

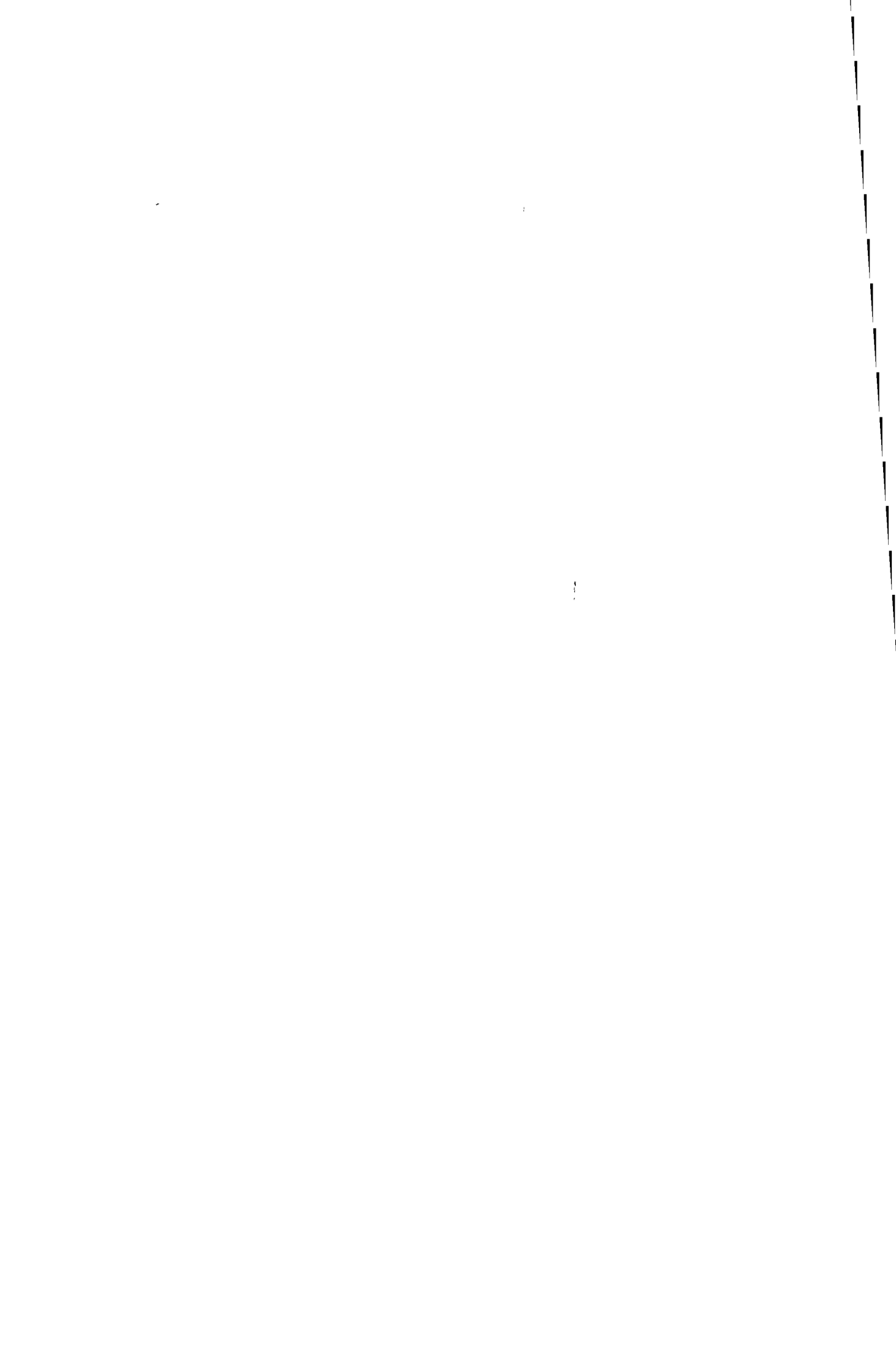
COMMISSION OF THE EUROPEAN COMMUNITIES

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MEMORANDUM

ESTABLISHMENT OF A RESEARCH PROGRAMME "SAFETY IN
MINES"



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"SAFETY IN MINES"

1. Introduction

Article 55 of the European Coal and Steel Community Treaty deals with the promotion and financing of technical and economic research relating to the production and increased use of coal and steel and research for improved occupational safety in the coal and steel industries of the Community.

