

**Proposed
Final
Rule**

**Thursday
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Part II

Department of Labor

Mine Safety and Health Administration

**30 CFR Parts 56 and 57
Safety Standards for Loading, Hauling,
and Dumping and Machinery and
Equipment at Metal and Nonmetal Mines;
Final Rule**

DEPARTMENT OF LABOR**Mine Safety and Health Administration****30 CFR Parts 56 and 57****Safety Standards for Loading, Hauling, and Dumping and Machinery and Equipment at Metal and Nonmetal Mines**

AGENCY: Mine Safety and Health Administration, Labor.

ACTION: Final rule.

SUMMARY: This final rule updates and clarifies the Mine Safety and Health Administration's (MSHA) safety standards for loading, hauling, and dumping and machinery and equipment at metal and nonmetal mines. These revisions reorganize standards, upgrade provisions consistent with advances in mining technology, eliminate duplicative and unnecessary standards, reduce recordkeeping requirements, and provide alternative methods of compliance.

DATES: This final rule is effective on October 24, 1988. The incorporations by reference of certain publications listed in this final rule have been approved by the Director of the Federal Register as of October 24, 1988.

FOR FURTHER INFORMATION CONTACT: Patricia W. Silvey, Director, Office of Standards, Regulations, and Variances, MSHA; phone (703) 235-1910.

SUPPLEMENTARY INFORMATION:**I. Rulemaking Background.**

MSHA announced the availability of preproposal drafts for the machinery and equipment (Subpart M) and loading, hauling and dumping (Subpart H) standards on February 11, 1983 (48 FR 6489) and April 22, 1983 (48 FR 17513), respectively.

After reviewing suggestions and recommendations from mine operators, labor groups, equipment manufacturers, and other interested parties, MSHA published a proposed rule in the *Federal Register* for machinery and equipment on March 6, 1984 (49 FR 8375) and a proposed rule for loading, hauling and dumping on December 18, 1984 (49 FR 49202). Public hearings were held in June 1984 for the machinery and equipment standards and August 1985 for the loading, hauling, and dumping standards. MSHA received and reviewed written and oral statements on both proposed rules from all segments of the mining community. The final rule for Subpart M contains more standards than were included in the proposed rule due to the inclusion of standards originally proposed in Subpart H, but

which more precisely and appropriately address machinery and equipment requirements. Additionally, a new standard addressing restricted clearance for foot travel on travelways is added to Parts 56 and 57, Subpart J (Travelways and Escapeways). The standards in Part 56 apply to all surface metal and nonmetal mines; those in Part 57 apply to underground and surface areas of underground metal and nonmetal mines.

II. Discussion and Summary of the Final Rule.**A. General Discussion.**

Hazards associated with loading, hauling, and dumping activities and the use of machinery, equipment, and tools in mining have resulted in many serious injuries and fatalities. Precautions against these hazards and the proper use of the equipment involved are essential parts of any effective mine safety program.

Although fatalities and injuries in general have shown a downward trend in metal and nonmetal mines, machinery and equipment-related injuries and fatalities, as a percentage of the total, have been increasing over the past few years. This trend is, in part, due to increasing mechanization of the mining industry. During the past two decades, activity in metal and nonmetal mining nationally has shifted from underground to largely surface mining. This development has resulted in a substantial increase in the number and size of haulage vehicles being used at mine sites. While improving productivity, these changes have also exposed miners to additional potential hazards.

Accidents related to powered haulage continue to represent a significant portion of the fatalities in metal and nonmetal mines. Transportation accidents involving large equipment tend to result in the most serious types of accidents. Between 1978 and 1987, an average of 78 fatalities and 12,600 nonfatal injuries occurred annually in metal and nonmetal mines. During this period, fatalities involving powered haulage averaged about 24 annually and nonfatal injuries involving powered haulage averaged 972 annually.

Machinery and equipment accidents were also a significant cause of injuries and fatalities in mines during this period. An average of 1,675 nonfatal injuries, and 11 fatalities occurred annually, caused by either accidental contact with or misuse of machinery and equipment ranging from small, portable hand tools to large, stationary machinery, crushers and conveyors.

MSHA examined fatality reports for the years 1982-1987 to determine projected benefits from this final rule for Subparts H and M. Over the last 6 years, the Agency estimates that 127 fatalities could have been prevented by full compliance with all the provisions of the final rule. Based on this estimate, MSHA projects that full compliance will result in between 10 and 15 lives saved per year.

While increased mechanization has created potential hazards, technological improvements have also created opportunities to ensure a safer working environment for miners. Technological advances aid in reducing hazards because many safeguards are integral design features on new products. Also, improved engineering and work practices in loading, hauling, and dumping operations can contribute to enhanced protection of persons working on mining property.

These revised standards are intended to improve safety by recognizing and incorporating many of these technological improvements and bringing MSHA's standards up-to-date. In addition, standards are included to ensure safety in areas not previously addressed; but where the data show that accidents are occurring and duplicative and unnecessary standards are eliminated.

MSHA's review of the existing standards and comments received has resulted in revisions to reflect both the Agency's experience and the concerns of commenters, including small mine operators. In developing this final rule, MSHA has been responsive, to the extent possible, to the many comments received from the mining public. These changes are consistent with the goals of the Federal Mine Safety and Health Act of 1977, Executive Order 12291, the Paperwork Reduction Act, and the Regulatory Flexibility Act, in that the final rule provides new compliance alternatives to accommodate advances in mining technology while offering the most effective protection for persons working at mines.

Throughout the rulemaking process a number of commenters expressed concern about the applicability of individual standards and the relationship of the loading, hauling, and dumping standards contained in Subpart H, to the machinery and equipment standards contained in Subpart M, particularly since many of the standards in Subpart H address equipment.

In drafting the final rule, it became evident that the most logical organizational approach would be to realign the standards into "hazard or

task-related" groups within separate subparts. Accordingly, many of the standards which appeared in the proposed rule for Subpart H have been transferred to Subpart M. The final rule continues to provide the necessary safety for workers at metal and nonmetal mines. Changes made to all of the existing standards are discussed fully below.

The standards that address safe conduct of loading, hauling, and dumping activities are contained in Subpart H under the following headings: Traffic Safety; Transportation of Persons and Materials; and Safety Devices, Provisions, and Procedures for Roadways, Railroads, and Loading and Dumping Sites. The standards contained in Subpart M address: Safety Devices and Maintenance Requirements; and Safety Practices and Operational Procedures for various types of machinery and equipment, including those used in loading, hauling and dumping activities. Standards for Subpart H and Subpart M are published together in the Federal Register for the convenience of readers to assist them in understanding the realignment of the standards and to clarify the relationship between Subpart H and Subpart M.

The Agency believes this realignment of standards and restructuring of subcategories will aid in clarifying the intent of each standard and will help users locate the various standards within the Code of Federal Regulations (CFR).

B. Transfers and Deletions.

The following table lists the transferred standards.

Final rule number	Existing number
56/57.14100	56/57.9001, 56/57.9002, 56/57.9073
56/57.13101	56/57.9003
56/57.14102	56/57.9048
56/57.14103	56/57.9010, 56/57.9011, 56/57.9012
56/57.14104	56/57.9069
56/57.14109	56/57.9007
56/57.14111	56/57.9015
56/57.14113	56/57.9013
56/57.14114	56/57.9026
56/57.14130	56/57.9088
56/57.14132	56/57.9087
56/57.14160	57.9115
56/57.14161	57.9098
56/57.14162	57.9112
56/57.14200	56/57.9005
56/57.14201	56/57.9008
56/57.14206	56/57.9031, 56/57.9032
56/57.14207	56/57.9036, 56/57.9037
56/57.14208	56/57.9049, 56/57.9068
56/57.14209	56/57.9070
56/57.14210	56/57.9025
56/57.14214	56/57.9009
56/57.14215	56/57.9065, 57.9097
56/57.14216	56/57.9046
56/57.14217	56/57.9047

Final rule number	Existing number
56/57.14218	56/57.9066
56/57.14219	56/57.9052

At the suggestion of several commenters and on the basis of the Agency's enforcement experience, the final rule deletes five existing standards. Standard 56/57.9019 which requires blocking of track guardrails, lead rails, and frogs is deleted because MSHA analysis showed no evidence of injuries associated with the performance of this task. Standard 56/57.9042 which requires that rocker-bottom and bottom-dump railcars be equipped with locking devices is deleted because these type railcars do not operate without locking devices. Standard 57.9114, which requires the designation of discharge and boarding points where mantrips are used, is deleted because final standard 56/57.9318 addresses the hazard of getting on or off moving equipment. Standard 56/57.14009 which addresses grinding wheels is also deleted because the hazard of operating such devices is covered by final standard 56/57.14205, which requires that equipment be used within the manufacturer's specifications and instructions unless no hazard to persons is created. Standard 56/57.14027, which requires that competent persons be assigned to the operation of machinery or equipment is deleted because the training requirements in 30 CFR Part 48 cover the competency of persons operating machinery or equipment.

