

In view of these comments and the Agency's desire to replace incorporations by reference with specific performance-oriented requirements where possible, this standard contains no incorporation by reference. To assist mine operators in meeting the performance criteria for falling object protective structures, an appendix of applicable national consensus standards is included as an informational aid.

*Section 56/57.14107 Moving machine parts.* This final standard revises and consolidates existing §§ 56/57.14001 and 56/57.14003. As with the existing standard, the final standard requires the installation of guards to protect persons from coming into contact with hazardous moving machine parts. The standard clarifies that the objective is to prevent contact with these machine parts. The guard must enclose the moving parts to the extent necessary to achieve this objective. It also provides that guarding by location is recognized as an alternative to a physical guard in instances where the exposed moving parts are elevated at least seven feet above walking or working surfaces.

The proposed rule would not have permitted guarding by location for fan blades. This was based upon a concern that the blades could become projectiles upon disengagement from the fan shaft. Commenters questioned whether a guard would be able to contain a fan projectile and whether guarding was needed at all for elevated ventilation fans which operate at low speeds. MSHA agrees that in several situations a guard would not be able to provide effective containment, and in other situations would not be practical or necessary. For these reasons, the final standard permits guarding by elevated location for fan blades, as well as for the other classes of moving machine parts. This change is consistent with the standard's intent to protect persons from contacting moving machine parts, as opposed to protecting persons from machine parts which have become projectiles after becoming disengaged from a machine.

Some commenters suggested that the standard also permit an exception for situations where the exposed moving parts are "located out of reach." However, this phrase would create uncertainty as to the standard's application. Under the final rule, the standard applies where the moving machine parts can be contacted and cause injury. Some commenters believed that guards should provide protection against inadvertent, careless, or accidental contact but not against

deliberate or purposeful actions. They considered guards which totally enclose moving parts as counter-productive to other safety considerations such as proper work procedures, training, and general attention to hazardous conditions.

In reviewing the statistics in which persons working in mines have lost hands, arms, legs, and their lives to moving machine parts, MSHA notes that in most of those instances the persons were performing deliberate or purposeful work-related actions with the machinery. The installation of a guard to enclose the moving machine parts would have prevented most of those injuries. Guards provide a physical barrier, which offers the most effective protection from hazards associated with moving machine parts. MSHA recognizes that guards provide only one of several safety measures for preventing injuries which can result from contact with moving machine parts. Proper work procedures, safety training, and attentiveness to hazards all play a role in reducing those injuries.

Some commenters questioned whether the standard would require guarding beyond that provided by the manufacturer for the engine cooling fan on small vehicles such as vans or pickup trucks. In those situations the vehicle size and the engine hood would act to prevent access and contact with the exposed moving parts, and no additional guard would be required. However, larger, off-road vehicles present special hazards because of the greater accessibility to their moving machine parts. In some instances persons can walk directly under the vehicle to inspect the engine and be exposed to its moving parts. In most instances, these parts are already guarded by the manufacturer but guards are sometimes removed during repair work and not replaced. MSHA's objective is to ensure that these guards remain in place.

Commenters also questioned whether the guarding requirement would reduce equipment inspection and maintenance capability by obscuring the ability to make observations of belt slippage or breakage. The commenters also believed that guards which met the performance objective of the proposed standard would be heavy and, therefore, pose risks of strained backs, hernias, and injured hands during installation or removal for maintenance.

The final rule does not require guards which are different from those currently required. Instead, the standard is intended to clarify the performance objective of guards. The standard does not specify the type of material to be

used for guarding, but expanded metal or transparent safety plastics are examples of alternatives which provide lightweight means to enclose the moving parts so that they cannot be contacted while also allowing observation during machinery operation.

*Section 56/57.14108 Overhead drive belts.* This final standard revises existing §§ 56/57.14002. It requires guarding of overhead drive belts in instances where the whipping action of a broken belt could be hazardous to persons. The existing standard applied only where the whipping action could affect persons beneath the overhead belt. The final rule clarifies that the standard applies to drive belts and that containment of the hazardous whipping action is required for all directions where the danger exists.

*Section 56/57.14109 Unguarded conveyors with adjacent travelways.* This final standard revises existing §§ 56/57.9007. It requires that unguarded conveyors next to travelways be equipped with emergency stop devices or protective railings. Emergency stop devices must be located so that a person falling on or against the conveyor can readily de-activate the conveyor. If railings are used as an alternative to stop devices, the railings must be placed in a position which will provide protection for the person and must be capable of preventing persons from falling on or against the conveyor. Under the existing standard, railings have been permitted by MSHA policy.

Commenters questioned whether the emergency stop devices must run the length of the conveyor or the length of the travelway. The standard has been revised to clarify that it applies only to the extent that the travelway is along an adjacent and unguarded conveyor. Where portions of the travelway and conveyor are not adjacent, emergency stop devices are not required.

Some commenters were concerned that the alternative permitting railings as a means of compliance would limit the standard to pipe railings and prohibit the use of other materials. The standard does not restrict the type of material used. The important consideration is that the railing meet the standard's performance requirements by being positioned properly and structurally capable of preventing persons from falling on or against the conveyor.

The railings must be able to withstand the anticipated forces such as vibration, shock and wear, to which they would be subjected during normal operations. Consideration must also be given to construction material and maintenance

so that the railing does not pose a hazard. For example, if wire ropes or wood are used, they must not be frayed or have jagged ends which could create a puncture or laceration hazard to a person traveling in the area.

