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DGMS (Tech.) Circular No. 1 of 2006

To,

The Owner, Agent & Manager / Installation Manager of all Coal Mines and all Oil Mines.

Sub.: Use of intrinsically safe insulation tester where flammable gas exists under Rule 126 of the Indian Electricity Rules, 1956.

You are aware that insulation tester commonly called megger is extensively used in mining industries for measurement of insulation resistance of the electrical apparatus and cables in mines. It has been observed that often ordinary insulation tester is being used in belowground coal mines including new coal face and hazardous areas in oil mines. Use of ordinary insulation tests may cause open spark at the connecting leads or inside the instrument during measurement. The open spark may be incentive in nature, which may ignite flammable gas, if any, present in the surrounding atmosphere.

Whereas technically there may not be any objection in use of such instrument in areas other than restricted areas of belowground coal mines and oil mines, possibility of inadvertent use in these restricted areas cannot be ruled out when the same set of instruments are used.

Therefore in the interest of safety, insulation tester used in all places belowground coal mines irrespective of gassiness of the seam and in hazardous areas of oil mines must be intrinsically safe and approved by directorate.

Sd/-

Director General of Mines Safety

DGMS (Tech.) Circular No. 2 of 2006 Dt. 12/06/2006

To,

The Owner, Agent & Manager of all Mines

Sub.: Sampling of Airborne Respirable dust levels in mine atmosphere.

DGMS (Tech.) Circular No. 5 of 1988 specifies guide lines for conducting airborne dust surveys in mines. As per the guide line NCB/MRE dust sampler type 113A or its approved equivalent is to be used for fixed /static dust sampling which will mainly give the assessment of airborne respirable dust in work place environment. Apart from static sampling, personal dust samplers are also used for assessing the dust dose of an individual during a shift.

It has been brought to the notice of the undersigned that M/s Casella, London, the only manufacturer of MRE-113A Gravimetric dust sampler had stopped manufacturing and as such procurement/maintenance of this sampler is becoming difficult. At present no other approved type of static sampler is available in the market.

The matter has been examined, in light of present non-availability of any approved type of static sampler in the market. In order to tide over the problem as of now, it has been decided to temporarily permit use of personal dust samplers for the purpose of carrying out airborne respirable dust survey in mines as static sampler as required under Regulation 123 of the Coal Mines Regulations, 1957 and Regulation 124 of the Metalliferous Mines Regulations, 1961 for a period of two years.

The personal dust samplers to be used for the purpose shall function on the principle of gravimetric separation and shall be able to give an equivalent concentration as measured with an MRE-113A Gravimetric dust sampler. Such personal dust samplers shall be of a type approved under Regulation 123 of the Coal Mines Regulations, 1957 and Regulation 124 of the Metalliferous Mines Regulations, 1961.

Sd/-

Director General of Mines Safety

DGMS (SOMA) Technical Circular No. 3 Dt. June'06

The Owner, Agent & Manager of all Mines

Sub.: Accident due to fall of persons while working at height.

Increasing number of fatal accidents due to fall from height has been a matter of concern for quite some time. Recently, a worker engaged by contractor lost his life by falling from a height of 10.8m while he was engaged in painting purlin at the roof level of a workshop in an opencast coal mine. While at work with a safety belt the deceased who was standing precariously on a projected bamboo fixed at its end to a steel truss lost his balance and fell down. The resultant jerks severed the safety belt causing his free fall.

Inquiry into the accident revealed failure to comply with some elementary safety precautions like providing platform/stage or scaffold, ensuring use of approved and well-maintained safety belt etc.

In order to prevent such type of accident in future you are requested to take following steps in addition to the prevalent practices and procedures.

- i. A working platform/stage or scaffold of adequate width with proper fencing shall be provided. A safe means of access to the working platform shall be provided.
- ii. Only approved type of safety belt or life line conforming to Indian Standard IS:3520-1999 shall be used which shall be properly maintained and checked for its fitness before every use.
- iii. A code of safe procedure shall be prepared and implemented for such type of dangerous jobs which amongst others may include training of persons, supervision before engaging contractual persons etc.