C. Other Changes.

The final rule includes a new § 56/57.11008 for Subpart J (Travelways and Escapeways). The standard addresses restricted clearances encountered by persons traveling on foot. The standard is added in response to several commenters who urged that existing § 56/57.9060, addressing restricted overhead clearance hazards in general, be limited to situations where persons are traveling in mobile equipment. The proposal suggested the restricted clearance areas be conspicuously marked where a hazard is created. However, commenters believed the standard should only apply where the restricted clearance creates a hazard to persons on travelways. MSHA agrees with commenters who stated that, without this limitation to travelways, a multitude of other restricted clearance locations might unnecessarily have to be marked. Commenters also opposed having the standard specify how the area should be marked. In this instance, the primary compliance action relates to

alerting persons to hazards presented by restricted clearances. Under this final rule, where marking is required, and method of conspicuous marking alerting persons would be permitted. Restricted clearances that create hazards to persons on mobile equipment are addressed in final § 56/57.9306.

The provisions of existing § 56/57.14014 addressing eye protection while using grinding wheels is a "personal protection" standard which the Agency has determined would be more appropriately grouped with other personal protection standards for metal and nonmetal miners. The final rule redesignates § 56/57.14014 as § 56/57.15014 in Subpart N. No changes have been made in the requirements of the standard.

D. Petitions for Modification.

Operators with petitions for modification that involve the standards revised in this rulemaking need to determine the status of those petitions before the effective date of this final rule. If there are sections of this rule which are renumbered but remain substantively unchanged from the existing standards, operators with modifications granted for these standards need not reapply. However, operators with modifications granted for standards that have been revised will need to comply with the new rule on its effective date. New petitions for modification of the final rule may be submitted in accordance with 30 CFR Part 44. If Agency assistance is needed, questions should be directed to the appropriate MSHA District Office.

E. Definitions.

Subpart H contains two defined terms: *Berm* and *mobile equipment*. Subpart M also contains two defined terms: *Mobile equipment*, and *travelway*. In the proposed rule for Subpart H, *berm* was defined as "A pile or mound of material along an elevated roadway capable of moderating or limiting the force of a vehicle in order to impede the vehicle's passage over the bank of the roadway." Commenters supported this definition which is retained in the final rule.

Several commenters suggested clarification of the proposed rule's definitions for mobile and self-propelled equipment. In the proposed rule for Subpart H, mobile equipment was defined as "equipment capable of moving or being moved readily," and self-propelled equipment as "equipment capable of moving itself." Both subparts now define *mobile equipment* as "wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of

moving or being moved." Wherever the final rule refers to equipment capable of moving itself, it uses the term *self-propelled mobile equipment*, for which a separate definition is not necessary.

The definition of *travelway* has been revised in Subpart M to include "a passage, walk, or way regularly used or designated for persons to go from one place to another." This revision recognizes that walkways that are regularly used, in addition to those which are designated, are also included within the scope of the safety standards.

Mantrip, as proposed in Subpart H, has been deleted from the final rule because commenters indicated that mantrip is a readily understood mining term. Likewise, *trip light* has been deleted since it is also fully recognized and understood within the affected mining community.

F. Incorporations by Reference.

Subpart H does not contain any incorporations by reference. Subpart M contains two standards which incorporate by reference national consensus standards: § 56/57.14130, which addresses roll-over protective structures (ROPS) and seat belts, and § 56/57.14131, which requires the use of seat belts on certain equipment which is not fitted with FOPS. These incorporations by reference were approved by the Director of the Federal Register, and are discussed in detail in the section-by-section analysis, below.

G. Section-by-Section Discussion of Subpart H.

The following section-by-section analysis discusses the issues raised during this rulemaking.

Traffic Safety

Section 56/57.9100 Traffic control. This standard revises existing § 56/57.9071. It requires the establishment and posting of traffic safety rules, signs and signals. The standard provides for the safe operation of self-propelled mobile equipment. The final rule clarifies several provisions of the proposal and expands the scope of the required traffic safety rules.

The failure to establish traffic rules and post warning signs has been cited as a contributing factor in mining accidents. Fatalities have occurred where rules governing direction of equipment movement were not established and where signs warning of hazardous curves and steep declines were not provided.

The final standard contains two requirements. Under paragraph (a) each mine is required to establish and follow traffic rules governing equipment speed,

right-of-way, direction of movement and the use of headlights. The latter requirement is added to emphasize the importance of using lights where necessary to prevent collisions and other hazards associated with operating self-propelled mobile equipment in conditions of limited visibility. The requirement is compatible with and a logical extension of the requirement in § 56/57.9101 that operating speeds be consistent with visibility. Paragraph (b) requires that warning signs or signals be placed at appropriate locations in order to alert equipment operators of the need to take appropriate precautions. For example, a sign warning the equipment operator to check a vehicle's brakes and use a low gear may be needed in advance of a steep decline.

Commenters stated that the proposal's provision for traffic rules to be posted was impractical for some mining operations since rules can change as often as each shift. MSHA agrees that this situation can exist at some mines, and the final rule deletes the posting requirement for rules but, not warning signs. However, rules would have to be established at the mine for miners' training and awareness.

Commenters also asked whether the standard would require an increase in the number of signs already required. The final rule does not require additional signs to be installed. However, it does require that the signs "warn of hazardous conditions". A second concern was the proposal's provision that each sign be uniform in size and shape for each purpose. Several commenters believed this provision was inappropriate since low clearances may sometimes make uniformity impossible, particularly underground. Commenters also stated that larger signs may be needed in some situations. MSHA agrees that while standardization may enhance warning recognition, compliance may be difficult in some situations; therefore, the final rule deletes the uniformity requirement.

Some commenters questioned the phrase "appropriate locations on roadways" and were not sure where signs or signals would be required. The final rule clarifies that signs or signals are required to be positioned so that hazardous conditions are known in advance. For example, signs must be appropriately placed to warn drivers of hazards which they are approaching, such as intersections, steep grades, and sharp turns.

Commenters also questioned the scope of the standard as it relates to underground operations. As with the existing standard, the final rule applies to surface as well as underground

locations since traffic control hazards exist in both situations. While MSHA realizes that rules of the road and signs may have to be different to accommodate confined environments, they must appropriately address underground hazards.

Section 56/57.9101 Operating speeds and control of equipment. This standard revises and consolidates existing §§ 56/57.9017, 56/57.9023, 56/57.9024, and 57.9113 which address equipment speed and control. The final rule requires that operators of self-propelled mobile equipment maintain control of equipment while it is in motion. It also requires that operating speeds be consistent with conditions of the roadway or tracks, other traffic, visibility and the type of equipment used. Commenters supported this consolidation and the final rule retains the proposed language.

Section 56/57.9102 Movement of independently operating rail equipment. This standard revises existing § 56/57.9035. To prevent collision of independently operated trains, the final rule requires that movement of two or more pieces of rail equipment operating independently on the same track be controlled for safe operation.

