MODULE NUMBER 3
OF
INSTRUCTION GUIDE NUMBER 43

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

HAULER OPERATION

This module describes the basic job steps, potential hazards or accidents, and recommended safe job procedures for hauler operation.

Haulers are one of the most widely used pieces of equipment at surface, metal/nonmetal mines. They are used for hauling ore, overburden, and spoil material. Haulers are available in a wide range of sizes, and may be designed for both on-road and off-road use, or for off-road use only.

Fatalities involving haulers most often occur when a hauler leaves a haul road and overturns, backs over the edge of an embankment when the ground at the edge fails, or runs over or backs over a person.

Accidents that occur when haulers or trucks leave the haul road may be caused by equipment failure or by driver error. Proper inspection and maintenance of braking and steering systems are especially important in preventing "loss of control" type accidents. Drivers must be attentive, and select proper gears for ascending and descending grades. Gears, retarders, and dynamic braking (diesel-electric haulers) must be used to control speed, in order to prevent excessive use of brakes.

In the event of loss of control of the hauler, the driver's chances of survival are greatly improved if a seat belt is worn. A seat belt prevents the driver from being thrown around the cab, or out of the vehicle.

In an emergency situation, drivers sometimes panic and jump out of the vehicle. Many drivers have lost their lives when jumping, by being crushed under their own machine. Drivers have the best chance of survival if they resist the impulse to jump. They are much safer in the cab, with their seat belt on. The steering wheel and emergency brake may give some control. Ironically, drivers have been killed after jumping from a hauler that later came to a stop with only minor damage, or no damage at all.

Extreme caution is required when haulers must dump over the edge of a stockpile or spoil bank. Berms or bumper blocks must be provided to help prevent over-travel. Ground conditions must be carefully inspected, and hazardous conditions corrected. If there is evidence that the ground of a dumping place may fail, haulers must dump a safe distance from the edge of the bank.

Hauler operators cannot be expected to avoid running over persons they cannot see. Everyone who works around heavy haulage machines must be aware of the very limited visibility from a hauler cab, and must stay clear of the equipment. Hauler operators can do their part, by checking around the hauler before climbing in, being alert, sounding the horn before starting or moving the hauler, keeping backup alarms working, and using mirrors and/or spotters while backing. Dust control measures must be taken where dust significantly reduces visibility of machine operators, or where respirable dust standards may be violated.

Most non-fatal injuries occur to hauler operators because of slips and falls while mounting and dismounting the hauler. Another common injury is caused by the steering wheel striking the operator, often because of rough or uneven road conditions. Both hands must be kept on the wheel, and arms should not be rested in the spokes of the steering wheel.

Mobile equipment operators must be especially cautious during bad weather. Potential hazards include slippery ladders and platforms, slippery haul roads, poor visibility, rock falls, and brake failure. Material may freeze in the hauler bed, and cause the hauler to overturn while dumping.

Modern heavy-duty haulers are carefully engineered, expensive pieces of equipment. They receive a great deal of rugged use, and may be subject to abuse. Prospective drivers should be thoroughly familiar with the hauler's mechanical features, safety controls, and emergency procedures. A sound training program for operators and maintenance personnel is essential for accident prevention with this machine. A program of regular inspection and maintenance, which outlines the daily, weekly, and monthly requirements for surface mine haulers, should be rigidly enforced at all times.

Self-propelled machines that will be used during the shift must be inspected by the machine operator before operation. Particular attention should be given to the steering and braking systems, to ensure proper working order. Headlights, horns, and backup alarm systems must function properly at all times. Seat belts must be provided and worn in haulers.

Canopy shields should extend over the hauler cab far enough to protect the operator, cab, and catwalks from damage by material spillage during loading. An indicator may be attached to the dump bed canopy to give the operator positive proof that the dump bed is in the lowered position before moving. A positive-acting, emergency braking system must be installed and maintained on all haulers.

Each hauler must be equipped with a fire extinguisher(s) and/or fire suppression system of adequate size and proper type to extinguish fires which might develop on the machine. Along with proper firefighting equipment, each mine should have access to emergency rescue equipment of a design to accommodate rescue from haulers.

Haulers are built by several different manufacturers; however, there are many similarities in operating procedures.

The basic job steps included in this module are:

1. Conduct walk-around check of hauler.
2. Mount hauler and check cab.
3. Start hauler and complete pre-shift examination.
4. Drive hauler to loading area.
5. Load the hauler.
6. Travel to dump area.
7. Dump material.
8. Drive back to loading area.
9. Refuel and park.
10. Night driving.
11. Emergency procedures.
12. Perform repairs and maintenance.

The operator's manual that is provided with the machine, and the mine's operating procedures, should also be used in training machine operators.