The matter may be brought to the notice of all concerned under your charge for strict compliance.

Sd/-

Director General of Mines Safety

DGMS (Tech.) Circular No. 4 of 2006 Dt. 12/06/2006

To,

The Owner, Agent & Manager of Coal Mines

Sub.: Firing of shots in fire areas / in vicinity of hot strata in opencast coal mine.

Firing of shots in fire areas/in vicinity of hot strata is fraught with danger. Detailed precautionary measures while charging and firing shots in such areas had been recommended by DGMS (Tech.) circular no. 2 of 1985.

Recently, in a mechanized opencast coal mine, where extraction of developed pillars by deep hole blasting was being carried out, one of the shot holes left charged prematurely detonated after a lapse of 2-1/2 hours. Fortunately no person was involved as the holes were unstemmed and there was no one in the vicinity.

Inquiry into the incident revealed that the holes were drilled upto the roof of the seam in solid pillars and upto 2 m above the roof of the gallery. There was no system of measurement of temperature in the shotholes in coal or overburden. The holes were charged with SMS explosives, cast boosters and non electric shock tube with down the hole detonators and were allowed to sleep without stemming. The temperature of the strata along a radius of 20 m. of the prematurely detonated holes was subsequently measured and found to be around 101° C. The heated condition in the particular hole resulted in premature detonation of down the hole detonator and subsequent firing of the charge.

Experience had shown that there may be occurrence of localized pockets of fire or heating in developed seam which may remain undetected and create such dangerous situation. Thus while extracting developed pillars by opencast method in conjunction with deep hole blasting following additional precautionary measures may be taken over and above the measures stipulated vide DGMS (Tech.) circular no. 2 of 1985.

- (i) The blasting officer shall ensure accurate measurement of temperature at the bottom of the shotholes drilled in coal benches and in overburden benches immediately above the coal seam and other fiery areas to determine whether fire exists. The measurement shall be recorded in a bound paged book kept for the purpose. For the purpose the temperature shall be measured initially after completion of the hole and thereafter at least once every shift. No hole shall be charged if the temperature in the hole exceeds 80°C.
- (ii) As a precaution against presence of pocket fires in coal benches in developed seams, overburden benches immediately above such coal seams and other fiery areas in the mine, the explosive charge shall be fired by detonator attached to the detonating cord at the surface and not within the shot hole.
- (iii) All explosives, cast boosters, detonators, detonaing cord and stock tubes shall be subjected to proper testing in an approved laboratory in respect of temperature

sensitivity, impact sensitivity for safe handling in mines. A certification to the effect shall be supplied for each batch.

- (iv) Sleeping of holes not be permitted in coal benches where fire or spontaneous heating has been detected and in overburden benches lying immediately above such seam and at all places where there is likelihood of fire or spontaneous heating.
- (v) NO PETN/TNT based cast booster shall be used for initiating non-capsensitive slurry/emulsion explosive in coal benches and overburden benches of a fiery coal seam.

Sd/-
Director General of Mines Safety

DGMS (Tech.) Circular No. 5 Dt. 09/11/2006

To,

The Owner, Agent & Manager of Oil Mines.

Sub.: Precautions to be taken in oil mines during work-over/ drilling operations.

Sir,

Recently there was an explosion followed by fire at the mud tank and mud pump, driven by an internal combustion engine fitted on the same skid mounted chassis, during work over operations at an oil mine.

Investigation into the accident revealed that, though an exhaust conditioner was provided, the explosion & fire were primarily caused due to contact to accumulated flammable vapours near the internal combustion engine with its unshield hot exhaust pipe.

Thus, in order to prevent such incidences of fire & explosion, following measures are suggested to be taken at all drilling/work-over rigs :-

1. Internal combustion engines, with or without exhaust conditioner shall be located at such a distance from the mud tank that there may not be any presence of the flammable vapours / gasses around the same.
2. Suitable arrangements for regular monitoring of flammable gases / vapours shall be provided where an internal combustion engine is required to operate and whenever presence of flammable gases/vapours are observed to be 1.5% or more such internal combustion engines shall be stopped immediately and the same shall not be re-started till the area is found free from flammable gases / vapours.
3. Discharge from bleed off lines shall in no case be allowed in mud tanks.
4. Effective steps shall be taken to keep mud tanks free from oil and gas.
5. Exhaust pipe of internal combustion engines shall be insulated/shielded to prevent its contact with flammable liquids, gases or vapours.