A commenter recommended that the standard permit "control for safe operation" to be achieved by either an equipment operator or a safety device. For clarification, operators can use either approach as long as safety is achieved. Some examples of control methods are: Train dispatchers using electronic switchboards; block light systems; flagmen and switchmen.

The final rule retains the proposed language.

Section 56/57.9103 Clearance on adjacent tracks. This standard revised existing § 56/57.9050. It prohibits the parking of railcars on side tracks unless clearance is provided for traffic on adjacent tracks to pass by. No comments were received on this standard as proposed, and the final rule clarifies the proposed language to explain that clearance is needed in order for traffic to pass.

Section 56/57.9104 Railroad crossings. This standard revises existing § 56/57.9059. The final rule requires that designated railroad crossings be posted with warning signs or signals or, as an alternative, guarded when trains are passing. For example, brakemen and switchmen can guard crossings in lieu of installing signs, as long as the goal of warning workers is achieved. The final rule retains the requirement that crossing points be planked or filled between the rails.

Some commenters believed this standard should only apply to surface rail equipment. These commenters were concerned that MSHA could require the entire length of underground rails to be planked or filled since persons often use the rails as travelways. The final standard continues to apply to both surface and underground locations since the hazards exist in either situation. However, the final rule clarifies that the standard applies only to those "designated" locations where persons or equipment cross the tracks. It also deletes the proposal's reference to "permanent" crossings since the appropriate consideration is whether the location is a designated crossing point.

Section 57.9160 Train movement during shift changes. This standard revises existing § 57.9116 which applies to underground areas of underground mines. Pedestrian traffic increases considerably in most track haulage areas during shift changes. Therefore, at those times, the final rule requires that production train travel be limited to areas where pedestrian traffic is not affected.

A commenter believed that the standard should be expanded to include persons who are exposed to rail or truck haulage traffic at open pit operations. However, the final rule retains the scope of the existing standard because underground operations generally have limited areas for persons to escape from moving equipment.

Transportation of Persons and Materials

Section 56/57.9200 Transporting persons. This standard revises and consolidates existing §§ 56/57.9040, 56/57.9041, 56/57.9067, and 56/57.9085. Each of these standards involve safety practices related to transporting persons on mobile equipment. Commenters supported the consolidation of these standards; however, the final rule modifies the proposal in several respects as discussed below.

In the proposal, paragraph (a) would have prohibited transporting persons in or on dippers, forks, clamshells, or buckets. Commenters requested that MSHA include the provision contained in existing § 56/57.9049 which permits persons to be transported in shaft buckets under limited circumstances. MSHA agrees and the final rule allows persons to be transported in shaft buckets during shaft-sinking operations, or during inspection, maintenance, and repair of shafts. Several commenters questioned whether paragraph (a) would prevent persons from working from raised platforms. The final rule addresses dippers, forks, clamshells and buckets, not raised platforms. However,

raised platforms are discussed in Subpart M, §§ 56/57.14211, which addresses equipment in a raised position and the use of mobile work platforms.

Paragraph (b) of the proposal prohibited transporting persons in beds of mobile equipment or railcars unless they were seated and provisions were made for secure travel. Paragraph (f) of the proposal addressed the related aspect of transporting persons in mobile equipment provided with unloading devices unless provisions were made to prevent accidental starting of the unloading devices. Commenters suggested that these related paragraphs be combined and the final rule for paragraph (b) reflects this consolidation.

Commenters questioned whether paragraph (b) would always require persons to be seated, even if provisions were made for their secure travel. For example, they cited instances of persons being safely transported while standing on platforms attached to the rear of mobile equipment. MSHA does not believe that it is always necessary for persons to be seated, so long as provisions are made for secure travel. Therefore, the final rule for paragraph (b) deletes the requirement for persons to be seated; depending upon the situation, "secure travel" may require that persons be seated or that other precautions be taken.

Paragraph (c) prohibits the transportation of persons on top of loads in mobile equipment. Except for an editorial change substituting the words "loads in" for "loaded," the final rule for paragraph (c) is the same as the proposal.

Paragraph (d) prohibits transporting persons on the outside of cabs, equipment operators' stations, or beds of mobile equipment except when necessary for maintenance, testing, or training purposes. Some commenters were concerned that the proposal's use of the term "equipment operators' stations" could prohibit the transportation of persons in cabs that are designed to accommodate more than just the operator of the equipment. MSHA did not intend to restrict the use of such cabs, and the final rule includes the term "cabs" to remove any ambiguity. As with the proposal, paragraph (d) of the final rule retains the exclusion of rail equipment.

Paragraph (e), with certain exceptions, prohibits persons from riding in locations on trains and locomotives which expose them to hazards from train movement. The proposal prohibited all persons from riding in hazardous locations on trains. Many commenters objected to the scope of this

prohibition, stating that there was no basis to conclude that riding between railcars was hazardous. During the past two years, MSHA has reviewed 6 fatality reports involving persons who rode between railcars of trains, and on the leading end of trains or railcars. These victims were performing train-related work duties, such as car dropping, at the time of the fatal occurrences. In nearly every instance, the use of a safety belt and line may have avoided the fatality. Commenters agreed that use of safety belt and line during car dropping eliminates the hazard of persons falling off the platform and being run over by a train. Therefore, paragraph (e) allows car droppers to ride on the leading end of trains as long as they are secured with a safety belt and line which will prevent them from falling off the work platform. Further, commenters were concerned that paragraph (e) would prohibit gravity dropping of railcars. The final rule does not prohibit gravity dropping, which is the practice of using gravity forces and braking power to reposition cars, rather than locomotive power. Commenters also pointed out that car droppers will at times be on the leading end of a railcar since the brake wheel and platform will come on to the line on the car's leading end about half of the time. During car dropping, a person must be at the end of the railcar that has the brake wheel and platform in order to control the railcar being dropped.

The final rule for paragraph (e) specifically addresses brakemen who typically have duties such as coupling and uncoupling cars, throwing switches, setting mechanical brakes on uncoupled cars, and giving signals to the engineer. Such duties may require these workers to be in locations between railcars. It also addresses trainmen who typically run the locomotive with a remote control device; go from one end of the train to the other; and, in some instances, must leave the train in order to arrange for the loading of cars. The final rule allows these workers to take actions necessary to perform their work functions, but specifically prohibits them from riding between cars of moving trains. Commenters agreed with MSHA that when persons are being transported on trains, there should be strict adherence to the standard's prohibited riding locations.

Paragraph (f) prohibits transportation of persons in overcrowded mobile equipment. Equipment is determined to be "overcrowded" when the stability of the equipment is affected or the presence of persons would interfere with the driver's ability to safely operate

the controls. The final rule retains the proposed language.

Paragraph (g) of the final rule prohibits transporting persons in mobile equipment with materials or equipment, unless those items are secured. Several commenters believed the standard should exempt small items that can be hand-carried, such as lunch boxes and mechanic's tools. Other commenters were concerned that if MSHA permitted such an exception, items that could pose a hazard due to their size or weight, such as mining bars and drill steel, could be construed as "hand-carried" items. The final rule addresses these concerns and permits small hand tools or other items to be hand-carried in mobile equipment if a hazard to persons is not created. Items such as mining bars or drill steel could pose hazards to persons and, therefore, would not be permitted in mobile equipment when persons are being transported unless they are secured.

Editorially, paragraph (h) of the proposal has become paragraph (g) of the final rule because of the consolidation of paragraph (b) and (f) in the final rule.

Paragraph (h) of the final rule is derived from existing §§ 56/57.9014. It appeared in the proposal for Subpart M (Machinery and Equipment) and addressed the hazard of persons riding on conveyors that are used to transport material or supplies. With the reorganization of standards, it has been retained in this subpart. Paragraph (h) prohibits persons from riding on conveyors unless the conveyors are designed to safely transport persons.

