सत्यमेव जयते

भारत सरकार
Government of India
श्रम एवं रोजगार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety

DGMS(Tech)(MAMID)Circular No. 02 of 2017 Dhanbad : 15/06/2017

To

All Owner, Agent & Managers of Coal Mines.

Sir,

Subject : LOCK OUT & TAG OUT – Energy shut down procedures

In coal mines, about 3% of accidents were caused due to Electricity. Majority of these accidents were caused by unexpected energization or startup of machines / equipment or by uncontrolled release of energy. The electrical accidents can be prevented by proper Lock out / Tag out procedures. The philosophy of LOCK OUT/ TAG OUT – Energy shut down Procedures is as such, not new in our country and being followed in oil field installations of CAIRN INDIA and in cement industry (including mines) of reputed organizations.

Electrical Safety is observed in mines (as well as in other Industries) as per laid down Practices of Indian Standards / NEC and Provisions of Legislation of Indian Electricity Act, 2003 and Regulations of Central Electricity Authority Regulations, 2010. As such, the provisions made there under are adequately covering the requirements of safe work practices and thereby to eliminate risks associated in unsafe working methods on use of Electricity. However, when it comes to underground mines, the prescribed work permit procedure as per BIS: 5216 is not sufficiently followed for varied reasons. This is more so in the case of coal underground mines where the workforce at lower levels, generally, prefers simple methods of working and goes awry. For lack of working discipline, adequate monitoring and control, people tend to go in short cut methods and invite risks.

The Lock out and Tag out energy shutdown procedures could well be an answer, in case of our underground mines, bringing some changes to suit our conditions of working and without compromising on the philosophy of work permit procedures laid down by BIS under standard: 5216.

Philosophy: To perform a service and maintenance work on industrial equipment safely, you must understand the importance of energy control. A LOCKOUT is a method of preventing mishaps by keeping equipment from being accidently started or switched ON. This method can be used for disconnecting switches, circuit breakers, valves or

other isolation mechanisms and to put them in safe / off position. It is physically an attachment of lock so that the equipment cannot be energized. In a TAGOUT, the energy isolating device is placed in safe position and a written warning is attached to it.

LOCKOUT means to physically neutralize all energies in a piece of equipment before beginning any maintenance or repair work. Lock out involves stopping all energy flows by turning off switches on supply lines. It also involves locking physically the switches and securing the machine, device or supply lines in a de-energised state.

TAGOUT means placing a warning tag or sign (TAGOUT device) on an energy isolating device, warning not to operate the machinery until the TAGOUT device is removed. The purpose is to alert other employees about the status of a machine or a system, why it has been taken out of service and identity of the individual who has applied the LOCKOUT.

Principles of practices:

These LOCKOUT and TAGOUT materials are to be supplied by the employer to their employees and the employer brings out a policy of answerability, accountability for all their acts / decisions taken during production, maintenance, servicing installation, dissembling of machines etc., which are generally, the areas where accidents take place in a work place.

- This Energy isolation and LOCKOUT / TAGOUT are to be carried out by trained employees who are also authorised to perform service or maintenance.
- Before applying LOCKOUT / TAGOUT, all employees who work in the affected area must be notified.
- The control of hazardous energy or sources is to be done according to a six step procedure.

Ground for shutdown: Before any equipment is turned off in order to lock or tag it out, It is required to know the types and amounts of energy that power it, the hazards of that energy and how that energy can be controlled.

Equipment shutdown: The OEM's recommended procedures by using operating controls shall be followed to shut the system down for the equipment so that no one is endangered during shutdown.

Equipment isolation:

(i) All energy isolating devices shall be installed so that the equipment is isolated from its energy sources.
(ii) All primary and secondary power supplies shall be isolated as well so as to avoid any back feeding of source of supply into the equipment under service / maintenance of job. No short cut methods are to be employed by just removing fuses and it shall be ensured a total disconnection of source of energy of power.

- ✓ The policy thus framed is required to be reviewed and updated as per the changing situations.

How to identify lockout situation:

- ➢ It is required to assess all processes, work activities and machinery and, where and when lockouts are needed to be identified.
- ➢ Maintenance work will be a major area where lockout needs are more. The Information may be through work place inspections, recommendations through ISO and Inspections by statutory authorities.
- ➢ Every machine, device or process that will require a lockout is to be listed. More than one lockout may be required for a single machine or system.

