

# **LEARNING MATERIALS**

**SEMESTER-6<sup>TH</sup> SEM.**

**BRANCH-MINING ENGG.**

**SUBJECT-M.L.G.S-II(TH-3)**

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## **MINE LEGISLATION & GENERAL SAFETY – II**

### **SHORT NOTES :**

**Mining Lease** : It means a lease granted for the purpose of under standing mining operation and include a sub lease granted for the purpose.

**Hours of works** : No adult employed above or below ground in a mine required to work for more than 48 hours in any week or 9 hours in any day in case of above mine ans 8 hours in any day in case of below grounds.

**Industrial Fatigue** : It is the physiological phenomena affecting a change in the natural organic function resulting in production of chemical product causing fatigue.

**Fatality rate** : It is the rate of which losing of life of any person in mine.

**Forest Act** : An act to a consolidate the law relating to forests, the transit of forest produce and the duty liable on timber and other forest produce. This act may be called Indian Forest Act 1927.

**Miss Fire** : Miss fire means the failure explodes of an entire charge of explosive in a shot hole.

**Overtime** : Where in a mine if a person work above ground for more than 9 hours in any day or works below ground for more than 8 hours in any day is called overtime work.

**Reporting Mine accident** : Place of occurrence, how many persons are involved, limb of

affected, it may be material to know which part of the body has been affected, using the safe devices receiptment.

**Permitted explosive** : It means an explosive manufactured by such from and of such type as the chief inspector may from the time to time specify by notification in the official gazette.

**Regional inspector** : It means the inspector of the mines in charge of the region or local area or area which he exercised his power under the act.

**Ventilation district** : It means a such part of the men's bellow ground as has an independent intake airway commencing with main intake & an independent return airway terminating at main return airway.

**Competent person** : Competent person means a person who has attained the age of 20 years and who has been duly attained in writing by the manager as a person competent to supervise or perform that works of operating plant machinery etc.

**Agent** : Agent means every person whether appointed as such or not acting or purporting to act on behalf of the owner, take part in management, control, supervision & direction of mines.

**Refresher training** : When ever a person refrain to employment on the surface or on opencast working or underground mine, after an absence from work for a period exceeding one year he shall within one month of his joining duty undergo refreshment training.

**Foreman's district** : Foreman's district is the area of mine which is given under the charge of supervision and control of one foreman.

**Mine Plan** : Mine plan include a surface plan or an underground plan a ventilation plan, water danger plan or a geological plan etc.

**Accident** : Conventionally any mishap in which are or more person are killed or injured constitutes an accident. It may be defined as an unexpected event causing loss of life or body injury.

**Serious bodily injury** : Means any injury which involves the permanent loss of any part or section of the body or permanent loss of injury to sight or hearing or fracture of bone.

**Bellman** : Bellman means a person appointed to superintend the raising and lowering persons tools, materials and the transmission of signals at any landing.

**Bank's man** : Bank's man means a person appointed to superintend the lowering & raising of person tool & materials & the transmission of signal at the top of a shaft or winze.

**Trainer** : A person to be newly employed in a mine, while undergoing training in accordance with the rule considered only a trainers.

**Working face** : It means which place excavation mineral is done. It is the moving of any working place.

**Stope** : It is a solid or block or ore pillar which is under extraction.

**Creche** : Creche means a room with necessary accommodation reserved for uses of children under six years of age of woman employed in mines.

**Creche nurse** : Creche nurse is an woman undergoing a training as a chreche nurse at an institution appointed as crèche nurse.

**Safety officer** : In every mine the average monthly output of which exceeds 5000 tonnes, the manager shall be assisted in the work of promoting safe practices the mine by a safety officer.

**Vocational training officer** : Every training centre shall be under the charge of a whole time or part time Vocational training officer as may be specified by the chief inspector. The duties of training officer to organize & supervise the training if every person undergoing training under him presence of the rules.

**Act** : Act means is an act of the parliament. Which is provides provision for health, safety & welfare of the person working in the mines.

**Approved safety lamp** : Approved safety lamp or approved electric torch means a safety lamp & an electric torch manufacture by such firm and of such type as the chief inspector may time to time specify by notification in the official gazette.

**Assistant manager** : Assistant manager means a person possessing a manager certificate appointed in writing by the owner, agent or manager to assist the manager in the control management & direction of the mine and who takes rank immediately below the manager.

**Auxiliary fans** : Auxiliary fan means a forcing fan or an exhausting fan used below ground wholly or mainly for ventilating a face or blind ends.

**Blaster** : Bluster means a person possessing a blaster certificate & appointed by the manager in writing to perform the duties of a blaster under these regulation & include a shot firer.

**Committee** : Committee means a committee appointed under sec-13 of the mines act.

**District magistrate** : District magistrate is relation to any mine means the district magistrate or the deputy commissioner as the case may be who is vested with the executive powers of maintaining law & order in the revenue district in which the mines is situated.

**Explosive** : Explosive shall have the same meaning as assigned to that term on the Indian explosive act 1884.

**Face** : Face means the moving front of any working place or the in by end of any drive level, cross cut raise or winze.

**Landing** : Landing means any floor or platform in a shaft or winze which is an authorized stopping place of the cage or other means of conveyer & includes a plat.

**Machinery** : Machinery means any such apparatus appliance or combination of appliances if any power developed stored transmitted converted or utilized thereby is used in connection with mining operation.

**Manager** : Manager means a person possessing the prescribed qualification and appointed in writing by the owner or agent to be in charge of a mine under the act and include a mines superintendent if appointed under sec-17 of the act.

**Material** : Material include rock, stone, mineral, ore or any other material.

**Mining mate** : Mining mate means a person possessing a manager, foreman or mates

certificate & appointed by the manager in writing under any designation whatever to perform the duties of mining mate under the regulation.

**Mine foreman** : Mine foreman means a person possessing a managers of foreman certificate a appointed by the manager in writing to perform the duties of supervision or control in a mines or part there of and includes a shiftless.

**Official** : Official means a person appointed in writing by the owner, agent or manager to perform duties of supervision in a mines a part if there of and includes an assistant manager, an under ground manager, a mine foreman, a mining mate , an engineer and a surveyor.

**Public road** : Public road means a road maintained for public use and under the jurisdiction of any government or local authority.

**Quarter** : Quarter means a period of three months ending on the 31<sup>st</sup> March, 30<sup>th</sup> June, 30<sup>th</sup> Sept, or 31<sup>st</sup> Dec.

**River** : River means any stream or current of water whether seasonal or perennial includes its banks extending up to the highest known flood level.

**Roadway** : Roadway means any part of passage or gallery below ground which is maintained in connection with the working in a mines.

**Schedule** : Schedule means a schedule appended to these regulation.

**Shaft** : Shaft means a vertical or inclined way or opening leading from the surface to working below ground or from one part of the working below ground to another and includes an incline.

**Signal man** : Signal man means a person appointed to treatment signals.

**Socket** : Socket means a shot hole or part of a shot hole remaining after being charged with explosive & blasted & which is not known to be misfired shot hole.

**Support** : Support includes timber work, masonry pack walls, sand packs, iron work of any form of support.

**Tub** : Tub includes a wagon, car, truck, hutch, bandy, bucket or any other vehicle for conveying material but doesn't include a railway wagon.

**Underground manager** : Underground manager means a person possessing a manager certificate appointed in writing by the owner, agent or manager to be in charge of the whole of the under ground working or specific portion thereof under the direction of the manager & a mining mate & include an underground agent.

**Winze or raise** : Winze or raise means a small shaft either vertical or inclined in the working bellow ground.

**Working place** : working place means any place in a mines to which any person has lawful access.

**Trainee** : Every person to be newly employed in mines while undergoing trainee in accordance with these rules, shaft for all purpose be considered only as a trainee.

**Weekly day at rest** : No person shall be allowed to work in a mine for obtaining mineral has been or being carried on.

**Rest shelter** : At every mines where more than 50 person are ordinarily employed adequate and suitable shelter known as rest shelter.

**Mine** : Mine means any excavation where any operation for the purpose of searching for obtaining mineral has been or being carried on.

