

LEARNING MATERIALS

SEMESTER-5TH SEM.

BRANCH-MINING ENGG.

SUBJECT-M.L.G.S.-I(TH-3)

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M.L.G.S-I

73. Duties of Welfare Officer –

(1) The duties of Welfare Officer shall be -

- (i) to establish contacts and hold consultations with a view maintain harmonious relations between the management and persons employed in the mine ;
- (ii) to bring to the notice of the management the grievances of employees, individual as well as collective, with a view to securing their expeditious redressal ;
- (iii) to promote relations between management and employees, which will ensure productive efficiency as well as melioration in the working conditions, and to help workers to just and adapt themselves to their working environments ;
- (iv) to assist in the formation of Work and Joint Production Committees, Cooperative Societies and Safety- First and Welfare Committees and to supervise their work ;
- (v) to help the management in regulating the grant of leave with wages and explain to the workers the provisions relating to leave with wages and other leave privileges and to guide the workers in the matter of submission of applications for grant of leave for regulating authorised absence.
- (vi) to advise on welfare provisions such as housing facilities, food-stuffs, social and recreational facilities, sanitation, individual personnel problems and education of children.

- (vii) to supervise welfare activities, statutory or otherwise including education and training of employees;
- (viii) to suggest measures which will tend to raise standard of living of workers and in general promote their being and ;
- (ix) to perform any other duty connected with the welfare of the persons employed in the mine.

33. Surface latrines and urinals. –

(1) On the surface at every mine, adequate latrine and urinal accommodation shall be provided at conveniently accessible places separately for the use of males and females employed in the mine.

(2) The scale of latrine accommodation shall be at least one seat for every 50 males and at least one seat for every 50 females employed at one time:

Provided that where sanitary latrines are maintained in bathing places the number of latrines to be provided under this rule may include such sanitary latrines.

37. Underground latrines - If in any mine more than fifty persons are employed underground at any one time latrine shall be provided underground on a scale approved by an inspector at convenient points near the working shafts and at entrances to the district or sections of the mine. The latrines shall be of a type approved of in writing by an inspector.

168. Drilling, charging, stemming and firing of shotholes. –

(1) No rill shall be used for boring a shothole unless it allows a clearance of at least 0.3 centimetre over the diameter of the cartridge of explosive which it is intended to use.

(2) No shothole shall be charged before it is thoroughly cleaned.

(3) Before any shothole is charged, the direction of the hole shall, where practicable, be distinctly marked on the roof or other convenient place.

(4) No detonator shall be inserted into a priming cartridge until immediately before it is to be use : however that in case of wt workings, priming cartridges may be prepared at the nearest convenient dry place; and such primed cartridges shall be carried to the working place in a securely closed case or container. Detonators once inserted into a priming cartridge shall not be taken out.

(5) The charge in any shothole shall consist of one or more complete cartridges of the same diameter and the same type of explosive.

(6) The shotfirer shall, to the best of his judgment, ensure that no charge in a shothole is over charged of under-charged, having regard to the task to be performed.

(7) No shothole shall be fired by a fuse less than 1.2 metres in length.

(8) Every shothole shall be stemmed with sufficient an suitable non-inflammable stemming so as to prevent the shot from blowing out. Only sand loosely filled in, or soft clay lightly pressed home, or a compact but not hard mixture of sand and clay or water shall be used as stemming.

(9) In charging or stemming a shothole, no metallic tool, scraper or rod shall be

used; and no explosive shall be forcibly pressed into a hole of insufficient size.

(10) No shot shall be fired except in a properly drilled, charged and stemmed shothole.

(11) Blasting gelatine or other high explosives shall not be lighted in order to set fire to fuses.

(12) All surplus explosives shall be removed from the vicinity of a shothole before a light is brought near it for the purpose of lighting the fuse.

(13) As far as practicable, a shot shall be fired by the same blaster who charged it.