Section 56/57.9201 Loading, hauling, and unloading of equipment and supplies. This standard revises existing § 56/57.9045 which addresses the hazard of equipment and supplies falling or shifting during the process of loading, transporting, and unloading. The final rule requires that each of these procedures be performed in a manner which does not create a falling or shifting hazard that could injure persons.

Commenters questioned whether the standard could be interpreted as requiring all loads to be physically secured without regard to the presence of a hazard. For example, unsecured items are often transported in the beds of pickup trucks without posing a hazard to persons in the truck's cab or to other persons. Under the final rule, loads do not have to be secured if a hazard to persons does not exist.

Commenters also asked if the standard would prohibit dropping loads when that is the customary method of unloading a particular item. The final

rule would permit this activity, so long as it did not create a hazard to persons.

Section 56/57.9202 Loading and hauling large rocks. This standard consolidates existing §§ 56/57.9034 and 56/57.9082. The final rule prohibits loading rocks in haulage vehicles when the rocks are too large to be handled safely. It also requires that when mobile equipment is used to haul mined material, the equipment must be loaded to minimize spillage where a hazard to persons could be created. In addition to creating a hazard to foot traffic, the spillage could also create a hazard to other vehicle operators.

Some commenters stated that the standard should apply only where persons "will" be endangered if rocks are not broken before loading. However, in order to prevent hazards from developing, MSHA believes that it is important to require that large rocks be broken prior to loading if their size could endanger persons or affect the stability of equipment. Several fatalities have resulted from equipment being overturned by rocks too large for the equipment.

As pointed out by commenters, the size of the equipment picking up or transporting the rock, and the size, weight, and shape of the rock are factors involved in determining whether a hazard will be created. Due to these highly variable factors, the standard is written to ensure that vehicles of appropriate size and design will be used, or that the rock is reduced to an appropriate size for the vehicle involved.

Some commenters, referring to the provision for minimizing spillage, believed that the standard should also require that loaded materials be centered. However, MSHA agrees with those commenters who noted that while operators normally attempt to center loads, a requirement to do so in all instances would be impractical given the methods typically used to load mined material. While it is impossible to prevent total spillage, the standard requires operators to take all reasonable actions to minimize spillage of material.

Section 57.9260 Supplies, materials, and tools on mantrips. This standard revises existing § 57.9099 and applies to underground operations. It prohibits the transportation of supplies, materials, and tools (except small hand tools that can be carried without creating a hazard) with persons in mantrips. It also specifies that mantrips must be operated independently of ore and supply trips. No comments were received on this standard as proposed, and the final rule clarifies the proposed language on small hand tools.

Section 57.9261 Transporting tools and materials on locomotives. This standard revises existing § 57.9096 and applies to underground mining operations. The standard prohibits the transportation of materials on top of locomotives because of the potential hazards to the train operator and miners. Derailing devices are exempted from the prohibition provided they are properly located and secured. No comments were received on this standard as proposed, and the final rule retains the proposed language.

Safety Devices, Provisions, and Procedures for Roadways, Railroads, and Loading and Dumping Sites

Section 56/57.9300 Berms or guardrails. This standard revises existing §§ 56/57.9022 which addresses berms. The final rule requires berms or guardrails to be provided and maintained on the banks of roadways where a drop-off exists which is of sufficient grade or depth to cause a vehicle to overturn or endanger persons in equipment. The final rule also includes a height requirement for berms and guardrails. While evaluating hazards presented by different types of roadways, MSHA identified over 90 fatalities occurring between 1969 and 1984 on haulage, service, and access roadways where a berm could have minimized the seriousness of the accident resulting from an out-of-control vehicle. In all documented instances, the roadway had a drop-off sufficient to cause equipment to overturn or otherwise endanger persons riding in the vehicle.

The existing berm standard applied to all elevated roadways, regardless of their function or frequency of use. Commenters questioned both the scope and nature of the berm provision. Many commenters believed that, under certain circumstances, the Agency should permit alternatives to the installation of berms or guardrails. Other commenters took the position that berms or guardrails should only be required on roadways that are used to haul the mine's ore and waste products. Others believed that infrequently traveled secondary roadways which are only used by small service or maintenance equipment, should be exempt from the standard. However, all of these commenters agreed that if certain roadways were exempted, alternative methods would be necessary to protect equipment operators on such roadways. MSHA has provided an option for those infrequently traveled roadways which are traveled only by service and maintenance vehicles.

MSHA discussed this issue in its public hearing notice published on July 3, 1985 (50 FR 27568), and outlined criteria to be followed should an alternative compliance method be permitted for infrequently traveled roadways which are only used by service or maintenance equipment. The Agency received public comment and testimony and agrees that an alternative to berms or guardrails on infrequently traveled roadways is appropriate and will provide necessary protection for workers. Under the final rule, berms or guardrails are not required for infrequently traveled roadways used only by service or maintenance vehicles. For those roadways, the final rule includes an alternative compliance method. Specifically, locked gates, warning signs, reflectors along the roadway's perimeter, and controlled speeds would have to be used where a berm or guardrail is not installed. These roadways cannot be traveled when traction is impaired by the presence of sleet or snow unless corrective measures are taken to improve the traction. All of these criteria must be met to diminish the likelihood of equipment going over the bank of an elevated roadway. MSHA believes that many service and secondary roadways, such as tailings dam roads can effectively use this alternative compliance method.

Some commenters also urged MSHA to exempt roadways that are under construction. However, during construction there is frequent use of the roadways, posing continual exposure to hazardous dropoffs. In these instances, the installation of the berm or guardrail should concurrently proceed with road construction. Since these roadways are in constant use and drop-off hazards exist, the alternative compliance method would not be effective. After construction, depending on the type and frequency of vehicles that use the roadway, berms or guardrails may be required or the alternative method may be used for roads used by service and maintenance vehicles.

Some commenters asked that MSHA explain the basis for requiring berms and guardrails to be mid-axle height of the largest self-propelled equipment which usually travels the roadway. Mid-axle height is the minimum height needed to (1) ensure under-carriage contact with the restraint, (2) alert the equipment operator of the hazardous situation, (3) moderate the force of the equipment, (4) provide time for corrective action, and (5) assist the operator in regaining control of the equipment. Studies have shown that

berms or guardrails less than mid-axle height are not capable of limiting the force of the equipment or impeding passage over the bank of the elevated roadway. There were no adverse comments regarding the mid-axle requirement. (See Bureau of Mines Information Circular No. 8758, 1977). Where berms or guardrails are required, the final rule requires that they be at least mid-axle height of the largest self-propelled equipment which usually travels the roadway. Therefore, the height of the berm would not need to be increased where equipment with greater mid-axle height infrequently travels the roadway.

Some commenters were concerned that berms could cause pools of water to be created along roadways which could affect the structural integrity of roads, particularly on tailings dams. MSHA realizes that water accumulation can be a problem, and the final rule permits openings along bermed areas to the extent necessary for roadway drainage.

Section 56/57.9301 Dump site restraints. This standard revises existing §§ 56/57.9054 which requires that berms, bumper blocks, safety hooks, or similar means be provided at dumping locations to prevent overtravel and overturning of mobile equipment.

Several commenters believed that the proposal's use of the words "restrain" and "prevent" was vague, and pointed out that the devices may not prevent equipment from overtravel or overturning in all cases. MSHA agrees that these devices may not provide an absolute barrier. They do, however, provide a restraint or impedance in the form of a physical obstruction to overtravel at the dump site. The final rule clarifies that these devices are intended to impede overtravel or overturning.

Some commenters also suggested that truck spotters be allowed as an alternative to using impeding devices. While the final rule does not prohibit using truck spotters in conjunction with these devices, truck spotters alone are not permitted. Truck spotters would not be able to provide an equivalent means of protection since they may not always be visible to the truck driver, nor can they provide the physical resistance that an impeding device can offer. Procedures for truck spotters are addressed in §§ 56/57.9305.

Section 56/57.9302 Protection against moving or runaway railroad equipment. This standard revises and consolidates existing §§ 56/57.9020 and 56/57.9056. The final rule requires the installation of stopblocks, derail devices, or other equivalent devices

where they are necessary to protect persons from moving or runaway railroad equipment.