**Canteen** : Mines rule 1955 has a provision under rule by that every mines where more than 250 persons are the ordinary employed, there shall be made a canteen by the owner and agent.

**Surveyor** : MMR has a provision under Reg.52 that at every mine a person holding a surveyor certificate of competency shall be appointed to be the surveyor for carrying out surveys.

**Workman inspector** : For every mine where more than 500 person are ordinary employed, the owner, agent or manager shall appoint a workman inspector. He should be the technical expert to carry out the inspection.

**Register Keeper** : Every person appointed to keep register or other records required by or under the act and the regulation and any end made there under.

**Night shift** : Where a person employed in a mines works in a shift which gat ends beyond midnight as known as night shift.

**Railway** : It means a railway as defined in the Indian railway Act 1890.

**Apparatus for testing for carbon monoxide**: In every mine of 2<sup>nd</sup> or 3<sup>rd</sup> degree they shall be kept at mine constantly available for use or more suitable birds or other detaching carbon

monoxide. Carbon monoxide gas approved by chief inspector.

**Shot firer** : Means a person possessing a manager, overman's, mets, shot firer certificate & appointed by the manager in writing to perform a duties of shot firer under the act.

**Types of explosive used in mines** : No explosive shall be used in mine except that provided by the owner, agent or manager. The explosive provided for use shall be good quality and good condition.

**Calendar year** : It means a year from the first day January to the 31<sup>st</sup> day of December.

**Minimum accidental plan** : Must be function of a every engineer practicing in his own discipline. Anticipation of hazard will cause a superior design to be involved. The ZAP & MAP effort should be maintain better utilization of the machines the system.

**Man power distribution plan** : For effective oms the exact man power planning is needed. Every staffing cost a lot of to a company and lower staff may affect the efficiency. Therefore the human resources management plan and forecast the manpower is needed in present & future expansion of the business. In mines shift wise man power planning is made for effective productions.

**Freely duty of rest** : For the purpose of full day relax system group of batch or workers be lagging to same category be released from normal works directed to attempt & a training centre for the required no. of days training works.

**Rest shelter** : At every mines where more than 50 persons are ordinary employed there shall be provided adequate 2 suitable shelter at or near loading wharrelole working, workshop 2,

mines entranced where 2 store more persons are ordinarily employed for taking food & res.

**Foreman district** : In a mine a set of heading is driven in the deprise & level direction. This proves the thickness of gradient of the seam & gives an idea of the rate of gas emission. Watery nature of roof condition & geological disturbances such as fault, dyke etc. Districts are open from such set of ledging & it is knows foreman districts.

**Trainers** : For the purpose of the practical training referred to in rule 6 every person to be employed in a mines shall be placed under the direct personal supervision of an experienced workman of an appropriate category, employed on actual operations herlinature referred to a trainer.

**Duties of training officer :**

1. To organize and supervise the training of every person undergoing training under him in pursuance of these rules.
2. To maintain records of the training given to every person & to furnish weekly reports the manager on the progress of the person undergoing training.
3. To maintain records of the supervision in referred to rule -6.
4. To discharge such other duties as may be necessary for the proper compliance of these rules.
5. Every training officer shall keep a record of his work and shall at the end of every year, forward to the chief inspector through the owner, agent or manager of the mines concerned a summary of the report of his work during the year.

**Safety committee. composition of safety committee and function of safety committee.**

**Safety committee** : Where more than 100% a safety committee shall be formed by the owner, agent or manager composition of safety committee.

**Composition of safety committee** : The manager act as chairman 5 competent persons are

nominated by the chairman 5 workers nominated by the longest trade union. The safety officer act a secretary.

**Function of safety committee :**

1. Discuss about re-medical measures against any unsafe condition.
2. Discuss about safety & health of person measures before opening of a new district starting a new installation new mining technique.
3. Introduction of a new mining technique.
4. Discuss about accident enquiry reports & make proper recommendation.
5. The safety committee should be meet once in 30 days.

**Lock out and lay off :**

Lock out : Lock out means (i) The temporary closing error of a place of a employment. (ii) The suspension of work. (iii) Refuse by an employer.

Lay off : Lay off means (i) A failure, inability of an employed. (ii) On account shortage of coal. (iii) The accumulation of stocks. (iv) The break down of which of machinery on any other connected reason.

**Duties & responsibilities of Manager : (MMR 44)**

1. In every mine daily supervision shall be exercised by the manager.
2. The manager shall make arrangement for all mine foreman other officials concerned to meet him one in every working day for the purpose of conferring on matters connected with their duties.
3. In case of working belowground , he shall visit & examine belowground at least four days in every week.
4. The manager shall assign to every official and competent person his particular duties.
5. The manager shall provide every mine foreman with a training up to the date of last

survey showing the working of the district belowground assigned to him.

6. The manager shall examine all reports, register & other records required & give counter sign to that.
7. The manager shall control, supervise management and direction of a mines.
8. The manager shall give attention to carefully investigation.
9. The manager may suspend a work person for contra vention of any provision of act.
10. When any accident occurs the manager shall inspect the site as soon as possible.
11. The manager shall maintain a bound paged register kept for the purpose finding the inspection and action taken, by him.

**Duties & responsibilities of Assistant Manager :**

1. Every assistant manager shall carry out the duties assigned to him by the manager & shall see that in the part of the mines assigned to him by the manager, all works carried but in accordance with rules & regulation.
2. The assistant manager shall subject to the order of the manager.
3. The assistant manager shall from time to time carefully examine every travelable part of the mine or part under his charge.
4. In the absence of manager the assistant manager or the underground manager shall have the same responsibility discharge the same duties and be subjected to the same liabilities as the manager but not as to exempt the manager there from.

**Duties & responsibilities of Mine Foreman :** The foreman shall strictly observe the following provisions.

1. Subject to the ender of superior official, he shall have responsible charge control of such part of the mine and shall carry out such duties as may be assigned to him by manager.

2. He shall be responsible to see that the subordinate official and competent person in his district carry out their respective duties on a proper manner.
3. He shall see that the sufficient supplier of timber, brattice and other necessities required for the safe working of his district.
4. He shall see that every air crossing, stopping, door brattice & the ventilation device is maintained as good order.
5. He shall see that all tracks & tramlines are properly laid graded blasted or otherwise packed.
6. He shall be responsible to see that except for the purpose of inspection, examination & repair every person other than an official or a haulage attend travels by the traveling roadway.
7. He shall give prompt attention to the removal of any danger observes by him and shall size see that dangerous places are adequately fenced off & other superior official see that approved safety lamp are used naked lights excludes wherever & when ever danger from inflammable gas in appeared.
8. He shall devote the whole of his time to this duties & shall visit each working place in his district as often as may be necessary or possible.
9. He shall at the end of his shift record in a bound paged book kept for the purpose a general report on the performance of all his duties during the shift.

**Duties & responsibilities of Blaster :**

1. Carry out his duties in accordance with the provision of the regulation of any orders made there under with respect to the transport use of explosive.
2. By responsible for the observance by his assistants of any of such provision & of any direction with a view to safety which may be given to them by a superior official.
3. Not handover any explosive to any unauthorized person.

4. See that clay, sand or other suitable steaming materials is available in sufficient quantities convenient places.
5. Be prevent when shots are being charged and stemmed & shall himself fire the shots.
6. Be responsible when a shot has misfired for seeing that the place is adequately fenced & that the provision of regulation 167 was strictly observed.

**Duties & responsibilities of Mining Mate :**

1. Subject to order of superior official, he shall have responsible charge & control of the district of the mine assigned to him by the manager or assistant manager.
2. He shall make inspection & reports as are required by the regulation & in making such examination he shall pay particular attention to the checking of support.
3. He shall see that all traveling roadways to working place in his district are made & kept secure.
4. If he observe any dangerous place during the course of inspection he shall withdraw all persons from such places & shall not leave such places until the danger has been removed on his presence.
5. He shall take care that every dangerous operations is carried out with due precautions.
6. He shall on receipt of information of an accident to any erson in his district, inspect the place & shall report the accident to the manager & assistant manager.
7. He shall devote the whole of his time to his duties and shall not leave the district, under his charge until the end of the shift.