(14) In any mine in which explosives other than gunpowder are used, every shot shall, if so required by the Regional Inspector, be fired electrically.

(15) Except in a stone drift or a sinking shaft, not more than 10 shots shall be fired in any one round. Where more than six shots are to be fired in one round, they shall be fired electrically.

(16) No shothole shall be charged except those which are to be fired in that round; and all shotholes which have been charged shall be fired in one round.

(17) Where a large number of shots has to be fired, a shotfiring shall, as far as practicable, be carried out between shifts.

(18) No person shall remove any stemming, or pull out any detonator lead, or remove any explosive, from a shothole either before firing or after a misfire, or bore out a hole that has once been charged, or deepen or temper with empty holes or sockets.

127. Danger from underground inundation. –

(1) Proper provision shall be made in every mine to prevent irruption of water or other liquid matter or any material that is likely to flow when wet from the workings of the mine the same mine or of an adjoining mine and to prevent accidents while drilling bore-holes for probe or release of a body of water or other liquid matter.

(2) Where work is being done in –

- any place in a seam or section, which is at a lower level than any other place in a lower

seam or section; or

- any place in a seam approaching a fault passing through an upper seam or section, which

contains or may contain an accumulation of water or other liquid matter or any material that is

likely to flow when wet;

(3) No working which has approached within a distance of 60 metres of any other working

and whether in the same mine or in an adjoining mine, shall be extended further except with the prior permission

(4) Every application for permission to extend any working referred to in sub-regulation (3)

shall be accompanied by two copies of the plan and section showing:

- (i) The outlines of all such disused or abandoned workings in relation to the

working

approaching them and also the depth of such disused or abandoned workings from

the surface;

(ii) The outlines, the lay out and the method of the proposed workings for which

permission is sought;

(iii) The faults, dykes and other geological disturbances in relation to working specified in

clause (i) or (ii) of the sub-regulation; and

(5) Whenever seepage of water, which is not normal to the seam is noticed at any place workings or if there be any such suspicion or doubt such working shall immediately be stopped and the Chief Inspector and the Regional Inspector shall forthwith be informed of such seepage. Such working shall not be extended further except with the prior permission in writing of the Chief Inspector and subject to such conditions as he may specify therein.

(6) Unless specific relaxation is granted by the Chief Inspector in writing under sub-regulation

(7), all the provisions of sub-regulation (6) shall be strictly complied with while extending any

working referred to in sub-regulation (3) or sub-regulation (5) .

(8) If the Chief Inspector is satisfied that the conditions in any mine or part thereof are such as to render compliance with all or any of the provisions specified in sub-regulation (6) unnecessary or impracticable, he may, by an order in writing and subject to such conditions as may be specified therein, relax, vary or dispense with all or any of the conditions and requirements contained in sub-regulation (6), and, if he is of the opinion that the conditions at any mine or part thereof are such as to require additional precautions to be taken, he may by an order in writing require that such additional precautions besides those specified in sub-regulation (6) shall be taken.]

Voltage Limits- Energy shall not be transmitted into a mine at a voltage exceeding 11000 volts and shall not be used therein at a voltage exceeding 6600 volts.

Provided that:

- a) Where hand- held portable apparatus is used, the voltage shall not exceed 125 volts.
- b) Where electric lighting is used:-
 - 1) In u/g mines, the lighting system shall have a mid or neutral point

connected with earth and the voltage shall not exceed 125 volts between phases.

- 2) On the surface of a mine or in an open cast mine the voltage may be raised to 250 volts, if the neutral or the mid- point of the system is connected with earth and the voltage between the phases does not exceed 250 volts.
- 3) Where portable hand- lamps are used in u/g working of mine, the voltage shall not exceed 30 volts.
- 4) Where any circuit used for remote control or electric interlocking of apparatus, the circuit voltage shall not exceed 30 volts.

c) Where electric signalling is used-

- 1) Adequate precaution should be taken to prevent signal and telephone wires coming into contact with the other cables and apparatus.
- 2) The voltage used in any circuit shall not exceeds 30 volts.