A commenter believed that the proposal's requirements were vague, open to interpretation, and that these devices should be installed in accordance with the American Railway Engineering Association (A.R.E.A.) standards. MSHA has reviewed the A.R.E.A. recommended practices, and the final rule is consistent with them. Both the A.R.E.A. standards and MSHA's final rule recognize the diversity of conditions at mining operations and allow mine operators to independently assess their particular conditions when determining which type of device is appropriate. At surface mines, these protective devices are necessary where rail equipment enters work areas such as repair shops and at railcar storage areas in the proximity of work or travel sites. In underground mines, these devices provide protection against overtravel at shaft collars, level landings, and rail car storage areas where equipment or material is loaded or unloaded near work or travel sites. The final rule does not change the wording of the proposal.

Section 56/57.9303 Construction of ramps and dumping facilities. This standard revises existing §§ 56/57.9063. The final rule requires that ramps and dumping facilities be constructed of materials that are capable of supporting the loads to which they will be subjected. These ramps and dumping facilities must also provide adequate width, clearance, and headroom to safely accommodate the equipment using the facilities. No comments were received on this standard as proposed and the final rule editorially clarifies the proposed language.

Section 56/57.9304 Unstable ground. This standard clarifies the provisions of existing §§ 56/57.9055 which addresses the hazard of unstable ground at dumping locations. The final rule requires that dumping locations be inspected prior to work commencing, and as ground conditions warrant. It also provides for actions to be taken when there is evidence that the ground at a dumping location may fail.

MSHA stated in the preamble to the proposed rule that the standard would require periodic examination of dumping locations for signs of instability. Some commenters believed the standard should expressly include this examination requirement whereas others were opposed to such a requirement. The final rule includes a requirement to visually inspect dumping locations prior to work commencing and

thereafter as ground conditions warrant. Numerous accidents have occurred when dumping locations deteriorate and become unable to support the weight of the equipment using them. Therefore, the final rule also requires that where there is evidence that the ground at a dumping location may fail to support the equipment, loads are to be dumped a safe distance away from the edge of the unstable area of the bank.

Section 56/57.9305 Truck spotters. This standard revises existing §§ 56/57.9058 which establishes safety procedures to be followed when truck spotters are used for guiding trucks during dumping. No comments were received on this standard as proposed and the final rule makes grammatical changes to the proposed language.

Section 56/57.9306 Warning devices for restricted clearances. This standard revises existing §§ 56/57.9060 and 56/57.9104. The final rule addresses instances where restricted clearance creates a hazard to persons on mobile equipment, and requires that a warning device be installed in advance of the restricted area and the area be conspicuously marked.

Commenters suggested that the standard be limited to restricted clearances along roadways and that rail equipment be excluded from its scope on the basis that proposed §§ 56/57.9330 covered those hazards. MSHA agrees that the standard should be limited to roadways since it would be impractical to anticipate and mark every off-road location that has a restricted clearance. However, rail equipment is retained in this standard because §§ 56/57.9330 applies only to side clearance and is limited to surface equipment. In addition, §§ 56/57.9330 does not require an advance warning device, and marking is only required where the minimum side clearance cannot be met at surface operations. Similarly, although commenters suggested that new §§ 56/57.11008 could adequately address restricted clearances, that standard pertains only to pedestrian exposure to these hazards.

Section 56/57.9307 Design, installation, and maintenance of railroads. This standard revises existing § 56/57.9016. The final rule requires that road beds and all elements of the railroad track be designed, installed, and maintained to prevent accidents and injuries which could result when rail equipment is operated at speeds too fast for the condition of the tracks. Trackage elements include such items as rails, joints, switches, and frogs. The proposed rule included the reference which limited the standard's application to trackage elements "subject to the

control of the mine operator". The Agency recognizes that these type of jurisdictional issues are sometimes addressed when citations are litigated. Matters of jurisdiction are not, however, at issue in the development of safety and health standards for miners. Therefore, the phrase has been deleted from the final rule. MSHA will examine the circumstances to determine who is responsible for correction of the violation.

Section 56/57.9308 Switch throws. This standard revises existing §§ 56/57.9028 which requires that switch throws be installed to protect switchmen from contact with moving trains. No comments were received on the standard as proposed and the final rule retains the proposed language.

Section 56/57.9309 Chute design. This standard revised existing §§ 56/57.9064 which requires that chute-loading installations be designed so that a person is placed in a safe location while "pulling" a chute. A safe location is needed to prevent the chute puller from either being struck by material that is being loaded, or by the vehicle involved. No comments were received on this standard as proposed and the final rule editorially clarifies the proposed language.

Section 56/57.9310 Chute hazards. This standard consolidates and revises existing §§ 56/57.9072, 57.9105, and 57.9106. Each of these standards address hazards such as uncontrolled rock movement and improper use of tools to free lodged material in chutes.

Paragraph (a) requires that prior to chute-pulling, persons who may be affected by the draw, or otherwise exposed to danger, must be warned and given time to clear the hazardous area. A commenter was concerned that paragraph (a) would prohibit persons from working on grizzlies above the chute during chute-pulling even if they were secured with a safety line. Persons working above the chute who are using safety lines would not be affected by the draw; therefore, the requirements of paragraph (a) would not apply in those situations.

Paragraph (b) addresses safety practices for persons attempting to free chute hangups. Commenters stated that the proposal's reference to "baring down" material did not fully describe all the methods used to dislodge chute hangups. MSHA agrees, and the final rule requires that proper tools be used to free material. Another commenter believed that paragraph (b) should retain the existing standard's requirement that persons attempting to free hangups be experienced and understand the hazards involved.

MSHA agrees that this work is extremely hazardous and has revised paragraph (b) of the standard to include experience and knowledge requirements.

Some commenters believed that the term "chute" was not descriptive of equipment found in some surface operations. For example, some surface operations place material in bins and stockpiles and then draw from the under portion through feeders. MSHA's use of "chute" in the final rule is intended as a general term to include draw points, feeders or gates, each of which serve the common purpose of providing an extraction point mechanism for the transfer of muck or material. The final rule would cover surface bins and stockpiles from which material is drawn.

Paragraph (c) requires that empty chutes be either equipped with guards to contain flying rock or material prior to dumping broken rock or material, or that persons be isolated from the hazards of flying rock or material. A commenter recommended that paragraph (c) be deleted from the standard, stating it had no application to surface operations. The final rule retains this requirement because many surface stone operations use these type of chutes.

Section 56/57.9311 Anchoring stationary sizing devices. This standard editorially revises existing §§ 56/57.9057 which requires that grizzlies and other stationary sizing devices be securely anchored.

A commenter asked whether this standard would prohibit use of grizzlies or grates that can be pivoted or raised to allow for cleaning. As long as the structure itself remains securely anchored, the final rule would allow use of a hinge feature to permit cleaning.

Section 56/57.9312 Working around drawholes. This standard revises existing § 57.9107 which prohibits persons from standing over drawholes if there is danger that material may be withdrawn or may collapse unless platforms or safety lines are used. No comments were received on this standard as proposed and the final rule retains the proposed language.

Section 56/57.9313 Roadway maintenance. This standard was considered for deletion in the proposed rule. The Agency originally believed that two other existing standards adequately addressed these roadway maintenance hazards §§ 56/57.4050, which prohibits the accumulation of waste materials in quantities that could create a fire hazard; and §§ 56/57.20003, which requires that workplaces, passageways and rooms be kept clean and orderly. However, some commenters requested

that MSHA retain and revise existing §§ 56/57.9053 because the hazard presented by the accumulation of water, debris, and spilled material on roadways in a loading, hauling, and dumping environment is not adequately addressed by either of these existing standards.

