

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

Module 3 - “Plant Shut-Down”

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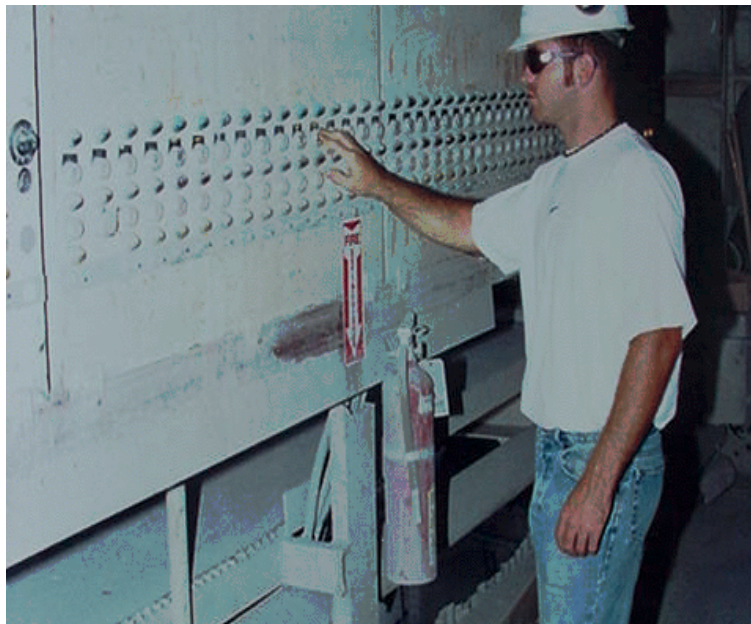
INSTRUCTION GUIDE SERIES

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**MODULE NUMBER 3
OF
INSTRUCTION GUIDE NUMBER 40**

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

PLANT SHUT-DOWN



For the job of plant shut-down, this module describes basic job steps, potential accidents and hazards, and recommended safe job procedures.

The job of plant shut-down is usually done by the plant operator, but may be done by other occupations, such as utility worker, laborer, etc. The plant operator/utility worker must make sure that employees, and others, are protected from accidents and injuries that could result from plant shut-down operations.

Remember to observe two key precautions during normal plant shut-down:

1. Do not shut off any equipment that is still carrying material.
2. Do not shut off any equipment to which material is still being delivered.

Note that these precautions only apply to normal shut-down procedures. They do not apply to emergency situations.

Material left on, or in, equipment can cause problems during start-up. For example, attempting to start a loaded conveyor belt can cause slippage at the drive pulley, or motor overload. If equipment is shut-off while material is still being delivered to it, a pile-up of spilled material will occur at the transfer points.

An improper shut-down sequence can damage plant equipment, and can also increase the risk of injury, if extensive clean-up is required. For proper, normal shut-down, the feed of material into the plant must be stopped first, if sequence rollers are not in use. The rest of the shut-down procedure must then wait until the plant is clear of material, or at least until each piece of equipment is clear of material. The various plant equipment is generally shut-off in the same order as the material flow, starting with the primary feed system - pit material input - and working through the finished product conveyors. The fresh water pumps, sand pumps, and other pumps are shut off last.

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

REQUIRED, OR RECOMMENDED, PERSONAL PROTECTIVE EQUIPMENT:
HARD HAT, STEEL-TOED SHOES, LIFE JACKET, SAFETY GLASSES

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
1. Stop primary feed system.	1. A) Leaving material, which may freeze, in the hopper or truck.	1. A) Make sure that material input from pit has stopped for shift, where applicable (all trucks have dumped). Shut off primary feed system (hopper feeder belt, belt from surge pile, etc). Watch for all material to clear plant, or at least clear each piece of equipment before shut-down.
2. Move finished product belts to the next shift's starting position (where applicable to plant operation).	2. A) Catching someone between moving radial stacker and stationary object.	2. A) Look to make sure that all persons are in the clear and/or sound the alarm.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
<p>3. Stop all conveyors, stackers, and associated equipment, in plant sequence.</p> <p>(Note to trainer: review your plant's shut-down procedure in detail.)</p>	<p>3. A) Leaving materials on, or in, equipment, which can cause start-up problems for the next shift (belt slippage, motor overload, etc.)</p> <p>B) Material pile-up and spillage at transfer points.</p>	<p>3. A) Be sure there is no material remaining on, or in, each piece of equipment before shutting it off.</p> <p>B) After primary feed system is off, shut-down sequence usually begins with the primary belt from hopper, or surge pile, and proceeds to the finished product belts (suggest written sequence and labeled switches for training and reference purposes). Look, where possible, to ensure that each piece of equipment has actually stopped before shutting off the next piece of equipment.</p>
<p>4. Stop secondary pumps.</p>	<p>4. A) Slipping/falling.</p>	<p>4. A) Use designated walkways, and examine them for wet or icy conditions, and for tripping hazards.</p>

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
	B) Electrical hazards (exposed wires, frayed insulation, etc.) C) Mechanical Hazards.	B) Check for electrical hazards, especially if on/off switch is at pump. C) Check for mechanical hazards, especially if on/off switch is at pump. Correct or report any hazards.
5. Stop primary pumps.	5. A) Falling into water. B) Slipping/falling. C) Electrical hazards. D) Mechanical hazards.	5. A) Wear life jacket. B) Use designated walkways, and examine them for wet or icy conditions, and for tripping hazards. C) Examine work area for electrical hazards. D) Examine work area for in-place guards.

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.