Voltage- In the difference of electric potential measured in volts between any two conductors or between any part of either conductor and the Earth as measured by a suitable voltmeter.

- 1) Low voltage- < 250 volt
- 2) Medium voltage- 250v-650v
- 3) High Voltage-650v-33kv

Notice to be given of accidents :-

(1) Whenever there occurs in or about a mine:-

- (a) an accident causing loss of life or serious bodily injury, or
- (b) an explosion, ignition, spontaneous heating, outbreak of fire or irruption or inrush of water or other liquid matter, or
- (c) an influx of inflammable or noxious gases, or
- (d) a breakage of ropes, chains or other gear by which persons or materials are lowered or raised in a shaft or an incline, or
- (e) an overwinding of cages or other means of conveyance in any shaft while persons or materials are being lowered or raised, or
- (f) a premature collapse of any part of the workings, or
- (g) any other accident which may be prescribed, the owner, agent or manager of the mine shall give notice of the occurrence to such authority in such form and within such time as may be prescribed, and he shall simultaneously post one copy of the notice on a special notice-board in the prescribed manner at a place where it may be inspected by trade union officials, and shall ensure that the notice is kept on the board for not less than fourteen days from the date of such posting.

4) Extra High Voltage->33kv

- Whenever in a mine an accident causing reportable injury to any person, the owner, agent or manager of the mine shall enter in a register and copies given to the chief inspector once in quarter.
- Whenever in a mine an accident causing loss of life or serious bodily injury to any person, the place of accident shall not be disturb on altered before the arrival of the chief inspector.

Types of Plan

1. The owner , agent or manger of every mine shall keep and maintained the following plans and sections:
 - a) A surface plan
 - b) Underground plan- separate for each seam or section
- A combined u/g plan of seams or sections which are within 9m of each other. Every seam or section shall be shown by a different colour.

- c) Vertical projection- in case dip is more than 30°. Each shall also be separate for each seam or section.
 - d) Ventilation plan- separate for each seam or sections
 - e) Geological plan
 - f) Joint survey plan
 - g) Water danger plan
 - h) Any other plan as desired by the regional inspector
2. a) Surface and u/g plans shall show surface contours at 5m intervals.
- b) u/g plan shall show spot levels
- along haulage roadways, at every junction.
 - at the end of headings which have been discontinued temporarily or permanently.
- c) Where two drifts in stone or two galleries in coal pass over one another, this shall be clearly indicated on the plan.
- d) a permanent benchmark shall be established on the surface and all levels taken above and belowground shall be referred to such benchmark.
3. a) Surface and u/g plans shall show the mine boundary
- b) u/g plan shall show all surface and u/g features upto 60m and either side of mine boundary.
4. all plans shall be maintained updated and kept readily available.

5. regional inspector may require showing any additional information on the plan

109 Setting of support – 1. (a) Every prop shall be set securely and on a sound foundation,

shall be kept tight against the roof.

(b) Where a prop is set on sand or, other loose material, a flat base-piece not less than 5

centimeter in thickness 25 centimeters in width and 75 centimeters in length shall be used.

(c) The lid used over a prop shall have a width not less than the diameter of the prop, a

thickness not less than 8 centimeters and a length not less than 50 centimeters.

2. a) Only rectangular pieces shall be used as members of a cog, so however that, in case of

timber it shall be sufficient to joggle two opposite sides.

b) The cogging members shall be not less than 1.2 metres in length.

c) Before erecting cogs in a depillaring area, props shall be erected at the corners of each cog.

3) In inclined seams the supporting props and cogs shall be so set as to ensure maximum

support having regard to the inclination of the seam or roadway and probable

strata

movement. Where necessary such supports shall be re-inforced to prevent displacement.

4) Every ledge and every prominent crack or slip in the roof shall be kept supported with at

least a pair of cogs or cross-bars suitable lagged.

