6.1 INTRODUCTION:
This chapter deals with the management of safety in Indian coal mines. It is divided into three sections. The First Section deals with Policy and planning; the Second with Organisation of safety and the third with the administration of safety.

SECTION - I

POLICY AND PLANNING

6.2 POLICY:
One of the principal objects of nationalisation of coal mines was to improve standard of safety in coal mines. That objective continues to remain the main motivator behind the safety policy which is to have Zero Accident Policy as its ultimate goal. The strategy followed is to identify clearly the policy goals and achieve them through the adoption of a policy of MBO (Management By Objectives).

6.3 THE IDENTIFICATION OF GOAL:
Objectives form an essential part of management practice at any time. Objective setting in relation to accidents is not only possible but desirable in effectively practicing management of health and safety. There is of course the general vague objective of creating safer
pits but quantification is possible and desirable. There must be no confusion with objectives and targets or aims. The target must be zero fatalities but this would never be accepted as an objective for accountability purposes. An objective has to be set that is capable, by effort, of achievement.

The point is that managing towards objective means the deliberate programming of effort, with resources, at removing hazards. This thinking leads to the "event concept". It is the accidental event which has to be controlled, the event regardless of the part of the body injured, of the age of the man, and of the time of the shift.

6.4 DESIGNING FOR ZERO ACCIDENT POTENTIAL

The proposal now for making mines safer yet is that of Zero Accident Potential (ZAP) and designing to achieve it. It presupposes that a design is effected that will actually not contain any propensity to an accident - that is it has a zero potential for an accident. The concept can only be achieved by designing to eliminate a hazard, any remaining hazard, however well guarded against, will generate an accident potential with a probability of greater than zero. An example is that of chainless power loader haulages where no accident can occur from whipping of broken haulage chains because there is no chain and there is Zero accident potential for this hazard. Similarly cable elimination have removed the hazards associated with this activity.

Removal of men will ensure that no injury producing accident occurs to them, even though the hazard remains. The technique is
not, however, quite as valuable as elimination of the hazard itself because a non-injury producing accident event can still occur, which whilst not hurting anybody will certainly depress the efficiency and productivity of the system.

The worthwhile design effort is certainly not within the competence of, nor should be regarded as the prerogative of or unique responsibility of, the safety engineer. Effective designing for ZAP or, if current technology does not permit this, designing for minimum achievable potential (MAP) for accidents must be the function of every engineer practicing in his own discipline.

It is now contended that more positive thinking by the designers of machines and systems and anticipation of hazards will cause superior design to be evolved and the goal of ZAP more nearly achieved by them.

Bitter historical experience and a wealth of information is available for planning stage effort in order to approach ZAP more closely in systems now being engineered.

If there is real value in the concept of designing for safer systems it seems right that the concept should be tested. An analysis of a random sample of 160 injury producing accidents examined by the Chief Safety Engineer, N.C.B. revealed that in no less than 37.5% of the cases examined that hazard could have been eliminated at the design stage. In additional 44.5% of the cases, the hazard, though not eliminable, could have been reduced. Further advances in technology can be expected to erode still further the possibility of the type of accident not yet
amenable to elimination by design. It is asserted that technology will now continue to be the main contributor to permanently safer mines in the decades to come.

Many fatalities and other injury producing accidents still occur which are often carbon copies and occasionally facsimile reproductions of those already experienced. In the vast majority of cases solutions and preventive remedies are already known and so it is impossible to accept the present accident figures as being immutable.

The progress made so far has resulted in a situation where the risk to any individual going on shift at a mine of becoming a fatality statistic is four in a million in British mines.

Another way of looking at the fatality statistics, which must surely spur mining engineers to greater efforts in making mines safer, is to examine the risk of fatal injury during the working life of a mine worker. The disturbing conclusion reached is that for every 100 young men entering the industry only 96 will emerge to retire from it.

Mining hazard is not considered in perspective with other apparently socially acceptable hazard e.g. road accidents.

6.5 ELEMENTS OF A SAFETY POLICY

A safety policy to be effective must try both to prevent accidents, fatalities and bodily injuries and when inspite of best efforts, accidents occur, arrange for relief, rehabilitation, medical treatment and adequate compensation. To prevent accidents the analysis of the causes of accidents must be
made; for such analysis provides guidance in designing machines, system of work, maintenance of safe work environment etc. which are essential for pursuing ZAP. Also if human agency is responsible for accidents then there is need to design systems and work methods to minimise proneness to accident. Training of workers, work drill, developing safety consciousness, and providing safety equipment etc.; may have to be taken up. The cooperation of workers as well as that of trade unions will also have to be secured for this purpose. Also a safety organisation will have to be set up with adequate trained staff and other needed resources to ensure safety and to monitor safety measures and programmes. Also a proper system of accountability for accidents and regular reporting of accidents must be developed and put into operation. Adequate arrangements for rescue, medical treatment, relief and rehabilitation and payment of compensation must be made. Finally safety should be integrated into the management decision process and safety should be made a line function.

