International Labour Conference
81st Session 1994

Report V (1)

Safety and health in mines

Fifth item on the agenda

International Labour Office Geneva
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INTRODUCTION


Both on the surface and underground, mines are experiencing continued heavy loss of life due to problems of occupational safety and health and catastrophic events associated with the unique and constantly changing working environment. The development of an international standard was considered to be important to member States for the following reasons: firstly, because of the value to workers, employers and governments of an instrument or instruments that address areas where existing instruments are deficient and, furthermore, consolidate such standards as do exist for the benefit of the sector-specific regulatory authorities already established in member States. Secondly, the provision of an instrument or instruments would mark the recognition of the considerable economic importance of mining in both industrially-developed and emerging nations. Furthermore mining, which is an industry undergoing rapid and significant technological change, is known to be one of the most hazardous occupations, in view of the adverse effects on mineworkers’ health of exposure to the multiple hazards of a working environment unique to mines.

The subject will be dealt with by the Conference under the double-discussion procedure provided for in article 39 of the Standing Orders of the Conference. In accordance with that article, the Office has prepared this report to serve as a basis for the first discussion at the Conference.

The first chapter defines mining activity, reviews the rapid technological developments occurring in the sector and examines the economic importance of the mining industry as a major employer and foreign-currency earner. The special problems of the small, almost informal, mining operations that abound in many countries — such as Bolivia where an estimated 4,000 such operations exist — are also examined. Chapter I further considers the diversity of operational scope, the severe compound environmental hazards to which mineworkers are exposed and the special nature of mining that distinguishes it from other types of heavy industry. After describing the important work of periodic meetings of tripartite committees of experts, the chapter concludes with a summary of the action taken by the ILO and other international organizations in respect of safety and health in mines, listing the applicable Conventions and Recommendations, and the recently-developed codes of practice.

Chapter II reviews the major hazards, especially the tragic loss of life in catastrophic coalmine explosions and the subsequent economic and social effects of such events on the community. Statistics on fatalities and employment injury in the industry and the relevant trends are examined as well as the reporting mechanisms and practices for the collection of these statistics. The chapter considers the law and practice of member States in respect of accidents
and injuries, health hazards, mine rescue and emergency preparedness, training and collaborative prevention, hostels, camps and living accommodation at mine sites. Consideration is also given to the special needs workers may have because of age or physiological conditions, as well as to social aspects and the organization and operation of the competent authority.

Chapter III serves as an introduction to the questionnaire which follows and to which governments are requested to reply giving the reasons for their replies. On the basis of the information thus received, the Office will draw up a second report summarizing the views expressed and indicating the main points the Conference may wish to consider.

Past experience has shown that member States whose law and practice are in conformity with the essential provisions of an international instrument are sometimes unable to ratify or accept it formally because of minor divergences between its precise terms and their national law or practice. It is important to take account of any such difficulties when drafting the instrument in order to determine whether sufficient flexibility can be incorporated in it without detriment to its substantive effect. The questionnaire accordingly asks member States to indicate any particularities of national law and practice that they believe might create implementation difficulties and also to make specific suggestions as to how these difficulties may be overcome.

In accordance with provisions of article 39, paragraph 1, of the Standing Orders of the Conference, the Office has prepared this report for preliminary discussion at the Conference and also to comply with the requirement that the report should reach governments not less than 12 months before the opening of the 81st Session of the Conference in 1994. In order that the Office may have time to examine the replies to the questionnaire and to prepare the second report which, in accordance with article 39, paragraph 3, of the Standing Orders must be communicated to governments not later than four months before the opening of the 81st Session of the Conference, governments are requested to send their replies so as to reach Geneva not later than 30 September 1993.

In this connection, the attention of governments is drawn to article 39, paragraph 1, of the Standing Orders of the Conference, in which they are requested "to consult the most representative organizations of employers and workers before finalizing their replies". The results of this consultation should be reflected in the governments' replies and they are asked to indicate which organizations have been so consulted.
CHAPTER I

TRENDS AND CHARACTERISTICS OF THE MINING INDUSTRY

DEFINITION OF MINING

In this report a "mine" means any place where mechanical disturbance of the ground takes place for the purpose of prospecting for or producing coal, mineral-bearing substances, placer minerals, rock, limestone, peat, clay, sand or gravel and oil sands and shales; it includes all machinery, equipment, building and civil engineering structures (such as tailings dams and waste-rock and overburden dumps) used in conjunction with mining and the subsequent on-site treatment of the products or servicing of these activities. This definition covers the main purpose of the activity, namely the search for, the extraction of and the related crushing, grinding, concentrating or washing of a product. That being said, however, any definition must allow for the exclusion of any component part or demarcation of the mine boundary if national laws or the competent authorities so determine.

SPECIAL NATURE OF THE INDUSTRY

Worldwide, mining involves a broad spectrum of size and sophistication ranging from small, almost informal, enterprises using traditional manual extraction methods or outdated techniques and equipment, to very large operations which may be highly mechanized or labour-intensive. None the less, all mines and their related infrastructures are unique and complex working environments where unforeseen and sudden changes in geological conditions and natural forces may lead to catastrophic events that cause heavy loss of life and/or severe damage to the environment. Furthermore mineworkers face the additional risks of continual long-term exposure to the multiple environmental hazards of debilitating dusts such as silica, coal, asbestos and the respirable combustible dusts (RCDs) from diesel engines, toxic gases from diesel emissions and blasting, methane released from strata, hydrogen sulphide or radon gases, as well as the problems of high noise levels and excessive vibration, heat or cold, explosions caused by blasting coal dust, sulphide dust or methane ignition, and the strain of performing repetitive tasks.

NEW TECHNOLOGICAL DEVELOPMENTS

Large-scale mechanization has occurred in mining in many countries to allow for the exploitation of deposits with very low unit values that would not be
economically feasible using smaller equipment or labour-intensive methods. The introduction of new equipment such as very large haulage units, both on surface and underground, large draglines, shovels, bucket-wheel excavators, long wall coal-cutting machines and continuous boring and mining equipment has enabled ore, coal and waste materials to be extracted rapidly from greater and greater depths. In the 1960s a large haulage truck could carry about 35 tonnes and underground trucks about 10 tonnes. As we approach the twenty-first century, haulage trucks have increased in size to the point where 350-tonne trucks are now used on the surface and 100-tonne trucks underground. This mechanization is resulting in the construction of the largest man-made structures on the face of the earth, easily monitored by satellite. The outer limits of these structures are represented by tailings dams over 200 metres high and containing more than 1 billion tonnes of finely ground waste, rock dumps that are built from platforms more than 400 metres above the valley floor and are designed to contain up to 2 billion tonnes of rock, as well as surface excavations reaching 500 metres in depth and underground operations mining at depths of 4,000 metres into the earth’s crust. Civil and mining engineering specialists designing these mines are working on the leading edge of their technical capability, dependent on an empirical development of knowledge as the work proceeds to understand the reaction of natural forces to the design and accelerated removal or placement of large volumes of material. The largest surface mines are extracting over 100 million tonnes of ore or coal and waste each year.

The remote control and full automation of surface and underground equipment that are now more commonplace have eliminated the rigours and historic hazards of the workplace but have presented the workers with new hazards.

In the crushing, grinding, concentration and washing plants located at the mine site the increased size and speed of equipment, automation and new chemicals and processeses are also introducing new safety and health hazards. For example, conveyors now operate at such high speeds that a worker can be pulled into the mechanism in a few hundredths of a second, yet for an inexperienced worker the potentially fatal consequences of an accident may not be apparent. Prevencem, a French accident-prevention association, reported that in France in 1976 there were 65 conveyor belt accidents resulting in three fatalities, four amputations and an average of 70 workdays lost per incident. Automation of the worksite has progressed to the point where two or three workers control the complete operation of a large and complex system that could have a severely adverse effect on the environment, on the workers or even on the public in places remote from the plant.

As already stated, mineworkers are continuously exposed to extremes of noise, vibration, heat and cold, repetitive-task strain, as well as to chemicals and dusts which often result in silicosis, pneumoconiosis and asbestosis. Of significant concern, unique to mines, is the compound effect on workers of an environment containing several of these agents, at levels approaching the limits set for occupational exposure, they are already in psychologically challenging conditions of complete darkness, sometimes alone and miles below the surface.
Of the plethora of new chemicals produced each year, many are introduced into mineral and coal mining operations. Residual low concentrations in the stream of waste products from the crushing, grinding, concentrating and coal washing plants amount to significant quantities annually entering the environment and, in some countries, endangering the health of mineworkers and their families or polluting the water supplies.

Mines are frequently found in the undeveloped frontier areas of a country and the current trend to avoid creating single-industry towns results in workers being transported on a fly-in/fly-out or bus-in/bus-out basis to on-site camps or hostels. Workers and employers are increasingly demanding schedules incorporating extended hours of daily work in order to harmonize work with social and family needs.

**Economic importance**

Mining is acknowledged to be a significant component of national industry, directly employing approximately 25 million workers worldwide. In many countries the exploitation of a natural resource by mining and the creation of new wealth make an important contribution or constitute the main economic engine providing the national income for medical, welfare, educational and social programmes. For example, mining employs 12 per cent of the population in Bolivia, accounts for 15 per cent of employment in Niger and Zambia, and provides 7 per cent of the GNP in developed countries such as Canada (where, however, it employs only 2 per cent of the workforce). Spain reported in 1983 that the mining sector consisted of 78 metal mines, 230 non-metal mines and 3,034 quarries employing altogether 6.5 per cent of the workforce and contributing 1.6 per cent of the GNP. Mines provide 10.4 per cent of the GNP in South Africa and 46 per cent of the exports. Gold, accounting for 29 per cent of the exports, represented one-third of the production of the established world market economies. The spin-off employment from mining activity or mined products is also very important to national economies. Sweden and Finland are significant exporters of mining equipment and technology and interestingly

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<th>Coal</th>
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<td>15.9</td>
<td>20.8</td>
<td>1.7</td>
<td>10.8</td>
</tr>
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</table>

Source: Compiled from various sources.
Italy, a country that does not mine gold, makes more money turning it into high-quality jewellery than South Africa does producing it.

Coal is the commodity mined in the greatest quantity, with world production at 3.038 billion tonnes of hard coal and 1.342 billion tonnes of soft coal in 1991. It is of significant national importance as an energy source since over 90 per cent of world production is consumed domestically. On a global basis annual production in recent years has been equivalent to approximately two billion tonnes of oil and has constituted the primary fuel for many countries such as Poland, Czechoslovakia, Bulgaria, Yugoslavia, Hungary and Romania. In 1990, in the former USSR, mining employed more than 5 million people, including 250,000 engineers, and accounted for 40 per cent of the rail transport capacity as well as one-third of the energy consumption.

SMALL-SCALE MINING SECTOR

Small, almost informal, mining operations abound in countries such as Argentina, Bolivia, Brazil, Burkina Faso, Chile, Colombia, India, Indonesia, Malaysia, Mexico, Niger, Peru, the Philippines, Venezuela and Zimbabwe. Frequently their technology and equipment are outdated and they suffer from an acute shortage or lack of professionals, financial resources, management skills

Figure 1. Coal as a primary fuel source, 1985-90

Source: Compiled from various sources.
and training. These mines are labour-intensive and thousands of persons may be engaged to perform the work that would be done by machines in modernized mines. The low levels of mechanization and technology, combined with relatively unplanned mining activity, often result in marginal-revenue production and poor safety and health conditions. However, hundreds and even thousands of these mines exist and contribute to domestic production. Often they are run as cooperatives, with sections of the coal or mineralized seam being allocated to small groups of workers who are responsible for the mining, transport and processing operations, as well as for their own safety and health. The application of mining laws to small mines varies from one country to another. For example, the legal provisions do not apply to operations with fewer than 100 workers in Argentina, Bolivia and Peru or to those with fewer than 50 workers in Zimbabwe; laws are applied selectively in Colombia, Mexico, Portugal and Spain and in Canada to mines employing one or two persons. These mines often end up in a "vicious spiral" of diminishing reserves, deteriorating working conditions and increased effort or cost so that no resources are left to improve wages and safety or to mechanize the operations.

The Fifth Tripartite Technical Meeting for Mines Other than Coal Mines, at its meeting in March-April 1990, spent considerable time discussing the plight of the small-scale mining sector and made two recommendations of particular relevance to it.
In Conclusions No. 29 the Meeting recommended that “governments should promote efforts of a tripartite nature in order to provide these mines with the expertise necessary for restructuring production, promoting efficiency and reshaping training efforts. Technical cooperation across countries for this purpose, though not always successful in the past, should also be considered by governments, in collaboration or consultation with employers’ and workers’ organizations, on a case-by-case basis”. It further stated: that “Where appropriate, governments should continue to help small-scale mines to comply with the minimum social and labour standards and income conditions prevailing in the country as well as with national standards of safety and health.”

Resolution No. 35 invited the Governing Body of the ILO to call on member States and on employers’ and workers’ organizations to:

1. find ways to give informal sector mining operations greater access to training, technology, marketing and other infrastructures, and to financial and other resources necessary to make it possible for them to comply fully with existing safety, environmental and other regulations while becoming more efficient enterprises;
2. facilitate tripartite approaches to develop and implement programmes to assist the informal sector mineworkers to adopt safe work practices and provide healthier working and living conditions, for example, by seconding selected workers from large mining operations for short periods of time to travel among the informal sector mining operations as advisers on safe work practices and healthy work procedures;
3. encourage and foster the creation of facilities such as central processing and transport, including through cooperative initiatives, that would help informal sector mining operations to be more efficient and productive of incomes and employment;
4. provide, where it is wanting, the social and economic infrastructure — including educational and transport facilities at the remote sites where informal sector mining operations are undertaken — that are necessary for the welfare of the persons involved and their families.

