labour relations, and more particularly relations with management, and to define the influence on safety of the working climate in the enterprise by means of appropriate studies.

6) Methods of payment

As it is essential that the worker employed on piece work should be able to take all necessary safety precautions without thereby incurring any loss in wages, and that the piece-rate paid should therefore allow for the time taken up by safety duties carried out in accordance with regulations, it is necessary that the High Authority should prepare a comparative survey of methods now used in the various member countries to make allowance for safety duties in the calculation of piece rates.

It would furthermore be desirable:

(a) to initiate an inquiry at international level to ascertain whether methods employed for the quantitative assessment of output are based on scientific criteria and not merely on empirical evaluation;

(b) to conduct an inquiry to ascertain whether any study has been made of systems of individual and team piece-work in connection with (a) above, and in particular to establish whether, in any such study, allowance has been made for the varying environment in the pits, especially as a factor in fatigue problems, and whether alternate work and rest periods have been studied in accordance with criteria which take into account the need for the constitution to recover after the faculties have deteriorated owing to fatigue in the subject;

(c) to promote among the countries concerned the systematic study of job description and job specification, beginning with the more dangerous and highly skilled jobs. The High Authority should also be asked to study the matter, in order to draw up a plan for the employment of these methods in a number of collieries in the different countries with an interest in this initial experiment.

7) Working hours -- absenteeism

Absenteeism affects safety, particularly by the disorganization of the teams. Absenteeism also often obliges the men in attendance to work overtime and thus the hours worked are unduly extended. The High Authority should therefore study the problem of absenteeism and to seek to establish its underlying causes in the collieries and the methods to be employed to reduce it.

8) Psychological accident-prevention methods

Systematic efforts should be made to establish clearly the various causes of accidents, in order to enable suitable psychological prevention methods to be worked out more effectively, and information should be issued concerning the psychological methods in use in the Community and in third countries for accident prevention, particularly those employed to train the supervisory staff for its safety duties.

In particular, the fact that accidents cost money should be brought home to every single member of the personnel, as this constitutes an important psychological point. To this end the enterprises of the Community, either in general or through a system of selected representative firms, should be requested to assess the cost of accidents in such a way as to show the real costs (direct and indirect), so as to make it possible to calculate the approximate amount of the charge per ton. The figures thus obtained would be sufficiently considerable to increase still further, if possible, the importance to the enterprises of reducing the accident rate, and to bring home to them that accident prevention pays.

Section Four: REPORTS ON ACCIDENTS AND INCIDENTS

Publication of Reports

It is desirable that periodic reports should be published describing the circumstances in which accidents and incidents of an instructive nature occurred, together with an account of the preventive measures which should be devised in consequence.

It would obviously be of value to publish accounts not only of accidents which have actually led to loss of life, but of accidents causing only material damage but nevertheless of an instructive nature. Reports should be issued at regular intervals detailing the circumstances under which such accidents and incidents took place, and the measures proposed to prevent their recurrence.

Section Five: STATISTICS ON ACCIDENTS IN COALMINES

The question of statistics on accidents in coalmines and the need to work out a method of compiling comparable statistics in the different Community countries were discussed by the Conference at considerable length.

Several German delegates stressed the difficulties involved. Although they recognized that a uniform method would be most valuable, they did not feel that it would be possible to establish one without first defining the terminology and classifying the concepts.

Other delegates expressed doubt as to whether a single method for the whole Community could be established at all. Even within one coalfield it was not easy to compare the statistics compiled by the different collieries, and it would therefore be exceedingly difficult to line up statistics in general, in view of the diversity of geological conditions if for no other reason.

Most of the delegates, while not underestimating the difficulty of the task, nevertheless felt that it was necessary to have comparable statistics, since these were essential if there was to be any possibility of carrying out surveys on a comparable basis. They further considered that the tables and relevant analyses should be circulated as promptly as possible to the persons and bodies directly concerned (employers, workers, Mines Inspectorates, etc.).

The following recommendation was put forward, with the support of the entire French, Italian and Luxembourg delegations, the Belgian workers' and employers' representatives, the Netherlands workers' and employers' representatives and the German workers' representatives:

A. 1. With regard to statistics on accidents in coalmines, the Conference considers that the High Authority should instruct a committee of experts from the mining industry including, in particular, mining engineers, technicians and representatives of the Mines Inspectorates to work out a method for compiling comparable statistics in Community countries.

2. This Expert Committee should observe the following principles:

Accident report sheets (at enterprise level)

Accident statistics must be based on accident report sheets, which should be as comprehensive as possible, and should, in particular, show

(a) circumstances;
(b) technical causes;
(c) human causes;
(d) workplaces of casualties;
(e) consequences of accident;
(f) action suggested and action taken.

This information should be given in a form suitable for handling by statistical accounting and tabulating machines (punched-card system).

Statistical tables (at Inspectorate and Community level)

These should be kept comparatively simple, so that they can be made available quickly and used effectively.

Compilation of the tables should fall into two stages:

(a) Until the statistics in the different countries have been lined up, it would be best for a simplified table to be introduced, to serve as a basis for a uniform statistical system for the whole Community.

In order that as little additional work as possible may be involved, these statistics should be such as can readily be extracted from the more detailed figures currently compiled in the different countries, and should consist only of a summarized breakdown

of accidents by technical causes and degree of seriousness.

(b) In the second stage, the Expert Committee should produce a harmonized and comparable system of statistics on accidents in coalmines throughout the Community.

In drawing up its tables, the Expert Committee should include those of the following elements which it considers to be most appropriate for use in compiling, analyzing and comparing statistics:

(i) technical and human causes;
(ii) workplaces of casualties;
(iii) consequences (deaths, permanent disablement, temporary disablement);
(iv) classification as to seriousness and frequency.

The I.L.O. will collaborate on this work, and the studies already carried out by this organization will be used as a basis for the Expert Committee's discussions.

B. The tables and relevant analyses should be circulated as promptly as possible to the persons and bodies directly concerned (employers, workers, Mines Inspectorates, etc.).

The Belgian and Netherlands Government representatives and one of the Belgian employers' representatives, while in agreement with the principle of the recommendation, felt notwithstanding that it would be preferable in the first instance to set up a Commission of representatives of colliery managements to study the problem. If the Commission deemed it necessary, or if it failed to reach agreement, an Expert Committee of mining engineers and statisticians could then be convened.