In response to this concern, MSHA reviewed 207 accidents associated with these hazards and found 43 haulage accidents which resulted from rough roadways, extended pools of roadway water, and spilled haulage material. In a study "MSHA Analysis of Underground Load, Haul, Dump Accidents" which addressed the cause of accidents that occurred from 1978 through 1980, rough roadways or roadway debris was a contributing factor in twenty percent of the accidents occurring during that period. Based on this information, the standard has been retained. Editorially, the standard has been revised to clarify that it applies to instances where water, debris, or spilled material on roadways creates a hazard to the operation of mobile equipment.

Section 56/57.9314 Trimming of stockpile and muckpile faces. This standard makes editorial changes to existing § 57.9061 which requires that stockpile and muckpile faces be trimmed to prevent hazards to persons. Some commenters suggested as an alternative method "that MSHA allow stockpile and muckpile faces to be either guarded or barricaded and posted until the hazard is removed". The final rule does not permit guarding, barricading, or posting as an alternative because the suggested language would allow the hazardous condition to exist indefinitely since stockpiles and muckpiles are used on a regular basis in the mining cycle. In addition, workers who are required to be in the immediate area above and below these stockpiles and muckpiles on a regular basis would not be provided with protection.

Section 56/57.9315 Dust control. This standard clarifies and revises existing §§ 56/57.9074 which requires dust control at muck piles, material transfer points, crushers, and on haulage roads where hazards to persons may be created as a result of impaired visibility.

Some commenters believed that the requirement to control dust where hazards "may" be created was too speculative, and suggested that the standard take effect when hazards "are" or "will be" created. MSHA agrees that "may" could be construed as being too speculative. In MSHA's view, to be effective, dust control measures must be instituted before the hazard to persons is created. Therefore, the final rule uses the term "would".

Section 56/57.9316 Notifying the equipment operator. This standard revises existing §§ 56/57.9027. It requires persons to notify the operator of self-propelled mobile equipment before getting on or off that equipment when the operator is present. The intent of the standard is to prevent serious injuries from occurring because equipment operators are unaware of the presence of persons near the equipment who intend to or attempt to get on or off it. The final rule retains the proposed language.

Section 56/57.9317 Suspended loads. This standard revises existing §§ 56/57.9030 which prohibits persons from working or passing under the buckets or booms of loaders in operation. No comments were received on this standard and the final rule retains the proposed language.

Section 56/57.9318 Getting on or off moving equipment. This standard revises existing §§ 56/57.9039 which prohibits persons from getting on or off moving mobile equipment. The proposal included an exception for trainmen who, because of their work duties, are required to get on and off slowly moving trains. Commenters requested that brakemen and car droppers also be exempt because their work duties entail getting off slowly moving trains. MSHA agrees, and the final rule clarifies that trainmen, brakemen, and car droppers are permitted to get on or off slowly moving trains in the performance of their work duties.

Section 56/57.9319 Going over, under, or between railcars. This standard revises existing §§ 56/57.9051 which establishes safety practices to be followed to prevent persons from being accidentally run over by the sudden movement of railcars. No comments were received on this standard as proposed and the final rule retains the proposed language.

Section 56/57.9330 Clearance for surface equipment. This standard makes editorial changes to existing §§ 56/57.9083. It is applicable to surface mines and surface areas of underground mines. It requires that where possible, at least 30 inches of continuous clearance from the farthest projection of moving railroad equipment be maintained on at least one side of the railroad tracks at surface installations. This 30-inch clearance is necessary to protect persons who work or travel along haulageways from the hazards of moving railroad equipment. Places that are less than 30 inches must be conspicuously marked. No comments were received on this standard as proposed and the final rule retains the proposed language.

Section 57.9360 Shelter holes. This standard consolidates and clarifies the requirements of existing §§ 57.9110 and 57.9111. The final rule requires that when continuous clearance of at least 30 inches cannot be maintained on at least one side of underground haulageways, shelter holes be provided at intervals which are adequate to assure the safety of persons along the haulageway. In response to comments, the standard provides that only areas having less than 30 inches of continuous clearance need to be evaluated, since the critical concern is access to a safe clearance area. For example, a commenter described a situation where 90 percent of an underground haulageway had at least 30 inches of clearance. To comply with the final rule, the mine operator would need to evaluate only the area where the minimum clearance could not be maintained and determine the distance to the nearest area that has the minimum 30-inch clearance. Where it would be questionable if persons can safely reach adequate clearance areas, shelter holes would need to be constructed. However, in most instances MSHA does not believe that additional shelter holes will need to be constructed to comply with the final rule.

Several commenters raised issues concerning the prohibition on using shelter holes for storage. They believed that as long as the minimum clearance was maintained, storage should be permitted. Other commenters supported the ban on storage and other uses. MSHA agrees with those commenters who noted that the critical factor is maintaining the minimum clearance. Therefore, the final rule allows shelter holes to be used for storage as long as the minimum clearance of 40 inches from the farthest projection of moving equipment is strictly maintained. This approach is consistent with the existing requirement, and avoids the need for the construction of additional storage facilities which may have been required under the proposal.

Section 57.9361 Drawholes. This standard clarifies existing § 57.9103 which requires that collars of open drawholes underground be kept free of muck or material.

Some commenters believed that it is impractical to keep drawholes free of material when normal practice calls for continuous or intermittent flow of materials. The accumulation of material around the collars of drawholes presents tripping and falling hazards to persons who work around the collar, and falling material hazards to those who work at the bottom of the drawhole. The final rule clarifies that

the standard does not apply when muck or material is being transferred through the drawhole.

Section 57.9362 Protection of signalmen. This standard revises existing § 57.9102 which provides that signalmen used during slushing operations must be positioned in a safe place. The proposal clarified that signalmen must be located away from possible contact with cables, sheaves, or slusher buckets during slushing operations in underground mines because broken cables can cause serious injuries. No comments were received on this standard. The final rule clarifies the proposed language, consistent with the intent of the standard to protect signalmen from contact with slushing hazards.

H. Section-by-Section Discussion of Subpart M

Safety Devices and Maintenance Requirements

Section 56/57.14100 Safety defects; examination, correction and records.

This final standard is derived from existing and proposed standards which appeared in Subparts H and M. It consolidates the equipment examination, defect correction and recording requirements of existing §§ 56/57.9001, 56/57.9002, 56/57.9073, and 56/57.14026. The rule addresses machinery and powered haulage accidents by establishing procedures for detection and correction of defects.

Powered haulage accidents and machinery and equipment accidents in metal and nonmetal mines are among the leading causes of fatalities and serious injuries. These accidents are often attributable to defects in the machinery and equipment which can develop at any time. During a five year period ending in December 1987, 104 fatalities occurred on equipment which is required to be examined for defects by this section. An additional 60 fatalities were recorded during this same period on machinery and equipment addressed by the defect correction requirements of this section.

Self-propelled mobile equipment is specifically required to be examined prior to use on each shift where it is to be placed in operation. This specific requirement is included in the standard in view of the fact that defects affecting safety become more critical when they occur on a piece of equipment which is mobile throughout the mine.

If safety defects are detected on any equipment, machinery or tools, the required compliance measures vary with the degree of the hazard. The final rule requires that all safety defects be

corrected in a timely manner and that, in instances where continued use would pose a risk of injury, the correction must be made immediately unless the defective equipment is removed from service and identified as defective. The defective condition must be corrected before the equipment is returned to service.

The time allowed to correct a safety defect will vary, depending upon the specific circumstances involved. For example, broken windshield wipers would constitute a defect affecting safety which would require timely repair. However, if this defect existed at a time when the wipers were needed because of rain, snow, or other conditions which affected visibility, then the removal from service or repair would have to be immediate. The primary reason for this differentiation among safety defects is to ensure that safety defects that impose an immediate hazard to persons are corrected before the equipment is used. It also provides that other safety defects will be corrected before they present a hazard to persons. It is expected that defects not creating an immediate hazard will be attended to without delay, normally at the end of the shift in which the defect is discovered.