ILO ACTION WITH REGARD TO SAFETY AND HEALTH IN MINING

Since its inception in 1919, the ILO has devoted noteworthy efforts to the improvement of conditions of work, the prevention of accidents and the protection of mineworkers. Indeed its work in the field of pneumoconiosis prevention began with the holding of the first-ever international meeting on this subject in Johannesburg in 1930.

Recognizing the need to provide model rules for mining activity, the Office prepared and published six codes of practice dealing specifically with the mining industry. The most recent are Safety and health in coal mines (1986) and Safety and health in opencast mines (1991).

The ILO's Coal Mines Committee has held 12 sessions since 1945 and there have been five meetings of the Tripartite Committee for Mines Other than Coal Mines since 1957 to discuss and report on the social and labour issues in mining. Safety and health have been of particular concern to these bodies. In 1990 the Office published a collection of the Committee's conclusions and resolutions (of which there are nearly 100) in a document known as the Coal mineworkers' charter. This charter, which also includes two consolidated texts dealing with various aspects of labour and social conditions in the coalmining industry,
comprises a substantial body of social policy guidelines specific to the coalmining sector which, though not legally binding, could be considered as a minimum international social code stemming from the consensus which they represent. The substantive parts of the conclusions and resolutions are presented in the charter under the following headings: recruitment; training; general conditions of employment; social services and welfare; safety and health; labour-management relations; technological improvements and their social consequences; and productivity.

At the 1988 meeting the Committee observed, in Conclusions No. 89, that "Pneumoconioses, whilst decreasing in some countries, remain a serious concern in others and will require continuing efforts for their eradication. Noise- and vibration-induced diseases and toxicological hazards due to wider use of chemicals and solvents in coal mines will require the development of measures oriented to the prevention and control of these diseases and hazards".

In the same text, the meeting also identified the concerns surrounding accident and illness reporting and stated that "A full evaluation of the extent of occupational safety and health problems in the coalmining industry is difficult because of the lack of full statistical data in many countries. Moreover, the absence of a standardized reporting system makes comparisons between countries difficult."

Another important contribution was the development of the International classification of radiographs of pneumoconioses permitting the assessment of lung capacity and progression of the disease. This system is widely used by member States for early diagnosis and prevention.

A number of ILO standards have a direct or indirect bearing on safety and health in mines. Those relating specifically to mines are the Underground Work (Women) Convention, 1935 (No. 45); the Hours of Work (Coal Mines) Convention (Revised), 1935 (No. 46); the Labour Inspection (Mining and Transport) Recommendation, 1947 (No. 82); the Minimum Age (Underground Work) Convention, 1965 (No. 123), and Recommendation (No. 124); and the Conditions of Employment of Young Persons (Underground Work) Recommendation, 1965 (No. 125). The purpose of referring to existing instruments is to identify texts which may overlap with proposed new standards, so as to avoid both duplication and conflict. Some instruments specific to mining that were adopted in the period 1935-65 are no longer appropriate for the mining industry of the twenty-first century. Other ILO instruments on the protection of workers from safety and health hazards in the working environment which, although not specific to mines, are equally applicable to them, include the: Night Work (Women) Convention (Revised), 1948 (No. 89) [and Protocol, 1990]; the Radiation Protection Convention, 1960 (No. 115); the Guarding of Machinery Convention, 1963 (No. 119); the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (No. 148), and Recommendation (No. 156); the Occupational Safety and Health Convention, 1981 (No. 155), and Recommendation (No. 164); the Asbestos Convention, 1986 (No. 162); and the Chemicals Convention, 1990 (No. 170). Relevant excerpts from several of these instruments are appended. While the provisions of these standards also apply to mines, they do not specifically address the particular hazards prevalent in mines, such as the dangers resulting from the
transient nature of operations, or the sudden geological and other changes that jeopardise workers' safety.

In recent years, the ILO has implemented a number of training projects aimed at improving the occupational safety and health of coalminers in developing countries, including China, India, Indonesia, Pakistan, Turkey and Viet Nam.

Under a current project in China a safety and health centre for the coal mining industry has been established at which various training programmes to promote safety and health, improve working conditions and increase productivity are being conducted.

Two projects are being implemented in Pakistan. One, in Baluchistan Province, for miners' training is geared mainly to middle-level supervisors but also includes the installation of testing laboratories, which aim to improve mine safety, and the training of the relevant personnel. The second project, in Sind Province, has a mining component which will provide some specialized instruments for testing mine ventilation and hazardous gases and upgrading training for the mine inspectors.

In 1992 within the framework of the International Programme for the Improvement of Working Conditions and Environment (PIACT), the ILO was one of the sponsors of the Global Conference on Health and Safety in the Mining Industry, organised by the Miners' International Federation in Haltern, Germany.

The ILO has for many years cooperated with the IAEA and WHO in the area of radiation protection and safety in the mining and milling of radioactive ores. The most recent collaboration was a mission to Namibia in 1992 to assess radiation safety and general mining safety and health at the Rossing Opencast Mine.

Note

1 “Reducing the risk of accident by design and maintenance of the mineral handling system” by C. Baubeau and A. Iatropoulos, in Safety and health in mining and quarrying industries, Proceedings of a Symposium held in Luxembourg, 10-12 September 1986, Report EUR 11319 EN (Luxembourg, Commission of the EC, 1988).
CHAPTER II

LAW AND PRACTICE IN RESPECT OF SAFETY AND HEALTH IN THE MINING INDUSTRY

In many countries, mining remains the most hazardous industrial occupation for the population at risk. Leading-edge technology is challenging engineering knowledge as massive equipment is introduced both on the surface and at increasing depths of as much as 4,000 metres. New frontiers are being explored by the deepest excavations and largest man-made structures on the earth. Abrupt changes in the mine workplace due to geological variances in the rock structure and unforeseen natural forces are not uncommon. Rockbursts caused by the sudden release of built-up stress in the rock mass in deep mines can cause a massive and unexpected collapse of underground workings and often result in significant loss of life or trap workers thousands of metres below ground. New instruments to ensure the continuous monitoring of very small movements and feed them into computer models for analysis are capable of forewarning of such catastrophic events.

MAJOR MINING ACCIDENTS AND THEIR CONTROL

Underground coalmine explosions involving considerable loss of life — such as those in Turkey and Yugoslavia in 1990, China in 1991 and Canada, Turkey and Ukraine in 1992 — attract worldwide attention and concern. Methane release from rapid coal extraction by continuous mining equipment provides the trigger for massive secondary explosion and fire. Reliable continuous monitoring devices can alert workers to explosive concentrations of methane. Ensuring sufficient ventilation to dilute methane and sweep it from the workings is an important mitigative measure that is often rendered ineffective, however, because of cost or inadequate attention to detail. Degassing particularly gassy seams in advance of mining can be of economic benefit through the sale of the gas and can reduce the safety risks and environmental impacts. Intrinsically safe electrical equipment is mandatory in many countries to ensure that sources of ignition are minimized.

Mountaintop opencast mining involves the construction of immense waste-rock dumps and tailings impoundments. Workers, the public and infrastructures are exposed to the risk of catastrophic failure of these structures. Rock dumps are often valley fills containing up to 2 billion cubic metres of material with the dump platform up to 400 metres above the valley floor and workers in 200-tonne trucks dumping over the crest. Monitoring movement is expensive and made more difficult because of compaction and settlement of as
much as 20 metres per day in stable dumps. Many variables such as rock quality, foundation slopes, soil strengths and drainage, precipitation and loading rates must be diligently monitored and evaluated by geotechnical engineers in order to predict instabilities early enough to remove workers from danger. The largest containment dams in the world are being constructed to contain billions of tonnes of tailings (ground waste rock) that can fluidize when subjected to seismic activity. Continuous monitoring, evaluation and compliance with the latest safety standards and prescribed operating parameters will ensure that severe environmental disasters and loss of life do not occur.

Secondary sulphide dust explosions, caused by routine blasting, occur in underground mines where the ores have a high sulphide content. When these occur, life-threatening concentrations of sulphur dioxide are generated in addition to extensive fire and blast damage. Such mines must rigorously enforce blasting prohibitions while any workers are underground to ensure their safety and must also send rescue teams underground after the blast to evaluate air quality when a dust explosion is suspected. So far, however, research work to develop preventive measures has met with only limited success.

Falls of ground remain a major cause of loss of life in mines. Deficient mine design, failure to follow design parameters, inability to foresee the impact of natural forces on the plan, and cost-cutting in non-productive areas such as ground control and support are the primary causes. Many countries such as Canada, Czechoslovakia, Germany, Hungary, Japan, the Russian Federation, Sweden, the United Kingdom and the United States take a proactive approach to minimizing risks by requiring that all mine designs or major modifications be reviewed and accepted by the competent authority. This process assesses the risks and ensures that all precautionary measures are taken.

**FATAL ACCIDENT STATISTICS AND TRENDS**

Severe mine disasters are dramatic events attracting front-page news coverage. Such occurrences arouse strong emotion and have wide-reaching effects not only on the families and communities of the dead or injured workers but also on the economic viability of the employer and the nation. Lengthy public inquiries are costly to all concerned and often result in overreaction and the hurried introduction of new laws and requirements for all mines.

The most reliable statistics available indicate that, worldwide, more than 15,000 mineworkers lose their lives each year. The Chinese *Workers' Daily* reports that in China 30 coalminers are killed in accidents every day, more than 10,400 having died in 1990.¹ According to the same source, mining deaths account for more than 60 per cent of all deaths in industrial accidents.

Fatal accident figures are very difficult to compile and severe underreporting is suspected; however, as shown in table 2, the information that is available indicates that some developing countries have higher fatal accident frequency rates than other countries — for example Canada and the United States, which have a good safety record.

An example of the difficulty in obtaining accurate information can be seen in the reporting of fatal accidents in China's coalmining industry. Frequently the
Table 2. Fatal accidents in mining operations

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</table>

Source: Compiled from various sources.

reports announce increases or decreases compared to the previous year; however, the previous year's statistics were never published or were not stated in the same manner. It must, of course, be remembered that China has some 120,000 coalmines, and that consequently compiling accurate information must pose a significant challenge.

The Workers' representatives at the Fifth Tripartite Technical Meeting for Mines Other than Coal Mines, commenting on the effect given to the resolutions and conclusions adopted by the previous Meeting, "deplored the fact that there was no standard system of accident reporting and [stated that they] would welcome ILO action to remedy the situation. Concerning accident prevention, the Worker members objected to ... performance-rating systems which could lead to underreporting of accidents." Furthermore, resolution No. 30 requested the Director-General "to take all appropriate steps to prompt governments to provide timely and complete replies in response to requests for information, in particular concerning the number and type of occupational accidents, as well as all data concerning miners' health". These concerns were further echoed in paragraphs (2) and (3) of resolution No. 36.

Trends in countries such as the United Kingdom show that death due to haulage, transport and equipment accidents have superseded the more traditional causes such as falls of ground, explosions and rockbursts. Since overall frequency rates have not changed significantly, it might be concluded that although technological innovation and concerted effort have reduced the
traditional hazards, insufficient training and control have been directed at the rapid mechanization of mining. Laws in a few countries provide for workers’ participation in developing and implementing procedures for training as new technology is introduced.

Some sectors of the industry in certain countries have been able to report reductions in the number of fatal accidents. For example, the Italian quarrying industry reported that fatal accidents had been reduced from 51 in 1973 to 16 in 1983, albeit the number of workers at risk had also gone down by 25 per cent. The Belgian industrial minerals sector, which was flourishing in 1983, reported only one fatal accident and four serious accidents, with frequency rates of 0.08 deaths per 1,000 workers and 0.03 accidents per 200,000 exposure hours. Significant reductions have also been achieved in the number of fatal and serious accidents in both the non-coal and coalmining industries of Japan over the five-year period from 1986. Even though the number of workers at risk has been reduced by 38 per cent in non-coal and 65 per cent in coal mines, fatal accidents have been almost eliminated, with reductions in the number of deaths of 72 per cent in non-coal and 87 per cent in coal mines. Furthermore, there have not been any of the serious coal mine explosions which caused up to a hundred deaths each year in the decade before 1986. Nevertheless, whether viewed in absolute numbers or frequency rates, the deaths of mineworkers are sad and significant facts in all countries.
SERIOUS ACCIDENT STATISTICS AND TRENDS

Mineworkers are for the most part isolated from supervisors or assistance during the workshift and must adapt to physically, psychologically and technically difficult and hazardous work and conditions.

International comparison of serious accident statistics is frustrated by the difficulty of obtaining reliable information and because the definition of a serious accident is not consistent. In some countries, such as Australia, Canada and Peru, a reportable serious accident is counted with the first lost day of work. In others, such as Belgium, Burkina Faso, France, Germany, Italy, South Africa and the United Kingdom, recognition occurs when there is between three and 20 days' absence from work.

Computerized systems are readily available to allow for efficient, standardized collection and reporting of accident figures. This information is of critical importance to employers, competent authorities and workers in analysing the causes and trends of accidents so that similar occurrences can be minimized or prevented.