The German Government and employers' representatives, on the other hand, proposed that only the colliery managements should be directed by the Governments to examine to what extent it would be possible to make accident statistics comparable.

PART FIVE

Organization of Rescue Services

In the organization of rescue services there are a number of differences from one country to another (e.g. national headquarters as against regional rescue centres), due either to the general set-up of the coalmining industry or to the geographical location and layout of the coalfields and pits.

On this point the Conference arrived at the following conclusions:

A. 1. The Committee is unanimously agreed in recommending that the rescue services be organized on a geographical basis broad enough for them to dispose of adequate equipment and personnel, but at the same time not too broad, so as to enable them to go into action at extremely short notice.

2. The Committee considers that a functional liaison must be established first between the rescue services of the different coalfields of each country, and then between one country and another.

It recommends that a system be organized enabling the rescue services of the different countries to assist one another, and to ensure maximum speed and efficiency in any emergency.

3. The Conference considers that a regular exchange of experience should be organized among the rescue services of the different countries in regard both to the improvement and to the co-ordination of the methods and means employed (training of rescue personnel, equipment used, etc.).

B. The Conference suggests that a committee of delegates from the different rescue services and Mines Inspectorates should meet with a view to organizing these various contacts.

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The tables following provide an overall picture of the organization of rescue services in the different countries.

F. Rescue Organization

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
1.(a) Existing Central Rescue H.Q. and Rescue Stations	No Central Rescue H.Q. Following regional and local stations: Borinage .. .. Frameries Centre .. .. Ressaix Charleroi .. .. Marcinelle Liège .. .. Glain Campine .. .. Rescue Station at every colliery. Also Rescue Station at every pit.	1. Special Corps to deal with burns, based on Paris. 2. Central Rescue Stations at coalfield level (Nord/Pas-de-Calais, Centre-Midi except Aquitaine) or colliery-group level (Lorraine and Aquitaine). 3. Rescue Stations at all pits.	1. Central Rescue H.Q. at Friedrichsthal. 2. Two Regional Rescue Stations at colliery group level, viz. at Luisenthal and König pits. 3. Local Rescue Stations at every pit.	1. Land North Rhine/Westphalia Two Central Rescue H.Q., at Essen and Mariadorf. Land Lower Saxony Rescue H.Q. at Clausthal-Zellerfeld. 2. All independent pits have their own Rescue Stations. There are also larger Rescue Stations for certain colliery groups.	In Italian coalmines organization of Rescue Stations is left to coalowners. In Sulcis coalfield there are one Central Rescue H.Q. and two secondary Rescue Stations.	Every pit has a Rescue Station and a Rescue Brigade.	There is not a Central Rescue Headquarters for the whole country. There are stations known as "Central Rescue Stations" which normally serve mines within a radius of 15 miles. Every mine must be affiliated to one of these stations, unless it is exempted by an inspector.
(b) Whether set up under special Acts or Regulations, or on coalowners' own initiative	Rescue Stations originally instituted under Royal decree of 1908. In addition, Regent's decree of September 25, 1947, states that breathing apparatus must be kept stored at all collieries, except those classified as non-gassy and employing less than 75 workers below ground.	Instituted in conformity with General Mines Regulations, which require that there shall be a Rescue Station at every pit employing more than 100 workers below ground at any one time. In addition, an order of May 29, 1929, amended on August 19, 1936, lays down conditions for use of rescue equipment in mines.	Instituted under Mines Regulations of January 10, 1946.	Instituted in accordance with Mines (Safety) Regulations.	Mines (Safety) Regulations contain special provisions regarding rescue arrangements.	Stations instituted under Section 172 of 1939 Mines Regulations and Directive No. 62 of the Inspectorate-General of Mines, which contain all the measures regarding equipment, rescue personnel, training, etc.	These arrangements are required by Part IV of the Coal and Other Mines (Fire and Rescue) Regulations, 1956.
2. Scale of staff and equipment	Staff Campine 47 rescue engineers, 290 rescue workers; Borinage 22 permanent rescue workers at station, 100 rescue guides and 50 engineers distributed among different pits; Centre 18 permanent rescue workers at station, 50 rescue guides and 35 engineers distributed among different pits.	Central Rescue Stations have a number of permanent employees or technical assistants specially responsible for the maintenance and supervision of rescue equipment. No permanent Rescue Corps. Central and secondary stations' rescue staff consist of workers and supervisors normally employed below ground.	Staff of Central H.Q. and Rescue Stations total 890. Equipment 330 suits of breathing apparatus; 62 filter appliances.	Staff and equipment are laid down in general rescue plans approved by Mining Authority. Minimum staff and equipment are fixed by law.	Staff and equipment fixed by colliery management according to dangerousness of mine and number of workers employed.	Staff 31 rescue-brigade captains; 647 rescue-brigade members (including team leaders)	

