

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

## **Module 2 - “Plant Clean Up”**

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

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**PLANT CLEAN-UP**



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

A tremendous quantity of material passes through a typical plant every day. Obviously, an objective is to deliver all the material to its final destination. However, because of the characteristics of the material - variable nature, extremely abrasive, often coated with cohesive material - some spillage will occur, which may necessitate frequent clean-up activities.

Belt conveyors are a major source of spillage. Spillage usually can be found at return idlers, tail pulleys, take-up pulleys, and transfer points. Chutes and skirt boards, that are used at transfer points, are subject to corrosion and wear from wet and abrasive materials. Holes will eventually form in chutes and skirt boards, resulting in spillage at transfer points.

A considerable amount of fine material is present in unwashed material coming from the feeder hopper to the main feeder belt. This unwashed material is usually coated with clay, and tends to stick to the belt. Return idlers, tail pulleys, and take-up pulleys pick up this clay covered material, and sling it onto surrounding surfaces. Chute boxes (skirt boards) may not catch all of the material, thereby allowing it to accumulate at the tail pulley. Belts, other than the main feeder belt, are subject to smaller amounts of spillage and accumulated fine material.

Spillage can also occur around scrubbers, crushers, shaker decks, classifier stations, and final rinse screening stations. Spillage in these areas can be caused by worn chutes, excessively wet material, or excessively high material feed rate. Material can bounce or roll off shaker screens, especially when the screens become clogged with flat rocks or clay. Loose or broken connections at classifier dumping stations, just above splitting troughs, can cause considerable amounts of spillage.

Spillage around the plant area must be cleaned up, because it may create hazardous situations, as well as economic loss. Accumulated material on walkways can be a tripping hazard, and, if permitted to build up to the top of toeboards, could even allow a person to slide under the intermediate rail, and fall to the ground. Loose materials may also fall over the toeboards and strike persons passing underneath. Wet spillage, which cakes on walkways, accelerates the corrosion process, which can eventually weaken the structure to the point that it could fall under a person's weight. Economic advantages of clean-up include reduction in rust, better operation of the plant, more efficient work by employees, and fewer accidents from spillage problems.

Spillage can be minimized if worn chutes, skirt boards, and other causes of spillage are reported and corrected. Mechanical belt cleaners reduce the clean-up job around conveyor systems. In general, hazards will be reduced, and money can be saved, if spillage can be minimized.

Typically, plant clean-up is done by utility workers, laborers, or conveyor belt crews. Where possible, clean-up activities should be scheduled to take place when the plant is shut down, in order to minimize hazards to employees working near moving equipment.

Clean-up workers use high pressure water hoses, shovels, and small front-end loaders. Injuries to clean-up workers include muscle strains (the most common), back injuries, and eye injuries (from water hoses).

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

**REQUIRED OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:**  
**HARD HAT, STEEL-TOED BOOTS (RUBBER BOOTS RECOMMENDED), SAFETY GLASSES OR GOGGLES, RUBBER GLOVES RECOMMENDED, SLICKER SUIT**

| <b>SEQUENCE OF BASIC JOB STEPS</b>               | <b>POTENTIAL ACCIDENTS OR HAZARDS</b>  | <b>RECOMMENDED SAFE JOB PROCEDURES</b>   |
|--|--|--|
| 1. Clean plant walkways with high pressure hose. | 1. A) Eye injuries.<br><br>B) Struck by whipping water hose.<br><br>C) Electrocution.<br><br>D) Bruises (struck by water) from water nozzle.<br><br>E) Knocked into something. | 1. A) Wear safety glasses or goggles.<br><br>B) Prevent hose from whipping by: <ol style="list-style-type: none"> <li>1. Securing your grip.</li> <li>2. Using a helper.</li> <li>3. Standing on hose near nozzle.</li> <li>4. Turning water on slowly to a pressure with which you are able to walk.</li> </ol> C) Don't aim water hose directly at electrical or junction boxes.<br><br>D) Don't aim water hose at others. Watch for people at other levels of the plant.<br><br>E) Don't stand with your back toward open walkways, stairways, etc. |

**SEQUENCE OF  
BASIC JOB  
STEPS**

**POTENTIAL ACCIDENTS  
OR HAZARDS**

**RECOMMENDED SAFE JOB  
PROCEDURES**

|  |   |   |
|--|---|---|
|  | F) Slips and falls.   | F) Don't climb or descend stairs while handling water hose under pressure. Stand with feet apart, one foot behind the other, and lean forward to brace yourself against pressure of hose. Where possible, brace yourself securely against a stationary object. Start from highest work area and work down, washing platforms, walkways, and other places where there is an accumulation of material. Remove water hose from the walkway after you finish, to eliminate a tripping hazard. |
| 2. Clean-up around tail pulleys and transfer points, tunnels, and other areas, as required, with a shovel. | 2. A) Getting caught in head or tail pulley.<br><br>B) Getting shovel caught in idlers. | 2. A) Use long-handled shovel in all areas, except where restricted clearance is a problem. This reduces the possibility of coming in contact with moving parts. Do not clean in guarded areas with the belt running. If you must clean-up in guarded areas, use proper lockout/tagout procedures.<br><br>B) When shoveling onto a moving conveyor, always shovel in the direction the belt is traveling. The shovel will be carried away from you, if it becomes hung in the belt.       |

| SEQUENCE OF BASIC JOB STEPS  | POTENTIAL ACCIDENTS OR HAZARDS   | RECOMMENDED SAFE JOB PROCEDURES   |
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|  | <p>C) Striking coworkers.</p> <p>D) Back injuries.</p> <p>E) Caught between moving radial stacker and stationary object.</p> | <p>C) Watch out for others working in the area.</p> <p>D) Load the shovel moderately. Move your feet when turning, rather than twisting your body. Lift with your legs, not your back.</p> <p>E) When working near the tail pulley of a radial stacker, do not get between the tail pulley and a stationary object.</p>   |
| <p>3. Cleaning up ground area and plant with a small loader (bobcat, etc.)</p> | <p>3. A) Overturning loader.</p> <p>B) Damaging equipment, or plant structure.</p> <p>C) Striking other people.</p>          | <p>A) During clean-up, operate the loader at less than half throttle, with the clutch in low speed. Do not operate the loader in a manner that causes any of the wheels to leave the ground. Do not overload the bucket. Carry the bucket in a low position when transporting materials. Always fasten the seat belt.</p> <p>B) Avoid bumping any equipment, or plant structures. Always check before changing direction. Look in the direction of travel. When parked, lower bucket, set parking brake, and chock wheels.</p> <p>C) Always check before changing direction. Look in the direction of travel.</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.