At its Twelfth Session in 1988, the Coal Mines Committee addressed this issue in conclusions No. 89 by stating that "The existing systems of reporting occupational injuries and diseases in different countries do not allow comparisons between countries. The ILO should endeavour to develop a
common basis for the notification of occupational injuries and diseases which would help in the identification and analysis of occupational risks and their prevention.”

Accident frequency rates in countries where the collection of statistics has been ongoing have shown little improvement although the causes and types of accidents have changed with developments in technology, working conditions and methods. For example, in France in 1984, the bauxite and fluorite industries reported frequencies of 8.8 and 40 respectively per 200,000 exposure hours and in Germany accident frequencies in the mining and quarrying industries, excluding coal, were virtually unchanged in the five-year period 1980-84 at 8.22 per 200,000 exposure hours.

Unfortunately, national statistics often do not account for the so-called “minor” accidents, which are in fact very frequent and also symptomatic of a more widespread and serious risk situation.

The keen interest in this area is demonstrated by the adoption on 3 December 1992 by the EEC of a common position on minimum requirements for improving the safety and health protection of workers in surface and underground mineral-extraction industries (12th individual Directive within the meaning of article 16(1) of Directive 89/391/EEC).

HEALTH HAZARDS AND PREVENTION MEASURES

Mineworkers, especially those underground, are continuously exposed to risk from extremes of noise, vibration, heat and cold; repetitive task strain; harmful chemicals; radioactive materials; potentially lethal levels of gases released during blasting, from diesel engines or from the rock strata; as well as debilitating dusts. Of significant concern, unique to the mining industry, is the compound effect of an environment containing several or all of these harmful chemical, physical and energy factors at the same time and often approaching occupational exposure limits.

The most significant long-term health effects suffered by mineworkers are hearing impairment, silicosis, pneumoconiosis, asbestosis and lung cancer. In some countries there is the further risk of ankylostomiasis (hookworm) from unsanitary water supplies, and in others of polycitemia, a newly identified illness caused by working long hours at high altitudes.

Significant reductions in the incidence of irreversible occupational diseases caused by dusts (silicosis, pneumoconiosis and asbestosis) have been achieved in countries such as Belgium, Canada, France, Germany, India, Poland, the Russian Federation, the United Kingdom and the United States where the national laws require engineering control of the dust at source. Similarly, the requirement for high ventilation rates and continued monitoring and maintenance of the system ensures adequate dilution and extraction of gases such as carbon monoxide, carbon dioxide, nitrous oxides, sulphur dioxide, radon, methane and hydrogen sulphide from blasting, diesel engines or emanating from rock strata.

The increased incidence of severe hearing impairment is of significant concern even in highly developed countries. More effort is required to attenuate
sound at source as opposed to depending on the continued use of hearing protection devices. Unfortunately many countries — such as Burkina Faso, Colombia, Indonesia, Niger, Papua New Guinea, Peru and Zimbabwe — have not established occupational exposure limits for noise.

The ever-increasing mechanization of mining work has led to a growing concern and need for research in order to have a better understanding of the long-term health and ergonomic effects of vibration and repetitive task strain.

Many kinds of chemicals, including several new ones, are used in the extraction and maintenance sectors of mining operations. The Chemicals Convention, 1990 (No. 170), provides for the evaluation of chemical hazards, labelling of chemicals and the provision of chemical safety data sheets to enable employers and workers to take necessary precautions, including operational control measures and the use of personal protective equipment as well as first aid.

It appears to be possible to minimize the health effects of policitemia by ensuring that miners working above 3,000 metres do not work more than four-hour shifts.

**MINE RESCUE AND EMERGENCY PREPAREDNESS**

Major disasters such as explosions, underground fires, falls of ground, rockbursts, inrush of water or semi-solids, often leave underground mineworkers cut off from escape, thousands of metres below the surface, in toxic atmospheres and without the life-sustaining essentials of air, water and food during the lengthy and dangerous rescue attempts.

Mine rescue workers, once they enter the mine, are fully dependent on their breathing equipment, the training they have received and their fellow rescue team members. They need well-maintained equipment, extensive training and practice over several years to have the requisite expertise and confidence to conduct recovery, rescue and rehabilitation work in extremely hazardous conditions without risk to themselves or others. Both Canada and Germany had to deploy their rescue teams in 1992 to save lives in their Westray and Haus Aden mines. In several countries, such as Botswana, Chile, China, Niger, Portugal and Turkey, the law and practice need to be reconsidered in the light of new methods and equipment.

National and international standardization of training and compatible equipment are important to facilitate the rapid marshalling of effective outside help. For example, the 12 provincial and territorial jurisdictions in Canada and several northern states of the United States have common training and equipment and have protocol agreements on mutual assistance. As a result teams and equipment from up to 7,000 kilometres distance were on stand-by alert or actually assisted following the 1992 coalmine explosion in Nova Scotia on the east coast of Canada.

Mineworkers, the environment and the public are exposed to risks associated with the potential catastrophic failure of major earthworks at mines such as tailings dams and rock dumps. Thousand of tonnes of chemicals and fuel are transported and stored at mines to support the operations. Failure of the storage facility or accidents in transport could result in significant
environmental damage or public health risks. Emergency plans that anticipate natural or accidental disasters should be drawn up and continually evaluated for accuracy at each mining operation.

**TRAINING AND COLLABORATIVE PREVENTION**

Accident analysis in developed countries indicates that most accidents are a result of human error or unsafe practices. Significant reduction in accident frequencies can only be achieved through comprehensive training and periodic retraining of mineworkers. Formal modular training systems that recognize the complex organization and multiplicity of functions at a mining operation have met with success in a few countries such as Canada, Czechoslovakia, France, Germany, Hungary, Papua New Guinea, the Philippines, Sweden, the United Kingdom, Zambia and Zimbabwe. Unfortunately, the majority of mining countries such as Australia, Brazil, Chile, Colombia, India, Indonesia, Mexico, Norway, Pakistan, Peru, Poland, South Africa, Turkey and the United States depend on informal training. The success of this approach is very much dependent on the skills and knowledge of the informal trainer. Furthermore, since this is not the latter's primary role at the mine, there is little incentive to perform at more than a perfunctory level. Informal training lacks consistency, thoroughness and discipline and may result in bad habits or practices being perpetuated.

In April 1992 the Fifth Tripartite Technical Meeting for Mines Other than Coal Mines, in resolution No. 30, called on member States “to make available, within existing resources, the means necessary for training to allow access to these new technologies and to existing jobs or to jobs to which they lead”.

In 1988, at its Twelfth Session, the Coal Mines Committee had observed (in conclusions No. 88) that “International training standards are less easy to formulate and apply because of the wide variations between practices in different countries. Nevertheless, there should be consistent efforts to raise international standards with reference to the training provided in those countries and enterprises with well-developed training systems”. The Meeting further stated that “Standards for training in the coalmining industry should be established in each country through measures suited to national circumstances. These measures should be taken by the competent authority, where possible with the collaboration of the employers' and workers' representatives concerned, and supported by legislation where appropriate”.

Since illiteracy is a big problem in many countries, even developed ones such as Canada, such training programmes should not be dependent on the ability to read and write. A complaint of migrant workers is that they are often not given instructions or training in their own language and thus do not fully understand the risks and hazards.

Belgium established mine inspection by workers' representatives in 1897, the first country to do so. It is generally accepted that improved safety and health in mines will be fully realized not because the traditional hazards have been removed but because they have been contained by new safety and health techniques along with action arising out of close cooperation between workers and employers.
A worker's right to remove himself from a work situation which he has reasonable justification to believe presents an imminent and serious danger to his life or health is proclaimed by the Occupational Safety and Health Convention, 1981 (No. 155), and the right to participate fully on safety and health committees is also proclaimed in international labour standards. The full application of these principles and the introduction of the concept of an Internal Responsibility System (IRS) for safety and health at the enterprise level is resulting in extremely low accident frequencies in some provinces of Canada. The IRS is founded on the close collaboration of safety and health committees with mine management in developing safe working procedures, inspecting the workplace and investigating all serious accidents and dangerous occurrences. The committees are particularly helpful in evaluating and developing procedures when new technologies or work systems are introduced. The system also benefits competent authorities faced with resource constraints, and where resources are adequate it enables more attention to be placed on safety and health research and advisory services for those sectors of the industry that most need it. Several countries do not provide for workers to participate on safety and health committees at the enterprise level. They include Brazil, Burkina Faso, Colombia, India, Indonesia, Papua New Guinea, Pakistan, Peru, South Africa and Zimbabwe.

HOSTELS, CAMPS AND LIVING ACCOMMODATION

New mining activity often takes place in undeveloped frontier areas and the trend to avoid the creation of single-industry towns results in a migrant or long-distance commuter workforce living in camps or hostels. Furthermore, successful, small informal mining operations often cause a stampede migration and instant temporary settlement reminiscent of the "gold rush" days that occurred a century ago in developed countries. Migrant or transient workers and at times their families too are often forced to live in camps, hostels or housing poorly protected from the extremes of climate, exposed to toxic mine effluents. Furthermore they may be without clean drinking water, basic sanitary facilities and sewage installations, adequate food supplies and medical facilities. Arduous work, poor living conditions and long-term separation from their family and community contribute to a high incidence of physical and psychological illness among these mineworkers, as reported in Botswana, Brazil, Namibia, Peru and South Africa. Occupational diseases and others such as ankylostomiases (hookworm) may be more prevalent in many countries because of inadequate training and knowledge in their diagnosis or cause, insufficient monitoring of the workers' health, exposure to workplace contaminants, inadequate national standards or the inability of the competent authority to enforce regulations.

PARTICULAR OCCUPATIONAL HEALTH NEEDS

The experts at the Eleventh Session of the Joint ILO/WHO Committee on Occupational Health, held in Geneva from 27 to 29 April 1992, recognized particular occupational health needs of workers because of age, physiological condition, social aspects, communication barriers or other similar factors. Such
needs should be met on an individual basis with due concern to protection of their health at work and without leaving any possibility for discrimination.

The impact of these factors on the safety or health of mine workers necessitates the formulation of comprehensive national policies for implementation at the workplace.

The minimum age of underground workers is covered by several ILO instruments and addressed in the laws of most countries. The standards vary from 21 years in Chile and Brazil, to 16 years in Turkey, South Africa and Zimbabwe, though many countries — such as Belgium, Hungary, Norway, Poland, Sweden and Zambia — set the standard at 18 years with exemptions being allowed by the competent authority for training purposes. However, there seem to be no age restrictions in the laws of Burkina Faso and Mexico.

Nearly 40 years after the Underground Work (Women) Convention, 1935 (No. 45), was adopted, the ILO proclaimed the Declaration on equality of opportunity and treatment for women workers in 1975. Since then the trend marked by this text has been maintained and in countries such as Australia, Canada and the United States, where improved safety and health standards exist, women are now working in mines both on surface and underground and at night.

COMPETENT AUTHORITIES

In theory all countries have competent authorities who conduct safety and health inspections and investigations in accordance with several existing international instruments. However, resource constraints or a lack of expertise result in mines being infrequently inspected in countries such as Brazil, Papua New Guinea, Peru, South Africa, Turkey and Zimbabwe. In Canada, France, India and Pakistan, workers have stressed the need for more frequent inspections. The competent authority for mining is normally a separate jurisdiction, such as a mining inspectorate, in some countries such as Canada, India, Japan, Pakistan, the United Kingdom and the United States or else a separate specialized unit within the national occupational safety and health organization in other countries, including Argentina, Belgium, Bolivia, Burkina Faso, France, Mexico, Portugal and Spain. Many countries where mining activity is still in the prospection or early development stages are being assisted by the ILO and other international agencies such as the United Nations to develop laws, regulations and codes of practice and to set up inspectorates.

Notes

CHAPTER III

CONCLUSIONS

Many of the existing Conventions dealing with mines were adopted almost 60 years ago and are no longer fully applicable to present-day mining hazards and needs. Significant technological changes over the intervening years have led to the demand for updated standards for this industry in which the workers face the greatest hazards.

In examining the possible content of a new instrument or instruments, it is important to recall the special features of the industry which are discussed in Chapter I and to understand that while conditions vary to some degree from one country to another, the problems faced by the industry are nevertheless remarkably similar and universal. The questionnaire which follows this report has been prepared following a study of the developments in the industry and recognizes the opinions, recommendations and conclusions of the ILO's Coal Mines Committee and of the Tripartite Technical Meetings for Mines Other than Coal Mines.

The Office believes that the significant size and unique risks of this industry dictate the need for an instrument or instruments that would make good the deficiencies of existing instruments and also consolidate existing applicable international standards into a document of value to governments, employers and workers as proposed in question 3.

The Office is confident that the ILO Codes of practice entitled Safety and health in opencast mines and Safety and health in coal mines provide answers to the many practical problems confronting employers, workers and governments in countries whose laws and regulations have not been revised for some time and in those countries where mining is only beginning to develop. Member States might consider these Codes in giving effect to any new instrument(s), thus avoiding the inclusion of specific provisions that may quickly become obsolete.

If a new instrument or instruments are adopted, it will be essential to define its (their) scope adequately to cover all sectors of the industry including options for application to the small, almost informal, mines, as proposed in questions 4 and 5.

Questions 9, 12, 13 and 20 deal with the important issues of organization of work and work systems to ensure that the risks to which workers are exposed are fully assessed and that the mines are designed, constructed and equipped with technical, mechanical and other equipment in such a way that workers' safety and health are not endangered.