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
2.(contd.)	Charleroi 18 permanent rescue workers at station, 160 rescue guides and 103 engineers distributed among different pits; Liège 30 permanent rescue workers at station, 240 supervisors and 70 miners acting as rescue guides, and 70 engineers, distributed among different pits. **Equipment** Self-contained breathing apparatus 360 Accessories for these 4000 Oxygen cylinders 500 Face masks (smoke helmets) 240 Air equalizers 25 CO and dust filters 80 Lamps 80 Protective clothing and helmets 110 Fire-extinguishers 550 Reviving and examination apparatus 150 Also telephone equipment, material for stoppings, fire-fighting kits, etc.	Nord/Pas-de-Calais 11 rescue workers to each secondary station, 35 rescue workers at central station. Other coalfields 10 rescue workers at smaller units, 100 rescue workers at the big Lorraine Collieries (140 at Merlebach). Equipment Rescue Stations have from 4 to 40 suits of self-contained breathing apparatus, according to size of station. Secondary and central Rescue Stations also have CO-detectors, CO filter masks, reviving apparatus, oxygen-inhalators, telephone equipment, motor vehicles.	37 smoke helmets, 48 reviving sets. 37 inhalators, 33,000 CO-filter self-rescuers, all stored at pit-heads.	Land North Rhine/Westphalia Total of 5,576 persons responsible for rescue work, viz. 153 Brigade captains, 1026 team leaders, 3934 rescue workers, 463 equipment maintenance workers. Total number of rescue appliances is 3882 oxygen appliances of various types, 108,000 self-rescuers.	Staff and equipment in Sulcis coalfield Cortighiana 3 first-aid teams (1 for each shift) 25 self-rescuers. Seruci 1 emergency team, also relief teams and reinforcement teams; 82 self-rescuers. Serbariu 3 teams of 30 miners, 87 suits of breathing apparatus and all other suitable equipment.	Equipment 227 rescue appliances, 325 self-rescuers, 33 CO-detectors, 36 oxygen reviving sets. 41 stretchers, 17 portable telephones.	In accordance with Regulations, there are two types of Rescue Stations, one with its own permanent Rescue Corps, to take immediate action, and one which operates through Rescue Brigades maintained at the mines themselves. The equipment to be kept at these stations, and at the mines themselves is laid down in Regulations.
3. Liaison between Rescue Stations and H.Q.	There being no Central H.Q., the Regional and Local Rescue Stations can always communicate with one another by telephone.	Secondary stations are for emergency action. If necessary, they inform central stations, which then come into action and organize assistance from other subsidiary posts. Mines Regulations make it obligatory for neighbouring stations to assist one another when necessary. Central Rescue Stations are generally responsible for training of rescue workers and maintenance of equipment at secondary stations.	Central Rescue H.Q. supervises work of rescue stations, which in the case of serious accidents must inform it immediately. Appliances and equipment at all rescue stations are inspected twice a year by Central Rescue H.Q. Mutual assistance is organized in accordance with a general rescue plan drawn up by the Central Rescue H.Q.	Requisite liaison and mutual assistance arrangements are laid down in detail in the general rescue plan.	None.	Rescue stations of different collieries maintain regular contact with one another. In the event of a serious accident, they place their personnel and equipment at one another's disposal.	Every mine affiliated to a Central Rescue Station must be in telephonic communication with the Station. The Regulations ensure that in general every mine has access to a Central Rescue Station where equipment is available in addition to its own, and that every mine either can obtain the services of the permanent Rescue Corps from the Station, or has its own rescue brigades.

	Belgium	France	Saar	Germany	Italy	Netherlands	United Kingdom
4. Geographical layout of rescue organization in whole country	See 1 above.	No national organization, except special corps dealing with burns. When necessary, one coalfield may call upon rescue facilities of another.	Over and above liaison with Central Rescue H.Q. the different rescue stations are in touch with local Red Cross.	See 1 above	None.	No organization at national level.	The National Coal Board has nine Divisions, each of which covers one of the principal coalfields in the country. The Divisions are subdivided into Areas, of which there are about 50 in the whole country, each covering nearly 20 mines on the average. Central Rescue Stations thus cover the whole country.
5. Liaison with Comaunity, associated and other countries	None.	No organized liaison. Central Rescue Station of Nord/Pas-de-Calais and corps dealing with burns have been known to leave the country on the occasion of disasters abroad.	Exchange of information with principal stations in German Federal Republic.	When necessary assistance is given on voluntary basis.	Impossible in view of geographical position of Italian mines.	No systematic liaison; occasional information discussions.	No agreed liaison, although occasionally reciprocal visits are made.
6. Supervisory function of Mines Inspectorate	Mines Authority inspects for compliance with measures required under Regent's decree of September 25, 1947 (see 1 above). It approves breathing apparatus prescribed. Superintendent of rescue equipment store is responsible to Mines Authority.	Mines Authority inspects rescue stations, as it does all other mining installations. In the event of a serious accident, the Mines Regulations empower it to direct rescue operations.	Mines Authority has delegated to Central Rescue H.Q. responsibility for inspecting rescue stations. Central Rescue H.Q. lays down all arrangements necessary, in consultation with Oberbergamt.	Rescue Stations come under supervision of Mines Authority which also approves rescue equipment.	Rescue operations come under control of district mining authority and must be approved by it. Where rescue arrangements, equipment and personnel are inadequate, mining authority may order action to be taken to expand rescue services to correspond with size of mine.	Rescue operations come under control of State Mines Inspectorate.	The inspectors have various specific functions under the Rescue Regulations. More generally, their powers under the 1954 Act to enter and inspect mines embrace the inspection of the rescue arrangements at mines and at Central Rescue Stations.

PART SIX

Implementation of the Conference's Recommendations and Continuation of its Work

Section One: SETTING UP OF A PERMANENT BODY

1) The Council of Ministers' resolution of September 6, 1956, defining the purpose of the Conference on Safety in Coalmines provides that the Conference should, in particular,

> make preparations for the establishment of a permanent body representing the six governments and presided over by the High Authority, this body
>
> (a) to continue arranging for the necessary exchanges of information;
>
> (b) to suggest to the governments the introduction of the most effective safety measures.
>
> The resolution further provides that the Conference should also
>
> determine suitable measures for ensuring permanent contact between the rescue centres in the different countries, in order to stimulate the action taken by each country in regard both to the improvement of the means at disposal and to the methods employed in rescue work.

2) Examination of the Conference's recommendations reproduced in the foregoing pages has revealed the need for a permanent body to be responsible for taking up, developing and advancing the work of the Conference.

3) This being so, the Conference recommends that

> A. A permanent body of 24 members (four for each country) should be attached to the High Authority. It should be composed of representatives of the national authorities, the employers and the workers in the

proportion 2:1:1, each member to be entitled to send in his place a substitute designated in advance.

The government representatives' group should be responsible for all necessary contact and information, and should prepare the studies and submit the documentation thus prepared to the permanent body.

The secretarial side should be the responsibility of the High Authority.

The members of the permanent body and their substitutes should be appointed by the Governments; the Chairman should be a High Authority nominee.

The International Labour Organization should be invited to send representatives to attend all meetings of the permanent body in a consultative capacity.

The United Kingdom should be invited to send representatives to attend such meetings as observers.