When safety defects on self-propelled mobile equipment are not corrected immediately, the defect must be reported to the mine operator. Reports of these defects must be recorded by the mine operator and retained until the defect has been corrected. If no defects affecting safety are found, no documentation is required. This reporting and recording procedure which was contained in the proposed rule for Subpart H, will ensure that persons in authority are made aware of defects and can arrange for appropriate correction while also keeping the recordkeeping burden to a minimum.

Some commenters believed that there should be no recordkeeping requirement when corrective action is taken immediately upon detection of the defect. Others believed that, as in the existing standard, there should be a record made in each instance and that these records should be retained for some period of time in order to build accountability for repairs. MSHA notes that it is a common practice to make on the spot repairs on equipment in the field. In these circumstances the Agency believes that it would be unnecessary to require a record to be made of the defect. From a safety standpoint, the critical consideration is the correction of the defect. Therefore, the final rule provides that no record need be made

where the corrective action is immediate.

Some commenters suggested that the recordkeeping requirements of this section be expanded to cover all mobile equipment, regardless of whether it is self-propelled. Others believed that the scope of the standard should continue to apply only to self-propelled mobile equipment. In MSHA's view, the inclusion of all mobile equipment within the scope of this standard would unnecessarily increase recordkeeping requirements; therefore, the final rule continues to limit this requirement to self-propelled mobile equipment.

Commenters also focused on the requirement to tag or otherwise effectively mark equipment that is taken out of service. Some commenters believed that tagging was a minimal burden that should be required in all instances. Others took the position that, in addition to tagging or marking defective equipment, the standard should also permit an alternative of allowing equipment to be placed in a designated repair area. These commenters stated that such placement was a common practice and that persons do not mistakenly use defective equipment under this arrangement.

Under the final rule this alternative is permitted as long as the equipment is placed in a designated area that is posted for defective equipment. Equipment located within a repair shop or repair yard would be considered in compliance with this requirement. Tagging or some other effective method of marking must be used whenever the equipment is not immediately removed to a designated repair area.

Section 56/57.14101 Brakes. This final standard sets forth minimum performance requirements for braking systems on self-propelled mobile equipment and requires that all braking systems be maintained in functional condition. It replaces existing §§ 56/57.9003 which required that the equipment be provided with adequate brakes. The rule provides for service brake tests on surface-operated equipment to determine the capability of a vehicle's braking system, clarifies the existing standard regarding adequate brakes, and also prevents the hazard by setting out specific braking requirements. In addition, it provides the mine operator with a specific means of testing his vehicles' brakes prior to inspection by MSHA. Rail equipment is excluded from this standard and is addressed by §§ 56/57.14103.

In the past three years, there were 88 accidents related to brake failure involving loading, hauling, and dumping

equipment, of which 3 resulted in fatal injuries. During FY 88, under existing §§ 56/57.9002, 680 violations were cited for faulty braking systems and during FY 87, 763 violations were issued.

Nearly all types of self-propelled mobile equipment found at mining properties are equipped with one or more braking systems. The service braking system is the primary system for stopping and holding equipment during normal use. Some large equipment also utilizes retarding mechanisms to supplement service braking systems. Most equipment also is provided with a parking (secondary) brake system. Service braking systems must be capable of stopping and holding the equipment, with its typical load, on the maximum grade it travels.

Some commenters pointed out that several types of equipment, such as some self-propelled lawn mowers, are not manufactured with brakes. The final rule takes this into consideration by providing that the standard does not apply to equipment which is not originally manufactured with brakes unless the equipment is used in a manner which requires the use of brakes for safe operation. Some commenters suggested that battery and air-powered equipment be exempted from the rule. However, this equipment is often used in a manner which necessitates the use of brakes.

The rule also requires that self-propelled mobile equipment equipped with parking brakes shall be capable of holding the equipment with its typical load on the maximum grade it travels. Several commenters to this provision urged MSHA to limit this performance requirement to a maximum grade of 15 percent. They noted that the Society of Automotive Engineers (SAE) document J 1152 has this performance limitation.

The final rule retains the performance requirement that the parking brake be capable of holding the equipment on the maximum grade traveled. MSHA notes that the SAE document establishes only the minimum acceptable performance. Although grades in excess of 15 percent are not common at mining operations, equipment must be able to perform safely under the conditions to which it is subjected. The steeper the grade, the more demand is placed on the brakes. If the brake does not perform, the vehicle will roll. Of the few operations having grades that are greater than 15 percent, MSHA estimates that most if not all mine operators would choose to regrade rather than incur costs to retrofit existing braking systems. These increased regrading costs would be offset by reduced equipment operating

costs. MSHA expects that the cost savings will offset the cost of regrading.

The second part of this rule addresses service brake system testing. It provides for tests on surface-operated self-propelled mobile equipment which is capable of traveling at least 10 miles per hour when there is reason to believe that the service brake system does not function as required. MSHA will not be conducting routine or random testing of equipment. The purpose of the test is to determine the performance of the service brake system. To pass the service brake test, equipment must not exceed the maximum stopping distance for its weight class at the speed tested. The maximum stopping distances are listed in Table M-1 of the standard.

The brake test is based on recommended minimum performance standards for service brakes which are set forth in the SAE document J 1152. MSHA's test combines different machine categories and weights from the SAE document, extracts the appropriate stopping distances from each group, and adds a one second response time. MSHA brake testing requirements, while differing somewhat from those in SAE J 1152 because of conditions likely to be encountered in the mining environment, are nevertheless based on widely accepted criteria. The requirements of this standard will provide the necessary measure of safety at the mine site.

Field testing of equipment is not expected to be frequent, and would not impose a significant burden on the mining operation. In its field tests, MSHA found that four brake test runs were typically completed in less than ten minutes. Under the final rule, equipment which passes the first test will not be tested further.

Some commenters favored the deletion of the testing provision. These commenters were concerned that testing could be dangerous since it would involve equipment with brakes which are already suspect. The final rule contains several provisions to ensure that brake testing will be performed safely. Testing will not occur when the mine operator agrees that the equipment's service brakes do not function as required and orders that the equipment be removed from service for repair. Although some commenters wanted mine operators to have the option of removing equipment for inspection instead of repair, others agreed that if the mine operator chooses to test, repair action should be initiated. The operator has the option to conduct testing and repair prior to inspection by MSHA. Testing would only be utilized in

those instances when there is disagreement about the performance capabilities of the service brakes. To further ensure safety, an MSHA inspector may independently determine that the equipment would be too hazardous to test in the field. For example, the inspector would not permit testing in any instance where a brakeline was plugged. The inspector will also inquire as to whether the equipment operator or mine operator is aware of any defect on the equipment about to be tested.

Testing is not to occur unless there is an appropriate test site at the mining operation. Working with the mine operator to ensure that no hazard will be presented by testing, the MSHA inspector will instruct the equipment operator before any testing to activate the equipment's emergency brakes should the service brakes fail completely. The mine operator can designate the person who will operate the equipment during the test. Most testing sites will also provide a course of sufficient length to allow the equipment to come to a rolling stop in the event of complete failure of all braking systems.

MSHA inspectors will also be trained to safely conduct these tests. Persons and equipment will be clear of the approach and measured course during testing. While testing places demands upon the equipment's service brakes, these demands are comparable to those that would be encountered in the continued performance of the equipment's routine functions at the mine site.

Several commenters who favored the deletion of the proposed rule's brake testing provision urged MSHA to substitute the "stall test" in its place. This test measures, under certain conditions, the equipment's mechanical braking capability against engine power.

MSHA did not adopt the stall test in the final rule for several reasons. The stall test only measures the static holding capability of the equipment's service brakes. As noted by commenters, for larger equipment it is the dynamic braking which does most of the work in slowing equipment for a stop.

For large equipment which utilizes some form of dynamic braking, mechanical braking becomes important at speeds below 10 mph. Unlike the stall test, the final rule's brake testing procedure does evaluate dynamic braking. The stall test cannot generally be applied to all equipment. The limited information provided by a stall test is only valid when the manufacturer has

specifically designed the test for the exact equipment in question.