**Duties & responsibilities of Magazine In charge :**

1. Shall subject to order of superior official be responsible for the proper receipt, stronger & issue of explosive in and from the magazines.

2. Shall maintain such records of explosives to any person other than a competent person & when explosives are returned to the magazine, shall re-issue such explosive before issuing fresh stock.
3. Shall record on a bound paged book kept for the purpose of the names of various competent persons issued to each of them.
4. He shall securely lock each canister before issuing it to the competent person & shall also check whether the canister is returned to the magazine in locked.
5. He shall not allow any unauthorized person to enter the magazine room.
6. Shall if he discovers any shortage of explosives in the magazine forthwith, inform the manager in writing.

**Power of inspector** : If a mine or part there of, appear to the regional inspector that the provision of regulation 106 and 107 or of any order issued under any of these regulation. Have not been complied with, he may give notice in writing to owner, agent or manager requiring him to take such protective measures within such times as he may specify on the notice. In case of non-compliance with the requirement of the notice the regional inspector may by an order in writing, prohibit until the requirement specified in the notice are complied with to his satisfaction the employment of any person other than those required for complying with the said requirement on the part or part of the mine in which protective measures are required to be taken.

**Protective work before a mine is closed** :

1. The chief inspector may be in order in writing require the owner of any mines to construct in the mine below ground or on the surface. Such protective works within such time as he may specify there in.
2. If the owner fails to construct such protective work within the time specified in order. The

chief inspector may get the works executed by other agency.

3. Until the protective works have been constructed to satisfaction of the chief inspector. The means of entering the mines of not less than two entrances, shall be kept intact and in working order.

**Working near mine boundaries :**

1. The owner, agent or manager of every mines shall have fixed boundaries of the mine. Now with standing anything contained in such regulations,
2. These shall not be charged except with the express permission of the chief inspector in writing & subject to such condition as he may specify there in.
3. No working shall be made with in a distance of 7.5 meter of the boundary of any mines & in case of a disputed boundary no working shall be made within a distance of 7.5 meter of boundary claimed by the owner of an adjacent mines until such time as a binding agreement has been reached.
4. Not with standing anything contained in sub regulation the chief inspector may, by an order in writing and subject to such condition as he may specify there in permits the working and mine or part there of to extend to within any shorter distance than 7.5 meter aforesaid.

**Drilling, Charging, Steaming & Firing of Shot Holes :**

1. No drill shall be used for boring a shot hole unless it allows a clear once of at least 0.3 cm over the diameter of the cartridge of explosive.
2. No shot hole shall be charged before it is thoroughly cleaned.
3. The detonator shall be inserted into a priming cartridge until immediately before it is to be used.
4. The blaster shall be the best of his judgment ensure that no charge in a shot hole is

over charge or under charge having regard to the task to be performed.

5. No shot hole shall be fired by a fuse less than 1.2 meter in length.
6. Every shot hole shall be stemmed with sufficient & suitable non-inflammable stemming so as to prevent the shot from blowing out.
7. In charging a shot hole no metallic tools shall be used and no explosive shall be forcibly pressed in to a hole of insufficient size.
8. No shot hole is fired except in a properly drilled, charged & stemmed shot hole.
9. All surplus explosive shall be removed from the vicinity of a shot hole before a light is brought near it for the purpose of lighting the face.
10. As far as practicable a shot hole shall be fired by the same blaster who charged it.
11. In any mine in which explosive other than gun powder are used every shot shall, if so required by the regional inspector be fired electrically.
12. Not more than 10 holes shall be fired in one round unless they are fired electrically or by means of an igniter cord.
13. No shot hole shall be charged except those which are to be fired in that round.
14. Where a large number of shots has to be fired shot firing shall as far as practicable be carried out between shifts.
15. No person shall remove any stemming otherwise than by means of water from any charged shot holes.

**Misfires :**

1. Misfire means the failure to explode of entire charge of explosive in a shot hole.
2. The number of shots which explode shall unless shots are fired electrically be counted by the shot firer.

3. No person shall be permitted to re-enter the place until 30 minutes after the firing of shots.
4. In the event of misfire the entrances to the working place shall be barricaded to prevent to advertent access.
5. Provided that where the shots are fixed electrically. This interval may be reduced to not less than five minutes after the sources of electrically has been disconnected from the cable.
6. After misfire another shot hole shall be drilled in such a direction that no point shall it be near or that 30 cm from the misfired holes.
7. When a misfired shot is not found the blaster shall before leaving the mines give information of the failure to such officials as may relive take over charge from him.
8. The blaster on the next shift shall locate & re-blast the misfired hole but if a through examination of the place where the misfired was reported to have occurred the blaster or other competent person is satisfied that no misfire has usually occurred, he may permit drilling is this place.

**Emergency plan :**

1. The manager of every mine having working below ground shall prepare a general plan of action for use on time of emergency.
2. The plan shall outline the duties and responsibilities of each mines official & including the telephone operator, so that each person shall know his duties during fire or explosion or other emergency cases.
3. The manager shall submit copy of the aforesaid emergency plan prepared by him to the regional inspector.
4. On receiving information of any emergency, the manager \* in his absence the principal official present of the surface shall immediately put the emergency action plan in

operation.

### **Zero accidental plan : (ZAP)**

The modern concept of ZAP can be achieved by design to eliminate a hazard any remaining hazard, well guard against will generation accident potential, with a probability of greater than zero. The various measure that should be taken up for achieving the ZAP or if current technology does not permitting for achieving the Minimum Achievable Potential (MAP) for accident consist of some major policy to the safety aspect of large coal mining industry such policy should comprise of from element.

1. Design, 2. Protective device, 3. Training, 4. Exultation.

**Creche** : Creche means room with necessary accommodation reserved for use of children under six year of age of woman employed in mines.

According to mine crèche rule. There shall be four types of crèches according to number of woman employed nearly type A, type B, type C & type D.

Every crèche shall confirm following standards.

- a. It shall be constructed on a suitable site selected by the mine management.
- b. It shall be contained an one building built of brick & mortar adequately lighed & properly ventilated & protected from wealth.
- c. The flooring shall be cement or stone and slicing shall not be less than 4 meter high from the floor.
- d. The interior wall shall be line washed once in six months and wood work shall be painted once a every three years.
- e. It shall be maintained on a clean & sanitary condition to the satisfaction of the inspecting staff.

**Amenities to be provided at crèches** : Amenities for first aid, cradler, cots, beds, linen, feeding bottles, cooking utensils, toys, furniture's & other equipment for use of children shall be maintained at each crèche.

**Use of crèche** : Use of crèche shall be restricted to children attendance and supervising staff & other person related with the children in crèche.

**Provision of staff** : A woman successfully undergone training as a crèche nurse at any institution approved by the central govt. shall be appointment as crèche in charge.

**Maintenance of records** : A register giving particular of children attending a crèche shall be maintained for inspector by the medical officer in charge.

**Environment Protection Act 1986** : It is an Act to provide for the protection and improvement of environment and for matter connected with it. This is about the protection regulation of discharge of environment pollutants & handling of hazardous substances. Speedy response in the event of accident threatening environment & different punishment to those who endanger human environment safety health. The environmental protection act has following main provision:

1. Power of central govt. to take measure to protect & improve environment.
2. Rules to regulate environmental pollutions.
3. Furnishing information to authorities and agencies in certain cases.
4. Power of inspection & entry.
5. Power so take sample.
- 6.

**Abandoned Mine plan (MAP) :**

1. Where any mine to which regulation 142 applies is abandoned or the working discontinued for a period of greater than four months, the owner of mines shall give plan to the chief inspector of mines within 5 months of discontinuance.
2. Every copy of plan shall show the bearing and distance of at least one of the shaft or opening of the mines from a trijunction or revenue pillar or from any other prominent & permanent surface feature the position of all water dam built below ground and also the spot levels at the end of working.
3. The original or a certified true copy of the plan & section shall be kept on the office of the mines.
4. The chief inspector may on such condition as he thinks fit to impose and on payment of the cost of preparing copies.