6.6 ACCIDENT COSTS:
Accidents are costly. Apart from the loss to the worker and his family, accidents cost the employer, the state as well as the community. A suitable accident prevention policy would minimise such cost apart from minimising fatalities and bodily injuries.

6.7 LOSS CONTROL:
An important purpose of safety policy is to determine the causes of accidents and help initiate measures to prevent accidents and
in any case control the losses arising there-from.

Basic Principles:

1) An unsafe act, an unsafe condition, an accident, all these are symptoms of something wrong in the management system.

2) Certain sets of circumstances can be predicted to produce severe injuries. These circumstances can be identified and controlled.

3) Safety should be managed like any other company function. Management should direct the safety effort by setting achievable goals by planning, organizing, directing and controlling to achieve them.

4) The key to effective line performance is management procedures that fix accountability.

The lack of procedure for fixing accountability in safety is the greatest failing.

5) The function of safety is to locate and define the operational errors that allow accidents to occur. This function can be carried out in two ways: (1) by asking why—for searching root causes of accidents, and (2) by asking whether or not certain known effective controls are being utilized.

To accomplish these purposes those in safety would do well to search out not what is wrong with people but what is wrong with the management system that allows accidents to occur. The professional task is diagrammatically presented in Chart 6-1.

6.8 ENSURING EFFECTIVENESS OF SAFETY POLICY:

To ensure that safety policy would be effective, safety has been made a line function. Further in appraising the performance of
line executives their performance in the field of safety is given
due weightage.

The Gugnani Committee on Safety in coal mines recommended linking
of career prospects of officials with their performance in the
field of safety also. Shri. Gugnani suggested to the coal
companies to introduce safety based merit rating system for the
collieries as in U.S.A.

The committee recommended that the Safety Officer shall visit
the surface and underground parts of the mine at least once every
day. He shall arrange his inspections in such a way that every
part of the mine is inspected by him at least every fortnight.

The following decisions were taken by the committee:

i) Safety Officers should be associated with the preparation and
formulation of planning of mines.

ii) Safety Officer in the colliery would be administratively
under the Manager and functionally under the Area Safety Officer.
SECTION - II

ORGANISATION OF SAFETY

6.9 DEFINITION OF SAFETY ORGANISATION

Safety Organisation may be defined as a definite, planned, and organised set-up whose purpose is to enlist and maintain the combined efforts of the entire personnel of an establishment or undertaking in the work of accident prevention.

6.10 ORGANISATION OF SAFETY IN COAL MINES IN INDIA

When the coal mines were nationalised in India one of the principal objectives was to ensure the health and safety of coal miners; in fact, when Coal India Limited (CIL) was established a network of organisations for administering safety was also created simultaneously and this organisation has been given statutory status to ensure that it has the necessary qualified, trained and experienced personnel and other needed resources and legal authority to administer safety effectively. A chart of this administrative set up is presented in Chart 6-2. Simultaneously internal safety organisations have been created in every subsidiary company of CIL; a typical chart of a safety organisation in a subsidiary coal company of CIL; has been presented in Chart 6-3.

6.11 CONSIDERATIONS IN FRAMING THE ORGANISATIONAL STRUCTURE

1) Ensuring Participation by both management and workers

For this purpose an apex body "National Conference on Safety in Mines" has been set up. It is a tripartite body representing
Government, coal industry and coal workers.

The conference meets annually and reviews the safety situation in coal mines during the year under report and makes recommendations - both with regard to policy, programmes and performance.

2. Ensuring Technical Consideration of safety issues:

A standing Safety Advisory Committee has been set up to review the safety policies, programmes and performance in the coal mines and render competent technical advise to the "National Conference on Safety in Mines".

3. Enable detailed study of various aspects of safety:

Various safety committees have also been set up to make thorough in depth study of specific aspects of the problem of safety and submit reports for consideration of the National Conference on safety in Mines.