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

Required and/or recommended personal protective equipment

Hard hat, safety shoes, safety glasses with side shields, gloves, clothing appropriate for weather conditions, hearing protection where needed.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
1. Conduct walk-around check of hauler.	1. A) Frostbite, hypothermia, sunburn, heat stroke, heat cramps, heat exhaustion.	1. A) Dress to suit weather conditions.
	B) Struck by moving hauler or other machine.	B) Hauler should be parked in a safe location out of the traffic pattern. If hauler is parked on a grade, check to be sure wheels are blocked and/or turned into a bank. Be alert for nearby machines.
	C) Slips or trips, struck by flying objects such as dirt or splashed fluids, caught in pinch points, high pressure fuel lines and hydraulic hoses.	C) Conduct walk-around inspection of hauler. Avoid slick spots, and keep area free of slipping or tripping hazards. Be especially careful of ruts, uneven ground, and frozen ground. Use suitable access if necessary to mount and dismount hauler to check engine or other area of machine.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
1. (Continued)	C) (Continued)	C) During walk-around inspection, check: 1) Tire and wheels for lug nuts, cracked rims, cuts, tire pressure. 2) Area around hauler for people or obstructions. 3) Suspension, steering linkage, and rock ejectors. 4) All bolts, guards, covers, and mechanical components of hauler to make sure they are in place. 5) Engine compartment for dirt, debris, oily rags, tools. Grasp engine covers firmly when removing. Avoid overreaching. Get help if needed. 6) Fluid levels. Wear safety glasses with side shields and gloves. Remove tank caps or covers carefully. 7) Hydraulic oil and coolant lines and hoses for breaks, leaks, rubbing lines or loose fittings. 8) Fire extinguisher (if one is on outside of machine) to make sure it is secured and fully charged. 9) Ladders, steps, grab bars, handrails, and walkways, for broken rungs, loose bolts, breaks, cracks, missing parts or bent and twisted steps.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
1. (Continued)	D) Sludge deposits or ice which might prevent valve operation - tank rupture from excessive pressure.	D) Bleed the air lines to release any condensation that might have accumulated, and trip the pressure relief to be sure it's operable.
2. Mount hauler and check cab.	2. A) Slips and falls. Clothing caught on control levers or other projections.	2. A) Wear snug fitting clothing. Keep ladders free of mud, ice, snow, grease, and oil.
	B) Falling from ladder.	B) Use belt hooks, pockets, etc., to carry materials up ladders and keep both hands free for climbing. Ropes can be used to hoist bulkier items. Face ladder and use three points of contact when climbing (two hands and one foot, or two feet and one hand, in contact with ladder at all times). Use handholds, and select firm footing. Avoid haste and projections.
	C) Missing or inoperative fire extinguisher. ROPS failure in a rollover.	C) Check fire extinguisher to make sure it is secured and fully charged. Check for damage the rollover protective structure (on machines equipped with ROPS).