**Vocational Training Centre :**

1. In rule – 18 of VTR-1966 there is a provision about the training centre. The owner , agent or manager of every mine shall provide & maintain a training centre which shall be adequate for the purpose of imparting the training required to be undergone by person who are employed in that mine.
2. By the order of chief inspector two or more mining owner also may be maintained a common training centre.
3. Every training centre shall have such staff equipment & other facilities as may be approved by the chief inspector of mines.
4. Every training centre shall be under the charge of a whole time or part time training officer.

--- to organize & supervise the training of every person undergoing training.

--- to maintain records of the training given to every person to furnish weekly reports to the manager on the progress.

--- to maintain records of the supervision is referred to rule – 6.

--- To discharge such other duties as may be necessary for the proper compliance of these rules.

5. Every training officer shall keep a record of his work and shall at the end of every year. Forward to the chief inspector through the owner, agent or manager of the mine current a summary of the report of his work during the year.

**Manager** : Manager mean any person who is responsible for management supervision & direction of a mines & includes a mines superintendent who is appointed by the owner sec-17 of the act.

**Metalliferous mine** : Metalliferous mines means any mine other than a coal or an oil mines.

**Maternity benefit act 1961** : This is an act to regulate the employment of woman in certain establishment for certain period before and after child birth & to provide for maternity benefit & certain other benefit. This act has following features:-

1. No employee shall knowingly employ a woman in any establishment during the six week immediately following the day 7 her delivery.
2. According to the provisions of acts she get the payment of maternity benefit at the rate of average daily wages.
3. The maximum period for which any woman shall be entitled to maternity benefit at the rate of daily wages.
4. Any woman for getting benefit under maternity benefit act may give notice to her employer on prescribed form.

5. If a woman die before receiving such maternity benefit act may give notice to her employer prescribed form.
6. If a woman die before receiving such maternity benefit or any other amount, the employer shall pay such benefit or amount to the person nominated by the woman.

According to maternity benefit act for the purpose of maternity benefit the term “wages”

includes :

1. Name of every women and her father’s or if married husband name.
2. Date of appointment.
3. Number of days she is (a) employed, (b) laid off and (c) Not employed.
4. Date on which the women gave notice of her claim for the maternity benefit and payment there of.
5. Date of discharge.
6. Date of production of proof of delivery.
7. Date of production of proof of illness.
8. Details of maternity benefit bonus etc paid by the management.
9. Name and details of the nominee of any etc.

Where a woman dies during the period of or which the maternity benefit is due the same shall be payable for the days up to and including the day of her death.

### **Causes of accident in opencast mines :**

According to the H.W. Helnirich unsafe act of people cause for more accidents than unsafe condition, 98% of accident are caused by hazardous condition or dangerous act. And therefore these could be prevented only 2% of the accident were caused by acts of nature. From the

prevented type of accident 88% were caused due to unsafe acts of person and only 10% were due to unsafe physical & mechanical activities.

Unsafe act of person :

1. Standing under suspended load.
2. Standing machines without wearing.
3. Unsafe speed of operation.
4. Make safety devices on operation.
5. Not using safety devices.
6. Using unsafe equipment.
7. Working on moving machine.
8. Failure to use safe dress & personal protective devices.

Unsafe condition :

1. Protective devices not available.
2. Protective device not in operation.
3. Unguarded gears or other moving parts.
4. Faulty design of machines.
5. Unsafe process of work.
6. Unsafe natural condition.(darkplace, sleep roadway)

**Protective measures against accident :**

1. Every case of accident due to dumper should be discussed with all the driveous & the unsafe act and condition should be explained to them.
2. Emergency parke, service brake & parking brake are provided in every dumper.
3. No unauthorized person should drive any dumper.
4. All binds is haulraod should be wider such that the driver can see upto 30 m long distance.

5. All dumpers must be equipped with audio-visual alarm to facilitate, safe reversal.
6. Drilling equipment should be operated in a level surface with a distance of 3 m from bench crest.
7. Fires extinguishers are equipped with every machineries.
8. Benches must be designed strictly in accordance with the provisions of the regulations the condition laid down by the chief inspector of mines.
9. No person should be allowed to undercut any face or side, so as to cause any overhanging.
10. No person should allowed to enter the mines with drinking or using any drugs.

**Provisions of mines crèche rules 1966** : Creche means a room or room with oscillary accommodation reserved for the use of children under six years of age of woman employed in a mines.

1. Provision of crèche : according to this rule where woman are employed the owner or agent of the mine shall construct a creche in accordance with the standard prescribed.
2. Standard of crèche : There shall be four types of crèches according to the number of woman employed named as, type A, type B, type C & type D.  
  
Every crèche shall contain one building, built of brick and mortar adequately lighted & properly ventilated & protected from weather.
3. Provision for bathroom : In every crèche there shall be provided a closed bathroom with separate space for washing clothes with a supply of minimum 15 liter of water per child.
4. Provision of latrine : There shall be provided one latrine in each A & C type of crèches & two latrine in each B & D type of crèches.
5. Time of open crèche : The crèche shall remain open at all times both by day & night when woman employee are work at mines.

**Working under railways & roadways etc. :**

1. No working shall be made and no extraction of mineral shall be made within 45 meters of any railway or of any public road without the prior permission of the chief inspector.
2. Every application for permission shall specify the provision of working of the mines in relation to railway or public road or building concerned. The manner in which carry out operation & limits to which extend. Two copies of plan containing mining operations. A copy of application also sends to the railway administration.
3. The stability of such railways building shall not be endangered until they have been dismantled diverted or vacated as case may be.
4. Where the stability of such railways road works building has been endangered due to any mining operation. The chief inspector may order require the owner to construct on the mines below ground or works within such protective works within such time as he may specify in the order.

**Mines accident and safety :**

**Discuss classification, causes & prevention of mine accident :**

Classification : All the accident may be classified as 2 groups.

1. Those due to technical, mechanical, physical causes.
2. Those due to unsafe behavior of the conserved cover about 15% of all accident and the second is 85%. Another classification of accident may be
  - (a) Accident causing major disaster. (i) Explosion of methane, (ii) Underground fires, (iii) Inundation.
  - (b) Accident involving one or few men only. (i) Roof fall, (ii) Steep working, (iii) Explosives shot firing, (iv) Coal cutting machines & electricity, (v) Accident to supervisor.

Cause of accident : Accidents are complex usually there are several causes of both men &

environment. That may operate the sequence or in combination to result in an accident. Accidents are caused they seldom just happen. To prevent an accident from happening its causes must be determined and eliminated. The causes are

1. An accident causing loss of life or serious bodily injury in connection with the mining operation.
2. An explosion or ignition.
3. A spontaneous heating or out break of fire.
4. An influx of noxious gas.
5. An occurrence of inflammable gas in a non-gassy metalliferous mine or in a coal mines of degree 1 of gassiness.
6. An eruption of water.
7. An instantaneous failure of pillar part of a pillar of coal in working below ground coal mines.
8. A rock hoist below ground in metalliferous mines.
9. Any accident due to explosive.
10. An under overhanging of cages.
11. A breakage or failure of any essential part of winding engine, crank shaft, coupling drum shaft.

Accident prevention : When the causes of accident are known then we can be done the prevention of accident.

Correcting action :

1. Engineering provision : Provision of guards fencing lacking devices.
2. Propagation of tools, work places & trainee.

3. Personal adjustment : choose a suitable person for a particular job according to his method and physical attitude.
4. Routines inspection followed by remedial action is the essence of accident control.

**Accident Costs** : Some costs of involved is the accident are listed below

Direct cost :

- (A) To employer, (i) Medical instrument, (ii) Compensation, (iii) Pension, (iv) First-aid, (v) Loss of production due to temporary stoppage of work, (vi) plant damage.
- (B) To employee, (i) Decreased income, (ii) Loss in future earning power.

Indirect cost :

- (A) To employer, (i) Loss of employees skill, (ii) Loss of uniforms estimated production, (iii) conduct of accidents enquires & preparation of accident reports, (iv) Increase in labour tension, (v) Breaking in new men.
- (B) To employee, (i) Personal pain & mental concern, (ii) Increased difficulties in matter of family life, (iii) Economic loss to the family of the injured, (iv) Loss of time of the fellow workmen.