B. The permanent body should be responsible for proposing the introduction of the most effective measures deemed necessary for the pursuit and full achievement of the objectives laid down for the Conference, viz. that of raising safety in coalmines to the highest possible level. Its tasks should include, in particular, action

(a) to assemble by the most effective methods all appropriate information in order to keep abreast of progress registered in all sectors of safety in mines, and to study ways and

means of disseminating it speedily among the various groups concerned (employers, workers, mining authorities);

(b) to check up on the action taken to implement the recommendations of the Conference;

(c) to follow developments in regard to safety regulations, and assemble information on the practical results of certain measures adopted and on the conclusions to be drawn concerning accident prevention;

(d) to decide upon the study and research work likely to contribute most to an improvement in safety, specify the best method of carrying it out, and promote such endeavours as far as possible;

(e) to facilitate exchanges of information and experience between officials in charge of safety arrangements, e.g. by organizing training periods for the discussion of safety problems;

(f) to recommend such action as may be indicated for the purpose of instituting the necessary liaison between the rescue services in the different Community countries.

C. In order to be able to perform its duties efficiently, the permanent body may request the High Authority to have particular studies and inquiries undertaken by its specialized departments, and may make use of those already carried out by them.

It may also have working parties of

specialists set up to carry out a systematic study of certain problems. Where this is done, it should follow their proceedings and endeavour to draw whatever conclusions may be indicated in respect of safety policy.

D. Proposals by the permanent body should be transmitted to the High Authority and to the Governments of the member States.

The permanent body should report annually to the Council and to the High Authority on its activities and on developments observed in the member countries in connection with safety in coalmines. Particular attention should be given in so doing to statistics of accidents and incidents in coalmines, and the fullest possible conclusions drawn.

The permanent body may, if it is felt desirable, propose that a Conference be called on a larger scale, organized along the same lines as the 1956/57 Conference on Safety in Coalmines.

It should be added that in its discussion of the problems connected with electrification, shotfiring, mechanization and strata control the Conference specifically emphasized that it had been unable, for lack of time, to go into a number of matters which it fully realized to be of considerable importance.

It therefore felt that the working parties mentioned under point C above, composed of the best specialists available, should be instructed to carry out a systematic study of these problems. These working parties should meet at stated intervals, say, every six months.

With regard to the problems connected with electrification, it was felt that the International Electrotechnical Commission could usefully be invited to take part in the work of the appropriate working party.

One point which was raised in particular in this connection was the standardization of the maximum voltages used underground. This is, however, only one of the problems to be dealt with, and by no means exhausts the subject of electrification. Another matter touched on calls urgently for examination -- the firedamp content above which the current should be cut off. The regulations at present in force in the member countries differ not only as to actual figures, but also as to basic principles: in some cases, there is one fixed maximum permissible content, while in others there are more than one, differentiated sometimes according to the machines and equipment employed, sometimes according to the location of the plant (in workings or return airways), and so on.

Consequently, the experts' views varied, and it will, therefore, doubtless be difficult to line up the regulations.

Similarly, in the field of shotfiring it was found that existing regulations differ from one country to another in certain fundamental points. For instance, the safety rating of the explosives to be used is determined in some countries solely on the basis of the actual danger rating of the working, whereas in others the type of detonator used is also taken into account.

It is exceedingly difficult to compare the degree of safety of different explosives. One of the proposed working parties should concern itself with the development of safety explosives and appropriate shotfiring methods, and discuss these fundamental matters in detail with a view to reconciling existing opinions.

As regards mechanization, one of the working parties should seek to produce a classification of large and small man-riding installations, as a basis for drawing up safety rules suited to each particular type. In addition, it should work out recommendations concerning the amount of light needed at the different workplaces. Adequate lighting corresponding to the degree of mechanization is a major safety factor.

Finally, as regards strata control, the Conference expressed the view that many problems in this sector overlapped with other sectors in such a way that they could not be dealt with solely from the point of view of strata control. One such problem is that of the optimum length of a working face from the point of view of safety. The

Conference considers that it would be advisable to establish a maximum permissible length. This length depends, among other things, on whether the roof comes down satisfactorily when the caving system is employed, and hence on what rate of advance can be attained. Apart from the obvious differentiation according to the seam thickness and the dip, the length of the face depends also on other factors such as ventilation, the firedamp hazard and dust. One of the working parties to be constituted should therefore consist of experts in all these fields, who would be qualified to judge the importance of the various problems from the point of view of safety.

While not wishing to lay down in detail the terms of reference of the proposed working parties, the Conference adopted the following recommendation:

(a) In view of the limited time at its disposal, the Conference finds it impossible to deal with all the problems arising in connection with the study of group accidents and recurrent individual accidents. It is therefore desirable that small working parties of experienced specialists should meet at stated intervals.

These working parties should go further into all the problems mentioned, and should concern themselves in particular with all questions raised by the introduction of new technical methods and equipment.

(b) With regard to electrification, a working party should examine, among other things, the problems involved by the standardization of the limits between the voltage ranges used underground (extra-low voltage, low voltage, medium voltage, high voltage) in the different countries. It should co-operate in all matters concerning manufacture with the appropriate committees of the International Electrotechnical Commission, and on the preparation of a revised edition of the Model Code, on the basis of the latest

technical advances, with the International Labour Office,

(c) With regard to shotfiring, a working party should concern itself with the development of safety explosives and appropriate shotfiring methods, and discuss the fundamental points in detail with a view to reconciling existing opinions.

(d) With regard to mechanization, a working party should seek to produce a classification of large and small man-riding installations, and to line up existing safety standards in respect of such installations. It should further draft recommendations concerning the amount of light needed in the different underground workplaces, allowing for the increased use of machinery.

(e) With regard to strata control, a working party should examine, among other things, the question of the optimum length of a working face from the point of view of safety. In order to be able to deal with this and similar problems, it should consist of experts on all sectors of the work.

Section Two: MULTILATERAL AGREEMENT CONCERNING THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE CONFERENCE

A draft recommendation was submitted to the Conference to the effect that such measures as might subsequently be approved by the Council of Ministers in the light of its findings should be embodied in a multilateral agreement to come into force in each country upon ratification by the Parliament of that country, and that the High Authority should accompany its proposals to the representatives of the Governments meeting in Council by a draft multilateral agreement for their approval.

