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**MODULE NUMBER 16
OF
INSTRUCTION GUIDE NUMBER 43**

**ON-THE-JOB TRAINING
FOR
SURFACE METAL AND NONMETAL MINES**

MANUAL HANDLING OF MATERIALS



This module describes the basic job steps, potential hazards and accidents, and recommended safe job procedures for the manual handling of materials. Safe job procedures for standing, reaching, lifting, shoveling, and sweeping are included in this module.

This module concentrates on the prevention of back injuries. Back injuries account for a high percentage of the injuries that result from the manual handling of materials. Instances of lower back pain in the United States are increasing at epidemic proportions. The United States Department of Labor estimates that at least 75 percent of the population has had back pain. The use of good body mechanics at work, and at home, can prevent the causes of back pain - too much strain on back muscles, and too much pressure on back discs.

The spine consists of 24 bones (vertebrae) connected by interlocking joints. Most of the vertebrae are separated by shock absorbers called discs. Too much pressure on a disc can cause the disc to weaken, and bulge out to one side. This bulge can push a nerve into a bony part of the spine, and cause great pain. Doctors say that the disc has "herniated," or "ruptured." Ruptured discs do not always require surgery, but this is the most common reason for back surgery.

Muscle strain, or spasm, is another type of back injury. Hundreds of muscles and ligaments connect to, and support, the spine. When a muscle is strained, it may swell and cause pain by increasing pressure on small nerves that pass through the muscle.

Lifting objects is not the only cause of back problems. Sitting, standing, bending, and stooping - everything we do with our bodies - either takes away from, or adds to, the overall health of our backs.

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

Required or recommended personal protective equipment:

Hard hat, steel-toed shoes, gloves

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
1. Standing.	1. A) Standing with knees locked while bending forward at waist puts 200 pounds of pressure on lower back discs.	1. A) Give your body a wide base of support. Put one foot in front of the other and bend the knees a little, in order to take pressure off your back. When possible, lean against something for support. When possible, stand with one foot propped up. Doing so can cut disc pressure in half.
2. Reaching over your head.	2. A) Placing extra pressure on your spine.	2. A) If object cannot be conveniently reached, use a safe platform or ladder. Keep one foot in front of the other. If possible, store materials within safe reach of floor or other secure work platform.
3. Lifting.	3. A) Bending from waist with locked knees, and holding anything in out-stretched arms, puts 10 times more pressure than normal on your back.	3. A) Establish a good base of support. Hold the object as close to your body as possible. If possible, store materials on shelving, or slightly elevated from floor.

**SEQUENCE
OF BASIC JOB
STEPS**

**POTENTIAL ACCIDENTS
OR HAZARDS**

**RECOMMENDED SAFE JOB
PROCEDURES**

3. (Continued)

B) Picking up heavy items incorrectly is a common cause of injuries - especially back strains and sprains.

C) If weight is too heavy, excess pressure on back discs can cause injury.

B) To pick up heavy items correctly:

1. Kneel with one foot forward.
2. Pull item in close.
3. Test weight by lifting one end.
4. Tuck in chin to help keep back straight.
5. Stand by pushing up with your legs.
6. Shift weight to back leg before walking, in order to test and maintain balance.

C) Test weight of object by trying to lift one end, as described above. If weight cannot be safely lifted by one person, get help, or use available hoists or other lifting aids.

4. Shoveling.

4. A) Excessive pressure on discs in your back due to lifting and twisting.

4. A) When shoveling, pivot instead of twisting when you need to throw material to one side. When you need to throw material to the left, keep your left foot forward with feet well separated. Load shovel moderately, and pull load in close. Keep right foot planted and move left foot back and to the left, toward where you are throwing the material. If throwing material to the right, keep left foot planted and pivot with the right foot.

5. Using a push-broom.

5. A) Extra pressure on discs in your back by moving arms back and forth, or bending at the waist.

5. A) Walk back and forth with handle of broom resting against hip-bone, keeping elbow bent.

GENERAL INFORMATION

This module is part of an Instruction Guide that was developed to assist the surface metal and nonmetal mining 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," June, 1983.

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.

