

SAND, GRAVEL, AND CRUSHED STONE ON-THE-JOB TRAINING MODULES

Module 8 - “Equipment Lockout Procedures”

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Originally Published AUGUST 2000

INSTRUCTION GUIDE SERIES

MSHA IG 40

**MODULE NUMBER 8
OF
INSTRUCTION GUIDE NUMBER 40**

**ON-THE-JOB TRAINING
FOR THE
SAND, GRAVEL, AND CRUSHED STONE INDUSTRY**

EQUIPMENT LOCKOUT PROCEDURES



This module describes the basic job steps, potential hazards and accidents, and the recommended safe job procedures to follow prior to performing equipment repair or maintenance.

Numerous injuries and deaths result from someone starting machinery which another worker has stopped in order to make repairs or adjustments. The assigned worker may be in a dangerous position when the equipment starts unexpectedly. The precaution of switching off power and locking out the electrical switch control handle will prevent someone from starting the equipment. A good rule is to always cut off, lockout, and tag power whenever guards or covers must be removed from electrically powered equipment, or when work must be done

on, or near, moving parts or bare conductors.

If the electrical controls that supply power to the equipment are not properly designed or maintained, a worker can be burned or shocked while locking out the equipment. It is, therefore, necessary to wear gloves and rubber soled boots, and/or to stand on a rubber mat or dry board when operating disconnect switches. It is also wise to stand to the side - not directly in front - of the switch box, in case the cover comes off because of a loose fastener, or in case it flies off because of a short circuit.

Loaded equipment, or equipment with unbalanced drives, may have a tendency to turn without power. This danger may not become apparent until the worker has begun working within, or under, the moving parts of the equipment. The worker may be caught in the moving parts and injured when the equipment moves to a balanced position. Blocking of moving parts is required when any possibility exists of non-powered movement. To block equipment against motion, a block of wood, an iron bar, or other appropriate item is placed in a manner that prevents parts from moving far enough to cause injury. Some equipment is manufactured with provisions for blocking equipment motion. Manufacturer's recommendations must be followed. Workers must be alert to always remove the block before removing the lock-out, in order to prevent damaging the machine at start-up.

Personnel may occasionally have to perform tests that require energized circuits and machinery motion. Such work must be done only when absolutely necessary, and then only by properly trained and qualified persons, using appropriate tools and protective equipment.

The following safe job procedures will help to minimize incidents which adversely affect production and cause injuries:

REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:

HARD HAT, STEEL-TOED BOOTS WITH RUBBER SOLES, GLOVES, SAFETY GLASSES OR GOGGLES

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
1. Lock out equipment that is electrically powered.	1. A) Someone may start equipment during repairs or adjustments. B) Arcing at disconnect may cause burns on hands or face if equipment is “on” when disconnected. C) Electrocution by contact with interior of box, or any part which may have become “hot” because of wear, damage, or poor maintenance. D) Someone may find key, if it is lying around, and start equipment during repairs or adjustments.	1. A) Tell supervisor that repair has begun. B) Move control to stop the equipment. C) Stand on non-conductive mat. Move disconnect. D) Place key to lock in your pocket, or on key ring on your belt. Do not give your key to another worker.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
	<p>E) Someone may decide to remove (cut) the lock if reason is not given.</p> <p>F) Wrong disconnect locked out.</p> <p>G) During repairs and adjustments, workers may contact energized wires with auxiliary equipment.</p>	<p>E) Fill out the maintenance tag, which should include date and time of attachment, description of work, and signature.</p> <p>F) Return to equipment and engage the start control to be sure there is no power to equipment.</p> <p>G) Determine whether there are other sources of electrical power supplying lights, motors, ventilation fans, etc.</p>
<p>2. Physically block equipment against motion.</p>	<p>2. A) Mechanical hazard if movement due to gravity load, or faulty disconnect or circuit breaker.</p>	<p>2. A) Follow manufacturer's recommendations for blocking equipment.</p>
<p>3. Restore power after repairs are completed.</p>	<p>3. A) Equipment damaged if restarted without restoring auxiliary services.</p> <p>B) Equipment damage if equipment is started without removing blocks.</p> <p>C) Mechanical hazard.</p>	<p>A) Remove locks and tags from auxiliary power and restore auxiliary services.</p> <p>B) Remove blocks.</p> <p>C) Notify supervisor that repairs are complete. After making sure no one is in hazardous position, and sounding alarm, if applicable, remove locks and tags, and restore main power.</p>

GENERAL INFORMATION

This module is part of an Instruction Guide that was developed to assist the sand, gravel, and crushed stone industry in conducting effective on-the-job training (OJT) of new employees, or employees reassigned to different jobs. The use of training materials, such as this module, is an important part of an effective, systematic, OJT program.

This Instruction Guide uses a generic Job Safety Analysis (JSA) of jobs common to the industry. The JSA format facilitates uniform basic training in safe job procedures, while requiring only a minimum of time and effort on the part of the trainer. This material is generic to the industry; therefore, each company using this guide will need to tailor the material somewhat to fit their particular requirements. In some cases, the material must be general in nature, and will not include specific details of procedures or equipment that must be taught by the trainer.

Recommendations for an overall OJT program are contained in the Mine Safety and Health Administration (MSHA) guide: "Structuring Effective On-The-Job Training Programs"

TRAINING RECOMMENDATIONS

On-the-job training is usually best done by the employee's immediate supervisor. If the supervisor relies on another employee to do certain parts of the training, the supervisor should be present to monitor the training. OJT is conducted at the actual job site, where the work will be done.

The supervisor/trainer should use the training materials (this module, or other materials) while the training is being done, to help ensure that all job steps are covered, and that no important safety precautions are omitted. Effective OJT should begin with an explanation (lecture and/or discussion) of the safe job procedure. The explanation should be followed by a hands-on demonstration of the proper job procedure. A good demonstration is, perhaps, the most important part of OJT. The demonstration is followed by supervised practice, during which the supervisor/trainer coaches (corrects and encourages) the employee, and evaluates when the employee is ready to do the job without direct supervision.

The first step - explaining the job to the employee - can be done in different ways. The supervisor/trainer and the employee can sit down and go through the training materials together. It may be advantageous to provide the employee with a copy of the training modules that are applicable to his/her job. The fact that most of the training is conducted at the job site does not preclude the use of a classroom, or a quiet office, for the first part of the training. Any general theory, or knowledge training, as well as the initial explanation of the job procedure, may be best done in an office/classroom setting; especially when noise levels, or other conditions at the job site, make communication difficult. A complete series of job steps could be presented through the use of slides developed at the mining operation.