Since 1969 a total of 2,613,566 units of account has been allocated in 566 pursuance of Article 55 to enable research projects directly related to mine safety to be undertaken. The aid has been mainly for research in the fields of "Underground Fires", "Explosion Arresting Barriers" and "Rescue of Trapped Miners" and currently work is being done on the three subjects in four countries of the Community. Research so far has shown benefits but further research is still desirable in these three fields. In addition to this well established research, financial aid was made available in 1976 for 5 further projects related to safety in mines. These broke new ground in the subjects covered and related to research on frictional ignitions, the use of explosives, the propagation and effects of explosions and the safety of electrical apparatus.

Up to the present projects relating to mine safety have been proposed yearly, in an individual manner, without recourse to an overall programme.

In addition to this direct safety research, Direction "Coal" of Directorate XVII, "Energy", in accordance with its "Medium-term Research Aid Programme for Coal", financially aids technical and economic research, due account being taken of the safety factors which are closely linked to all the techniques and technologies studied. The Mines Safety and Health Commission is also concerned with all facets of mine safety and operates by way of exchanges of practical experiences. Its mandate enables it to recommend that certain researches be undertaken and the results of all pertinent research are brought to the notice of the Commission as they become available.

Besides financially aiding safety research the Community aids research concerning health in mines which, in general, covers all aspects of mine dusts and noxious vapours. Since 1957 there have been three "Health in Mines" programmes, each of 5 years duration and involving total aid of 12,900,000 units of account, the current programme being scheduled for completion in 1976. Having these medium term programmes has enabled all concerned to plan and work within known parameters of time and available finance resulting generally in well co-ordinated research.

In the light of the world energy crisis the Community needs to maintain supplies of indigenous fuel. To this end, in the mining sphere, increased technological progress will be necessary with which increased safety must go hand in hand to ensure mining methods and machines are made as safe as possible and to create the essentially safe working environment so necessary to attract and keep the requisite manpower.

Thus, on several counts, the setting up of a Medium Term Mine Safety Research Programme is desirable. The Programme is needed to ensure adequate research into safety problems, both current and those which will be thrown up by advances in technology and to ensure that the requisite research can be adequately and continuously programmed as would be the case when parameters of time and available finance are fully known.

The need to harmonise all research is a prerequisite and in the formulation and operation of a Programme "Safety in Mines" due account will need to be taken of research undertaken by other bodies, both within and outside the Community, particularly that of manufacturers of equipment for mining.

2. The Safety Programme

1. GENERAL

A programme of safety research should cover not only those aspects of mining relating to potential disasters but also those aspects which, although more often resulting in a single casualty, in the long term take a greater toll of life and limb. It may be that the latter will necessitate a different approach. Always, in the field of safety in mining, one is confronted not only with new problems but also the evolution of old problems, and any safety programme should seek to identify current and future problems bearing in mind particularly changes in methods and machinery. The aim should be to "build in" safety with new techniques and to adopt a system readily identifying dangers not initially apparent so that they can be countered without delay should they arise. Finally, in the context of these general terms, any research should be of such a nature

that tangible results are likely to emerge and these should be translated into terms of practical application to the mining situation.

Problems already posed by increased mechanisation in all its forms, concentration of workings, continuity of working, the working of seams having inferior characteristics, the increase in distances covered by all forms of underground haulage and transport and the use of all forms of conveyance to maximum capacities are likely to intensify, so requiring increased safety research and control to maintain a safe and constantly improving working environment.

The formulation of a Mine Safety Programme and the framework of topics for research has been discussed with the Committee of Producers and Workers on Industrial Safety and Medicine, the Restricted and Plenary Committees of the Mines Safety and Health Commission and national organisations of each country within the Community having intimate knowledge of current problems and developments. A noteworthy feature has been the expressed unanimity of the need for such a programme and the similarity of views and requirements expressed by the various parties. A programme should be defined within a broad framework enabling all the known and anticipated safety problems to be accommodated and sufficiently flexible to cater for unforeseen problems past experience having shown that such problems do arise.

Preparation of a programme has shown that the choice of research topics for past and current financial aid has been justified as further projects in the same fields figured prominently in the suggestions made.