4. To ensure that adequate attention is paid to safety education and training and to design and ensure use of safety equipment:

a) To ensure that safety education is made readily available and accessible, courses are offered as shown below:

i) Occupational safety and health course is offered by NITIE Bombay.

ii) Safety Engineering courses are offered by the Indian School of mines, Dhanbad.

iii) Safety Management course is offered by CIL staff college, at Ranchi.

iv) Safety course is also offered at CIL, Bombay.
b) To facilitate safety training: Training courses are offered by:

i) Miners Vocational Training Centers.

ii) Regional Training Institutes of CIL.

iii) Directorate of Vocational Training.

c) To ensure study of mining equipment and personal safety equipments:

A ‘Mines Safety Equipment Committee’ has been set up.

5. To ensure technical support to the "National Conference On Safety in Mines" and to focus research attention on the problems of coal mining:

A Central Mining Research Station has been set up at Dhanbad.

6. To ensure a free and independent monitoring and review of the Safety situation in coal mines in India on a continuous basis:

A special statutory Watch-Dog Organisation - "The Directorate General of Mine Safety" - has been set up independent of the internal safety organisation of CIL. The Directorate General of Mine Safety has its own offices located at the regional, area, and colliery level for inspection, monitoring and evaluation of safety conditions and measures. The Directorate General is assisted by the Mines Rescue Station Committee to monitor the effectiveness of the rescue teams organised by the statutory safety officers at various levels divisional, regional, area, colliery etc.

7. To ensure adequate management attention to the problem of safety in coal mines:

Safety has been made a line function and safety performance of
officers is given due weightage in considering them for promotion.

Apart from this an elaborate internal statutory organisation for safety and conservation has been set up both at the headquarters of CIL and in every one of the subsidiary coal companies. The organisational chart of this internal statutory safety organisation called the "Safety and Conservation Department" has been presented earlier in Chart 6-2.

The details of the organisation chart of a typical safety and conservation department of a coal company which is a fully owned subsidiary of CIL have been furnished in Chart 6-3 earlier.

6.12 CONSIDERATIONS IN FRAMING THE ORGANISATIONAL CHART OF THE SAFETY AND CONSERVATION DEPARTMENT OF A SUBSIDIARY COAL COMPANY:

i) In the light of the pattern of managerial structure of CIL each subsidiary company should have its own internal Safety Wing which will be independent of the Production Wing.

ii) During day to day inspection of Mines / Districts, four major causes contributing to accidents, i.e. inadequacy of supports, poor transport equipments, insufficient ventilation and inadequate treatment of coal dust require specific attention on a priority basis.

iii) All fatal accidents and serious accidents should be enquired into by adequately qualified mining graduates. These officers should also enquire into the existing systems in each mine, such as adequacy of suppressing stone dust; treatment of coal dust; adequate ventilation, etc.

iv) A small number of Electrical/Mechanical Engineers should also
be associated with the Internal Safety Wing with the primary object of satisfying themselves about the intrinsic safety of mechanical and electrical equipments as well as the winding shackles including ropes, both in winding and haulage used in the mines.

6.13 (A) The structure of the Internal Safety Wing is broadly on the following lines, subject to marginal modifications to suit local conditions wherever necessary.

6.13 (B) SUBSIDIARY COMPANY:
The Internal Safety, Conservation and Training Wing is headed by a Mining Engineer of the rank of Additional CME, who will be the Divisional Safety Officer. He may be assisted by 1 or 2 Dy. CME's/ Superintendents (Mines) as determined by the Chairman-cum-Managing Director with reference to the specific conditions in the particular company keeping in mind the fact that total number of two officers may be drawn from E & M discipline of the rank of senior EE. Necessary supporting staff such as Junior Executive Engineers, Statisticians and Stenographers will assist this branch.

6.14 AREAS:
1) There will be one Superintendent (Mines) who will be the Area Safety Officer exclusively charged with safety in respect of each area. He may be assisted by an Officer of the rank of Colliery Manager wherever the area is large.

ii) The necessity and possibility of providing Senior Overman for
Safety work at this level would be examined by the Divisions and if available, they would constitute the necessary support to the Area Safety Officer.

iii) Each area will have a laboratory for determining the gas concentration in air samples, inflammability of coal dust samples and all matters relating to safety where chemical or physical analysis is necessary. The laboratory would also have the equipment for analysing the quality of coal for joint sampling purposes.

6.15 COLLIERY:
The statutory Safety Officer of the Colliery would continue as at present and except for emergencies, it should be ensured that he is not deployed for any purpose other than safety. He will report to the Manager as well as to the independent Safety Organisation. Safety set up is organised on the pattern of internal audit, and the Safety Officer, while acting as the Adviser to the Colliery Manager, has direct access to higher authorities and is not subordinate to the former. A separate cadre of Safety and Ventilation Officers should be organised. It would be for the Manager to decide whether or not to accept the advice of the Safety Officer, but the latter has the right to report direct to an Area Safety Officer, who is located in the office of the Area General Manager.