The dynamic phenomenon of instantaneous destruction of the rock or coal mass and the subsequent outburst of rock into the mine workings, which is
sometimes followed by escaping gases that are toxic and/or explosive, is the subject of questions 14, 17 and 18 and because of these and other dangers which might trap mine workers miles below ground, the need for two exits from each working place and from the mine itself is dealt with in question 15.

The transport, storage and use of explosives are important daily routines in mines and consequently Question 19 deals with the inclusion of this important topic. The mine environment can be particularly hostile, containing several respirable hazards such as the potentially debilitating dusts including silica, asbestos, coal and radioactive dusts as well as potentially toxic gases. Questions 27 and 28 deal with the issues of preventive source controls and personal protective equipment as well as environmental monitoring.

Once mining operations have exhausted the economic recovery of the resource, they need to be abandoned in a secure manner so that future risks from collapse, entrapped fluids or civil engineering works are minimized. Question 26 covers this important issue.

The international shortage of the official information that is so critical to fully evaluate safety and health trends in mining should be of great concern to member States. The collection of fatal and serious accident statistics is non-existent or very inadequate in many countries and results in an incomplete global assessment, at times based merely on bits and pieces of information gleaned from technical journals or reported by workers’ representatives. Question 21 deals with this issue.

The collaboration between workers and employers in the prevention of accidents and occupational diseases and the serious issues of the training of workers are dealt with in questions 10, 11 and 21.

Mine rescue and emergency preparedness are subjects unique to the working hazards involved in mining. Several disasters, especially coalmine explosions, occur each year, trapping mineworkers in situations where specially trained and equipped rescue teams are their only hope for survival. Such teams are also of national importance because their skills are especially suited to recovery and life saving in large cities after an earthquake. Furthermore, the immense magnitude of waste structures at mines and the large quantities of chemicals used require careful emergency planning and preparation. Questions 17, 18 and 22 to 25 deal with these issues.

The importance of welfare facilities and environmental protection for mineworkers and their families, especially the transient, migrant or fly-in/fly-out workers who are away from their homes and settled communities, is recognized by general statements of principle as to what should be provided or available. The Codes of practice provide practical guidance in these areas. However, questions 16, 23, 29 and 30 consider the specific need for the instrument(s) to address this issue.

Questions 31 to 35 deal with implementation considerations, any special problems of application that may be faced by member States and provides an opportunity to comment on any other pertinent problems which ought to be considered.
In accordance with article 39 of the Standing Orders of the International Labour Conference, governments are requested to consult the most representative organizations of employers and workers before finalizing their replies to the following questionnaire and to send their replies, indicating the reasons for each reply, so as to reach the International Labour Office in Geneva by 30 September 1993 at the latest.

The questionnaire does not follow the format of possible future instruments as they are likely to be drafted. However, it includes all the elements of the probable contents of such instruments. The structure of the future instruments cannot be decided until the answers to the questions have been evaluated. The various elements contained in the questionnaire will be compressed into comprehensive points and paragraphs for the conclusions which will be proposed with a view to the adoption of one or more instruments.

I. Form of the international instrument(s)

1. Do you consider that the International Labour Conference should adopt an instrument or instruments concerning safety and health in mines?

2. If so, and taking into consideration the technological changes in the mining industry, do you consider that the instrument(s) should take the form of:
   (a) a Convention;
   (b) a Recommendation;
   (c) a Convention supplemented by a Recommendation?

II. Preamble

3. Should the instrument(s) contain a preamble referring to relevant ILO instruments which might include the following existing instruments: the Radiation Protection Convention, 1960 (No. 115), and Recommendation (No. 114); the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (No. 148), and Recommendation (No. 156); the Occupational Safety and Health Convention, 1981 (No. 155), and Recommendation (No. 164); the Occupational Health Services Convention, 1985 (No. 161), and Recommendation (No. 171); the Asbestos Convention, 1986 (No. 162), and Recommendation (No. 172); the Safety and Health in Construction Convention, 1988 (No. 167), and Recommendation (No. 175); and the Chemicals Convention, 1990 (No. 170), and Recommendation (No. 177)?
III. Scope and definitions

4. For the purpose of the instrument(s) should the term "mine" apply to:
(a) surface or underground sites where, in particular, the following activities take place:
   (i) prospecting for or extraction of minerals other than extraction through the drilling of boreholes;
   (ii) preparation including crushing, grinding, concentration or washing of the extracted minerals;
(b) all machinery, equipment, buildings and civil engineering structures used in conjunction with such activities?

5. Should the proposed instrument(s):
(a) cover all mines; or
(b) provide that the competent authority of each member State, after consulting the most representative organizations of employers and workers concerned, (i) may exclude from the application of the instrument(s) certain mines and, if so, by reference to what criteria;
   (ii) should, in the case of the exclusion of certain mines, make plans for progressively covering all mines?

IV. General provisions

6. Should the instrument(s) provide that the measures for ensuring its (their) application should be prescribed by national laws and regulations?

7. Should the instrument(s) provide that the measures taken to give effect to it (them) be drawn up in consultation with the most representative organizations of employers and workers concerned?

8. Should the instrument(s) provide that national laws and regulations should designate the competent authority or authorities responsible for the supervision of occupational safety and health in mines and the enforcement of the provisions of relevant national laws and regulations?

9. (1) Should the instrument(s) specify that the employers should take all necessary measures to eliminate or minimize the risk to safety and health from activities covered in question 4 (a) above and from machinery and equipment under their control?
   (2) Should the instrument(s) provide that to this end the employers should take necessary measures to ensure that:
      (a) the risks to which workers are exposed in the mine have been identified and assessed;
      (b) all mines are designed, constructed and equipped to secure safety in their operation and a healthy working environment;
      (c) all mines are commissioned, operated and maintained in such a way that workers can perform the work assigned to them without endangering their safety and health or those of other persons?
10. Should the instrument(s) provide that measures should be taken to ensure that there is cooperation between employers and workers, in accordance with arrangements to be defined by national laws or regulations, in order to promote safety and health in mines?

11. Should the instrument(s) specify that national laws and regulations should provide that workers should have the duty to:
(a) cooperate as closely as possible with their employer in the application of the prescribed safety and health measures;
(b) take reasonable care for their own safety and health and that of other persons at the mine who may be affected by their acts or omissions at work;
(c) use facilities placed at their disposal and not misuse anything provided for their own protection or the protection of others;
(d) report forthwith to their immediate supervisor any situation which they believe could present a risk, and which they cannot properly deal with themselves;
(e) comply with the prescribed safety and health measures?

12. Should the instrument(s) provide that where two or more employers undertake activities at the same mine:
(a) each employer should be responsible for all matters under his control;
(b) the employer who, in accordance with national laws and regulations, is in charge of the mine should be responsible for coordinating the implementation of all the measures concerning the safety and health of the workers;
(c) the coordination referred to in (b) above should not affect the responsibility of the individual employers for the safety and health of the workers placed under their authority?

V. Preventive and protective measures

13. Should the instrument(s) provide that the competent authority should require the employer to submit mine plans and subsequent major modifications for authorization before they are put into operation?

14. Should the instrument(s) provide that in every mine steps should be taken to maintain the stability of the ground, to control movement of the strata and, as may be necessary, to support the roof and sides to secure the safety of the workplace?

15. Should the instrument(s) provide that for underground operations, whenever practicable, two exits should be provided from every workplace, and that each of these should be connected to an alternative means of egress to the surface?

16. Should the instrument(s) provide that all underground workings to which access is permitted should be ventilated in an appropriate manner to maintain an atmosphere:
(a) in which working conditions are adequate;
(b) in which the risk of explosion is kept under control?
17. Should the instrument(s) provide that, in zones susceptible to gas outbursts, to rockbursts, or to water and semi-solid inrushes, an operating plan should be drawn up and implemented so as to ensure a safe system of work and the protection of workers?

18. Should the instrument(s) provide that measures and precautions appropriate to the nature of a mine operation should be taken to avoid, detect and combat the start and spread of fires and explosions?

19. Should the instrument(s) provide that operations involving the storage, transport and use of explosives and initiating devices should be carried out only by trained and authorized persons so as to eliminate or minimize the risk to workers?

20. Should the instrument(s) provide that national laws and regulations should specify that electrical, mechanical and other equipment should be selected, installed, commissioned, operated and maintained in such a way as to eliminate or minimize the risk to workers?

21. Should the instrument(s) provide that the employer should ensure that:
   (a) adequate training is provided to workers on safety and health matters as well as on the work assigned;
   (b) all safety instructions are made comprehensible to all workers;
   (c) adequate supervision and control on each shift is provided to secure the safe operation of the mine in compliance with national laws and regulations;
   (d) arrangements are implemented whereby a correct record is made of the names of all persons who are underground at any time;
   (e) all fatal and serious accidents and dangerous occurrences are investigated and reported to the competent authority as soon as possible?

22. Should the instrument(s) provide that the employer be required to prepare an emergency response plan, specific to the mine concerned, for industrial and natural disasters, that provides for organizational arrangements, means for adequate protection of the workers and the environment, and the training of workers in emergency response?

23. Should the instrument(s) provide that national laws or regulations should specify the requirements for mine rescue and first aid, including organization, training, the number of trained persons and the equipment?

24. Should the instrument(s) specify that the employer should take the requisite measures to provide the necessary communication and warning systems to enable safe operations and escape to take place and rescue operations to be launched if the need arises?

25. Should the instrument(s) specify that underground workers should be provided, in accordance with national laws or regulations, with self-rescue respiratory devices?

26. Should the instrument(s) provide that protective measures should be taken for the securing of abandoned mine workings in a manner which minimizes the risk to safety and health in accordance with national laws or regulations?
27. (1) Should the instrument(s) provide that, where workers are exposed to physical, chemical or biological hazards such as:
(a) airborne mineral dusts;
(b) firedamp and other mine gases;
(c) noxious and toxic fumes and hazardous chemicals;
(d) radiation from rock strata;
(e) noise and vibration;
(f) extreme temperatures;
(g) insufficient lighting or ventilation;
(h) those related to work carried out at high altitudes and extreme depths;
appropriate measures should be taken to inform the workers of the health risks and to prevent exposure to such risks?

(2) Should the instrument(s) provide that the preventive measures referred to in (1) above should comprise:
(a) technical and organizational measures applied to relevant mining activities or to the plant, machinery, equipment or structures;
(b) where it is not possible to have recourse to (a) above, other effective measures, including the use of personal protective equipment and protective clothing?

28. Should the instrument(s) specify that the employer should ensure the monitoring of the working environment to identify the hazardous substances or agents to which the workers are exposed and to assess their level of exposure?

29. Should the instrument(s) specify that the employer should ensure the regular health surveillance of workers exposed to occupational health hazards specific to mining based on the general principles of occupational health?

30. Should the instrument(s) provide that there should be provided and maintained, at or within reasonable access of every workplace:
(a) an adequate supply of wholesome drinking water;
(b) sanitary and washing facilities;
(c) facilities for changing and for the storage and drying of clothing;
(d) accommodation for taking meals?

VI. Implementation

31. Should the instrument(s) provide that each Member should:
(a) take all the necessary measures, including the provision of appropriate penalties and corrective measures, to ensure the effective enforcement of the provisions of the instrument(s);
(b) provide appropriate inspection services to supervise the application of the measures to be taken in pursuance of the instrument(s) or satisfy itself that appropriate inspection is carried out;
(c) provide for the investigation of mine disasters, fatal or serious accidents and dangerous occurrences in mines;
(d) provide for the compilation and publication of statistics on accidents and dangerous occurrences in mines in accordance with national laws and regulations?

32. Should the instrument(s) specify that the national laws and regulations adopted in pursuance of its (their) provisions may provide for their practical application through technical standards or codes of practice consistent with national conditions and practice?

VII. Special problems

33. (1) Are there any unique features of national law or practice which, in your view, are liable to create difficulties in the practical application of the proposed instrument(s) as conceived in this questionnaire?

(2) If so, how would you suggest that these difficulties be met?

34. (Federal States only.) Do you consider that, in the event of the instrument(s) being adopted, the subject-matter would be appropriate for federal action, or wholly or in part for action by the constituent units of the federation?

35. Are there, in your view, any other pertinent problems not covered by the present questionnaire which ought to be taken into consideration when the instrument(s) are being drafted? If so, please specify which.
ANNEXES
ANNEX I

CODE OF PRACTICE ON SAFETY AND HEALTH IN COAL MINES (1986)

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ANNEX III

SUBSTANTIVE PROVISIONS OF RELEVANT ILO CONVENTIONS
AND RECOMMENDATION

This Appendix reproduces the substantive provisions of the following instruments:
Radiation Protection Convention, 1960 (No. 115);
Working Environment (Air Pollution, Noise and Vibration Convention, 1977
(No. 148), and Recommendation (No. 156);
Occupational Safety and Health Convention, 1981 (No. 155);
Occupational Health Services Convention, 1985 (No. 161);
Asbestos Convention, 1986 (No. 162);
Chemicals Convention, 1990 (No. 170).

Radiation Protection Convention, 1960 (No. 115)

PART I. GENERAL PROVISIONS

Article 1

Each Member of the International Labour Organization which ratifies this
Convention undertakes to give effect thereto by means of laws or regulations, codes of
practice or other appropriate means. In applying the provisions of the Convention the
competent authority shall consult with representatives of employers and workers.