The Conference discussed the matter, and unanimously approved the following wording:

> The Conference, recognizing the importance, as regards the improvement of the standard of safety in mines, of the speedy introduction in the six Community countries of the measures to be approved by the Council of Ministers in the light of its findings,
>
> requests
>
> the Council of Ministers to examine and adopt the most appropriate means -- such as a multilateral agreement should this be deemed the most satisfactory method -- of making compulsory in the countries of the Community all such measures recommended by the Conference as are sufficiently important to warrant this, suitable for practical introduction on a general scale with due regard for the varying conditions prevailing in the different Community coalfields, and not too liable to be affected by technical developments.
>
> In no circumstances should these proceedings be allowed to hold up the implementation of the Conference's recommendations.

Section Three: RESOLUTION CONCERNING CUSTOMS FORMALITIES AND CHARGES IN CONNECTION WITH EQUIPMENT REQUIRED FOR SAFETY PURPOSES

In the course of the discussions which took place in the Committees and at the plenary sessions of the Conference, it was revealed that, in some instances, the production of the apparatus, equipment and certain materials whose use is essential or advisable in the interests of greater safety, and whose employment is urged in the recommendations made by this Conference, has not developed uniformly in all the countries of the Community.

In some countries, such equipment and material are thus already available on the market in a more technically perfect form than in others.

Furthermore, even where such equipment and material are technically on a par, the manufacturing costs, and thus the prices asked on the market, do, of course, generally vary from country to country, sometimes to a very considerable extent. Consequently, the coalowners who have to procure such apparatus and material for their own mines on their home market, are not only compelled to accept on occasion technical features which are inferior to those available in other countries, but must also, in certain cases, accept less advantageous terms than those asked in another market, whereas, if they wish to buy abroad, thereby overcoming the first difficulty, they come up against the national Customs barriers.

Therefore, recognizing in such circumstances the existence of concrete obstacles to the realization of the maximum degree of safety in all Community countries,

the Conference expresses the hope

> that the coalmines of the Community will have access, without Customs formalities and charges of any kind, to the international market for the most up-to-date equipment and material required for safety purposes, and in this way be enabled to obtain them at the most advantageous prices; and that the High Authority will request its member countries to act accordingly with the least possible delay, in particular by lifting the Customs duties at present imposed on such equipment and material.

Doc. No. S 360/57 e

Annex I

LIST OF DELEGATIONS

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BELGIAN DELEGATION

A. Government Representatives:

1. Monsieur van den BEUVEL
   Directeur Général des Mines
   Ministère des Affaires Economiques
   rue de la Loi, 70
   BRUSSELS

2. Monsieur Lucien BOULET
   Directeur Général du Fonds national de
   Retraite des Ouvriers mineurs
   Place Stephanie, 6
   BRUSSELS

3. Monsieur Georges LOGELAIN
   Inspecteur Général à l'Administration des Mines
   Ministère des Affairs Economiques
   rue de la Loi, 70
   BRUSSELS

4. Monsieur Paul GERARD
   Directeur Divisionnaire à
   l'Administration des Mines
   Luikersteenweg 62
   HASSELT

5. Monsieur I. LAURENT
   Directeur Divisionnaire à l'Administration
   des Mines
   72, rue Lambilette
   JUMET

6. Monsieur STENUIT
   Ingénieur en Chef
   Directeur à l'Administration des Mines
   rue de la Loi, 70
   BRUSSELS

Technical Advisers:

1. Monsieur DEMELENNE
   Directeur Divisionnaire à
   l'Administration des Mines
   Avenue Blonden
   LIEGE

2. Monsieur STASSEN
   Ingénieur Principal Divisionnaire des Mines
   rue de la Loi, 70
   BRUSSELS

B. Employers' Representatives:

1. Monsieur Joseph MICHAUX
   Directeur Général
   S.A. Charbonnages de Roton Farciennes
   et Oignies Aiseau
   TAMINES

2. Monsieur DESSALLE
   Administrateur-Délégué de la S.A.
   des Charbonnages du Bois d'Avroy
   Avenue Reine Astrid, 10
   HASSELT

3. Monsieur STEVENS
   Directeur-Gérant de la S.A. des Charbonnages de
   Ressaix, Leval, Péronnes, Ste Aldegonde et Genck
   RESSAIX

Technical Adviser:

Monsieur DAVIN
Directeur des Travaux de la S.A. des
Charbonnages d'Hensies-Pommeroeul
HENSIES, par ville Pommeroeul

C. Workers' Representatives:

1. Monsieur Nicolas DETHIER
Secrétaire Général de la Centrale Syndicale
des Travailleurs des Mines de Belgique
rue Mathieu, 24
BEYNE-HEUSAY
LIEGE

2. Monsieur Joseph DEDOYARD
Secrétaire National de la Centrale Syndicale
des Travailleurs des Mines de Belgique
rue Joseph Stevens, 8
BRUSSELS

3. Monsieur THOMASSEN
Président National de la Centrale
des Francs-Mineurs
rue Montoyer, 36
BURSSELS

Technical Adviser:

Monsieur Joseph LEGIEST
Secrétaire Général de la Centrale
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CHARLEROI

FRENCH DELEGATION

A. Government Representatives:

1. Monsieur DAVAL
   Ingénieur Général des Mines
   Chef de l'Inspection Générale des Mines
   Ministère de l'Industrie et du Commerce
   97, rue de Grenelle
   PARIS VII

2. Monsieur Maurice DURUY
   Ingénieur Général des Mines
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   97, rue de Grenelle
   PARIS VII

3. Monsieur ROBERT
   Ingénieur en Chef des Mines
   Ministère de l'Industrie et du Commerce
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   PARIS VII

4. Monsieur Marcel SALA
   Ingénieur en Chef des Mines
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5. Monsieur Gilbert RUTMAN
   Ingénieur des Mines
   2, rue de l'hôpital militaire
   STRASBOURG

6. Monsieur NICOLAS
   Ingénieur en Chef des Mines de
   l'Arrondissement minéralogique de Douai
   rue Charles Boursault
   DOUAI

7. Monsieur REGARD
Ingénieur en Chef des Mines
1, rue Eugène Schneider
METZ

8. Monsieur CONSOLI
Ingénieur en Chef des Travaux publics de l'Etat
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B. Employers' Representatives:

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PARIS VIII

2. Monsieur de CHAUMONT
Directeur aux Charbonnages de France
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PARIS VIII

3. Monsieur GARDENT
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PARIS VIII

4. Monsieur REY
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PARIS VIII

C. Workers' Representatives:

1. Monsieur LAMPIN
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2. Monsieur CHAUVEAU
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88, rue de Pernes
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3. Monsieur BREHON
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4. Monsieur GREGOIRE
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GERMAN DELEGATION

A. Government Representatives:

1. Herr Ministerialdirigent RICHTER
   Bundeswirtschaftsministerium
   BONN 11

2. Herr Ministerialrat GECK
   Bundeswirtschaftsministerium
   BONN 11

3. Herr Oberbergamtsdirektor Dr. BOERGER
   Oberbergamt
   Hindenburgplatz 9
   CLAUSTHAL-ZELLERFELD 1

4. Herr Berghauptmann Dr. FUNDER
   Oberbergamt
   Konvikstrasse 11
   BONN

5. Herr Ministerialrat Dr. HELLER
   Ministerium für Wirtschaft und Verkehr
   Land Nordrhein-Westfalen
   Am Karltor 8
   DUESSELDORF

6. Herr Oberbergrat EPPING
   Oberbergamt
   Goebenstrasse 25
   DORTMUND

7. Herr Oberbergrat Wilhelm SCHNIER
   Oberbergamt
   Goebenstrasse 25
   DORTMUND

8. Herr Oberbergrat LATTEN
Ministerium für Wirtschaft und Verkehr
Land Nordrhein-Westfalen
Am Karltor 8
DUESSELDORF

B. Employers' Representatives:

1. Herr Dr. Ing. Karl ULLRICH
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ESSEN

2. Herr Oberbergamtsdirektor a.D. GASSMANN
Steinkohlenbergbauverein
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3. Herr Bergwerksdirektor ROLSHOVEN
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4. Herr Bergwerksdirektor VAHLE
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C. Workers' Representatives:

1. Herr Heinrich WALLBRUCH
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3. Herr Heinrich RASCHE
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4. Herr Anton TAPLIKOWSKI
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ITALIAN DELEGATION

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3. Ing. GIROLAMI
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Capo Ispettorato Regionale del Lavoro
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TURIN

7. March. Ignazio SANFELICE DI MONTEFORTE
1° Segretario
Ministero Affari Esteri
Direzione Generale dell'Emigrazione
Via Boncompagni 30
ROME

8. Dott. Paolo SAVINA
Consigliere per l'Emigrazione
Ambasciata d'Italia
28, rue de Livourne
BRUSSELS

B. Employers' Representatives:

1. Prof. Mario CARTA
Istituto Arte Mineraria
Società Carbosarda
CAGLIARI, Sardinia

2. Ing. RONZA
Direttore Generale Miniero
Società Carbosarda
CARBONIA, Sardinia

3. Ing. BUSONERO
Direttore Miniere (Carbosarda)
Corso Vittorio Emanuele 110
ROME

4. Ing. Luigi CLERICI
Nazionale Cogne S.P.A.
Via S. Quintino 28
TURIN

C. Workers' Representatives:

1. Dott. COPPO
C.I.S.L.
Via Po 21
ROME

2. Dott. Romolo ARENA
C.I.S.L.
Via Po 21
ROME

3. Signor BACCI
U.I.L.
Via Po 21
ROME

4. Ing. MORINO
U.I.L.
Via Lucullo 6
ROME

LUXEMBOURG DELEGATION

A. Government Representatives:

1. Monsieur François HUBERTY
Ingénieur-Directeur du Travail et des Mines
Ministère du Travail
LUXEMBOURG

2. Monsieur Marcel LEINEWEBER
Contrôleur des Mines à l'Inspection
du Travail et des Mines
Ministère du Travail
LUXEMBOURG

B. Employers' Representative:

Monsieur Robert SCHROEDER
Directeur des Mines à l'Arbed
rue d'Audun, 83
ESCH/Alzette

C. WORKERS' Representative:

Monsieur Nicolas MAINES
Représentant de la Fédération Nationale
des Ouvriers Luxembourgeois
Cité de Lallingerberg, 37
ESCH/Alzette

NETHERLANDS DELEGATION

A. Government Representatives:

1. Mr. L.G. WANSINK
   Hoofd van de Directie Mijnwezen
   Ministerie van Economische Zaken
   Bezuidenhoutseweg 30
   THE HAGUE

2. Ir. P. de HAART
   Inspecteur-Generaal der Mijnen
   Staatstoezicht op de Mijnen
   HEERLEN

3. Ir. D.J. KNUTTEL
   Inspecteur der Mijnen
   Staatstoezicht op de Mijnen
   HEERLEN

4. Ir. A.F.P.H. BLOEMEN
   Inspecteur der Mijnen
   Staatstoezicht op de Mijnen
   HEERLEN

5. Ir. Chr. PICKEE
   Inspecteur der Mijnen
   Staatstoezicht op de Mijnen
   HEERLEN

6. Mr. H. Ch. HULSHOFF
   Directoraat-Generaal voor de Buitenlandse
   Economische Betrekkingen
   Ministerie van Economische Zaken
   Bezuidenhoutseweg 30
   THE HAGUE

B. Employers' Representatives:

1. Ir. C.E.P.M. RAEDTS
Directeur Oranje-Nassau Mijnen
HEERLEN

2. Ir. P.F. de ZEE
Chef van de Veiligheidsdienst
van de Staatsmijnen in Limburg
HEERLEN

3. Mr. J.A.A.M. LINTHORST
Algemeen Secretaris van de Staatsmijnen
van der Maesenstraat
HEERLEN

C. Workers' Representatives:

1. De Heer J. PALMEN
Secretaris van de Ned. Katholieke Mijnwerkersbond
Parallelweg 12
HEERLEN

2. De Heer H.L. GROND
Katholieke Vereniging van Mijnbeambten
Schelsberg 202
HEERLERHEIDE (L)

3. De Heer C. FEENSTRA
Voorzitter Protestants-Christelijke Mijnwerkersbond
Burg. de Hesselseplein 26
HEERLEN

OBSERVERS FROM THE SAAR

A. Government Representatives:

1. Herr Walter GROSS
Bergwerksdirektor und Bergassessor a.D.
Leiter des Referats Bergbau
Regierung des Saarlandes
Ministerium für Wirtschaft, Verkehr,
Ernährung und Landwirtschaft
Am Bahnhof 4
SAARBRUECKEN