At the mine level, the Safety Officer should be assisted by a Ventilation Officer. The Ventilation Officer will be his principal deputy, to advise the Colliery Manager. It is also incumbent on him to send periodic reports to the Area Safety
Officer, pointing out the safety standards followed in the mine in his charge.

6.16 DUTIES AND RESPONSIBILITIES OF HEAD OF SAFETY WING:

1) Shall be the head of safety wing of the subsidiary company, shall work under the Technical Directorate/CMD and shall have overall responsibility for efficient functioning of the Safety Wing.

2) Shall have all the officers of Safety Wing under him and shall allocate their work in such a manner as to ensure proper and efficient functioning of the Safety Wing.

3) Shall make inspections of the mines so as to have a first hand knowledge about the actual standard of mine workings.

4) Shall maintain a continuous liaison with DGMS and organise meetings between different area Safety Officers and DGMS officials so as to effect quick solution.

5) Shall direct various safety drives in the company so as to have maximum involvement in safety matters.

6) Shall keep the Director (Technical)/CMD posted in respect of major irregularities in respect of safe working of mines and other major violations pointed out by DGMS.

7) Shall personally inspect the site of all fatal accidents, scrutinise the enquiry report submitted by the Enquiry Officer and shall forward it to the Director (Tech.)/CMD with his comments and recommendations.

8) Shall study the analysis of fatal and serious accidents and shall intimate suitable steps to cut down accident rates.
9) Shall carry out any other duties assigned to him by his superiors.

10) The Divisional Safety Officers must spend at least 12 days in a month on actual underground inspection and maintain continuous liaison with the Directorate General of Mines Safety. All major violations indicated by DGMS should be brought to the notice of the CMD by this Officer.

6.17 ROLE OF THE AREA SAFETY STRUCTURES:
When the area safety structure was set up in NCB, it was evident that a key function of the organisation in the field of safety and health was to define standards, initiate and co-ordinate investigatory and development work, anticipate possibilities of new hazards to ensure their eradication, and support and guide colliery management in the overall objective of minimising risk and overcoming patent and latent causes of accident and damage to health. A central safety organisation in each area was a necessity, even if only to ensure that the best possible standards were introduced in the shortest time at all collieries. In more recent times, in the context of the changed and highly mechanised methods of mining, the realisation of the dangers of air borne dust, the recognition of other environmental hazards such as heat and noise have made the need of an Area Safety structure imperative.

The area safety organisation has a responsibility of improving safety and health of the workforce at collieries. The area organisation has primary responsibilities in the field of safety and health and they have a specific influence on the
establishment of standards and widespread introduction of measures to deal with new hazards that changes in system and more intensive research and development have revealed.

It has proved possible to reduce decisively the number of mining disasters, caused by explosion of firedamp in German mining industry. However, greater working depths have increased the risk of rock bursts. Among the occupational diseases there has been a drop in cases of silicosis and in meniscal damage, whereas the utilization of bigger machines has brought about a steady and a very rapid increase in deafness.

The activities of medical officers, safety officers and safety "Wardens" are specified and governed by legislation. All these officers have a duty to assist the colliery manager in his responsibility for mine safety, and to assist Work's Councils in the performance of their duties as the workmen's representative.

A reduction in accidents due to falls of ground is closely linked with operations at the face since over 80% of such accidents occur there. The prospect for further improvement, especially in the accident rate per man-hour, lies in remote control and automation which allows men to be withdrawn to positions of comparative safety.

The role of safety branch personnel is vital in catalysing thinking at the design stage and their particular expertise includes a wide knowledge of classes of hazard and of preventative measures. They are also trained to be perceptive and help to anticipate hazards in newly designed machines and systems. Safety branch should try to influence management to
achieve the objective of zero accident potential by employing the expertise which is unique to them.

6.18 DUTIES OF AREA SAFETY OFFICER:

1) He will keep check on the performance of the duties of the colliery safety officers.

2) Adequate posters and publicity materials will be supplied by him to the colliery safety officer.

3) He will inspect collieries with an idea of accidents prevention and safety improvement from time to time and submit reports to the Dy. CME (Safety). In the reports he will deal with the quality of inspections made by the mine officials and other statutory personnel.

4) He will arrange to rectify the matters noted during the inspections and approach the General Manager for help in implementing the recommendations wherever the need be.

In the report he would mention the Thrust Areas to which he would like to draw the attention of the GM of the Area and the Officers in the HQ. He will review the monthly performance about the Safety in the area and chalk out the programme to be undertaken for safety promotion the next month. He will give the feed-back information to the GM of the Area and to the Safety Hqrs. regularly.