2. CONTENTS OF PROGRAMME

It is proposed that a Research Programme on Mine Safety be formulated under the following main headings under which desirable topics for research are indicated.

a. Fires and Underground Combustion.

As indicated, research in this field has received financial assistance, past and current research being concerned with underground roadway fires, particularly those involving long items of plant such as conveyors and electric cables, causes and early detection of spontaneous combustion and methods of rendering roadway linings fire resistant. Work on these subjects should continue, due regard being taken of new materials, products and developments underground so that suitable criteria can be developed for testing their suitability for mining use as regards fire risk and products of combustion in the event of fire.

In addition research would be related to :

The efficiency of existing methods of fire detection and suppression and where necessary the development of new methods.

The development of apparatus and systems for the monitoring of mine atmospheres for the early detection of combustion.

The fire hazard associated with the use of diesel engines underground.

Fundamental aspects of the oxidation of coal relating to spontaneous combustion.

The effect of fires on the ventilation of mines.

b. Explosions

In this field there is the need to continue research on the different types of explosion arresting barriers with the aim of providing efficient and practical barriers to meet all mining situations.

Further work on the development and practical application of Triggered Barriers should be continued and to this end research would need to :

Compare different Triggered Barriers

Evaluate the performance of these barriers in roadways having a large cross section, in roadways having obstructions in them and in low wide roadways.

Besides work on barriers, under this heading research would be related to :

The development of methods for prevention and safe suppression of firedamp ignitions resulting from frictional sparking.

The determination of parameters for inflammability of hybrid mixtures of inflammable gas and dusts and the inflammability of coal dust as a function of volatile content.

The safety of diesel engines used underground where inflammable atmospheres may exist.

c. Rescue

Again, as with the first two main headings, subjects already aided financially should be continued to develop satisfactory means of rescuing trapped miners involving locating, communicating with, contact and rescue.

Further research would related to :

The design, development, construction and maintenance of self rescuers.

Determination of the parameters for use of self contained breathing apparatus.

d. Surveillance, Telemetry, Remote Control, Automation and Communication

Under this broad heading research work would relate to :

The design, development and application of surveillance instruments to monitor and safeguard all aspects of the underground environment.

The development of systems for remote monitoring and control of the underground environment using the instruments developed.

The study of automated and remotely controlled systems to assess their performance and safety.

The development of systems of underground communication both for all the benefits accruing from immediate, efficient communication and also to ensure contact with persons working alone or remote from others.

e. Methods of Working

Under this very general heading would come all aspects related to current and possible methods of exploitation and would include research on the following :

The safety aspects of methods and machinery.

Underground mining waters, with the aim of determining the origin of waters and relating waters to the presence of old workings.

Rockbursts in all their aspects.

Strata stability, particularly in pillar and room workings.

Materials for consolidating and improving adverse strata conditions and their conditions of use.

The development of methods of sealing mine areas and roadways, particularly in adverse circumstances and with emphasis on achieving satisfactory sealing from a position remote from the siting of the seal.

Mining explosives, to develop and ensure the use of satisfactory explosives for present mining circumstances.

In this category would be included research related to noise, vibration, lighting and climate in mines, associated with which would be requisite studies on mine ventilation.

f. Electricity

In addition to the proposed research on intrinsic safety and flameproof enclosures further work on the safety of electrical networks and static electricity would be done and this would include :

The study of fault and leakage currents and rapid tripping circuit breakers.

The study of all aspects of static electricity particularly in the context of the greater use of synthetic materials in mines.

g. Metallurgy

Under this heading would be grouped all research work of a metallurgical character. Apparatus used in the mining environment is subject to large and varying stresses, the

safety of the whole depending on the strength of the individual parts. Research would be devoted to :

The study of the behaviour of ropes, chains and chain connectors as used for conveying, haulage and winding operations in mines, the determination of suitable operating parameters and the design and development of relevant non destructive testing equipment.

In this section would be included study of light alloys to determine if possible satisfactory means of eliminating or controlling their incendiarity.

h. Accidents and Accident Information

Safety in the mining environment is often a function of the individual and the application of measures resulting from studies of incidents and accidents.

Research into aspects covering these would include :

Investigation into systems and methods of presenting data relating to accident prevention, to determine the most efficient and beneficial method.