Article 2

1. This Convention applies to all activities involving exposure of workers to ionising
radiations in the course of their work.

2. This Convention does not apply to radioactive substances, whether sealed or
unsealed, nor to apparatus generating ionising radiations which substances or apparatus,
owing to the limited doses of ionising radiations which can be received from them, are
exempted from its provisions by one of the methods of giving effect to the Convention
mentioned in Article 1.

Article 3

1. In the light of knowledge available at the time, all appropriate steps shall be taken
to ensure effective protection of workers, as regards their health and safety, against
ionising radiations.

2. Rules and measures necessary for this purpose shall be adopted, and data essential
for effective protection shall be made available.

3. With a view to ensuring such effective protection —
(a) measures for the protection of workers against ionising radiations adopted after
ratification of the Convention by the Member concerned shall comply with the
provisions thereof;
(b) the Member concerned shall notify, as soon as practicable, measures adopted by it prior to the ratification of the Convention, so as to comply with the provisions thereof, and shall promote such modification of other measures existing at the time of ratification;

(c) the Member concerned shall communicate to the Director-General of the International Labour Office, when ratifying the Convention, a statement indicating the manner in which and the categories of workers to which the provisions of the Convention are applied, and shall indicate in its reports on the application of the Convention any further progress made in the matter;

(d) at the expiration of three years from the date on which this Convention first enters into force the Governing Body of the International Labour Office shall submit to the Conference a special report concerning the application of subparagraph (b) of this paragraph and containing such proposals as it may think appropriate for further action in regard to the matter.

**PART II. PROTECTIVE MEASURES**

**Article 4**

The activities referred to in Article 2 shall be so arranged and conducted as to afford the protection envisaged in this Part of the Convention.

**Article 5**

Every effort shall be made to restrict the exposure of workers to ionising radiations to the lowest practicable level, and any unnecessary exposure shall be avoided by all parties concerned.

**Article 6**

1. Maximum permissible doses of ionising radiations which may be received from sources external to or internal to the body and maximum permissible amounts of radioactive substances which can be taken into the body shall be fixed in accordance with Part I of this Convention for various categories of workers.

2. Such maximum permissible doses and amounts shall be kept under constant review in the light of current knowledge.

**Article 7**

1. Appropriate levels shall be fixed in accordance with Article 6 for workers who are directly engaged in radiation work and are —

   (a) aged 18 and over;

   (b) under the age of 18.

2. No worker under the age of 16 shall be engaged in work involving ionising radiations.

**Article 8**

Appropriate levels shall be fixed in accordance with Article 6 for workers who are not directly engaged in radiation work, but who remain or pass where they may be exposed to ionising radiations or radioactive substances.

**Article 9**

1. Appropriate warnings shall be used to indicate the presence of hazards from ionising radiations. Any information necessary in this connection shall be supplied to the workers.
2. All workers directly engaged in radiation work shall be adequately instructed, before and during such employment, in the precautions to be taken for their protection, as regards their health and safety, and the reasons therefor.

Article 10

Laws or regulations shall require the notification in a manner prescribed thereby of work involving exposure of workers to ionising radiations in the course of their work.

Article 11

Appropriate monitoring of workers and places of work shall be carried out in order to measure the exposure of workers to ionising radiations and radioactive substances, with a view to ascertaining that the applicable levels are respected.

Article 12

All workers directly engaged in radiation work shall undergo an appropriate medical examination prior to or shortly after taking up such work and subsequently undergo further medical examinations at appropriate intervals.

Article 13

Circumstances shall be specified, by one of the methods of giving effect to the Convention mentioned in Article 1, in which, because of the nature or degree of the exposure or a combination of both, the following action shall be taken promptly:
(a) the worker shall undergo an appropriate medical examination;
(b) the employer shall notify the competent authority in accordance with its requirements;
(c) persons competent in radiation protection shall examine the conditions in which the worker's duties are performed;
(d) the employer shall take any necessary remedial action on the basis of the technical findings and the medical advice.

Article 14

No worker shall be employed or shall continue to be employed in work by reason of which the worker could be subject to exposure to ionising radiations contrary to qualified medical advice.

Article 15

Each Member which ratifies this Convention undertakes to provide appropriate inspection services for the purpose of supervising the application of its provisions, or to satisfy itself that appropriate inspection is carried out.

Working Environment (Air Pollution, Noise and Vibration) Convention,
1977 (No. 148)

PART I. SCOPE AND DEFINITIONS

Article 1

1. This Convention applies to all branches of economic activity.
2. A Member ratifying this Convention may, after consultation with the representative organizations of employers and workers concerned, where such exist,
exclude from the application of the Convention particular branches of economic activity in respect of which special problems of a substantial nature arise.

3. Each Member which ratifies this Convention shall list in the first report on the application of the Convention submitted under article 22 of the Constitution of the International Labour Organization any branches which may have been excluded in pursuance of paragraph 2 of this Article, giving the reasons for such exclusion, and shall state in subsequent reports the position of its law and practice in respect of the branches excluded, and the extent to which effect has been given or is proposed to be given to the Convention in respect of such branches.

Article 2

1. Each Member, after consultation with the representative organizations of employers and workers, where such exist, may accept the obligations of this Convention separately in respect of —
   (a) air pollution;
   (b) noise; and
   (c) vibration.

2. A Member which does not accept the obligations of the Convention in respect of one or more of the categories of hazards shall specify this in its ratification and shall give reasons in the first report on the application of the Convention submitted under article 22 of the Constitution of the International Labour Organization; it shall state in subsequent reports the position of its law and practice in respect of the category or categories of hazards excluded and the extent to which effect has been given or is proposed to be given to the Convention in respect of each such category of hazards.

3. Each Member which has not on ratification accepted the obligations of this Convention in respect of all the categories of hazards shall subsequently, when it is satisfied that conditions permit this, notify the Director-General of the International Labour Office that it accepts the obligations of the Convention in respect of a category or categories previously excluded.

Article 3

For the purpose of this Convention —
(a) the term “air pollution” covers all air contaminated by substances, whatever their physical state, which are harmful to health or otherwise dangerous;
(b) the term “noise” covers all sound which can result in hearing impairment or be harmful to health or otherwise dangerous;
(c) the term “vibration” covers any vibration which is transmitted to the human body through solid structures and is harmful to health or otherwise dangerous.

PART II. GENERAL PROVISIONS

Article 4

1. National laws or regulations shall prescribe that measures be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise and vibration.

2. Provisions concerning the practical implementation of the measures so prescribed may be adopted through technical standards, codes of practice and other appropriate methods.

Article 5

1. In giving effect to the provisions of this Convention, the competent authority shall act in consultation with the most representative organizations of employers and workers concerned.
2. Representatives of employers and workers shall be associated with the elaboration of provisions concerning the practical implementation of the measures prescribed in pursuance of Article 4.

3. Provision shall be made for as close a collaboration as possible at all levels between employers and workers in the application of the measures prescribed in pursuance of this Convention.

4. Representatives of the employer and representatives of the workers of the undertaking shall have the opportunity to accompany inspectors supervising the application of the measures prescribed in pursuance of this Convention, unless the inspectors consider, in the light of the general instructions of the competent authority, that this may be prejudicial to the performance of their duties.

Article 6

1. Employers shall be made responsible for compliance with the prescribed measures.

2. Whenever two or more employers undertake activities simultaneously at one workplace, they shall have the duty to collaborate in order to comply with the prescribed measures, without prejudice to the responsibility of each employer for the health and safety of his employees. In appropriate circumstances, the competent authority shall prescribe general procedures for this collaboration.

Article 7

1. Workers shall be required to comply with safety procedures relating to the prevention and control of, and protection against, occupational hazards due to air pollution, noise and vibration in the working environment.

2. Workers or their representatives shall have the right to present proposals, to obtain information and training and to appeal to appropriate bodies so as to ensure protection against occupational hazards due to air pollution, noise and vibration in the working environment.

PART III. PREVENTIVE AND PROTECTIVE MEASURES

Article 8

1. The competent authority shall establish criteria for determining the hazards of exposure to air pollution, noise and vibration in the working environment and, where appropriate, shall specify exposure limits on the basis of these criteria.

2. In the elaboration of the criteria and the determination of the exposure limits the competent authority shall take into account the opinion of technically competent persons designated by the most representative organizations of employers and workers concerned.

3. The criteria and exposure limits shall be established, supplemented and revised regularly in the light of current national and international knowledge and data, taking into account as far as possible any increase in occupational hazards resulting from simultaneous exposure to several harmful factors at the workplace.

Article 9

As far as possible, the working environment shall be kept free from any hazard due to air pollution, noise or vibration —

(a) by technical measures applied to new plant or processes in design or installation, or added to existing plant or processes; or, where this is not possible,

(b) by supplementary organisational measures.
Article 10

Where the measures taken in pursuance of Article 9 do not bring air pollution, noise and vibration in the working environment within the limits specified in pursuance of Article 8, the employer shall provide and maintain suitable personal protective equipment. The employer shall not require a worker to work without the personal protective equipment provided in pursuance of this Article.

Article 11

1. There shall be supervision at suitable intervals, on conditions and in circumstances determined by the competent authority, of the health of workers exposed or liable to be exposed to occupational hazards due to air pollution, noise or vibration in the working environment. Such supervision shall include a preassignment medical examination and periodical examinations, as determined by the competent authority.

2. The supervision provided for in paragraph 1 of this Article shall be free of cost to the worker concerned.

3. Where continued assignment to work involving exposure to air pollution, noise or vibration is found to be medically inadvisable, every effort shall be made, consistent with national practice and conditions, to provide the worker concerned with suitable alternative employment or to maintain his income through social security measures or otherwise.

4. In implementing this Convention, the rights of workers under social security or social insurance legislation shall not be adversely affected.

Article 12

The use of processes, substances, machinery and equipment, to be specified by the competent authority, which involve exposure of workers to occupational hazards in the working environment due to air pollution, noise or vibration, shall be notified to the competent authority and the competent authority, as appropriate, may authorize the use on prescribed conditions or prohibit it.

Article 13

All persons concerned shall be adequately and suitably —

(a) informed of potential occupational hazards in the working environment due to air pollution, noise and vibration; and

(b) instructed in the measures available for the prevention and control of, and protection against, those hazards.

Article 14

Measures taking account of national conditions and resources shall be taken to promote research in the field of prevention and control of hazards in the working environment due to air pollution, noise and vibration.

PART IV. MEASURES OF APPLICATION

Article 15

On conditions and in circumstances determined by the competent authority, the employer shall be required to appoint a competent person, or use a competent outside service or service common to several undertakings, to deal with matters pertaining to the prevention and control of air pollution, noise and vibration in the working environment.
Article 16

Each Member shall —

(a) by laws or regulations or any other method consistent with national practice and conditions take such steps, including the provision of appropriate penalties, as may be necessary to give effect to the provisions of this Convention;

(b) provide appropriate inspection services for the purpose of supervising the application of the provisions of this Convention, or satisfy itself that appropriate inspection is carried out.

Working Environment (Air Pollution, Noise and Vibration) Recommendation, 1977 (No. 156)

I. Scope

1. (1) To the greatest extent possible, the provisions of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, and of this Recommendation should be applied to all branches of economic activity.

(2) Measures should be taken to give self-employed persons protection in the working environment analogous to that provided for in the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, and in this Recommendation.

II. Preventive and Protective Measures

2. (1) The competent authority should prescribe the nature, frequency and other conditions of monitoring of air pollution, noise and vibration in the working environment to be carried out on the employer's responsibility.

(2) Special monitoring in relation to the exposure limits referred to in Article 8 of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, should be undertaken in the working environment when machinery or installations are first put into use or significantly modified, or when new processes are introduced.

3. It should be the duty of the employer to arrange for equipment used to monitor air pollution, noise and vibration in the working environment to be regularly inspected, maintained and calibrated.

4. The workers and/or their representatives and the inspection services should be afforded access to the records of the monitoring of the working environment and to the records of inspection, maintenance and calibration of apparatus and equipment used therefor.

5. Substances which are harmful to health or otherwise dangerous and which are liable to be airborne in the working environment should, as far as possible, be replaced by less harmful or harmless substances.

6. Processes involving air pollution, noise or vibration in the working environment as defined in Article 3 of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, should be replaced as far as possible by processes involving less or no air pollution, noise or vibration.

7. The competent authority should determine the substances of which the manufacture, supply or use in the working environment should be prohibited or made subject to its specific authorization, requiring compliance with particular measures of prevention or protection.
8. (1) In appropriate cases the competent authority should approve standards for the emission levels of machinery and installations as regards air pollution, noise and vibration.

(2) Those standards should be attained as appropriate by —
(a) design; or
(b) built-in devices; or
(c) technical measures during installation.

(3) An obligation to ensure compliance with these standards should be placed on the manufacturer or the supplier of the machinery or installations.

9. Where necessary, the manufacture, supply or use of machinery and installations which cannot, in the light of the most recent technical knowledge, meet the requirements of Paragraph 8 of this Recommendation should be made subject to authorization by the competent authority requiring compliance with other appropriate technical or administrative protective measures.

10. The provisions of Paragraphs 8 and 9 of this Recommendation should not relieve the employer of his obligations in pursuance of Article 6 of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977.

11. The employer should ensure the regular inspection and maintenance of machines and installations, with respect to the emission of harmful substances, dust, noise and vibration.