5) Area Safety Officer will have regular co-ordination meeting with the Colliery Safety Officer.

6) He will also go through the diaries of colliery managers and safety officers and reports of statutory officers and bring out
1) Salient points to the notice of GM and Company Hqrs.

7) Arrange to educate workers on safety.

8) Make surprise inspections to find out causes of danger and to arrange to remove the same.

9) To ensure implementation of suggestions for improving safety standards as well as other suggestions of the Pit Safety Committee.

10) Work out statistics for economy achieved by various investments on safety.

11) He will collect necessary statistics in connection with safety, analyse them and keep the area and Hqrs apprised of the trend.

12) One of the functions of the Area Safety Officers should be to provide timely help with the provision of safety stores and materials when required. He is to keep a link between the mines and General Manager's office.

13) Area Safety Officers should be deemed to be fully responsible for the following:

   a) Rectification of serious violations.

   b) Follow up and periodical reports about their implementation should be put up to the General Manager.

   c) Copies should be sent to the GM, SCT deptt. Officers of Safety Wing of the GM and SCT during their visit to the collieries, will also note the progress in this regard.

14) Area Safety Officers have to act as a special and skilled eye for the line management in detecting irregularities, suggesting remedial measures, help in implementation but the responsibility
and the function of its successful implementation shall still be with the line management.

15) The Area Safety Officer should spend at least 18 days in a month on actual underground inspection. The senior overman wherever he is posted must spend at least 22 days in a month for this purpose.

6.19 DUTIES OF THE COLLIERY SAFETY OFFICERS:

1) Performance of such statutory duties as are prescribed by the Coal Mines Regulations and the circulars issued there under.

2) Inspection of the works sites and noting the points which may lead to accidents underground or on surface or of any violations of the safety regulations.

3) Out of that, the minor defects should be rectified on the spot with the help of Supervisors and staff available. For bigger jobs the matter may be taken up with the Manager, and other officers. In case where a safety organisation has been provided under him such defects or dangers which fall within his jurisdiction should be removed/rectified by him. For steps to be taken which do not come within his power he will pursue the matter regularly with the colliery Manager till the desired action is taken. He will submit the report to the Area Safety Officer with copies to the Manager of the colliery. Inspection report will mention clearly, the step taken by him for the rectification in regards to the safety matter and the points not attended to.

4) He will see that the posters and other publicity material are produced and displayed from time to time in prominent places and where work persons frequently visit. He should ensure that
taperecorded speeches be relayed before beginning of each shift. He should also arrange lectures from suitable workers, staff and officers at the commencement of the shifts occasionally.

5) Inter-district safety competitions are to be arranged for different subjects periodically.

6) Safety committee meetings will be organised regularly and follow up is to be maintained for implementation of the suggestions of the committee approved by the Manager or the GM. Reports of the meetings will be submitted as usual.

7) Monthly report incorporating work done in the direction of safety will be conveyed to Area Safety Officer and Manager by 2nd of next month.

8) He will make surprise inspection of the mines to ascertain the quality of inspections by mines officials and shall send a report of such inspection to Area Safety Officer and Colliery Manager, indicating the steps to be taken to improve the quality of inspections.

9) Safety Officers will have regular meetings with the Area Safety Officers.

10) Investigate important causes of accidents and find out ways and means for preventing similar accidents in future.

11) To ensure implementation of suggestions for improving safety standards.

12) Work out statistics for economy achieved by various investments on safety.

13) To examine the violations pointed out by the Inspecting Officers of the Directorate General of Mines Safety and the
follow up and suggest measures of rectifying the violations and taking corrective actions.

14) To assist the Manager in dealing with the correspondence with respect to Mines Safety.

15) To offer effective liaison in respect of mines safety between the working units, sub-area and area officers.

16) To study the requirements of safety appliances in mines, their provision, operation, maintenance, as also to get abreast of development in respect of safety appliances in mines.

17) To conduct regular underground inspections of mines with a view to ascertain the level of safety of mines working, plant, and equipment, appliances and to draw out reports of such inspections for the information of CM. Such reports should contain specific recommendations and suggestions, as may be practicable, keeping in view all relevant aspects.

18) To conduct expeditious enquiries into fatal accidents and such serious accidents which could be potentially dangerous, to prepare reports of such enquiries and to make the same available to the officers concerned at the Area and the Divisional Level. Reports of such enquiries shall be properly maintained.

19) To arrange to conduct periodical study and analyse all the accidents in the area and to circulate such findings to officers concerned at different levels. Such findings should indicate the trend of accidents, the dominating causes and factors and suggest ways and means to prevent reoccurrence.