**Accident report** : The important information to be divided from an accident reports as.

1. How many persons are involved?
2. Places of occurrence.
3. Time of accident.
4. Lien be affected it may be material to know which part of the body has been affected.
5. Immediate contributory causes.
6. The unsafe act & unsafe conditions

The unsafe act may be

- (a) Operating without authority.
- (b) Operating to unsafe speed.
- (c) Using unsafe devices or equipment.
- (d) Unsafe loading, placing of equipment material etc.
- (e) Working on dangerous equipment.
- (f) Taking unsafe position of posture.
- (g) Failure to use protective devices.

Finally the accident investigation shall give the complete story of the accidents to the higher authority.

**Accident investigation** : The purpose of an investigation in an accident is to obtain all the information about the accident. The important principle of accident investigation should always be come in mind.

- (a) Majority of accidents involves both unsafe acts and unsafe conditions. So the investigator must not only look for all causes carefully but he must also investigate into the condition in respect of every case.
- (b) The investigation is fact-finding and not fault finding if the worker feel that the investigation is trying to fix the blame they will not co-operate and will not give all the required information.
- (c) All accident should be investigated with the least possible delay.
- (d) Every person injured in the accident must be examined.
- (e) The interview with the injured may be delayed until he has received the medical treatment.
- (f) If the injured cannot be interviewed other witness may be interrogated.
- (g) The following type of question may be asked during investigation.

How did the accident happen?

How is injured?

Where did it happen?

When did it happen?

How did it occur?

What are the materials, equipment or condition involved.

- (i) The age, sex and occupation of the injured.
- (ii) The date & time of accident.
- (iii) The place of accident.
- (iv) The types of accident.

Finally the investigator shall give all the information about accidents to the higher authority.

**Severity rate** : The term severity may be defined as the total days of disability per 100000 man hours of work exposure.

$$\text{Severity} = \frac{\text{Total days of disability} \times 10^6}{\text{Total man hours of work exposure.}}$$

**Safety consciousness** : It is useful to have

1. Inter company contests.
2. Inter department or inter unit contests.

**Categories of workers** :

(i) Loader & filler, (ii) Timber man, (iii) Line mistress, (iv) Over man or foreman & sirdar or blaster, (v) Haulage driver, (vi) Mechanics, (vii) Pump attendants, (viii) Vocational trained person.

This may be spread over different mine workshop & mineral binding plant.

**Safety campaign** : There are fundamental concepts must be accepted to make a safety campaign successfully.

1. Accidents are caused.
2. Accident must be taken to control accidents.
3. The same type accidents will occur if no correction action is taken.

The safety campaign may include the following.

1. The mine management should arrange & conduct safety closes for the supervising staff various categories of skilled labours and other workers. The lectures in general safety may include, (i) good practices in supporting roadways & working under various conditions, (ii) How common and typical accidents occur and how they can be avoided, (iii) The use and handling of explosive, (iv) Dealing with coal dust, (v) Travelling of men in shafts, (vi) Practice of handling and attending haulage & pumping machines.
2. Safety competitions of different types & forms should be observed in every mines at difference intervals between different categories of workers.
3. First aid competition should be observed periodically between different mines.
4. Workers should be invited to make suggestion for improving safety.

**Frequency rate** :

(a) Accident per million man hours worked

Number of accident X 10<sup>6</sup>

F.R.= \_\_\_\_\_

Total number of man hours worked.

(b) Accident per 1000000 man shift worked

Number of accident X 1000000

F.R.= \_\_\_\_\_

Total number of man hours worked.

(c) Accident per 1000 men employed

Number of accident X 1000

F.R.= \_\_\_\_\_

Number of men employed

(d) Accident per million tones of outputNumber of accident X 10<sup>6</sup>

F.R.= \_\_\_\_\_

Total output in mines.

**Safety organization :**

In a large mining company the safety organization may be held by a director (safety) under who may be as follows.

1. Formulating with the general manager for the co-ordinate of & communication of the safety matter.
2. Discussion with the general manager for the co-ordination \* communication of the safety matter.
3. connecting research in safety matter.
4. Formation of the safety research & standardization using in the under ground.
5. Honour the safety policy formed by the director of the company & find out the way & means for translating it into action.

6. Formulate methods for safety inspection & safety audit for their mines.
7. Arrange for a proper accident analysis programmed with a view to prevent their recurrences.
8. Observe safety works fortnight etc in the mines.
9. Better communication.
10. Keeping in touch with the latest technique of safety.
11. The time with in which and the form in which acknowledgement of the receipt of any such application may be sent.
12. The matter which may be considered where applications in receipt of the same land are received on the same way.
13. The authority by which prospecting licenses or mining lease in respect of government may be granted.
14. The terms on which & the condition subject to which any other prospecting licenses or mining lease may be granted or renewed.
15. The grouping of associated minerals for the purpose of maximum area for which a prospecting license or mining lease may be granted.
16. The manner in which and the condition subject to which a prospecting license or a mining lease may be transferred.
17. The form of registered to be maintained under this act.

### **Trade Union :**

1. According to Indian trade union act 1926, trade union has been defined as a combination or association of workmen as well as that of employer for the purpose of

regulating the relation between the workmen or between employers & includes any federation of two or more trade union.

2. Any 7 or more members of a trade union may apply for registration of the union.
3. Any person of the age of 15 year & above can be member of a registered trade union.

**Minor mineral** : It means building, stones, gravel, ordinary clay, ordinary sand other sand used for prescribed purpose and only other minerals which the central Govt. may be notification in the official gazette.

**Man power distribution plan** : for effective oms the exacts man power planning included.

1. Over staffing cost a lot to a company and lower staff may effect the efficiency. Therefore the human resources management plan and forecast the man power is need in present & future expansion of the business.
2. In mines shift wire man power planning is made for effective production.

**Reserve station** : It is temporary storing plant of explosive in under ground coal mines. It must be well ventilated & fenced well.

**Minimum Accidental plan** : Must be function of a every engineer practicing in his own discipline. Anticipation of hazard will cause a superior design to be involved. The ZAP & MAP effort should be maintain in every mines to more nearly achieve better utilization of the machines the system.

**Break even analysis** : It is otherwise known as profit loss analysis. Breakeven point is point where there is no losses no profit. A graph is drawn taking the total fixed cost and variable cost in one axis & the revenue granted generated by selling the mineral in the axis. The point where

two graph meet is break even point.

If the mineral is sell above the break even point then it will create profits for an organization where as below break even point is a loss to the organization.

**DGMS** : Director of mines safety which comes under the labour of and welfare department of Govt. of India and which deals with the safety & misfire of worker of different mines with in India including Andaman & Nicobar island.

**Wage** : Remunatition which paid to the workers for their work is known as wages. It may be computed on daily basis weekly basis or monthly basis.

**First aid kit** : The small first aid kit which can be take staff contains the following item :

1. Structure with two blankets.
2. Splints with triangular bands to apply them.
3. Wool, cotton and adhesive plaster.
4. Roller bands.
5. Burn dressing & sterilized dressing.
6. Dettol sauren other equipments.
7. Adhesive, Sesser , safety pin & carbolic soap.

**Industrial Fatigue** : The word fatigue origin from the Latin word Fatigue. It means some one very tired.

The workmen work in industrial in electrical, mechanical department cause a fatigue, extreme tireless, brittleness in metal or other material caused by repeated stress loose fitting clothing of a sort worn by solider.

**National Mineral policy** : India has a comprehensive mineral policy for management of its mineral wealth. Policy guidelines are

1. State is the owner of all mineral resources of the country & development of mineral resources and regulation of mine is responsibility of to control and state Govt.
2. As mineral are exhaustible have to be guided by long term national goals.
3. Mineral constitute the vertical raw materials for many basic industries & major resources for development.
4. Development of each mineral shall be formulated and reviewed periodically on the basis of available.
5. Induction of foreign technology and foreign participation in exploration and encouraged.
6. Mining operations shall not be ordinarily take is identified ecologically and biological.