5) Overhanging sides shall be dressed down. Where this is not practicable, stay props or

other suitable means of support shall be erected at intervals not exceeding one metre.

(6) Where sand or other material is stowed or a pack is formed for the purpose of support, it

shall be packed or made as tight against the roof as practicable over its whole area.

(7) Where roof bolts are used for support, bolts shall be securely fixed in place.

(8) (a) Powered supports, hydraulic chocks or link-bars shall be advanced as soon as

practicable after a web of coal has been taken off the face so as to ensure that the area

of unsupported newly exposed roof is kept to a minimum.

(b) Powered supports, hydraulic chocks and props and friction props shall be set securely and checked from time to time.

(c) Where, by reason of any irregularity in the roof, floor or sides or due to any other reasons,

any powered support or hydraulic chock become ineffective, conventional supports in sufficient number shall be used”.

41. Duties and responsibilities of managers – (1) In every mine daily personal supervision

shall be exercised by the manager; and in case of workings belowground, he shall visit and

examine the workings belowground on at least four days in every week to see that safety in

every respect is ensured. Of these inspections one at least in every fortnight shall be made

during the night shift ..

(2) The manager shall make arrangements for all overmen and other officials to meet him or

an undermanager, or assistant manager once in every working day for the purpose of

conferring on matters connected with their duties.

(3) The manager shall see that a sufficient supply of proper materials and appliances for

the purpose of carrying out the provisions of the Act and of the regulations or orders made

thereunder .

(4) The manager shall assign to every competent his particular duties, shall on his

appointment make over to him a copy of the regulations, rules and bye-laws

and of any

orders made thereunder which affect him, and shall take all possible steps to ensure that

Every such person understands, carries out and enforces the provisions therein contained in a proper manner.

(5) The manager shall provide every overman with a tracing, upto the date of the last survey,

showing the workings of the district belowground assigned to him.

(6) The manager shall examine all reports, registers and other records required to be made or

kept in pursuance of the Act or of the regulations.

(7) The manager shall give attention to, and cause to be carefully investigated, any specific

representation or complaint that may be made to him in writing by an employee of the mine.

(8) When any accident, resulting in serious bodily injury to any person or in loss of life, occurs

in a mine, the manager shall inspect the site of accident as soon as possible.

(9) The manager shall perform such other duties as have been prescribed in that behalf under

the Act, the regulations, or orders made there under.

(10) The manger may suspend or take such disciplinary action against any employee for

122. Cables- All cables, other than flexible cables for portable or transportable apparatus, shall comply with the following requirements:-

(a) All such cables (other than the outer conductor of a concentric cable) shall be covered with insulating material and shall be efficiently protected from mechanical damage and supported at sufficiently frequent intervals and in such a manner as to prevent damage to such cables;

(b) (i) Except as provided in clause (c), no cables other than concentric cables or two-core or multicore cables protected by a metallic covering or single core cables protected by a metallic covering and which contain all the conductors of a circuit shall be used-

(1) Where the voltage exceeds 125 volts, or

(2) When an Inspector considers that there risk of igniting gas or coal-dust or other inflammable material, and so directs;

contravention of any of the provisions of the Act.

(ii) The sheath of metal-sheathed cables and the metallic armouring of armoured cables shall be of a thickness not less than that recommended from time to time in the appropriate standard of the ¹[Bureau of Indian Standards];

(c) Where a medium voltage direct current system is used, two single core cables may be used for any circuit provided that their metallic coverings are bounded together by earth conductors so placed that the distance between any two consecutive bonds is not greater than 30 metres measured along either cables;

(d) The metallic covering of every cable shall be-

(i) Electrically and mechanically continuous throughout;

(ii) Earthed, if it is required by sub-rule (1) of rule 117 to be earthed by a connection to the earthing system of conductivity not less than of the same length of the said metallic covering;

(iii) Efficiently protected against corrosion where necessary;