20) To build up safety literature and arrange safety publications suitably for different levels of Management and workmen. For the
workmen it will also be in the local language/languages. He will organise various activities to increase the level of safety consciousness amongst workmen and the supervisors.

21) Other functions of a safety officer are:
   a) Ensuring that the company meets the statutory requirements for the safety of the personnel.
   b) Carrying out safety checks on any equipment or operation and advising the management of the department on the action required to eliminate any hazards.
   c) Providing safety training and promoting safety consciousness.
   d) Responsibility for safety levels at the mine.

22) The safety officers should involve themselves with the working right from the planning and preparation stage so that preparation of all future districts is made with a safety bias. Safety Officers should also carry out system analysis of different operations and identify the unsafe zones and suggest to the proper authorities the modification of system so as to ensure safety.

23) Safety officers in mines have been given more powers to look after the work in connection with safety, like cleaning, stone dusting, water spraying, ventilation, stopping and sectionalisation of workings.

24) Safety officers in the collieries should be devoting sufficient time not only to ensure safety in the mines, but also to create an atmosphere of safety consciousness amongst workmen.

25) Safety officer of the mine should be alive to the problem. Also, more serious and effective supervision coupled with proper
training in vocational training center is desirable.

26) Safety officers should every day, send a report along with his suggestions to the colliery manager regarding safety standards, especially on important aspects.

27) Colliery safety officer will be under the direct administrative control of the colliery manager, but become functionally responsible to the Superintendent (Safety) attached to the Area.

28) Performance of Safety Officer and colliery managers will henceforth be judged not only on production, productivity etc., achieved but also on the number of accidents and maintenance of safety standards in general.

29) It is a statutory requirement that safety officer of a mine should investigate all types of accidents involving fatal, serious, and minor injuries. While that is done he should also investigate the non-casualty incidents in the mine, so as to analyse the same along with the casualty accidents, with a view to pin-point the nature and common causes which can result in accidents in the mine.

6.20 COAL MINES REGULATION 41-A, DUTIES OF SAFETY OFFICERS:

1) The duties of the Safety Officers shall be:
   a) i) to visit surface and underground parts of the mine with a view to meeting the workers on the spot to talk to them on matters of safety inviting suggestions;
   ii) to take charge of the newly recruited staff and show them around the mine pointing out the safe and unsafe acts during the
course of their work in the mine.

b) i) to investigate all types of accidents and incidents in the mine, including minor accidents, to analyse the same with a view to pinpointing the nature and common cause of the accidents in the mine.

ii) to maintain detailed statistics about mine accidents and to analyse the same with a view to pinpointing the nature and common cause of the accidents in the mine.

iii) to study and appraise the manager of all possible sources of danger such as inundation, fire, coal dust and others.

c) i) to hold safety classes and give safety talks and lectures to the members of the supervisory staff.

ii) to organise safety weeks and other safety education and propaganda in the mine.

d) to see that all concerned mine employees are fully conversant with various standing orders (such as those relating to stoppage of mine mechanical ventilators and to the occurrence of a fire or other emergency in the mine) and Systematic Timbering Rules;

e) to provide assistance in the formation of programme for training at the mine level, including vocational training in gas-testing, and training in First-Aid;

f) to report to the manager as a result of his visits to the various parts of the mine, as to whether provisions of the Mine Act, Regulations and rules made thereunder are being complied with in the mine;

g) to promote safety practices generally and to lend active support to all measures intended for furthering the cause of
safety in the mine, and

h) to assist the manager in any other matter relating to safety in the mine.

2) If any duties other than those specified above are assigned to Safety Officer by the Manager, a written notice thereof shall be sent to the Regional Inspector within three days of such assignment.

3) The Safety Officer shall maintain in a bound-paged book a detailed record of the work performed by him every day.

6.21 SAFETY OFFICER'S WORK:

At a colliery, Safety Officer must spend the greater proportion of his time in making inspections and in discussion on the job. He should speak to the workers on the spot and demonstrate to them the correct way of doing a job safely. He should not be entrusted with the common role of guide to the visitors. He must be a keen observer and should be able to make brief reports on what he sees. To guide the safety officer in his duties a "PLANNED SAFETY SCHEME" should be introduced which will help the safety officer in carrying out specific tasks at periodic intervals and under the overall supervisions of Area Safety Officer or area general manager. He should make report to his manager with a copy to the Area Safety Officer. The supervision of colliery safety Officers by Area Safety Officer or Group Safety Engineer will be a vital link in safety organisation and for co-ordinating their efforts a regular monthly meeting of colliery safety officers can be held at area headquarters at which experience can be exchanged and further guidance given.
Maintenance of safety statistics and their analyses provide information to maintain injury history cards of individual workers and safety record of official and at the same time, they direct attention on preventive measures to be taken. General safety progress of the mine is also measured by statistical means. Safety records of districts supervised by individual officials are part of safety statistics. Much depends on colliery organisation but safety statistics for overmen's districts should at least be compiled and it may be desirable to compare on a competitive basis the safety performance of small groups of workers if possible. This will develop a sense of personal responsibility of the individual officials.