12. The competent authority should, when necessary for the protection of the workers' health, establish a procedure for the approval of personal protective equipment.

13. In pursuance of Article 9, subparagraph (b), of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, the competent authority should, as appropriate, provide for or promote, in consultation with employers' and workers' organizations, the reduction of exposure through suitable systems or schedules of work organization, including the reduction of working time without loss of pay.

14. In prescribing measures for the prevention and control of air pollution, noise and vibration in the working environment, the competent authority should take into consideration the most recent codes of practice or guides established by the International Labour Office and the conclusions of meetings of experts which may be convened by the International Labour Office, as well as information from other competent bodies.

15. In prescribing measures for the prevention and control of air pollution, noise and vibration in the working environment, the competent authority should take account of the relationship between the protection of the working environment and the protection of the general environment.

III. SUPERVISION OF THE HEALTH OF WORKERS

16. (1) The supervision of the health of workers provided for in Article 11 of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, should include, as determined by the competent authority —
(a) a pre-assignment medical examination;
(b) periodic medical examinations at suitable intervals;
(c) biological or other tests or investigations which may be necessary to control the degree of exposure and supervise the state of health of the worker concerned;
(d) medical examinations or biological or other tests or investigations after cessation of the assignment which, when medically indicated, should be made available as of right on a regular basis and over a prolonged period.

(2) The competent authority should require that the results of any such examinations or tests be made available to the worker, and at his request to his personal physician.
17. The supervision provided for in Paragraph 16 of this Recommendation should normally be carried out in working hours and should be free of cost to the worker.

18. (1) The competent authority should develop a system of records of the medical information obtained in pursuance of Paragraph 16 of this Recommendation and should determine the manner in which it is to operate. Provision should be made for the maintenance of such records for an appropriate period of time to assure their availability, in terms which will permit personal identification by the competent authority only, for epidemiological and other research.

(2) To the extent determined by the competent authority, the records should include information on occupational exposure to air pollution, noise and vibration in the working environment.

19. Where continued assignment to work involving exposure to air pollution, noise or vibration is found to be medically inadvisable, every effort should be made, consistent with national practice and conditions, to provide the worker concerned with suitable alternative employment and to maintain his previous income through social security measures or otherwise.

20. In implementing this Recommendation, the rights of workers under social security or social insurance legislation should not be adversely affected.

IV. TRAINING, INFORMATION AND RESEARCH

21. (1) The competent authority should take measures to promote the training and information of all persons concerned with respect to the prevention and control of, and protection against, existing and potential occupational hazards in the working environment due to air pollution, noise and vibration.

(2) Representatives of the workers of the undertaking should be informed and consulted in advance by the employer on projects, measures and decisions which are liable to have harmful consequences on the health of workers, in connection with air pollution, noise and vibration in the working environment.

(3) Before being assigned to work liable to involve exposure to hazards of air pollution, noise or vibration, workers should be informed by the employer of the hazards, of safety and health measures, and of possibilities of having recourse to medical services.

22. (1) The competent authority, in close cooperation with employers' and workers' organizations, should promote, assist and stimulate research in the field of prevention and control of hazards in the working environment due to air pollution, noise and vibration, with the assistance, as appropriate, of international and national organizations.

(2) All concerned should be informed of the objectives and results of such research.

23. Employers' and workers' organizations should take positive action to carry out programmes of training and information with respect to the prevention and control of, and protection against, existing and potential occupational hazards in the working environment due to air pollution, noise and vibration.

24. Workers' representatives within undertakings should have the facilities and necessary time, without loss of pay, to play an active role in respect of the prevention and control of, and the protection against, occupational hazards in the working environment due to air pollution, noise and vibration. For this purpose, they should have the right to seek assistance from recognized experts of their choice.

25. Such measures as are necessary should be taken to secure that, in connection with the use at a workplace of a substance liable to be harmful to health or otherwise dangerous, adequate information is available on —

(a) the results of any relevant tests relating to the substance; and
(b) the conditions required to ensure that, when properly used, it is without danger to the health of workers.
V. MEASURES OF APPLICATION

26. Each Member should —
(a) by laws or regulations or any other method consistent with national practice and conditions take such steps, including the provision of appropriate penalties, as may be necessary to give effect to the provisions of this Recommendation;
(b) provide appropriate inspection services for the purpose of supervising the application of the provisions of this Recommendation, or satisfy itself that appropriate inspection is carried out;
(c) endeavour to do so as speedily as national conditions permit.

27. In giving effect to the provisions of this Recommendation the competent authority should act in consultation with the most representative organizations of employers and workers concerned, and, as appropriate, manufacturers', suppliers' and importers' organizations.

28. (1) The provisions of this Recommendation which relate to the design, manufacture and supply of machinery and equipment to an approved standard should apply forthwith to newly manufactured machinery and equipment.

(2) The competent authority should, as soon as possible, specify time limits appropriate to their nature for the modification of existing machinery and equipment.

Occupational Safety and Health Convention, 1981 (No. 155)

PART I. SCOPE AND DEFINITIONS

Article 1

1. This Convention applies to all branches of economic activity.

2. A Member ratifying this Convention may, after consultation at the earliest possible stage with the representative organizations of employers and workers concerned, exclude from its application, in part or in whole, particular branches of economic activity, such as maritime shipping or fishing, in respect of which special problems of a substantial nature arise.

3. Each Member which ratifies this Convention shall list, in the first report on the application of the Convention submitted under article 22 of the Constitution of the International Labour Organization, any branches which may have been excluded in pursuance of paragraph 2 of this Article, giving the reasons for such exclusion and describing the measures taken to give adequate protection to workers in excluded branches, and shall indicate in subsequent reports any progress towards wider application.

Article 2

1. This Convention applies to all workers in the branches of economic activity covered.

2. A Member ratifying this Convention may, after consultation at the earliest possible stage with the representative organizations of employers and workers concerned, exclude from its application, in part or in whole, limited categories of workers in respect of which there are particular difficulties.

3. Each Member which ratifies this Convention shall list, in the first report on the application of the Convention submitted under article 22 of the Constitution of the International Labour Organization, any limited categories of workers which may have
been excluded in pursuance of paragraph 2 of this Article, giving the reasons for such exclusion, and shall indicate in subsequent reports any progress towards wider application.

Article 3

For the purpose of this Convention —
(a) the term "branches of economic activity" covers all branches in which workers are employed, including the public service;
(b) the term "workers" covers all employed persons, including public employees;
(c) the term "workplace" covers all places where workers need to be or to go by reason of their work and which are under the direct or indirect control of the employer;
(d) the term "regulations" covers all provisions given force of law by the competent authority or authorities;
(e) the term "health", in relation to work, indicates not merely the absence of disease or infirmity; it also includes the physical and mental elements affecting health which are directly related to safety and hygiene at work.

PART II. PRINCIPLES OF NATIONAL POLICY

Article 4

1. Each Member shall, in the light of national conditions and practice, and in consultation with the most representative organizations of employers and workers, formulate, implement and periodically review a coherent national policy on occupational safety, occupational health and the working environment.

2. The aim of the policy shall be to prevent accidents and injury to health arising out of, linked with or occurring in the course of work, by minimizing, so far as is reasonably practicable, the causes of hazards inherent in the working environment.

Article 5

The policy referred to in Article 4 of this Convention shall take account of the following main spheres of action in so far as they affect occupational safety and health and the working environment:
(a) design, testing, choice, substitution, installation, arrangement, use and maintenance of the material elements of work (workplaces, working environment, tools, machinery and equipment, chemical, physical and biological substances and agents, work processes);
(b) relationships between the material elements of work and the persons who carry out or supervise the work, and adaptation of machinery, equipment, working time, organization of work and work processes to the physical and mental capacities of the workers;
(c) training, including necessary further training, qualifications and motivations of persons involved, in one capacity or another, in the achievement of adequate levels of safety and health;
(d) communication and cooperation at the levels of the working group and the undertaking and at all other appropriate levels up to and including the national level;
(e) the protection of workers and their representatives from disciplinary measures as a result of actions properly taken by them in conformity with the policy referred to in Article 4 of this Convention.
Article 6

The formulation of the policy referred to in Article 4 of this Convention shall indicate the respective functions and responsibilities in respect of occupational safety and health and the working environment of public authorities, employers, workers and others, taking account both of the complementary character of such responsibilities and of national conditions and practice.

Article 7

The situation regarding occupational safety and health and the working environment shall be reviewed at appropriate intervals, either overall or in respect of particular areas, with a view to identifying major problems, evolving effective methods for dealing with them and priorities of action, and evaluating results.

PART III. ACTION AT THE NATIONAL LEVEL

Article 8

Each Member shall, by laws or regulations or any other method consistent with national conditions and practice and in consultation with the representative organizations of employers and workers concerned, take such steps as may be necessary to give effect to Article 4 of this Convention.

Article 9

1. The enforcement of laws and regulations concerning occupational safety and health and the working environment shall be secured by an adequate and appropriate system of inspection.

2. The enforcement system shall provide for adequate penalties for violations of the laws and regulations.

Article 10

Measures shall be taken to provide guidance to employers and workers so as to help them to comply with legal obligations.

Article 11

To give effect to the policy referred to in Article 4 of this Convention, the competent authority or authorities shall ensure that the following functions are progressively carried out:

(a) the determination, where the nature and degree of hazards so require, of conditions governing the design, construction and layout of undertakings, the commencement of their operations, major alterations affecting them and changes in their purposes, the safety of technical equipment used at work, as well as the application of procedures defined by the competent authorities;

(b) the determination of work processes and of substances and agents the exposure to which is to be prohibited, limited or made subject to authorization or control by the competent authority or authorities; health hazards due to the simultaneous exposure to several substances or agents shall be taken into consideration;

(c) the establishment and application of procedures for the notification of occupational accidents and diseases, by employers and, when appropriate, insurance institutions and others directly concerned, and the production of annual statistics on occupational accidents and diseases;

(d) the holding of inquiries, where cases of occupational accidents, occupational diseases or any other injuries to health which arise in the course of or in connection with work appear to reflect situations which are serious;
(e) the publication, annually, of information on measures taken in pursuance of the policy referred to in Article 4 of this Convention and on occupational accidents, occupational diseases and other injuries to health which arise in the course of or in connection with work;

(f) the introduction or extension of systems, taking into account national conditions and possibilities, to examine chemical, physical and biological agents in respect of the risk to the health of workers.

Article 12

Measures shall be taken, in accordance with national law and practice, with a view to ensuring that those who design, manufacture, import, provide or transfer machinery, equipment or substances for occupational use —

(a) satisfy themselves that, so far as is reasonably practicable, the machinery, equipment or substance does not entail dangers for the safety and health of those using it correctly;

(b) make available information concerning the correct installation and use of machinery and equipment and the correct use of substances, and information on hazards of machinery and equipment and dangerous properties of chemical substances and physical and biological agents or products, as well as instructions on how hazards are to be avoided;

(c) undertake studies and research or otherwise keep abreast of the scientific and technical knowledge necessary to comply with subparagraphs (a) and (b) of this Article.

Article 13

A worker who has removed himself from a work situation which he has reasonable justification to believe presents an imminent and serious danger to his life or health shall be protected from undue consequences in accordance with national conditions and practice.

Article 14

Measures shall be taken with a view to promoting in a manner appropriate to national conditions and practice, the inclusion of questions of occupational safety and health and the working environment at all levels of education and training, including higher technical, medical and professional education, in a manner meeting the training needs of all workers.

Article 15

1. With a view to ensuring the coherence of the policy referred to in Article 4 of this Convention and of measures for its application, each Member shall, after consultation at the earliest possible stage with the most representative organizations of employers and workers, and with other bodies as appropriate, make arrangements appropriate to national conditions and practice to ensure the necessary coordination between various authorities and bodies called upon to give effect to Parts II and III of this Convention.

2. Whenever circumstances so require and national conditions and practice permit, these arrangements shall include the establishment of a central body.

PART IV. ACTION AT THE LEVEL OF THE UNDERTAKING

Article 16

1. Employers shall be required to ensure that, so far as is reasonably practicable, the workplaces, machinery, equipment and processes under their control are safe and without risk to health.
2. Employers shall be required to ensure that, so far as is reasonably practicable, the chemical, physical and biological substances and agents under their control are without risk to health when the appropriate measures of protection are taken.

3. Employers shall be required to provide, where necessary, adequate protective clothing and protective equipment to prevent, so far is reasonably practicable, risk of accidents or of adverse effects on health.

Article 17

Whenever two or more undertakings engage in activities simultaneously at one workplace, they shall collaborate in applying the requirements of this Convention.

Article 18

Employers shall be required to provide, where necessary, for measures to deal with emergencies and accidents, including adequate first-aid arrangements.

Article 19

There shall be arrangements at the level of the undertaking under which —

(a) workers, in the course of performing their work, cooperate in the fulfilment by their employer of the obligations placed upon him;

(b) representatives of workers in the undertaking cooperate with the employer in the field of occupational safety and health;

(c) representatives of workers in an undertaking are given adequate information on measures taken by the employer to secure occupational safety and health and may consult their representative organizations about such information provided they do not disclose commercial secrets;

(d) workers and their representatives in the undertaking are given appropriate training in occupational safety and health;

(e) workers or their representatives and, as the case may be, their representative organizations in an undertaking, in accordance with national law and practice, are enabled to enquire into, and are consulted by the employer on, all aspects of occupational safety and health associated with their work; for this purpose technical advisers may, by mutual agreement, be brought in from outside the undertaking;

(f) a worker reports forthwith to his immediate supervisor any situation which he has reasonable justification to believe presents an imminent and serious danger to his life or health; until the employer has taken remedial action, if necessary, the employer cannot require workers to return to a work situation where there is continuing imminent and serious danger to life or health.