*Section 56/57.14110 Flying or falling materials.* This final standard revises existing §§ 56/57.14011 and addresses those instances where a hazard is created by flying or falling materials generated from the operation of screens, crushers, or conveyors. The existing standard did not specify the sources of the flying or falling material. The final standard requires guards, shields, or equivalent protection to be provided in areas where persons are exposed to hazards from those sources. Some commenters believed the standard should address all instances where a hazard is created by flying or falling materials. MSHA has limited the scope of the standard in the final rule to those hazards associated with the operation of screens, crushers, or conveyors because several other safety standards already provide protection from other specific sources of flying or falling materials.

*Section 56/57.14111 Slusher, backlash guards and securing.* This final standard revises existing §§ 56/57.9015. It requires that safety devices be provided when slushers are used. A slusher is a versatile piece of machinery which is used to move material or other machinery by means of a hoisting engine, cables, and two drums on which the cable is wound. It is distinguished from a similar machine known as an "air tugger" which has a single drum and cable.

Commenters suggested that the proposed rule's requirement to securely anchor slushers and equip them with rollers and drum covers be limited to situations where persons are exposed to slushing operations. MSHA agrees and the final rule adds this qualification to address situations where slushing operations are performed by remote control or from protective enclosures. Commenters also suggested that cable guides be permitted in place of rollers. MSHA did not adopt this suggestion because guides can cause burrs to develop on the cable and increase the chance of a hangup or break in the cable.

In response to commenters, the final rule expressly states that the standard does not apply to air tuggers of 10 horsepower or less that have only one cable and one drum. As noted in the preamble to the proposed rule, this standard is not intended to apply to such devices since their low horsepower minimizes the hazards associated with slushers.

*Section 56/57.14112 Construction and maintenance of guards.* This final standard replaces and consolidates existing §§ 56/57.14006 and 56/57.14007. As with the existing standards, it addresses construction characteristics, maintenance, and safe practice requirements for guards. To be useful and effective, guards must not themselves create a hazard and must be able to withstand the vibration, shock, and wear to which they would be subjected during normal operations. In response to commenters, the rule does not include the proposed rule's reference to "all reasonable" vibration, shock, and wear and clarifies that guards must be able to stand up to the stresses they will be subjected to during normal operation. Both the existing standard, and the new standard require that guards remain securely in place while machinery is being operated. However, the final standard permits removal of the guard when the testing or adjustment of the machinery could not otherwise be performed. The existing standard had permitted guard removal only for testing.

*Section 56/57.14113 Inclined conveyors: backstop or brakes.* This final standard clarifies existing §§ 56/57.9013. It requires the installation of backstops or brakes on drive units of inclined conveyors to prevent the conveyors from running in reverse and exposing persons to the risk of material rushing downward which can occur when the incline causes the conveyor and the material being conveyed to reverse direction. The final standard clarifies that these devices are installed on the drive units of inclined conveyors.

Commenters were concerned that the standard's requirement for devices which "prevent" conveyors from running in reverse might prohibit the slight backward motion which occurs when the brake is setting up. Because the standard's performance objective is to prevent conveyors from "running" in reverse, the momentary backward motion as the brake engages would not constitute a violation.

*Section 56/57.14114 Air valves for pneumatic equipment.* This final standard clarifies the requirements of existing §§ 56/57.9026. It requires a manual master quick-close type air valve on all pneumatic-powered equipment if there is risk of uncontrolled movement of the equipment when the air supply is activated. The valve is required to be closed unless the equipment is being operated.

Some commenters wanted the standard to be revised to apply only to operator controlled self-propelled pneumatic powered equipment which is

used for loading, hauling, and dumping. In MSHA's view, all types of pneumatic powered equipment which present a potential for uncontrolled movement upon activation of the air supply, need to be equipped with this safety valve. MSHA notes that these valves are a standard feature on most types of pneumatic equipment which have this hazard potential. MSHA is aware that some equipment is provided with a control trigger switch and cannot be activated unless the trigger is depressed. Pneumatic powered equipment provided with a trigger switch control is not required to have a master valve since no uncontrolled motion could occur until the trigger is depressed.

Some commenters opposed the proposed rule's requirement that the valve be closed unless the equipment is being operated. They believed it was unnecessary to have the valve closed when the equipment was not connected to the air supply. Other commenters favored having the valve remain closed except during operation of the equipment. MSHA retained this requirement in the final rule to avoid the potential for injury which may occur when equipment with an open valve is inadvertently connected to an open air supply, thereby creating sudden movement of the pneumatic equipment.

*Section 56/57.14115 Stationary grinding machines.* This final standard revises and clarifies existing §§ 56/57.14008. As with the existing standard, the final standard requires peripheral hoods, safety washers, and adjustable tool rests as safety devices for stationary grinding machines. It specifies the maximum allowable opening between adjustable tool rests and grinding wheels. The tool rest opening is an important safety consideration because a gap which is larger than the width of the material being ground can allow the material to be drawn into the grinding wheel and cause serious injury. To eliminate this hazard, the standard requires that the opening be set so that all points between the grinding surface of the wheel and the tool rest are not greater than 1/8 inch.

The existing standard required the tool rest opening to be set as close as practical to the wheel. In the preproposal draft, the agency included a performance oriented requirement that would have permitted a variable tool rest opening, as long as the opening was smaller than the material being worked. The proposed rule provided that the opening not exceed 1/8 inch. Although some commenters preferred the variable