Nature of injury analysis is also of service in relation to personal safety equipment. A regular quarterly census of personal safety equipment such as safety hats, safety boots, etc., in use is worth the effort and can serve as a guide for the continued use of these protectives.

SECTION - III

ADMINISTRATION OF SAFETY

6.22 INTRODUCTION :

The nationalisation of coal mines (1973) represents a national commitment to improve the working conditions of coal miners and to contribute significantly and continuously to the improvement of the health and safety of coal miners. This commitment was put into effect by the creation of a net-work of organisations and
authorities. We have in the preceding section discussed the role of these various organisations and authorities. The Government has also enacted adequate and effective legislation to ensure the health and safety of mine workers. Further it has framed elaborate Mining Regulations to ensure -

i) Safe working conditions and

ii) The health and safety of workers (See regulation 41-A in particular).

Since adequate arrangements have been made for monitoring effectively the functioning of these various organisations and authorities, they are working regularly and effectively. A most important outcome of all this is that ensuring health and safety of workers has been made a line function.

6.23 CONSEQUENCES OF MAKING HEALTH AND SAFETY OF WORKERS A LINE FUNCTION :

A major consequence of making health and safety of mine workers a line function is that it focuses regular and continuous attention of the administration on problems of health and safety in mines. In fact, this has led to the integration of production planning and safety planning in coal mines and has resulted in the integration of planning of health and safety with long range corporate planning of coal mines in India.

6.24 SAFETY PLANNING :

A tangible evidence of safety planning is that an "Annual Safety Action Plan" is prepared every year for each area and the plan is vigorously implemented and "An Annual Safety Performance Review"
is also made and circulated for comments to higher level safety officers and to the National and Zonal tripartite conferences as well as to the National Coal Board. Also the recommendations made by them are implemented in the ensuing year. This exercise focuses regular and continuous attention of the administration on the problem of health and safety of workers in all its aspects.

### 6.25 Management Control of Safety

The management considers that:

i) Eliminating unsafe conditions;

ii) Discovering causes of accidents so as to eliminate them as far as possible; and

iii) Eliminating unsafe actions are the principal ways of preventing accidents, and takes vigorous action in these areas.

1) **Eliminating Unsafe Conditions:**

   For this purpose the following steps are taken:
   1. Safeguarding all machines, equipment, workspace etc.
   2. Rectifying or preventing defective conditions.
   3. Withdrawal of men to safety from defective workplaces.
   4. Suitable and safe design and construction.
   5. Safe arrangements, processes, methods of work etc.
   6. Adequate and suitable illumination, ventilation etc.
   7. Safe dress and protective personal equipment.

2) **Discovering Causes of Accidents:**

   Every accident is investigated and its causes analysed with a view to initiate preventive action. The following type of steps are taken.
1) Job safety analysis.
2) Safety sampling.
3) Investigation of accidents.
4) Inspection of plant and equipment.
5) Collection of Accident Statistics and their analysis.

iii) Eliminating Unsafe Actions:
It is now well recognised that even in a situation of Zero Accident potential, accidents do occur and the main reason for that is human failure or human error. Hence there is need to minimise such human error through the following type of steps.
1) Personnel adjustment.
2) Safety education and training.
3) Supervision.
4) Discipline.
5) Safety campaign.

6.26 MEASURES FOR ELIMINATING UNSAFE CONDITIONS:
Three types of measures are adopted to eliminate unsafe conditions:
1) Inspection of work-site for detecting unsafe conditions if any.
2) Paying attention to special problems.
3) Securing worker's participation at the grass roots level.

a) Inspection of work-site:
Rigorous inspection of work-site is carried out to ensure that the working conditions are safe e.g. light and ventilation are tested. Air samples are tested for the presence of Co, coal and
rock dust. Site inspection is also done to detect; possibility of flooding, and fire, roof collapse, wall collapse; etc. and to take counter measures.

In addition, special attention is paid to the principal causes of accidents as discovered by analysis of accident statistics. These are:

i) Inadequacy of mine support;
ii) Poor transport equipment;
iii) Insufficient ventilation;
iv) Inadequate treatment of rock and coal dust.