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
2. (Continued)	D) Struck by flying objects, jammed controls, projecting control levers.	D) Remove or secure any loose objects in cab. Avoid projections.
	E) Accident caused by poor visibility.	E) Inspect and clean windows and mirrors. Adjust mirrors if necessary.
	F) Thrown against cab interior, or thrown out of the machine.	F) Make sure seat belts are provided and in good condition. Seat belts must be worn.
	G) Machine malfunction.	G) Check all instruments and gauges before start-up to be sure they aren't stuck. Make sure all controls are in neutral position and parking brake is set.
3. Start hauler and complete pre-shift examination.	3. A) Hitting or running over persons or objects in area, striking steering wheel or other parts of cab if hauler moves suddenly.	3. A) Check machine for warning tags. Check controls to be sure they are in neutral. Sound horn before starting or moving. Check backup alarm after start-up.
	B) Engine or auxiliary equipment malfunction.	B) Let engine run until it reaches normal operating temperature. Check all gauges, indicators, and warning lights again for normal readings.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
3. (Continued)	C) Engine malfunction.	C) Check engine for smooth idle, and unusual smoke or noise.
	D) Poor visibility. Poor operation.	D) Check wipers and lights. Check hydraulic controls.
	E) Emergency steering failure.	E) Check emergency steering, if equipped, as recommended by the manufacturer.
	F) Loss of control.	F) Check brakes, steering and retarder after moving a short distance. Brakes may also be checked against partial engine power before moving, according to company policy or manufacturer's recommendations. Check transmission operation.
	G) Potential hazards which remain corrected.	G) Report and, if possible, repair any defects found. Do not use machine with uncorrected safety defects. If the hauler is unsafe and removed from service, tag it to prohibit further use until repairs are completed.
4. Drive hauler to loading area.	4. A) Personal injury.	4. A) Do not allow anyone to ride outside the cab for any reason. No one should ride with the operator unless safe seating facilities are provided.
	B) Running over someone.	B) Sound horn and wait a moment before moving.
	C) Poor visibility, overturning hauler, striking other machines or people.	C) Observe travel area. Adjust speed for conditions. Follow standardized traffic rules, signals, and warning signs. Only authorized persons are permitted on haulage roads.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
4. (Continued)	D) Struck by door.	D) Keep doors securely latched.
	E) Overturning hauler, running off road.	E) Travel in proper gear at acceptable speeds for conditions. Avoid loose material, slick spots, weak areas, and other road hazards.
	F) Loss of control, running off road.	F) Be sure proper berms or guards are provided on elevated roadways. Water, debris, or spillage which create hazards must be removed from haulage roads.
	G) Loss of steering and/or brakes. Collisions.	G) Monitor gauges/ indicators. Check brakes before descending grades.
	H) Collisions - loss of control.	H) Follow other vehicles at a safe distance, and limit passing to areas of adequate clearance and visibility.
5. Loading the hauler.	5. A) Use of improper procedures. Poor communication - damage to hauler or loader.	5. A) Loading the hauler may be done by a wide range of shovels or loaders. The approach and spotting procedure will vary, depending on the type of machine used.
	B) Backing over someone.	B) Always check the mirror on the blind side, making sure of your clearance. Backing in on the blind side should be avoided where possible.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
5. (Continued)	C) Tire damage.	C) Back up as far as possible without driving on top of loose material. Try to avoid running over boulders and loose material.
	D) Struck by falling material. Bounced or shaken.	D) If your hauler has an adequate cab guard, stay in the cab while hauler is being loaded and leave your seat belt fastened. If there is a hazard from falling material, park the hauler with transmission in neutral and parking brake set. Get out and wait in a safe location.
	E) Collision with loader.	E) Wait for signal before driving off.
	F) Other machines striking oversized load.	F) If hauling any material which extends more than 4 feet beyond the rear of the hauler body, mark it clearly with a red flag by day and a red light at night.
6. Travel to dump area.	6. A) All hazards in Step 4 apply.	6. A) All procedures in Step 4 apply.
	B) Uneven loading may adversely affect handling of hauler.	B) Start slowly to get the feel of driving the loaded hauler.
	C) Loss of control, collisions.	C) Travel at speed consistent with load and roadway conditions. Follow established traffic pattern. (Loaded haulers usually travel on the inside of elevated roadways).