LOTO procedures

- ❖ Procedure should be in writing and communicated to all employees and departments concerned.
- ❖ They should include the Supervisors in the work areas.
- ❖ All lockouts are to be authorised by work permit.
- ❖ Lockout shall stay, if work is not competed at the end of the shift.
- ❖ Completed work is to be reported to the person in-charge for signing off the work permit.
- ❖ The procedures should identify person responsible for performing lockout, person responsible for ensuring the lockout properly, energy sources to be controlled in the lockout, location of control panels, power sources, special hazards, personnel protective equipment, step by step lockout procedure, testing procedure etc., to ensure that all energies are controlled safely.
- ❖ Step by step procedure for removing the lockout etc.,

Lockout material including key operated Locks, locking devices shall be sturdy for issuing to workers who service or maintain equipment. An identification tag must be securely attached to the lock. Each worker will be issued only one key. It is important that for their personal protection, each worker and /or for person working in or on a machine places his / her safety lock on the disconnecting switch. It is ensured that tags are used to spotlight the work in progress, giving details of work being done. Only when the work is completed and the work permit is signed off, each worker is allowed to remove his or her lock. The last lock to be removed should be that of a person supervising the lock out. This lockout should be the removed by the person in charge and this responsibility should not be delegated.

Requirements of Training

All workers performing lockouts and their supervisors must receive training. The training should address importance of lockouts, legal requirements of lockouts, safety and employer's policy, energy forms, hazards and procedures on administrative and work related that must be followed.

Lockout / Tagout: All energy isolating devices are to be locked, tagged or both according to recommended and framed safety LOCKOUT / TAGOUT procedures put in place as a policy. Only standardized devices supplied by the employer shall be used and they are not be used for anything else. If lock cannot be placed directly on the energy control, lockout devices can be used. When lockout is used, every other employee can also lockout a single energy isolating device by using multiple locks. For big jobs, lockout box can be used to maintain control over large number of padlocks and keys. The tags are to be used along with the locks by attaching them at same points as locks are placed or as close to it as possible. The Tags are to be filled completely and correctly.

How to control stored energy: The following steps are necessary to guard against stored energy left in the equipment after it has been isolated from its energy sources.

(i) Inspect the system to make sure all parts have stopped.
(ii) Install ground wires i.e. discharge rod connecting to earth.
(iii) In case of other sources as applicable, relieve trapped pressure, release tension on the springs or block the movement of spring driven parts, block or brace the parts that could fall because of gravity.

Equipment isolation verification

(i) The work areas where there is likelihood of causing danger should be free of personnel.
(ii) Verify that the main disconnecting switch cannot be moved to ON position.
(iii) Use a testing meter to check the switch that source of power is fully isolated.
(iv) Press all ON buttons and other activating controls on equipment itself to verify that the source is isolated.
(v) Shut off all machine controls when the testing is finished.

A clear well defined policy supported by administrative and control procedures and proper training is essential for lockouts to be effective. A systematic approach would be drawn to develop a lockout policy.

- ✓ The policy is required to identify lockout situations, to develop procedures, to train workers and to enforce as per the prescribed recommendations.
- ✓ The written lockout policy should make reference to Employer's general safety policy and reference to applicable statutes / laws. It should clearly outline responsibilities and refer to procedures to be followed. The policy should state employer's intent and commitment to protect the safety of personnel and equipment.
- ✓ The policy should identify all activities, machines, equipment and processes where lockout is required.
- ✓ Appropriate persons shall be made responsible for lockouts and to be ensured lockout are performed by authorised persons only.
- ✓ Procedures are to be framed for each lockout situation and training of those who perform lockouts is an important aspect of policy.

The importance of procedures, lockout errors such as the equipment is inoperable or too small to warrant a lockout etc., shall be brought out in methodology of training. The use and care of personal protective equipment, proper use of tools etc., shall be addressed in the training. In the training sessions, mock locks outs shall be conducted and tested, and refresher classes shall be provided periodically.

Enforcement and updating lockout policy

The Enforcement of policy will be effective, if persons responsible are indentified and accountable for lapses. The best way is to include in their job descriptions. The policy should also put emphasis on individuals' achievements for duly rewarding them where it resulted in productivity with high safety standards.

It is also required to review lockout procedures periodically and revise them in light of any problems that may have been identified. When change in a process or equipment, Lockout requirements also change and require Review and revision.

Yours faithfully,

15/06/17

(P.K. Sarkar)
Director General of Mines Safety