In case the work-site is found to be unsafe during inspection the work is stopped and the workers are shifted to a safe place.

b) Paying Attention to Special Problems:

Mine working below a depth of 150 metres presents special problems. By focussing attention on these problems the danger of accidents can be minimised. Similarly accidentprone mines may be identified on the basis of accident statistics analysis and special attention may be paid to them to make them safer.

c) Securing workers participation at the grass root level:

Unless the workers are made safety conscious and participate voluntarily in the implementation of safety programme they cannot become really effective. To ensure workers participation in safety programmes at the grass-root level "Pit-safety Committees" consisting of workers are constituted and this has improved the morale and enhanced safety.
6.27 DISCOVERING CAUSES OF ACCIDENTS :

A system of investigating every accident and maintaining records of accidents has been introduced. The analysis of the statistics of accidents so generated has revealed important causes of accidents. As was indicated in 6.26 (a) earlier, the inspections focus on such causes and ensure that they are not present at the work-site or if they are present, remedial measures are initiated immediately, to eliminate them.

6.28 ELIMINATING UNSAFE CONDITIONS :

Human error has been identified as an important factor in causing accidents. This can be minimised by safety education and training and safety campaigns to make workers safety conscious and accept responsibility for preventing accidents. The trade unions too should be invited to cooperate and ensure workers' participation in safety programmes. Also close supervision and disciplinary action are necessary to minimise accidents through human error. This is particularly so in the case of use of safety equipments. Personnel adjustment may also help improve safety.

6.29 ACCOUNTABILITY :

A second major consequence of making health and safety a line function has been to fix responsibility of officers for health and safely work.

This has resulted in :

i) Preparation and enforcement of safety codes, guide lines, and formulation and implementation of safety programmes and launching of education and training programmes and launching of safety

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programmes to improve safety consciousness.

ii) Defining the duties and responsibilities of officers at various levels and granting them authority to discharge their responsibility. This is necessary to hold them accountable.

ii) Linking career prospects of officers to their performance in the area of health and safety of workers, as per the recommendations of the Gugnani Committee.

6.30 INTERNAL SAFETY ORGANISATION:

A third major consequence of making health and safety a line function is the creation of an internal safety organisation organised on the lines of the audit organisation i.e. the officers of the internal safety organisation are administratively under the control of line officers but functionally come under the control of Director of Mine Safety, and have direct access and send copies of their reports to officers of higher level both line and staff. This has ensured independent reporting and acts as a counter-check on the reports of line officers.

6.31 ROLE OF DIRECTOR GENERAL OF MINE SAFETY:

This is a watch-dog agency having officers at headquarter, zonal, regional, area and colliery levels to monitor the implementation of safety programmes.

6.32 TRIPARTITE ACTION:

Also from the very beginning it was realised that for effective action cooperation between workers, management and Government was necessary. Hence a tripartite body - the National Conference on Safety in Mines - has been constituted to formulate policy,
review programmes and their performance and make recommendations. The body meets every quarter, reviews programmes, discusses performance and makes recommendations which are implemented. The functioning of the National Conference has resulted in co-ordination of policy, co-ordinated action and continued attention to health and safety of workers in the coal mines.

6.33 FINDINGS :
Thus it may be seen that in the coal industry health and safety programmes receive regular and continuous attention from the management and health and safety are well planned and well executed under regular and continuous supervision and monitoring at all levels.
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**CHART 6-1: THE MANAGEMENT SYSTEM - THE PROFESSIONAL TASK**
WCL (SUBSIDIARY COMPANY OF CIL).

CHART 6-2.

INTERNAL SAFETY ORGANISATION.

C.M.O

D.G.M.S.

D.G.M.S.

DIRECTOR
MINE SAFETY
SAP ICOM.

IT DIRECTOR
MINE SAFETY

DIRECTOR
FINANCE

DIRECTOR
PRODUCTION

DIRECTOR
TECHNICAL

DIRECTOR
PERSONNEL

DIRECTOR
SAFETY.

C.G.M.
FINANCE

G.M.
(PROD)

G.M.
PLANNING

G.M.
PERSONNEL
STORES.

G.M.
ECONOMICS

G.M.
PRODUCTION

C.G.M.'S OF REGIONS
ONE FOR EACH REGIONS.

DY. G.M. (Regional)

G.M.
ECONOMICS

G.M.
PRODUCTION

G.M.S. FOR EACH AREA
ONE FOR EACH AREA.
Chart 6.3 Administrative and Safety Organisation of WCL, Nagpur.