**Forest Act** :

1. The forest conservation Act come into force with effect from October 1980. Under the Act, no forest act land can be used for non-forest purpose except with the prior approval of the central Govt. Non forest purpose means breaking up or clearing of any forest land or its portion for any purpose other than the re-forestation.
2. The approval granted under the act would ensure commitment on the part of the mine owner to take due care of the forest and undertake a forestation to restore the land off cut by mining operation.
3. The respect of the mining operation being carried on the forest lands leased before the commencement of the forest Conservation Act 1980 the approval of the central Govt. for the use of forest land for any non forest area of purpose.
4. By circular issued in July 1986 the mining of environment and forest has stated that mining is a non forest activity by approval of the Central Govt. essential before a mining

lease (ML) is granted. The prospecting license (PL) need not be referred to the central Govt. for prior approval do not cutting the tree or clearance of forest.

5. All mining project should be referred to environment wing of the department of environment & forest for environment clearance simultaneously with the proposal for forest clearance.

The conservation rules should be provided :

1. Total mining lease area and forest area required.
2. Period of mining lease proposed.
3. Estimated reserve of each mineral are in the forest area.
4. Annual estimated production of mineral ore.
5. Nature of mining operation (opencast & under ground).
6. Plans for rehabilitation of the area after mining.
7. Gradient of the area where mining would be undertaken.
8. Average number of person to be employed everyday.
9. Area of forest land required for  
 --- Mining, dumping of overburden, Storing mineral / ore, storing tools and machinery, construction of building, power stations, workshop etc, Town ship / housing colony, construction of road/ ropeway/ railway lines, full land use plan for the forest area required.
10. Procedure for the stocking of the top soil for re use.
11. Phased reclamation programmer con currently with the mining operation.

**Safety audit** : the aim of safety audit are

1. To lay down such check will keep help to maintain high safety standard in the mines.
2. To optimize the utilization of the safety appliances to prevent injures.

3. It consist the mine by pointing out the silent areas.
4. To maintain a constant awareness to face an emergency in the mines.
5. To analyze the causes of accidents.

The audit term may consist of the manager production superintendents and exclusive engineers of the area to inspect the mines. This audit team safety audit is essential at to acess the safety standard in a mine.

**The duties of the safety officer shall be :**

1. To visit surface and under ground parts of the mine with a view to meeting the workers on the spot to tack to them on matter of safety.
2. To take charge of the newly joined staff and shoe them around the mines pointing out the safe & unsafe acts during the course of their work in the mines.
3. To investigate all types of accidents and incidents in the mine including miner accident.
4. To maintain detailed statistics about mines accidents.
5. to study and a pries the manager of all possible sources of danger such as inundation, fir, coal dust etc.
6. To hold safety classes gives safety tracks.
7. To organize safety weeks & other safety education & propagate in mines.
8. To see that all concerned mines employees are freely conversant with various standing order.
9. To report to the manager as a result of his visits to the various parts of the mines.
10. To assist the manager in any other matter relating to safety in the mines.
11. The safety officer should normally be senior most assistant manager of the mines nest in rank only the manager.

**Precaution against inflammable and noxious gas :** According to the MMR 1961 under

section 141.

1. for the purpose of this regulation inflammable gas shall be detected when it is indicated by the lower flame of flame safety lamp.
2. When any person duties the pressure of inflammable gas he shall not brush it out, but shall immediately with draw from the place & shall inform his superior officials about the same.
3. during the removal of such gas all person shall be withdrawn from the return side of the ventilating district except these necessary for such removal.
4. No person shall be recommended in to the place where the gas was detected until a competent person has examined the place.
5. When the gas was found & when it is removal the percentage of the inflammable gas shall be recorded in a bound paged kept for the purpose.

**Rules for regulating the grant of prospecting licenses & mining lease** : According to the mines and minerals regulations and development act 1957 under section -13.

1. The central government may be notification in official gazette, make rules for regulating the grant of prospecting licenses & mining lease in respect of minerals & for the purpose connected there with.
2. Such rules may provide for all or any of the following matters namely, the person by whom and manner which application for prospecting license or mining lease in respect if land in which the mineral vest in the government may be made and fees to be paid there of.

**Provision regarding serious bodily injury** :

1. Every person receiving an injury in the course of his duty shall or soon as possible report the same to an official.
2. Where the person receiving an injury is not in a position to report the same to an official.
3. The official shall make such arrangement for rendering first aid to the injured as may be required.
4. If the injured requires immediate attention by the medical practitioner, the official shall arrange for the medical practitioner to be called.
5. If an official who is required to carry a first aid outfit under rule receives information above injury to work person, he shall obtain to the injury person.
6. It shall be duty of the person in charge of the nearest first aid stations provided under rule 44 to render such first aid to the injured person as may be necessary.

#### **Inspection after shot firing :**

1. After a shot has been fired no person other than the blaster or any other competent person holding a manager or foreman certificate appointed for the purpose by the manager shall enter.
2. Allow any other person to enter the place until the area is free from dust, smoke or fumes.
3. The blaster or other competent person shall enter the place make a careful examination & with his assistants if any make the place safe.
4. After shots have been fired a person engaged to clearing mineral, rock or debris shall look for an exploded cartridge and detonators are found it shall be removed & handed over to blaster or other official.

#### **Haulage roadways :**

1. The haulage roadway shall be of adequate dimensions, straight and regular gradient.

2. The haulage roadways shall have tracks properly laid with rails of adequate section.
3. Where haulage is affected by one or more rope.
4. At the top of every inclined plane at least one stope block.
5. At least one runway switch a distance greater than the length of a sit or tubs by more than 10 m shall be provided.
6. Safety hook Jazz rail shall be provided.
7. Re-railer are provided at interval not more than 250 mt.
8. Where haulage roadways exceeding 30 mt length signal arrangement shall be provide code of signal

One rap – Stop in motion.

Two raps – lower haul in slow.

Three raps – start when at rest.

Four raps – raise or haul out slowly.

9. No person other than a competent person or un-official shall give any signal.
10. Adequately precautions shall be taken to prevent signal & telephone wire from touching cable & other electrical apparatus.
11. Man holes shall be put less the 1.8 mt in height 1.2 mts in depth & not less than 0.75 mts width but not more than 1 mt.

**Precautions after a fire has broken out :**

1. On the appearance in any part of mines of smoke or other signs may have broken out a fire, all person should be immediately withdrawn from the mines. Except necessary for deal in with fire & sealing off fire.

2. No person shall be read initiated until the fire or heating has been extinguished or affectively scaled off and an examination has been made by manager assistant manager underground manager to declared to be mine safe or not.
3. Carbon monoxide shall be present in the place through out during the whole time of sealing off or delay with fire.
4. Where sealing off dealing with fire going on the following apparatus shall be available in near the place two smoke helmets or other suitable birds.

**Equipment for fire fighting :**

1. Sand or other incombustible dust of portable fire extinguisher shall be provided at every entrance of a mine.
2. At every landing and bottom of every shaft or winze are uses.
3. At every engine room or where combustible material stored.
4. A sufficient supplied sand or incombustible dust or portable fire extinguished and shall be provided are entrance of the district.
5. Soda acid type extinguisher of water shall not be used for fighting oil or electrical fire.
6. Foam type extinguisher shall be used for fighting electric fires.
7. A competent person shall once at least in every 3 month examine every fire extinguisher, so provided & shall be report of binding note book signed & dated.

**Traveling roadway :**

1. Traveling roadways shall be separate from haulage roadway except specify by regional inspection.
2. Dimension of traveling roadway shall not be less than 1.8 meters high thronged.
3. Where the traveling roadways exceeds 80° inclination their shall be provided with suitable steps or ladders.

4. Where the inclinations exceeds  $45^{\circ}$  their shall be provided hand rails or ropes in addition to the steps or ladders.
5. Where inclination exceeds  $60^{\circ}$  their shall be provided platforms at intervals not more than 10 mts.

**Aoulance of danger :**

1. If a competent person found any danger in mines or district he shall be immediately with draw the all person the mines or district & should be fenced off.
2. The competent person shall immediately inform the superior officer about the danger & shall record the fact in the book kept under purpose.
3. The superior officer shall make or cause to be made by competent person shall readmitted to the mine or district in reported to be safe.
4. If the work of removing the danger as suspended before the danger is removed the mines or district shall be secure by fenced off.