(iv) Of a conductivity at all parts and at all joints at least equal to 50 per cent of the conductivity of the largest conductor enclosed by the said metallic covering; and

(v) Where there may be risk of igniting gas, coal-dust, or other inflammable material, so constructed as to prevent, as far as practicable, the occurrence of open sparking so as the result of any fault or leakage from live conductors;

(e) Cables and conductors where connected to motors, transformers, switch-gear, and other apparatus, shall be installed so that:-

(i) They are mechanically protected by securely attaching the metallic covering to the apparatus; and

(ii) The insulating material at each cable end is efficiently sealed so as to prevent the diminution of its insulating properties;

(f) Where necessary to prevent abrasion or to secure gas-tightness properly constructed glands or bushes shall be provided;

(g) Unarmoured cables or conductors shall be conveyed either in metallic pipes or metal casings or suspended from efficient insulators by means of non-conducting materials which will not cut the covering and which will prevent contact with any timbering or metal work. If separate insulated conductors are

Agent- Means a person who is appointed, such or not who acting or

purporting to act on behalf of the owner and take part in management control, supervision or direction of the mine.

Manager- A person who is the superintendent of mines appointed by the owner or agent of a mine under section 17 of mines act and responsible for the control, management, supervision and direction of the mine.

Opencast working- It means any excavations where any operation for the purpose of searching for or obtaining minerals has been or being carried on in a shaft or excavation extends below superjacent ground.

Goaf” means any part of workings below ground wherefrom a pillar or part thereof, or in the case of “longwall” workings, coal has been extracted but which is not a working place;

Permitted explosive” means an explosive manufactured by such firm and of such type as the Chief Inspector may from time to time specify by notification in the Official Gazette;

General body of air” means the general atmosphere in a seam and includes the atmosphere in the roof cavities, but does not include general atmosphere in the sealed off area or in any borehole drilled in coal or in the adjacent “strata”;

Gassy seams of the second degree” means coal seams or part thereof lying within the precincts of a mine not being an open cast working in which the percentage of inflammable gas in the general body of air at any place in the workings of the seam is more than 0.1 or the rate of emission of inflammable gas per tonne of coal produced exceeds one cubic metre but does not exceed

ten cubic metres;

Onsetter” means a person appointed to superintend the raising and lowering of persons, tools and materials and to transmit signals at any inset or shaft bottom;

Ventilating district” means such part of a mine below ground as has an independent intake airway commencing from a main intake airway, and an independent return airway terminating at a main return airway, and, in the case of a mine or part thereof which is ventilated by natural means, the whole mine or part;

Intrinsically safe apparatus- means an electrical device which is so designed that any sparking that may occur in normal working is incapable of causing explosion of inflammable gas.

Minerals - Means all substances which can be obtained from the earth by mining, digging, drilling, hydraulicing or by any other operations.

Competent person” in relation to any work or any machinery, plant or equipment means

a person who has attained the age of 20 years and who has been duly appointed in

writing by manager as a person competent to supervise or perform that work, or to

supervise the operation of that machinery, plant or equipment, and who is responsible for

the duties assigned to him, and includes a shotfirer;

Mine- means only excavation where any operation for the purpose of searching for minerals has been is carried on includes all borings, all opencast mines etc.

misfire” means the failure to explode of an entire charge of explosives in a shothole;

gassy seams of the third degree” means of coal seam or part thereof lying within the

precincts of a mine not being an open cast workings in which the rate of emission of

inflammable gas per tonne of coal produced exceeds ten cubic metres;

Reportable injury- means injury other than serious bodily injury which involves enforced absence of the injured person from work for a period of 72 hours or more.

Certifying surgeon- means a qualified medical practitioner appointed to be certifying surgeon under section 2

Calendar year- a year from 1st day of January to the 31st day of December.

First –Aid station- it is a place fixed by the manager for rendering first-aid to persons injured.