Article 20

Cooperation between management and workers and/or their representatives within the undertaking shall be an essential element of organizational and other measures taken in pursuance of Articles 16 to 19 of this Convention.

Article 21

Occupational safety and health measures shall not involve any expenditure for the workers.
Occupational Health Services Convention, 1985 (No. 161)

PART I. PRINCIPLES OF NATIONAL POLICY

Article 1

For the purpose of this Convention —

(a) the term "occupational health services" means services entrusted with essentially preventive functions and responsible for advising the employer, the workers and their representatives in the undertaking on —

(i) the requirements for establishing and maintaining a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work;

(ii) the adaptation of work to the capabilities of workers in the light of their state of physical and mental health;

(b) the term "workers' representatives in the undertaking" means persons who are recognized as such under national law or practice.

Article 2

In the light of national conditions and practice and in consultation with the most representative organizations of employers and workers, where they exist, each Member shall formulate, implement and periodically review a coherent national policy on occupational health services.

Article 3

1. Each Member undertakes to develop progressively occupational health services for all workers, including those in the public sector and the members of production cooperatives, in all branches of economic activity and all undertakings. The provision made should be adequate and appropriate to the specific risks of the undertakings.

2. If occupational health services cannot be immediately established for all undertakings, each Member concerned shall draw up plans for the establishment of such services in consultation with the most representative organizations of employers and workers, where they exist.

3. Each Member concerned shall indicate, in the first report on the application of the Convention submitted under article 22 of the Constitution of the International Labour Organization, the plans drawn up pursuant to paragraph 2 of this Article, and indicate in subsequent reports any progress in their application.

Article 4

The competent authority shall consult the most representative organizations of employers and workers, where they exist, on the measures to be taken to give effect to the provisions of this Convention.

PART II. FUNCTIONS

Article 5

Without prejudice to the responsibility of each employer for the health and safety of the workers in his employment, and with due regard to the necessity for the workers to participate in matters of occupational health and safety, occupational health services shall have such of the following functions as are adequate and appropriate to the occupational risks of the undertaking:
Appendix III

(a) identification and assessment of the risks from health hazards in the workplace;
(b) surveillance of the factors in the working environment and working practices which may affect workers' health, including sanitary installations, canteens and housing where these facilities are provided by the employer;
(c) advice on planning and organization of work, including the design of workplaces, on the choice, maintenance and condition of machinery and other equipment and on substances used in work;
(d) participation in the development of programmes for the improvement of working practices as well as testing and evaluation of health aspects of new equipment;
(e) advice on occupational health, safety and hygiene and on ergonomics and individual and collective protective equipment;
(f) surveillance of workers' health in relation to work;
(g) promoting the adaptation of work to the worker;
(h) contribution to measures of vocational rehabilitation;
(i) collaboration in providing information, training and education in the fields of occupational health and hygiene and ergonomics;
(j) organizing of first aid and emergency treatment;
(k) participation in analysis of occupational accidents and occupational diseases.

PART III. ORGANIZATION

Article 6

Provision shall be made for the establishment of occupational health services —
(a) by laws or regulations; or
(b) by collective agreements or as otherwise agreed upon by the employers and workers concerned; or
(c) in any other manner approved by the competent authority after consultation with the representative organizations of employers and workers concerned.

Article 7

1. Occupational health services may be organized as a service for a single undertaking or as a service common to a number of undertakings, as appropriate.

2. In accordance with national conditions and practice, occupational health services may be organized by —
(a) the undertakings or groups of undertakings concerned;
(b) public authorities or official services;
(c) social security institutions;
(d) any other bodies authorised by the competent authority;
(e) a combination of any of the above.

Article 8

The employer, the workers and their representatives, where they exist, shall cooperate and participate in the implementation of the organizational and other measures relating to occupational health services on an equitable basis.

PART IV. CONDITIONS OF OPERATION

Article 9

1. In accordance with national law and practice, occupational health services should be multidisciplinary. The composition of the personnel shall be determined by the nature of the duties to be performed.
2. Occupational health services shall carry out their functions in cooperation with the other services in the undertaking.

3. Measures shall be taken, in accordance with national law and practice, to ensure adequate cooperation and coordination between occupational health services and, as appropriate, other bodies concerned with the provision of health services.

Article 10

The personnel providing occupational health services shall enjoy full professional independence from employers, workers, and their representatives, where they exist, in relation to the functions listed in Article 5.

Article 11

The competent authority shall determine the qualifications required for the personnel providing occupational health services, according to the nature of the duties to be performed and in accordance with national law and practice.

Article 12

The surveillance of workers' health in relation to work shall involve no loss of earnings for them, shall be free of charge and shall take place as far as possible during working hours.

Article 13

All workers shall be informed of health hazards involved in their work.

Article 14

Occupational health services shall be informed by the employer and workers of any known factors and any suspected factors in the working environment which may affect the workers' health.

Article 15

Occupational health services shall be informed of occurrences of ill health amongst workers and absence from work for health reasons, in order to be able to identify whether there is any relation between the reasons for ill health or absence and any health hazards which may be present at the workplace. Personnel providing occupational health services shall not be required by the employer to verify the reasons for absence from work.

Part V. General provisions

Article 16

National laws or regulations shall designate the authority or authorities responsible both for supervising the operation of and for advising occupational health services once they have been established.

.....
Asbestos Convention, 1986 (No. 162)

PART I. SCOPE AND DEFINITIONS

Article 1

1. This Convention applies to all activities involving exposure of workers to asbestos in the course of work.

2. A Member ratifying this Convention may, after consultation with the most representative organizations of employers and workers concerned, and on the basis of an assessment of the health hazards involved and the safety measures applied, exclude particular branches of economic activity or particular undertakings from the application of certain provisions of the Convention when it is satisfied that their application to these branches or undertakings is unnecessary.

3. The competent authority, when deciding on the exclusion of particular branches of economic activity or particular undertakings, shall take into account the frequency, duration and level of exposure, as well as the type of work and the conditions at the workplace.

Article 2

For the purpose of this Convention —

(a) the term “asbestos” means the fibrous form of mineral silicates belonging to rock-forming minerals of the serpentine group, i.e. chrysotile (white asbestos), and of the amphibole group, i.e. actinolite, amosite (brown asbestos, cummingtonite-grunerite), anthophyllite, crocidolite (blue asbestos), tremolite, or any mixture containing one or more of these;

(b) the term “asbestos dust” means airborne particles of asbestos or settled particles of asbestos which are liable to become airborne in the working environment;

(c) the term “airborne asbestos dust” means, for purposes of measurement, dust particles measured by gravimetric assessment or other equivalent method;

(d) the term “respirable asbestos fibres” means asbestos fibres having a diameter of less than 3 μm and a length-to-diameter ratio greater than 3 : 1. Only fibres of a length greater than 5 μm shall be taken into account for purposes of measurement;

(e) the term “exposure to asbestos” means exposure at work to airborne respirable asbestos fibres or asbestos dust, whether originating from asbestos or from minerals, materials or products containing asbestos;

(f) the term “workers” includes the members of production cooperatives;

(g) the term “workers' representatives” means the workers' representatives recognised as such by national law or practice, in conformity with the Workers' Representatives Convention, 1971.

PART II. GENERAL PRINCIPLES

Article 3

1. National laws or regulations shall prescribe the measures to be taken for the prevention and control of, and protection of workers against, health hazards due to occupational exposure to asbestos.

2. National laws and regulations drawn up in pursuance of paragraph 1 of this Article shall be periodically reviewed in the light of technical progress and advances in scientific knowledge.
3. The competent authority may permit temporary derogations from the measures prescribed pursuant to paragraph 1 of this Article, under conditions and within limits of time to be determined after consultation with the most representative organizations of employers and workers concerned.

4. In granting derogations in pursuance of paragraph 3 of this Article, the competent authority shall ensure that the necessary precautions are taken to protect the workers' health.

**Article 4**

The competent authority shall consult the most representative organizations of employers and workers concerned on the measures to be taken to give effect to the provisions of this Convention.

**Article 5**

1. The enforcement of the laws and regulations adopted pursuant to Article 3 of this Convention shall be secured by an adequate and appropriate system of inspection.

2. National laws or regulations shall provide for the necessary measures, including appropriate penalties, to ensure effective enforcement of and compliance with the provisions of this Convention.

**Article 6**

1. Employers shall be made responsible for compliance with the prescribed measures.

2. Whenever two or more employers undertake activities simultaneously at one workplace, they shall cooperate in order to comply with the prescribed measures, without prejudice to the responsibility of each employer for the health and safety of the workers he employs. The competent authority shall prescribe the general procedures of this cooperation when it is necessary.

3. Employers shall, in cooperation with the occupational safety and health services, and after consultation with the workers' representatives concerned, prepare procedures for dealing with emergency situations.

**Article 7**

Workers shall be required, within the limits of their responsibility, to comply with prescribed safety and hygiene procedures relating to the prevention and control of, and protection against, health hazards due to occupational exposure to asbestos.

**Article 8**

Employers and workers or their representatives shall cooperate as closely as possible at all levels in the undertaking in the application of the measures prescribed pursuant to this Convention.

**PART III. PROTECTIVE AND PREVENTIVE MEASURES**

**Article 9**

The national laws or regulations adopted pursuant to Article 3 of this Convention shall provide that exposure to asbestos shall be prevented or controlled by one or more of the following measures:
(a) making work in which exposure to asbestos may occur subject to regulations prescribing adequate engineering controls and work practices, including workplace hygiene;
(b) prescribing special rules and procedures, including authorization, for the use of asbestos or of certain types of asbestos or products containing asbestos or for certain work processes.

**Article 10**

Where necessary to protect the health of workers and technically practicable, national laws or regulations shall provide for one or more of the following measures —
(a) replacement of asbestos or of certain types of asbestos or products containing asbestos by other materials or products or the use of alternative technology, scientifically evaluated by the competent authority as harmless or less harmful, whenever this is possible;
(b) total or partial prohibition of the use of asbestos or of certain types of asbestos or products containing asbestos in certain work processes.

**Article 11**

1. The use of crocidolite and products containing this fibre shall be prohibited.
2. The competent authority shall be empowered, after consultation with the most representative organizations of employers and workers concerned, to permit derogations from the prohibition contained in paragraph 1 of this Article when replacement is not reasonably practicable, provided that steps are taken to ensure that the health of workers is not placed at risk.

**Article 12**

1. Spraying of all forms of asbestos shall be prohibited.
2. The competent authority shall be empowered, after consultation with the most representative organizations of employers and workers concerned, to permit derogations from the prohibition contained in paragraph 1 of this Article when alternative methods are not reasonably practicable, provided that steps are taken to ensure that the health of workers is not placed at risk.

**Article 13**

National laws and regulations shall provide that employers shall notify to the competent authority, in a manner and to the extent prescribed by it, certain types of work involving exposure to asbestos.

**Article 14**

Producers and suppliers of asbestos and manufacturers and suppliers of products containing asbestos shall be made responsible for adequate labelling of the container and, where appropriate, the products, in a language and manner easily understood by the workers and the users concerned, as prescribed by the competent authority.

**Article 15**

1. The competent authority shall prescribe limits for the exposure of workers to asbestos or other exposure criteria for the evaluation of the working environment.
2. The exposure limits or other exposure criteria shall be fixed and periodically reviewed and updated in the light of technological progress and advances in technological and scientific knowledge.
3. In all workplaces where workers are exposed to asbestos, the employer shall take all appropriate measures to prevent or control the release of asbestos dust into the air, to ensure that the exposure limits or other exposure criteria are complied with and also to reduce exposure to as low a level as is reasonably practicable.

4. When the measures taken in pursuance of paragraph 3 of this Article do not bring exposure to asbestos within the exposure limits or do not comply with the other exposure criteria specified in pursuance of paragraph 1 of this Article, the employer shall provide, maintain and replace, as necessary, at no cost to the workers, adequate respiratory protective equipment and special protective clothing as appropriate. Respiratory protective equipment shall comply with standards set by the competent authority, and be used only as a supplementary, temporary, emergency or exceptional measure and not as an alternative to technical control.

Article 16

Each employer shall be made responsible for the establishment and implementation of practical measures for the prevention and control of the exposure of the workers he employs to asbestos and for their protection against the hazards due to asbestos.

Article 17

1. Demolition of plants or structures containing friable asbestos insulation materials, and removal of asbestos from buildings or structures in which asbestos is liable to become airborne, shall be undertaken only by employers or contractors who are recognized by the competent authority as qualified to carry out such work in accordance with the provisions of this Convention and who have been empowered to undertake such work.

2. The employer or contractor shall be required before starting demolition work to draw up a work plan specifying the measures to be taken, including measures to —
   (a) provide all necessary protection to the workers;
   (b) limit the release of asbestos dust into the air; and
   (c) provide for the disposal of waste containing asbestos in accordance with Article 19 of this Convention.

3. The workers or their representatives shall be consulted on the work plan referred to in paragraph 2 of this Article.

Article 18

1. Where workers' personal clothing may become contaminated with asbestos dust, the employer, in accordance with national laws or regulations and in consultation with the workers' representatives, shall provide appropriate work clothing, which shall not be worn outside the workplace.