**Precaution against fire :**

1. No oil, grease, canvas or other inflammable materials shall be stored in any mines except in fire proof receptacle. Grease or oily waste in workings below ground shall be regularly removed to the surface.
2. All surface, structures & supports with in a horizontal distance of 10 mt from of combustible material.
3. No person shall place or throw or cause or permit to be placed or throw any naked light or lamp or near any timber wooden structure or other combustible material.

4. dead leaves to accumulate or remain and combustible materials other than material required for use within a period of 24 hours, shall not be stored within a distance of 15 m from any entrance to mines.
5. No person shall light a fire or permit a fire to be lighted on the surface within a distance of 15m from any entrance to mine.
6. No person shall have leave a portable light or lamp belowground unless he has placed it in charge of some other person remaining there in.

**Accident proneness** : Accident proneness is required as set of personal quality which renders. Some workers more liable to sustain accidents than other studies by physiologist shines that those workmen who had more than their share of minor accidents had also an excess of manager accidents. Thus only a small group of workmen are susceptible to accidents where all other workers are equally to such risks. The same relationship holds good among the roof thickness, absentism and accident.

An American survey on distribution of accidents revealed that 10% of the workmen account for 50% of the accidents. As such accident proneness is a factor which will have to be taken into consideration but it is doubtful whether any effective system could be evolved for screening the were above average intelligence & bearing ability.

**Accident causes in opencast mines** :

1. Accident due to face of sides : Failure to make and keep the sides secured by proper benching sloping and keeping benches off adequate height & width. Under cutting so as to act dangerous over hang. Extraction of coal pillars by opencast method so as to cause collapse of such pillars while person are at work in top or at the sides. Lack of supervision.
2. Accident due to machinery : Accident due to transporting of shovel, trucks & dumpers

mainly caused under the following circumstances, During reversal operation. Whole person are taking shelter under the vehicle moved suddenly, Unauthorized driving of vehicles by helper, Loss of control vehicles, Vehicles moving in steeper gradients or on benches of inadequate width.

3. Accident due to use of explosion : Projectiles due to blasting, coal dust explosion while heavy blasting is carried out in over burden underground galleries.
4. Miscellaneous : Use of electricity, Inundation in cause if opencast working in the vicinity of water course.

#### **Prevention of accident in opencast mines :**

1. The top edge of opencast working should be kept properly fenced.
2. At the finishing stage, the working should be fenced with machinery wall not less than 0.4m thick and 1.2m length with apparent tip.
3. The sides of excavation & the height & width of benches must be properly maintained.
4. Quarrying should be done from top down ward.
5. Special case should be taken any slip or other planes of weakness exist.
6. Regular dressing of sides of bench shall be carried out for safety purpose & workers employed with 5m of the working face.
7. Special bank should not retained by artificial means at an angle of response and this must not exceed 31.5 degrees from the horizontal.
8. Safety belt or rope should be fall more than 1.8 vertically while person are at work or to travel or close to beneath.
9. Precaution against danger while reversing of heavy machinery by installing audio visual alarms & appointment of spotters.

**Duties of lamp room in-charge** : Every competent person in-charge of a safety lamp room.

1. shall be responsible for ensuring that all lamps in the safety lamp room are properly maintained in accordance with the provisions of the regulations.
2. Shall see that safety lamp room in kept in a neat and tidy conditions and that all damaged and effective gauges, glasses and other arts of safety lamp are not kept or stored in such room.
3. Shall see that fire extinguisher or other means of dealing with fire provided in the safety lamp room are in good condition & readily available for use.
4. Shall see that all records required by the regulations for the issue, return and maintenance of safety lamp are properly maintained.
5. Shall carry out such other cuties relating to the maintained issue & return of safety lamp as may be specified by the manager or assistant manager or under ground manager.

**Duties & responsibilities of surveyors** :

1. Every surveyor -

(a) Shall make such surveyors & traveling and prepare such plans & sections and tracing there of as the manager may direct or as may be required by the act or by the regulations or orders made there under and shall sign the plans, sections & tracing & date his signature.

(b) Be responsible for the accuracy of any plan & section or tracing there of that has been prepared & or signed by him.

2. The surveyor shall record in a bound book kept for the purpose.

(a) The full facts when the workings of the mines have approached to about 75 meters from the mines boundary of from disused or water logged workings.

(b) Any doubts which may exist concerning the accuracy of the plans and sections prepared under these regulation and

(c) Any other matter relating to the preparation of the plans, sections & tracing that he may like to bring to the notice of the manager.

Every entry in the book shall be signed and dated by the by the surveyor & countersigned & dated by manager.

3. Nothing in sub-regulation shall absolve the owner, agent or manager of his responsibility under the act & under these regulation and orders made there under.

**Duties & responsibilities of engineers** : The engineer of other competent person appointed for the purpose.

1. Shall subject to the orders of the manager and other superior official hold general charge of all machinery at the mines and shall be responsible for the proper installation maintenance & safe working of each machinery.
2. Shall be present through out whenever any work of installing, changing or recapping, if any winding rope or of installing changing or annealing any suspension gear is being carried on.
3. Shall see that the provisions of the act and of the regulations and order made there under relating to the installation maintenance operation or examination of machinery are properly carried out by himself or subordinate officials r by competent persons or by work person as the case may be appointed for the purpose.
4. Shall if machines or other subordinates officials or competent person are appointed for the purpose examine all reports registers & other records relating to installtion, maintenance, operation or examination of machinery required to be made or kept in pursuance of the act & of the regulations and orders made the render & shall countersign the same & date his signature.

**Duties of winding engineer :**

1. At the beginning of his shift, every winding engineers shall examines the engines, brakes & all appliances in his charge & shall satisfy himself that they are is good working order.
2. Every winding engineers shall during his shift keep the winding engine & apparatus connected there with properly cleaned and oiled shall see that the engine room is clean & free of inflammable material.
3. The winding engineers shall immediately report in writing to the engineer of other competent person appointed for the purpose any defect has noticed in the engine brake, indicator, drum rope or other appliance under his charge.
4. The winding engineer shall not allow any unauthorized person to enter the engines room or in any way to the interfere with the engines.
5. Every winding engineers through by acquaint himself & carefully attended to the prescribed of signals & shall not start the engines until he has received the proper signal to do so if the signal is indistinct he shall not start the engine until it has been repeated and he clearly understand it.
6. The winding engineman shall avoid jerk in starting running & stopping the engine and shall cause the cage or other means of conveyance to be brought gently to rest at any stopping place.
7. While persons are being lowered or raised in the shaft the winding engineers shall not drive the engine at a speed higher than the speed that shall be fixed by the manager, for man-winding purpose.

**Duties of bankman, bellman & signal man :** Every bankman, bellman & signal man as the case may be shall observe the following provisions.

1. He shall subject to the orders of a superior official have full control of the top of the shaft

or winze or the landing or the case may be & shall report to such official any person who without authority gives a signal or disobeys instructions.

2. He shall thoroughly acquaint himself with and carefully attend to the prescribed code of signals & shall properly transmit the signals by the means of provided. He shall not act on stop. He shall not allow any un-authorized person to give signal.
3. He shall immediately report to his superior any defect in the signaling installation.
4. He shall devote the whole of his time to his duties and shall not leave his post during the period of his duty. Where persons are raised or lowered in the shaft, he shall not leave his post at the end of his shift or unless he has been relieved by a duty appointed substitute.
5. He shall not allow more than the authorized number of conveyance at any one time.
6. He shall not unless specially authorized in writing by the manager in that behalf, allow any person when riding in cage or other means of conveyance to take with him any bulking material other than tools & instruments.
7. After a stoppage of winding for repairs or for any other cause for a period of exceeding two hours he shall not allow any persons to ride in a cage or other means of conveyance unless it has been run at least one complete trip up & down the working portion of the shaft.

**Maintenance & examination of safety lamp :**

1. A competent person appointed for the purpose shall clean from examine and securely deep the lamps before they are issued for use.
2. A competent person appointed the purpose for shall examine the safety lamp at the surface immediately before the taken below ground for used and shall assure himself for internal observation, such lamp is on safe working order securely locked.