You are requested to take suitable steps to comply with the above recommendations in the interest of safety.

Sd/-

Director General of Mines Safety

DGMS (Tech.) Circular No. 6 of 2006 Dt. 10/11/2006

To,

The Owner, Agent & Manager of all Mines

Sub.: Recommendations of Central Saunda Court of Inquiry.

The court of inquiry appointed under Section 24 of the Mines Act, 1952 to inquire into the causes and circumstances attending the accident that occurred in Central Saunda Colliery of M/s. Central Coalfields Ltd., on 15.06.2005 causing loss of 14 lives due to inundation, had made the following recommendations; inter-alia.

- 1.0 Most of the accidents take place essentially due to human failure in complying with the provisions of statute. Recurrence of such failures from time to time is disturbing. Therefore, it is urgently needed to inculcate awareness among them regarding statutory provisions vis-a-vis their duties.
- 2.0 During the hearing session of this Court, the issue of shortage of statutory manpower in mines came into force time and again. Supervision of work in mines has direct bearing on safety of workers and hence it must be insured that a clear policy of regular recruitment of statutory manpower be framed and implemented by the mine management.
- 3.0 In a company consisting of large number of mines, it becomes very difficult for one person to pay proper attention to safety aspects in all mines. Therefore, the court is of the opinion that in such companies nomination of ownership may be shared by two or three directors. This will enable them to deal with safety matters in mines more effectively.
- 4.0 Role of Internal Safety Organisation (ISO): Arising out of the recommendations of the 5th Conference on Safety in Mines, most of mining companies have since formulated their safety policy and created ISO to translate the principle of self regulation into practice. The Court feels that though ISO was existing, it had not been very effective. Their role could be more purposeful if -
 - (a) Work in a new district is commenced only after clearance from ISO.
 - (b) The head of ISO should either be on the Board of the company or he should report to a Director not directly connected with production.

You are therefore requested to take suitable steps to implement the above mentioned recommendation of the Central Saunda Court of inquiry in all mines under your control.

Sd/-

Director General of Mines Safety

DGMS (Tech.)(DMRS) CircularNo. 7 of 2006

Dt. 01/12/2006

To,

The Owner, Agent & Manager of all Mines

Sub.: Provision of additional equipments at Mines Rescue Stations/Rooms.

Sir,

You are aware that under the existing provision of the Mines Rescue Rules, 1985, rescue stations / rooms are minimally equipped to cater the emergencies caused by fire & explosions only. Therefore in case of the emergencies arising out of strata failure and other causes the rescue personnel are unable to help the mine personnel in an effective way. Even in case of a major fire they do not have sufficient tool to fight it out.

Therefore, it is advised to provide following equipments (in addition to those required under Annexure I/II) at all Rescue Stations/Rooms to enable the rescue personnel to help us in a better way in case of an emergency :

1. Portable Gas Chromatograph and Portable Generator & Lighting Units:
2. Lifting Air-Bag sets with Compressed Air cylinders Air/ Hydraulic hand pumps & connecting hoses etc.
3. Hydraulic Comb Tools (cutters cum spreaders), with Hydraulic Power Packs;
4. Concrete Cutter and Rescue Rams/Jacks.
5. Fire fighting monitors, with hose reel, nozzles & pumps
6. Personal Protective Suits (e.g. Nomex fire suits, fire fighting boots, gloves & helmets etc) and florescent striped suits for rescue personals
7. Fall Arrest System including Fall Arrest Harness & Hoisting System.
8. Rope Descender and Retractable Fall Arrester.
9. Portable Power-packs with Manifabis &Hose reels
10. Fire bandages/sheets (to be applied as first aid in case of burn injuries)
11. Trapped Miner Cocarer.

Actual number of these equipments may be assessed as per the requirement with respect to the type of mines, being served by the rescue station/room.