2. The handling and cleaning of used work clothing and special protective clothing shall be carried out under controlled conditions, as required by the competent authority, to prevent the release of asbestos dust.

3. National laws or regulations shall prohibit the taking home of work clothing and special protective clothing and of personal protective equipment.

4. The employer shall be responsible for the cleaning, maintenance and storage of work clothing, special protective clothing and personal protective equipment.

5. The employer shall provide facilities for workers exposed to asbestos to wash, take a bath or shower at the workplace, as appropriate.

Article 19

1. In accordance with national law and practice, employers shall dispose of waste containing asbestos in a manner that does not pose a health risk to the workers concerned,
including those handling asbestos waste, or to the population in the vicinity of the enterprise.

2. Appropriate measures shall be taken by the competent authority and by employers to prevent pollution of the general environment by asbestos dust released from the workplace.

**PART IV. SURVEILLANCE OF THE WORKING ENVIRONMENT AND WORKERS' HEALTH**

**Article 20**

1. Where it is necessary for the protection of the health of workers, the employer shall measure the concentrations of airborne asbestos dust in workplaces, and shall monitor the exposure of workers to asbestos at intervals and using methods specified by the competent authority.

2. The records of the monitoring of the working environment and of the exposure of workers to asbestos shall be kept for a period prescribed by the competent authority.

3. The workers concerned, their representatives and the inspection services shall have access to these records.

4. The workers or their representatives shall have the right to request the monitoring of the working environment and to appeal to the competent authority concerning the results of the monitoring.

**Article 21**

1. Workers who are or have been exposed to asbestos shall be provided, in accordance with national law and practice, with such medical examinations as are necessary to supervise their health in relation to the occupational hazard, and to diagnose occupational diseases caused by exposure to asbestos.

2. The monitoring of workers' health in connection with the use of asbestos shall not result in any loss of earnings for them. It shall be free of charge and, as far as possible, shall take place during working hours.

3. Workers shall be informed in an adequate and appropriate manner of the results of their medical examinations and receive individual advice concerning their health in relation to their work.

4. When continued assignment to work involving exposure to asbestos is found to be medically inadvisable, every effort shall be made, consistent with national conditions and practice, to provide the workers concerned with other means of maintaining their income.

5. The competent authority shall develop a system of notification of occupational diseases caused by asbestos.

**PART V. INFORMATION AND EDUCATION**

**Article 22**

1. The competent authority shall make appropriate arrangements, in consultation and collaboration with the most representative organizations of employers and workers concerned, to promote the dissemination of information and the education of all concerned with regard to health hazards due to exposure to asbestos and to methods of prevention and control.
2. The competent authority shall ensure that employers have established written policies and procedures on measures for the education and periodic training of workers on asbestos hazards and methods of prevention and control.

3. The employer shall ensure that all workers exposed or likely to be exposed to asbestos are informed about the health hazards related to their work, instructed in preventive measures and correct work practices and receive continuing training in these fields.

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**Chemicals Convention, 1990 (No. 170)**

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**PART I. SCOPE AND DEFINITIONS**

**Article 1**

1. This Convention applies to all branches of economic activity in which chemicals are used.

2. The competent authority of a Member ratifying this Convention, after consulting the most representative organizations of employers and workers concerned, and on the basis of an assessment of the hazards involved and the protective measures to be applied:

   (a) may exclude particular branches of economic activity, undertakings or products from the application of the Convention, or certain provisions thereof, when:

      (i) special problems of a substantial nature arise; and

      (ii) the overall protection afforded in pursuance of national law and practice is not inferior to that which would result from the full application of the provisions of the Convention;

   (b) shall make special provision to protect confidential information whose disclosure to a competitor would be liable to cause harm to an employer's business so long as the safety and health of workers are not compromised thereby.

3. This Convention does not apply to articles which will not expose workers to a hazardous chemical under normal or reasonably foreseeable conditions of use.

4. This Convention does not apply to organisms, but does apply to chemicals derived from organisms.

**Article 2**

For the purposes of this Convention:

(a) the term "chemicals" means chemical elements and compounds, and mixtures thereof, whether natural or synthetic;

(b) the term "hazardous chemical" includes any chemical which has been classified as hazardous in accordance with Article 6 or for which relevant information exists to indicate that the chemical is hazardous;

(c) the term "use of chemicals at work" means any work activity which may expose a worker to a chemical, including:

   (i) the production of chemicals;

   (ii) the handling of chemicals;

   (iii) the storage of chemicals;

   (iv) the transport of chemicals;

   (v) the disposal and treatment of waste chemicals;

   (vi) the release of chemicals resulting from work activities;

   (vii) the maintenance, repair and cleaning of equipment and containers for chemicals;
(d) the term "branches of economic activity" means all branches in which workers are employed, including the public service;

(e) the term "article" means an object which is formed to a specific shape or design during its manufacture or which is in its natural shape, and whose use in that form is dependent in whole or in part on its shape or design;

(f) the term "workers' representatives" means persons who are recognized as such by national law or practice, in accordance with the Workers' Representatives Convention, 1971.

**PART II. GENERAL PRINCIPLES**

**Article 3**

The most representative organizations of employers and workers concerned shall be consulted on the measures to be taken to give effect to the provisions of this Convention.

**Article 4**

In the light of national conditions and practice and in consultation with the most representative organizations of employers and workers, each Member shall formulate, implement and periodically review a coherent policy on safety in the use of chemicals at work.

**Article 5**

The competent authority shall have the power, if justified on safety and health grounds, to prohibit or restrict the use of certain hazardous chemicals, or to require advance notification and authorization before such chemicals are used.

**PART III. CLASSIFICATION AND RELATED MEASURES**

**Article 6**

**CLASSIFICATION SYSTEMS**

1. Systems and specific criteria appropriate for the classification of all chemicals according to the type and degree of their intrinsic health and physical hazards and for assessing the relevance of the information required to determine whether a chemical is hazardous shall be established by the competent authority, or by a body approved or recognized by the competent authority, in accordance with national or international standards.

2. The hazardous properties of mixtures composed of two or more chemicals may be determined by assessments based on the intrinsic hazards of their component chemicals.

3. In the case of transport, such systems and criteria shall take into account the United Nations Recommendations on the transport of dangerous goods.

4. The classification systems and their application shall be progressively extended.

**Article 7**

**LABELLING AND MARKING**

1. All chemicals shall be marked so as to indicate their identity.

2. Hazardous chemicals shall in addition be labelled, in a way easily understandable to the workers, so as to provide essential information regarding their classification, the hazards they present and the safety precautions to be observed.
3. (1) Requirements for marking or labelling chemicals pursuant to paragraphs 1 and 2 of this Article shall be established by the competent authority, or by a body approved or recognized by the competent authority, in accordance with national or international standards.

(2) In the case of transport, such requirements shall take into account the United Nations Recommendations on the transport of dangerous goods.

Article 8
CHEMICAL SAFETY DATA SHEETS

1. For hazardous chemicals, chemical safety data sheets containing detailed essential information regarding their identity, supplier, classification, hazards, safety precautions and emergency procedures shall be provided to employers.

2. Criteria for the preparation of chemical safety data sheets shall be established by the competent authority, or by a body approved or recognized by the competent authority, in accordance with national or international standards.

3. The chemical or common name used to identify the chemical on the chemical safety data sheet shall be the same as that used on the label.

Article 9
RESPONSIBILITIES OF SUPPLIERS

1. Suppliers of chemicals, whether manufacturers, importers or distributors, shall ensure that:
   (a) such chemicals have been classified in accordance with Article 6 on the basis of knowledge of their properties and a search of available information or assessed in accordance with paragraph 3 below;
   (b) such chemicals are marked so as to indicate their identity in accordance with Article 7, paragraph 1;
   (c) hazardous chemicals they supply are labelled in accordance with Article 7, paragraph 2;
   (d) chemical safety data sheets are prepared for such hazardous chemicals in accordance with Article 8, paragraph 1, and provided to employers.

2. Suppliers of hazardous chemicals shall ensure that revised labels and chemical safety data sheets are prepared and provided to employers, by a method which accords with national law and practice, whenever new relevant safety and health information becomes available.

3. Suppliers of chemicals which have not yet been classified in accordance with Article 6 shall identify the chemicals they supply and assess the properties of these chemicals on the basis of a search of available information in order to determine whether they are hazardous chemicals.

PART IV. RESPONSIBILITIES OF EMPLOYERS

Article 10
IDENTIFICATION

1. Employers shall ensure that all chemicals used at work are labelled or marked as required by Article 7 and that chemical safety data sheets have been provided as required by Article 8 and are made available to workers and their representatives.

2. Employers receiving chemicals that have not been labelled or marked as required under Article 7, or for which chemical safety data sheets have not been provided as required under Article 8, shall obtain the relevant information from the supplier or from
other reasonably available sources, and shall not use the chemicals until such information is obtained.

3. Employers shall ensure that only chemicals which are classified in accordance with Article 6 or identified and assessed in accordance with Article 9, paragraph 3, and labelled or marked in accordance with Article 7 are used and that any necessary precautions are taken when they are used.

4. Employers shall maintain a record of hazardous chemicals used at the workplace, cross-referenced to the appropriate chemical safety data sheets. This record shall be accessible to all workers concerned and their representatives.

Article 11
TRANSFER OF CHEMICALS

Employers shall ensure that when chemicals are transferred into other containers or equipment, the contents are indicated in a manner which will make known to workers their identity, any hazards associated with their use and any safety precautions to be observed.

Article 12
EXPOSURE

Employers shall:
(a) ensure that workers are not exposed to chemicals to an extent which exceeds exposure limits or other exposure criteria for the evaluation and control of the working environment established by the competent authority, or by a body approved or recognized by the competent authority, in accordance with national or international standards;
(b) assess the exposure of workers to hazardous chemicals;
(c) monitor and record the exposure of workers to hazardous chemicals when this is necessary to safeguard their safety and health or as may be prescribed by the competent authority;
(d) ensure that the records of the monitoring of the working environment and of the exposure of workers using hazardous chemicals are kept for a period prescribed by the competent authority and are accessible to the workers and their representatives.

Article 13
OPERATIONAL CONTROL

1. Employers shall make an assessment of the risks arising from the use of chemicals at work, and shall protect workers against such risks by appropriate means, such as:
(a) the choice of chemicals that eliminate or minimize the risk;
(b) the choice of technology that eliminates or minimizes the risk;
(c) the use of adequate engineering control measures;
(d) the adoption of working systems and practices that eliminate or minimize the risk;
(e) the adoption of adequate occupational hygiene measures;
(f) where recourse to the above measures does not suffice, the provision and proper maintenance of personal protective equipment and clothing at no cost to the worker, and the implementation of measures to ensure their use.

2. Employers shall:
(a) limit exposure to hazardous chemicals so as to protect the safety and health of workers;
(b) provide first aid;
(c) make arrangements to deal with emergencies.


Article 14
DISPOSAL

Hazardous chemicals which are no longer required and containers which have been emptied but which may contain residues of hazardous chemicals, shall be handled or disposed of in a manner which eliminates or minimizes the risk to safety and health and to the environment, in accordance with national law and practice.

Article 15
INFORMATION AND TRAINING

Employers shall:
(a) inform the workers of the hazards associated with exposure to chemicals used at the workplace;
(b) instruct the workers how to obtain and use the information provided on labels and chemical safety data sheets;
(c) use the chemical safety data sheets, along with information specific to the workplace, as a basis for the preparation of instructions to workers, which should be written if appropriate;
(d) train the workers on a continuing basis in the practices and procedures to be followed for safety in the use of chemicals at work.

Article 16
COOPERATION

Employers, in discharging their responsibilities, shall cooperate as closely as possible with workers or their representatives with respect to safety in the use of chemicals at work.

PART V. DUTIES OF WORKERS

Article 17

1. Workers shall cooperate as closely as possible with their employers in the discharge by the employers of their responsibilities and comply with all procedures and practices relating to safety in the use of chemicals at work.

2. Workers shall take all reasonable steps to eliminate or minimize risk to themselves and to others from the use of chemicals at work.

PART VI. RIGHTS OF WORKERS AND THEIR REPRESENTATIVES

Article 18

1. Workers shall have the right to remove themselves from danger resulting from the use of chemicals when they have reasonable justification to believe there is an imminent and serious risk to their safety or health, and shall inform their supervisor immediately.

2. Workers who remove themselves from danger in accordance with the provisions of the previous paragraph or who exercise any other rights under this Convention shall be protected against undue consequences.

3. Workers concerned and their representatives shall have the right to:
(a) information on the identity of chemicals used at work, the hazardous properties of such chemicals, precautionary measures, education and training;
(b) the information contained in labels and markings;
(c) chemical safety data sheets;
(d) any other information required to be kept by this Convention.
4. Where disclosure of the specific identity of an ingredient of a chemical mixture to a competitor would be liable to cause harm to the employer's business, the employer may, in providing the information required under paragraph 3 above, protect that identity in a manner approved by the competent authority under Article 1, paragraph 2 (b).

PART VII. RESPONSIBILITY OF EXPORTING STATES

Article 19

When in an exporting member State all or some uses of hazardous chemicals are prohibited for reasons of safety and health at work, this fact and the reasons for it shall be communicated by the exporting member State to any importing country.