The study of "common" accidents by the use of questionnaire machines which would enable the many minor accidents which occur daily, and on which no or little information is presently collected, to be studied.

One aspect thrown up by present accident statistics is the high incidence of accidents occurring in situations relating to underground haulage and transport. This subject demands prompt attention and studies would be undertaken to improve existing systems and to try to

evolve better and safer systems of both men and materials transport in all situations.

3. Undertaking of Research Work

The research work under the Safety Programme would, in general, be undertaken by the mining research institutes in the countries of the Community. These institutes have, over many years, undertaken research into mine safety and health problems and are fully capable of doing any work proposed by the Safety Programme. Research would be allocated to the institutes according to their particular facilities and general direction of research so that the Programme would be completed in the most efficient and beneficial manner.

4. Procedures

After a Research Programme proposed by the Commission has been satisfactorily considered by the Consultative Committee of the European Coal and Steel Community and has received the assent of the Council of the European Communities the necessary executive and consultative procedures are adopted by the Commission to ensure fulfilment of the Programme.

Three advisory committees, the Research Committee, the Committee of Producers and Workers on Industrial Safety and Medicine and the Committee of Government Experts, all composed of members having the necessary expertise, offer pertinent advice to the executive when projects are being considered.

On acceptance of a project by the Commission it is controlled by a relevant contract detailing all requirements including

periodic submission of technical reports. These are discussed by Working Groups or Experts Committees whose members have specialised knowledge which enables them to offer relevant advice.

This system has worked well over a considerable period of time and it is proposed that it be extended to the Safety Programme. The number of Groups and Committees would be as few as possible and the members within the bodies kept to a satisfactory minimum.

5. Results of Research

It is essential that all details and results of research are made known to all interested bodies. By the procedure described above dissemination of information on research is achieved through the members of the Groups and Committees of Experts, members receiving, with minimum delay, all technical reports falling within the ambit of their particular Group or Committee. In this way necessary information is made available to mining industries in the member countries of the Community.

For wider dissemination precied information on research being undertaken, results and patents are contained in Abstracts published and distributed by the Commission. In addition any person or body requiring fuller information may obtain complete reports on any aided research upon request. Also, during the lifetime of a Programme, a report detailing projects, progress and other relevant information is published and distributed.

These methods have proved satisfactory and it is proposed that similar methods would be applied to a Mine Safety Programme.

6. Financial Aspects and Duration
of Programme

A Programme of Safety Research, as indeed with any research programme, should be of sufficient duration to enable tangible results to be achieved and as short as possible to enable the benefits arising from the studies to be implemented practically as quickly as possible.

Past experience has shown that in general a Programme of 5 years duration is satisfactory and this period is proposed for the Safety Programme, to become operative in 1976. In general, projects included in the Programme would be of two years duration.

With experience of financially aided research already having been done by the institutes which, for the most part, will do the research proposed under the Safety Programme a reasonable estimate of the cost of financial aid from the Community can be obtained.

Financial aid by the Community can be a maximum of 75% of the total costs of a research project the beneficiary meeting the remainder. Over the years the cost of research, as with everything, has escalated and in arriving at a factual costing the possibility of a continuation of this trend over the next few years must be borne in mind. Many of the institutes already possess facilities essential for realistic research and to minimise cost it is imperative that the research work is correctly distributed so as to maximise the use of existing facilities and hence minimise Programme spending.

In addition to the direct research costs sufficient credit should be made available to finance Programme running costs.

Such costs comprise those for the holding of all necessary meetings relative to the Programme, travelling and subsistence allowances for experts and research workers, the organisation and running of study or information seminars and the publishing and dissemination of the results of the research undertaken.

Considering all these aspects, to give a suitable Programme which would contribute substantially towards increased safety in mines a total financial aid of 7,500,000 European Units of Account over a period of 5 years is considered necessary.

7. C o n c l u s i o n s

The Commission of the European Communities,

- considering the need to promote research in mine safety and adapt it to the methods of production and working evolved;
- taking account of the favourable opinions and full agreement of the professional, governmental and scientific consultative committees as well as the expressed views on research by the institutes and specialised bodies consulted;
- considering Article 55 of the European Coal and Steel Community Treaty;

Proposes :

- to assign 7,500,000 European Units of Account for the realisation, .. over a period of five years commencing in 1976, of a 'Research Programme "Safety in Mines"'. .