Sd/-
Director General of Mines Safety

DGMS (Tech.) Circular No.8 Dt. 28/12/2006

To,

The Owner, Agent & Manager of all mines and All Manufacturers of Electrical Equipment

Sub.: Setting value of earth Leakage / Fault relays with restricted neutral system of supply in belowground mines, oil mines and opencast mines.

1. With the amendment of sub clause 1 of Rule 116 of the Indian Electricity Rules, 1956, it is mandatory that earth fault current shall not be more than 750 milli-ampere for system voltages upto 1100V in respect of below ground mines and oil fields and not more than 50 amperes in 3.3KV / 6.6KV system in opencast mines. To limit the magnitude of earth fault current, restricted earthed neutral system of supply need to be employed.
2. By restricting the prospective earth fault current to the values mentioned above, adequate tripping ratio between the prospective earth fault current and operating value of earth leakage, relay is necessary to ensure that sufficient earth fault current is available for detection, when an earth fault occurs.
3. When a cable, connected to a typical mining supply system is subjected to a two phase short circuit and earth fault, the voltage available to drive earth fault current is reduced by upto 68% particularly when the system is supplying a large motor load at the time the fault occurs. Fault current flowing to earth is not more than 110 milli-ampere in such condition.
4. Hence, to ensure operation of earth fault protection under conditions of two phase short circuit and earth fault with a large connected motor load, it is necessary to employ a tripping ratio of at least 7:1.
5. To ensure operation of earth fault protection for a ground fault of a Delta / Star transformer covering 90% of the star connected winding, a tripping ratio of 10:1 is necessary.
6. The tripping value, thus selected shall be above the system charging current. The system charging current is the fault current that will flow when one phase is faulted in an isolated neutral / free neutral system of supply.
7. Considering the above, the standard practice is to set the tripping value of all the earth leakage / fault relays between 80-100 milliampere for belowground and oil mine installations for a system voltage upto 1100V and between 5 to 7 amperes in 3.3KV / 6.6KV system in opencast mines.
8. With the above tripping value, selective relaying can not be achieved by increasing the operating value of up stream earth leakage / fault relays, but can only be accomplished

by increasing the operating time of up stream relays. By doing so, if the tripping mechanism of the GEBs or field switches or the intermediate switchgears fails to operate, the main breaker of the transwitch unit / transformer will be tripped after a short delay.

9. It is therefore, necessary to ensure that
 - (a) Tripping value of all the earth leakage / fault current shall be set between 80 to 100 milli-ampere for belowground installations with a clearance time less than 600 millisecond for transwitch unit / transformer secondary main, less than 400 millisecond for intermediate switchgears and less than 200 millisecond for the Gate End Boxes and the switchgears controlling drill panels.
 - (b) Tripping value of all the earth leakage / fault relay shall be set between 80-100 milli-ampere for oil mines, with a clearance time less than 600 millisecond for the transformer secondary main, less than 400 millisecond for intermediate switchgears if any and less than 200 millisecond for the switchgears controlling motor starters, and
 - (c) Tripping value of all the leakage/fault relays shall be set between 2 to 5 amperes for opencast mines, with a clearance time less than 600 millisecond for the transformer secondary main, less than 400 millisecond for intermediate switchgears and less than 200 millisecond for the field switches.
10. Earth leakage relays incorporated with electrical, apparatus used in belowground mines and oil mines for a system voltage up to 1100V, shall have current settings from 50 to 250 mA having set values at 50mA, 80mA, 100mA, 150mA, 200mA, and 250mA with time lag between 0 to 1 sec, steps of 100ms.
11. Earth leakage relays for opencast mines shall be of core balance transformer operated relays having current settings between 2 to 5Amps with time lag between 0 to 1 sec in steps of 100ms.
12. Further, neutral resistance monitoring relay shall be incorporated with every transformer/ transwitch unit to prevent the shifting of restricted earthed neutral system of supply to isolated neutral system of supply, in case the resistance fails.

It is needless to mention that earth leakage relays, resistance and resistance monitoring relay shall be of high quality and subjected to relevant tests as per the relevant Indian Standard or IEC to ensure satisfactory performance.

Sd/-
Director General of Mines Safety