3. It shall examine the safety lamp after return. If no such examination any lamp is found to damage or misused he shall record the nature of the damage or misuse in a bound paged book. He shall be counter sign & dated by the manager.
4. No person shall be appointed as competent person unless he holds a gas testing certificate.

### **Transport of explosive :**

1. While explosive in bulk are lowered or raised in a shaft or winze a distinguished the explosive or the person in-charge of explosive shall travel in the same cage or bucket.
2. Every cage skip or bucket containing explosives shall be gently lowered or raised & it shall be the duty of the banksman or bellman as the case may be adequately warn the winding engine as set in motion.
3. Where explosive are being carried on a ladder every case or container shall be securely fastened to the person carrying it.
4. No person other than a blaster shall carry any priming cartridge into a shaft which is in the course of being sunk.

### **Shot firing tools :**

1. Every blaster on duty shall be provided with a suitable electric lamp or torch.
2. A tool made entirely of wood suitable for charging out shot holes.
3. A scraper made of wood suitable for cleaning out shot holes.
4. Where fuse are used a knife for cutting for fuse, where machine cap fuses are used also a pair of suitable crimping.
5. Where detonators are used a picker made of wood or of a man ferrous metal for priming cartridge.
6. No tool or appliance other than that provided as above shall be used by a blaster.

**Precaution against gas during dewatering & re-opening :**

1. A competent person shall be present during dewatering any more or shaft only approved safety lamp & torches shall be exclusively used.
2. After a discontinuous of mining a period exceeding seven days of any part of a mines. The first inspection of mines or part which is re-open shall be made by a competent person or after the dewater shall be made by a competent person approved safety lamp or electric torch shall be exclusively used.
3. The result every such inspection shall be recorded in bound paged book kept for the purpose shall be signed & dated by the person.

**Prescribed of mine vocational training :**

1. Prescribed duration of training should be increased 1 month in three stages.
  - (a) In formal decreases on objectives purpose & programmed of training.
  - (b) Theoretically talks & spot demonstration and
  - (c) Although approved of every individual.
2. The refresher courses should be obligatory irrespective of any discontinuously.
3. Pre-training interview if trainees should be arranged to blinder stand the attainment attitudes and culture of the trainees.
4. Special on the job training for at least one month should be made obligatory of workers being transferred to mechanize difficult being mine.
5. Some training mines should be maintained exclusive for training purpose. Excursions to important mines should be arranged as a part of training programmed.
6. Some competition in different areas of training should be introduced.

7. Supervision should also be covered under the V.T rules for undergoing courses in decision making motivation etc.
8. The training should be imparted skilled the group of fresher old hands, skilled worker separately.
9. Training schedule charged new schedules should be added for new technology & machinery.
10. Provisions for frontline supervision training should be include MVTR. All safety committee member and workman inspector should be covered under the MVTR.
11. The training instruction should be recreated from right disciplines and with proper aptitude, so that all aspects training are covered efficiently the training officer.

#### **Use of permitted explosive :**

1. No explosive other than a permitted explosive shall be used in any mines.
2. No detonator shall be used unless it is an electric detonator or copper tube.
3. Permitted explosive shall be fired by approved shot firing apparatus.
4. No shot hole shall be steamed or fired by any person who does not held a managers, foreman, mates certificate as together with a gas testing certificate.
5. Where more shots 15cm one are charge they should be fired simultaneously. No delay action detonator shall be used except with the previous permission of DGMS writing.
6. Immediately before charging a shot hole or a round it shot holes & before firing the shot the blaster shall care freely test inflammable gas at all places with in arises of 20m of the place firing.

#### **Standard of lighting :**

1. If any doubt a rises as to whether any lamp or light is of adequate lighting performance

or not it shall be referred to the chief inspector for decision.

2. The chief inspector may from time to time notification in the official gazette specify the type of lamp.

**General lighting :**

1. Adequate general lighting provided during working hours.
2. On like surface.
3. Where the natural light is sufficient.
4. In every engine house.
5. In the vicinity of every working shaft.
6. In every opencast working.
7. At every shunting or marshalling yard.
8. At every place where persons have to work.

**Standard of ventilation :**

1. It shall be duties of the owner agent or managers of every mines to take such steps as are necessary for ensuring there is constantly produced in all part of the mine below ground in ventilation adequate to clear away smoke, steam & dust to dilute gases that are inflammable or noxious gas to harmless nor ensure that.
2. The percentage of oxygen shall not less than 19%.
3. The % of CO<sub>2</sub> or any noxious gas should not exceed 5%.
4. The % of inflammable gas should be exceeding 1.25%.
5. The regional inspector is of the opinion that the ventilation is not adequate, he may by an order in writing require the installation & maintenance of such mechanical ventilation as is capable of producing adequate ventilation in the mine or part.

**Auxiliary Fan :**

1. Every auxiliary fan shall be installed located & worked such a manner that a sufficient quantity of air shall at all times reach if so as to ensure that it does not re-circular air & there as no risk to the air which it circulates being contaminated by any substantial quantity of inflammable or noxious gases or dust.
2. It shall have an air dust to ensure an adequate supply of air to with in 4.5m of the face or blind end.
3. No auxiliary fan shall be started stopped removed replaced or in any way altered or interfered with expect by or on the authority of an official.
4. No person shall enter or remain in any place which is dependent for its ventilation on auxiliary fan, whether by the stoppage of the fan or other wise no person shall be so enter or remain there in except for the purpose of restoring the ventilation unless the place has been examined by a competent person and declared safe.

**Apparatus for testing for carbon monoxide :**

In every mine off second or third degree they shall be kept at mines constantly available for use or more suitable birds or other detaching carbon monoxide gas approved by chief inspector.

**Precaution against irruption :**

Where any working is extended to with in 30 nos of any stopped out area or disused working containing or likely or contain an accumulation of inflammable or noxious gases there shall be maintained at least one bore hole not less than 1.5m advance of working.

**Danger from surface water :**

1. Where any mine or part there is so situated that there is any danger of in such of surface water into the mines or part adequate protection shall be provided.
2. No working shall be made in any mines vertically below any part of any river, canal, lake, tank or other surface reservoir.
3. In spot lying with in horizontal distance of 1.5m from either bank of river or canal or from the boundary a lake tank or other surface reservoir.

**Danger from underground inundation :**

1. Proper provision shall be made by in every mines to prevent irruption of working of the same mine or an adjoining mines.
2. No working which has approached with in a distance 60m & duscused or abandoned worker.

**Locomotive :**

1. No locomotive shall be used belowground other wise than in accordance with the permission in writing of the chief inspector & subject to such condition.
2. No locomotive shall be used where the gradient exceeds 1 in 15.
3. No person other than the driver shall ride on any locomotive unless authorized in writing to do so by the manager.
4. Except during shunting operations, the locomotive shall lead the tubs or set or train of tubs.

**Cartridge :** Unless other wise permitted by the chief inspector by an order in writing and subject to such condition as he may specify there in no explosive, other than a fuse or a

detonator, shall be issued for use in mines or taken in to or used in any part of a mines unless it is in the form of a cartridge.

**Rules of safety committee** : The rules of safety committee shall be.

1. To discuss remedial measures against unsafe conditions & practices in the mine as pointed out in the reports of workmen inspector.
2. To consider before commencement of operation in any new district of mine or commissioning of new electrical or mechanical installation or introduction of new mining technique.
3. To discuss the report of inquiry into accident & make appropriate recommendation.
4. To formulate appropriate safety campaigns based on analysis of accidents.
5. To meet at least once in 30 days to consider the matters placed before it and other matter that may be raised by members & make such recommendation.
6. To serve as a forum for communication on safety & occupational health matters.

**Rules of workmen inspector** : The rules of workmen inspector shall be.

1. To inspect all shaft, inclines, roads, work places & the equipment & transfer of workers.
2. In case of any urgent and immediate danger that comes to his notice.
3. To inform the manager & the arranged about the same.
4. To suggest remedial measures necessary to avoid the danger.
5. To accompany the inspector in the course of complete inspection of the mine.
6. The workmen inspector shall record of full report of his inspection in interleaved played and register kept for the purpose in the mine in the form underground.