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
6. (Continued)	D) Someone unfamiliar with traffic pattern may be in the wrong lane.	D) Watch for traffic. Only authorized persons are permitted on haulage roads, but sightseers may ignore warning signs.
	E) Loss of control, runaway hauler.	E) Be very cautious if you must travel down steep grades with a loaded hauler. Be sure you are traveling slowly in a lower gear before starting down the grade. Use retarder or dynamic braking to maintain a slow speed.
7. Dumping material.	7. A) Rollovers caused by ground failure at dump.	7. A) When approaching the dump location, observe the entire area. You should pick a location to dump and decide on how you want to turn. Before backing, you should visually inspect the dump edge for slumping or soft spots and good berms. If there is evidence the ground may fail, dump a safe distance back from the edge.
	B) Loss of control.	B) Water, debris, or spillage which create hazards must be removed from dumping locations.
	C) Over-travel at dump.	C) While backing, observe the berm and back edge of your wheels. Once you have touched the berm, stop with your service brakes - do not use the berm as a brake. Put your transmission in neutral and set your parking brake.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
7. (Continued)	D) Spotter backed over or struck by falling material.	D) If spotters are used, they must be in the clear while haulers are backing and dumping, and must use lights at night. Spotters should wear high visibility vests.
	E) Struck by falling material.	E) Adequate protection must be provided at dumping locations where persons may be endangered by falling material.
	F) Raised bed contacting power line or obstruction. Electrocution.	F) Be sure you are aware of any overhead power lines or obstructions near dumping area.
	G) Overturning because of material stuck in bed and/or rapid accel-eration with bed raised.	G) Pull your dump lever and increase your engine rpm's to dump your load. Lower your bed as quickly as possible before pulling onto the main haul road. Pull out slowly from dump area.
	H) Rolling backward.	H) When pulling away from the dump edge, be sure to engage your transmission before releasing the parking brake.
8. Drive back to loading area.	8. A) Same as Step 4.	8. A) Same as Step 4
9. Refuel and park.	9. A) Struck by machinery. Fuel spillage, fire hazard.	9. A) Park at refueling station, place controls in neutral and set brakes. No smoking at or near the refueling station.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
9. (Continued)	B) Slips and falls, clothing caught on control levers or other projections.	B) Dismount hauler (see Job Procedures 2.A-B).
	C) Fuel on skin and in eyes.	C) Wear safety glasses. Take fuel hose from storage rack, remove tank cap slowly and pump fuel into tank.
	D) Trips, slips and falls, fire hazard.	D) Avoid fuel spillage and keep area free of extraneous materials. If necessary to climb on hauler to refuel, use access ladder, steps, available rails or handholds. Keep all walking or standing areas free from slipping and/or stumbling hazards.
	E) Fire hazard, fuel spillage or discharge.	E) Shut off fuel, remove nozzle hose, and replace fuel cap. Return hose to rack.
	F) Collision, runaway machine, traffic obstruction.	F) Park only at designated parking areas and always set brakes. Avoid parking on inclines or haul roads. If necessary to park on an incline, turn wheels into bank and/or block securely. If parking on a haul road is required, pick the safest place. Lights, flares, or other warning devices should be posted when parked machine creates a hazard to vehicular traffic.
	G) Runaway machine.	G) Place transmission in neutral position or in a gear opposite to direction of grade. Engage parking brake.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
9. (Continued)	H) Engine damage.	H) Idle engine for a short period of time and then shut it off.
	I) Slips and falls, clothing caught on control levers or other projections.	I) Dismount hauler (see Job Procedures 2.A-B).
	J) Hazards due to lack of communication.	J) Always inform appropriate personnel of any abnormal conditions, defects, changes made in machine, and/or job procedure or condition.
10. Night driving.	10. A) Poor vision, collisions.	10. A) During your pre-shift inspection clean your windows, lights, and mirrors and be sure your wipers are in good condition.
	B) Striking or being struck by other machines.	B) In loading area, be aware of the light locations on all machines. For example, the shovel counterweight or rear portion of the shovel house may not be visible after dark.
	C) Collisions.	C) Meeting on-coming haulers with only headlights may present problems, because these lights may not indicate the true width of the hauler.
	D) Missed dumps.	D) If you are not sure of the dump edge stability or location of your rear tires in relation to the edge, then dump on top away from the edge.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
11. Emergency procedures.	11. A) Fire, (engine compartment), burns, entrapment.	11. A) 1. Stop hauler. 2) Shut down engine (very important) to stop the fan and hydraulic pump. Set brake. 3) Activate fire suppression system if available. 4) Use fire extinguisher to extinguish small fire or aid escape from large fire. 5) Leave the operator's cab and climb down the ladder. 6) Do not jump down unless the fire has covered the ladder areas. 7) Notify foreman/obtain firefighting assistance.
	B) Runaway (brake or retarder failure on downhill haul).	B) 1) Attempt to control speed with the brakes or retarder, whichever is working. 2) Notify foreman and other drivers of your condition, if possible. 3) Steer onto a "run out berm" or "straddle berm". 4) Do not jump from hauler.
	C) Collision with other hauler or small vehicle.	C) 1) Stop hauler if not already stopped in collision, and park securely out of traffic pattern if possible. 2) Notify foreman immediately if hauler is equipped with radio. 3) Leave cab if possible. Assist with first aid to others. 4) Make periodic fire checks.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
11. (Continued)	D) Dump edge failure, rear of hauler slips off.	D) 1) Engage front brakes if slippery road switch is activated. Set park brakes if not already done. 2) Hauler will usually stop sliding once the under carriage drags on the edge of the dump. 3) Stay in the cab until the machine stops sliding then carefully climb down. 4) Notify foreman.
	E) Hauler goes into skid on ice, snow, or mud.	E) 1) Do not apply service brakes during skid. 2) Turn front wheels into direction of skid. 3) "Power out" of skid by increasing engine rpm's. Do not over-speed engine. Notify other drivers of loss of control hazard.
12. Performing repairs and maintenance (if applicable).	12. A) Personal injury from improper procedure.	12. A) Do not attempt repairs or maintenance you do not understand, and are not trained to do.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
12. (Continued)	B) Caught by or struck by moving or falling parts, or moving machine.	B) Do not attempt any repairs or maintenance until the power is off, the machinery is blocked against motion, and all raised equipment lowered. If necessary to perform work on top of, under, around, or from a raised piece of equipment, block or mechanically secure the equipment to prevent accidental rolling, falling, or lowering. Remove ignition key to prevent hauler from being started while work is performed. Tag out machine.
	C) Towed machine running away or overtaking towing equipment.	C) If a machine must be towed, a properly sized tow bar or equivalent must be used. Unless steering and braking are under the control of an operator on the towed machine, a suitable safety chain or wire rope must be used along with primary rigging.
	D) Caught in pinch points.	D) Repairs to lines or hoses under pressure should not be done until pressure is relieved from a safe location. Securely block any raised equipment if you must be under it to relieve pressure.

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.