-Every first-aid station is provided with following equipment-

1. A stretcher and two blankets.
2. Set of splints(1.4m, 0.9m, 0.3m) and sufficient triangular bandages,

3. First-aid boxes, one per 150 persons, containing-

- Sufficient supply of large and small dressings and burn dressings.
- Sufficient supply of sterilised cotton and adhesive plaster.
- Roller bandages.
- Dettol or other antiseptic solution
- A tourniquet , scissors and safety pins

Medical appliances-

- In every mines there shall be provided during all working hours such number of first-aid boxes.
- Every first-aid box shall be kept in the charge of a responsible person who is trained in such first-aid treatment and who shall be charges, available during the working hours of the mines.
- In every mines there shall be available arrangement for conveyance to hospital or dispensary of person who while employed in mines suffers bodily injury or become ill.
- In every mines where is more than 150 persons are employed there shall be provided and maintained a first-aid room of such size with such equipment and in charge of such medical and nursing staff.

Drinking water-

- Management shall arrange to make cool and wholesome drinking water readily available at conveniently accessible points.

- The quantity shall be atleast 2 litre per person for every person employed at any one time.
- Water shall be supplied free of charge.
- Supply may be made from taps from public water supply system or in kept vessels, sheltered from weather.
- The vessels shall be cleaned and refilled every day and kept in hygienic conditions.

Serious bodily injury-

Means an injury which has resulted in, or in all probability will result in the following:

- Permanent loss of any part or section of the body.
- Permanent loss or injury to sight or hearing or
- Any permanent physical incapacity.
- Fracture of any bone, or one or more joints, or bones of phalanges of hand or foot.

Standard of ventilation-

- **Quantity-** air passing along the last ventilation connection, in every ventilating district, shall not be less than 6 cubic mtr /min/person employed in the district in the largest shift or 2.5 cubic mtr/min/tonne of daily production.
- **Quality-** At every place where persons are required to work or pass air shall contain
 - O₂ – not less than 19 %

- CO₂ – not more than 0.5 %
- CH₄ – not more than 0.75% in return and not more than 1.25% in intake
- **Temperature-** At any working place not to exceed 33.5 °C(wet bulb temp.)
If it exceeds 30.5°C velocity of air shall be not less than 1m/sec.
- Ventilation shall be produced by mechanical ventilator.
- Respirable air borne dust at any working place shall not exceed 3mg/m³ air.

Rescue Station-

Rescue station has facilities for:

- Storage, assembly, testing, adjustment of apparatus and their speedy transport to mines.
- Initial training
- Refresher training
- Attending to major accidents and supporting Rescue rooms in case of prolonged rescue and recovery operations.
- Providing rescue coverage to mines within 35km.
- Rescue station is equipped with 54 sets of self contained breathing apparatus and 18 brigade members.

Function of Safety Committee-

- Discuss remedial measures against unsafe conditions and practices pointed out by WI or otherwise.

- Discuss proposed safety and health measures before opening of a new district or introduction of new mining techniques.
- Discuss accident enquiry report and make proper recommendation.
- Formulate and implement safety campaign based on accident analysis.
- Meet at least once in 30 days to consider the matters of safety placed before it.

Rest shelters-

- In every opencast mine employing more than 50 persons, adequate and suitable rest shelter should be provided.
- A canteen shall be counted as rest shelter
- Every shelter should afford effective protection against weather.
- Be kept in clean and tidy condition.
- Be constantly provide with adequate supply of cool and wholesome drinking water.

Provision of Canteens - At every mine where in more than 250 persons are ordinarily employed, if the Chief Inspector or an Inspector or an Inspector so requires, there shall be provided and maintained in or adjacent to the precincts of the mine, a canteen for the use of all persons employed

Provided that where the conditions at any mine so require the Chief Inspector or an Inspector may direct that other suitable arrangements approved by him for serving food, drink and other items to the persons employed be provided and maintained in addition to the canteen required under this sub-rule.