2. Herr Oberbergamtsdirektor BUCHHOLZ
Oberbergamt Saarbrücken
SAARBRUECKEN

B. Employers' Representative:

Herr Hermann MEINKE
Leiter der Hauptstelle für das
Grubenrettungswesen
FRIEDRICHSTHAL-OSTSCHACHT (SAAR)

C. Workers' Representative:

Herr DIETZLER
Christliche Gewerkschaft des Saarlandes
SAARBRUECKEN

UNITED KINGDOM DELEGATION

A. Government Representatives:

1. Sir Harold ROBERTS, C.B.E., M.C.
Chief Inspector of Mines
Ministry of Power
7, Millbank
Thames House South
LONDON, S.W. 1

2. Mr. A.M. RAKE, C.B.E.
Under-Secretary responsible for the
Safety and Health Division of the
Ministry of Power
7, Millbank
Thames House South
LONDON, S.W. 1

B. Employers' Representative:

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

C. Workers' Representative:

Mr. Ted JONES
Vice-President of the National Union
of Mineworkers
5, Westminster Bridge Road
LONDON, S.E. 1

REPRESENTATIVES OF THE INTERNATIONAL LABOUR ORGANISATION

1. Monsieur Marcel ROBERT
   Chef de la Division de la
   Sécurité et de l'Hygiène du Travail
   Bureau International du Travail
   GENEVA

2. Monsieur Charles DROUARD
   Ingénieur-Général des Mines
   Expert près du B.I.T.
   55, Avenue Marceau
   PARIS

3. Monsieur J.E. WHEELER
   Membre Principal de la Division de la
   Sécurité et de l'Hygiène du Travail
   Bureau International du Travail
   GENEVA

4. Monsieur Wilhelm STOERMANN
   Membre de la Division des Commissions
   d'Industrie
   Bureau International du Travail
   GENEVA

OBSERVERS OF THE I.C.F.T.U. (C.I.S.L.)

1. Monsieur H. BUITER
   Secrétaire Général du Comité des XXI
   Bureau de Liaison C.I.S.L.
   50, Avenue de la Liberté
   LUXEMBOURG

2. Sir William LAWTHER
   General Secretary of the
   International Federation
   of Mineworkers
   10, Blackfriars Road
   LONDON, S.E. 1

3. Mr. Denis EDWARDS
   Assistant Secretary of the
   International Federation
   of Mineworkers
   10, Blackfriars Road
   LONDON, S.E. 1

OBSERVERS OF THE I.C.C.T.U. (C.I.S.C.)

1. Dr. A.C. de BRUYN
   Secrétaire de la Fédération des Syndicats
   Chrétiens dans la C.E.C.A.
   47, Avenue de la Liberté
   LUXEMBOURG

2. Monsieur E. EVRARD
   Directeur des Travaux aux Charbonnages
   de la Minerie
   Membre de la Centrale Nationale des
   Employés de Belgique
   52, route de Herve
   BATTICE (LIEGE)

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Annex II

COMPOSITION OF THE COMMITTEES

- - - - -

COMMITTEE I

BUREAU :

PRESIDENT	M. GERARD (B)	
VICE-PRESIDENT	M. DETHIER (B)	
VICE-PRESIDENT	M. VEDRINE (F)	Substitute M. de CHAUMONT
RAPPORTEUR	M. LATTEN (G)	

WORKERS' REPRESENTATIVES:

1. Monsieur DETHIER (B)
2. Herr RASCHE (G)
3. Ing. MORINO (I)
4. Monsieur MANNES (L)
5. De Heer GROND (N)
6. Herr DIETZLER (S)

EMPLOYERS' REPRESENTATIVES:

1. Monsieur STEVENS (B)
2. Monsieur VEDRINE
   Directeur Général-adjoint des Houillères du Nord et du Pas-de-Calais
   20, rue des Minimes
   DOUAI, Nord

   Substitute
   Monsieur de CHAUMONT
3. Herr ERLINGHAGEN
   Bergassessor a.D.
   Steinkohlenbergbauverein
   Friedrichstrasse 2
   ESSEN (G)
4. Ing. RONZA (I)
5. Monsieur SCHROEDER (L)
6. Ir. de ZEE (N)

   Substitute
   Ir. F.C.M. WIJFFELS
   Hoofdingenieur bij de Staatsmijnen in Limburg
   Akerstraat 12a
   BRUNSSUM (L)

GOVERNMENT REPRESENTATIVES:

1. Monsieur GERARD (B)
2. Monsieur LEMMENKE (B)
3. Monsieur ROBERT (F)
4. Monsieur NICOLAS (F)

   Substitute
   Monsieur REY
   Ingénieur des Mines
   Ministère de l'Industrie et du Commerce
   97, rue de Grenelle
   PARIS VII

5. Herr GECK (G)
6. Herr LATTEN (G)
7. Professore MESSINEO (I)

   Substitute
   Signor CERULLI
   Ingénieur en Chef des Mines
   Ministère de l'Industrie
   Via Veneto, 33
   ROMA

8. Dottore PADELLARO (I)
9. Monsieur HUBERTY (L)
10. Monsieur LEINEWEBER (L)
11. Ir. de HAART (N)
12. Ir. KNUTTEL (N)

U.K. EXPERT:

Dr. WILLETT

I.L.O. EXPERT:

Monsieur DROUARD

SECRETARIES TO THE COMMITTEE:

Monsieur DRESEN
Haute Autorité
rue Aldringer 29
LUXEMBOURG

Herr Dr. WILL
Haute Autorité
rue Aldringer 29
LUXEMBOURG

COMMITTEE II

BUREAU:

PRESIDENT	M. FUNDER (G)
VICE-PRESIDENT	M. COPPO (I)
VICE-PRESIDENT	M. CARTA (I)
RAPPORTEUR	M. RUTMAN (F)

WORKERS' REPRESENTATIVES:

1. Monsieur LEGIEST (B)
2. Monsieur PREHON (F)
3. Herr TAPLIKOWSKI (G)
4. Dott. COPPO (I)
5. De Heer FEENSTRA (N)

EMPLOYERS' REPRESENTATIVES:

1. Monsieur DESSALLE (B)
2. Herr VAHLE (G)
3. Professore CARTA (I)
4. Ir. de ZEE (N)

   Substitute
   Dr. Ir. J.M. DEENEN
   Hoofdbedrijfsingenieur bij de Mijnen
   Laura en Vereniging
   Sint Janstraat 6
   EYGELSHOVEN (L)

5. Herr MEINKE (S)

GOVERNMENT REPRESENTATIVES:

1. Monsieur LAURENT (B)
2. Monsieur STASSEN (B)
3. Monsieur MERMET (F)

   (replaced by M. RUTMAN from the second meeting onwards)

4. Herr Dr. FUNDER (G)
5. Herr EPPING (G)
6. Ing. GIROLAMI (I)
7. Ing. FRACASSI (I)
8. Ir. BLOEMEN (N)
9. Ir. PICKEE (N)
10. Herr BUCHHOLZ (S)

U.K. EXPERT:

Mr. W.F. RICHARDSON

Chief Safety Engineer
National Coal Board
Hobart House
Grosvenor Place
LONDON, S.W. 1

I.L.O. EXPERT:

Monsieur DROUARD

Monsieur WHEELER

SECRETARIES TO THE COMMITTEE:

Dott. FACINI
Haute Autorité
rue Aldringer 29
LUXEMBOURG

Herr GOTTWALD
Haute Autorité
rue Aldringer 29
LUXEMBOURG

COMMITTEE III

BUREAU:

PRESIDENT	M. DAVAL (F)
VICE-PRESIDENT	M. THOMASSEN (B)
VICE-PRESIDENT	M. LANGE (G)
RAPPORTEUR	M. KNUTTEL (N)

WORKERS' REPRESENTATIVES:

1. Monsieur THOMASSEN (B)
2. Monsieur CHAUVEAU (F)
3. Herr BLUME (G)
4. Signor BACCI (I)
5. De Heer PALMEN (N)

EMPLOYERS' REPRESENTATIVES:

1. Monsieur DAVIN (B)
2. Monsieur GARDENT (F)
3. Herr Bergwerksdirektor LANGE
   Steinkohlenbergwerk Hannover Hannibal
   Hannoverschestrasse 29
   BOCHUM HORDEL (G)

   Substitute
   Herr GASSMANN
4. Ing. BUSONERO (I)
5. Ir. RAEDTS (N)

   Substitute
   Dr. Ir. A.J. HUSMANN
   Directeur van de Domaniale Mijnmaatschappij
   Nieuwstraat 109
   KERKRADE (L)

GOVERNMENT REPRESENTATIVES:

1. Monsieur STENUIT (B)
2. Monsieur van den HEUVEL (B)
3. Monsieur DAVAL (F)
4. Herr RICHTER (G)
5. Herr Dr. HELLER (G)
6. Dott. GAMBELLI (I)
7. March. SANFELICE di MONTEFORTE (I)
8. Ir. KNUTTEL (N)
9. Mr. HULSHOFF (N)

   Substitute
   Mr. WANSINK (N)

10. Herr GROSS (S)

U.K. EXPERT:

Dr. A. WINSTANLEY, C.B.E.
Deputy Chief Inspector of Mines for
Special Duties
Ministry of Power
Millbank
LONDON, S.W. 1

I.L.O. EXPERT:

Monsieur ROBERT

SECRETARIES TO THE COMMITTEE:

Monsieur JANSSEN
Haute Autorité
rue Aldringer 29
LUXEMBOURG

Herr Dr. SCHIEFER
Haute Autorité
rue Aldringer 29
LUXEMBOURG

COMMITTEE IV

BUREAU:

PRESIDENT	M. PURPURA (I)
VICE-PRESIDENT	M. DUMAY (F)
VICE-PRESIDENT	M. WALLBRUCH (G)
RAPPORTEUR	M. WANSINK (N)

WORKERS' REPRESENTATIVES:

1. Monsieur DEDOYARD (B)
2. Monsieur SINOT
   Fédération Nationale Force Ouvrière des Mineurs
   198, Avenue du Maine
   PARIS XIV

   Substitute
   Monsieur LAMPIN
3. Herr WALLBRUCH (G)
4. Dott. ARENA (I)
5. Monsieur MANNES (L)
6. De Heer PALMEN (N)

EMPLOYERS' REPRESENTATIVES:

1. Monsieur MICHAUX (F)

   Technical Adviser
   Monsieur André BERTEN
   FEDECHAR
   31, rue des Arts
   BRUSSELS
2. Monsieur BASEILHAC
   Directeur Général des Charbonnages de France
   Avenue Percier, 9
   PARIS VIII

   Substitute
   Monsieur DUMAY
3. Herr Dr. Ing. ULLRICH (G)
4. Ing. CLERICI (I)
5. Monsieur SCHROEDER (L)

6. Mr. LINTHORST (N)

Substitute
Mr. E.H. BISSCHOP BOELE
Secretaris van de Directie der
Oranje Nassau Mijnen
Valkenburgerweg 66
HEERLEN

GOVERNMENT REPRESENTATIVES:

1. Monsieur BOULET (B)
2. Monsieur LOGELAIN (B)
3. Monsieur DURUY (F)
4. Monsieur SALA (F)
5. Herr Dr. BOERGER (G)
6. Herr SCHNIER (G)
7. Dott. PURPURA (I)
8. Dott. SAVINA (I)
9. Monsieur HUBERTY (L)
10. Monsieur LEINEWEBER (L)
11. Ir. de HAART (N)
12. Mr. WANSINK (N)

U.K. EXPERT:

Mr. T.A. ROGERS, C.B.E.
Deputy Chief Inspector of Mines
Ministry of Power
Millbank
LONDON, S.W. 1

I.L.O. EXPERT:

Monsieur STOERMANN

SECRETARIES TO THE COMMITTEE:

Monsieur CARPENTIER
Haute Autorité
rue Aldringer 29
LUXEMBOURG

Monsieur TEITGEN
Haute Autorité
rue Aldringer 29
LUXEMBOURG