Several comments were directed toward the issue of which brakes may be applied in a service brake test. Some commenters were concerned that the use of the term "service brakes" in the proposed rule would prohibit the use of dynamic brakes during tests. The final rule allows the use of "auxiliary retarders" when they are simultaneously activated by the application of the service brake control. The term "dynamic brakes" and "auxiliary retarders" are often used interchangeably. The final rule clarifies MSHA's intent that all braking systems which are designed to bring the equipment to a stop under normal operating circumstances may be used during the test. Parking and emergency brakes or, as they are sometimes described, secondary brakes, are not to be used during a test since they are not designed or intended to stop equipment under normal braking circumstances.

Another aspect of testing involves the load carried by the vehicle being tested. In the proposed rule, MSHA provided that service brakes were to be tested with the equipment "fully loaded." Several commenters objected to this provision. They favored testing vehicles which were loaded to their gross vehicle weight, while others took the position that either of those measures would be inappropriate where a mining operation routinely fills its haul trucks below their capacity.

The final rule responds to these concerns by providing that equipment is to be tested with a load which is typical for the particular model of equipment at the mining operations. Gross vehicle weight was not utilized as the measure for loading because it would be necessary to weigh equipment before a test. Scales are not always present at operations and even where present, the load for some equipment may exceed the scale's measuring capacity.

MSHA notes that the testing provisions of the brake standard is not limited to haulage trucks. It applies to all types of self-propelled mobile equipment which is capable of traveling at least 10 miles per hour. For non-haulage vehicles, the typical load consists of the load, if any, that is normally carried by the equipment to be tested.

Several commenters were concerned that front-end loaders with full buckets might have less stability during testing and could spill some of their load. To ensure safety, the final rule provides that front-end loaders are to be tested with the loader bucket empty. For safety reasons the final rule also provides that

equipment carrying hazardous loads, such as explosives, may not be tested with those loads. In such instances, the hazardous load must be removed and an equivalent substitute weight placed on the equipment before testing.

Some commenters also believed that the table which sets forth the maximum allowable distances should have a separate weight category and longer stopping distances added for equipment weighing over 600,000 pounds. The final rule does not provide an additional category because the heaviest weight class already specifically includes all equipment which exceeds 400,000 pounds. The major reason for allowing greater stopping distances for heavier equipment is to take into account the increased time it takes for the service brake system to respond to the application of the brake. This "system response time" does not significantly increase for equipment which exceeds 400,000 pounds.

Commenters also questioned whether the standard should include testing of equipment underground. The proposed rule provided that testing would apply to all equipment capable of traveling at least 10 miles per hour. Many commenters objected to testing of equipment underground due to restricted roadway widths, the presence of drift walls, and limited lighting. Other commenters believed that while some underground roadways would be inappropriate, each situation should be independently assessed. MSHA has considered both of these viewpoints but, in recognition of the limitations for brake testing underground, the final rule limits testing to equipment which is used at surface locations. Therefore, testing applies to surface locations at underground mines and all surface mines.

Several comments were directed toward the details of testing. As pointed out by commenters, some equipment with defective brakes could, technically, pass a brake test by sliding sideways as long as the maximum distance was not exceeded.

In such a situation, more than the braking system in at work in stopping the equipment since lateral motion is involved. Equipment is not designed or intended to stop in this manner. For this reason, the final rule provides that a valid test requires that the equipment not slide sideways or exhibit other lateral motion while braking.

The proposed rule also provided that the roadway approach have sufficient length and uniformity of grade to enable the equipment to maintain a stable rate of speed. The proposal stated that the braking portion of the test course was to

be generally level, dry, and packed. Some commenters believed these ground conditions would be difficult to find and could be a source of controversy. MSHA's field testing disclosed that appropriate test sites will exist at most mines. As mentioned in the proposed rule, a distance of less than one-sixth of a mile is needed. However, where no appropriate site is present, no tests would be required. Test sites are not required to be constructed under this standard, although some mining operations may decide to designate their own test sites as a useful method of field testing their own equipment after repairs.

The final rule clarifies that the approach is to be of sufficient length to allow the equipment operator to reach and maintain a constant speed between 10 and 20 miles per hour prior to entering the 100 foot measured area. In response to comments, the final rule states that the roadway is to be wide enough to adequately accommodate the size of the equipment being tested. It also explains that ground moisture may be present to the extent that it does not adversely affect the braking surface. Some degree of ground moisture has the effect of improving stopping performance. Although some commenters expressed concern that spillage during testing could affect whether the ground remains generally level, MSHA has determined that this will be unlikely since testing will typically involve a single piece of equipment. The testing of front-end loaders with their buckets empty should also diminish this likelihood. Should this problem arise, the course could also be regraded, but MSHA's field testing revealed that limited amounts of spillage did not affect the outcome or safety of the tests.

Although some commenters suggested that the equipment's power train be permitted to be disengaged during braking, the final rule does not allow this action unless the equipment is designed to function that way. Disengaging the power train may improve braking performance, since it disengages the rotational inertia of the electric motors on some equipment. However, except where so designed as part of the service brake system for stopping, this procedure would be inconsistent with the equipment's normal method of stopping. MSHA's field testing revealed that all well-maintained properly functioning equipment, regardless of its age, was able to readily pass the brake tests without this assistance.

As confirmed by MSHA's field studies, the brake testing provision provides an objective, safe and reliable means for mine management and MSHA to resolve questions about the performance of service brake systems on surface equipment. It provides means to quantitatively measure the performance of the brake systems in question.

Where there is not an appropriate test site at the mining operation or the equipment is not capable of traveling at least 10 miles per hour, service brake tests will not be conducted. In such cases, the inspector will rely upon other available evidence to determine whether the service brake system meets the performance requirement of this standard.

Section 56/57.14102 Brakes for rail equipment. This final standard revises existing §§ 56/57.9048 by clarifying that braking systems on railroad cars and locomotives are required to be maintained in functional condition.

Several commenters wanted this section to apply only in those instances when rail equipment is under the control of the mine operator. These commenters noted that there is great diversity in the business relationships between mine operators and railroads as to ownership, maintenance, and control over rail equipment. MSHA's objective is to provide for safe rail equipment on mine property, regardless of who owns or controls the equipment. However, when a violation of a standard pertaining to rail equipment is involved, MSHA will examine the circumstances to determine who is responsible for correction of the violation.

Some commenters considered it unnecessary for all railroad car braking systems to be functioning if there were a sufficient number of cars with functioning systems to be able to stop the train. MSHA has considered this approach but the final rule requires each railroad car equipped with a braking system to be functional. That system must be maintained in functional condition for several reasons. First, cars are often handled individually and their braking systems must function individually. Second, if the braking systems on all cars were not maintained, numerous cars could be linked together with no functional brakes.

The final rule does not require the installation of braking systems, but rather requires that provided systems be maintained in functional condition.

Section 56/57.14103 Operators' stations. This final standard sets forth several safety requirements relating to the operator's station on self-propelled

mobile equipment. It consolidates existing §§ 56/57.9010, 56/57.9011, and 56/57.9012.

Paragraph (a) requires that when windows are provided on equipment they are to be of safety glass or a material with an equivalent safety characteristic maintained to provide safe operating visibility. Commenters asked MSHA to explain what would be equivalent to safety glass. Safety glass is a general term which refers to a type of glass which breaks into relatively harmless granules upon impact, instead of sharp pieces. Therefore, any glass or plastic product with equivalent performance qualities meets the requirements of this paragraph.

Some commenters also suggested that this paragraph retain the existing requirement that windows be kept "clean", instead of the proposed rule's wording that windows be maintained to provide safe operating visibility. MSHA retained the wording of the proposed rule because it more accurately describes the desired performance objective of the standard.

Paragraph (b) addresses damaged windows. It requires the removal and in some instances, replacement of windows when they have been damaged in a manner which either obscures operating visibility or poses a risk of injury to the equipment operator. Replacement is required where the absence of a window would leave the equipment operator exposed to hazardous environmental conditions which would affect the ability to safely operate the equipment.

While some commenters believed that the rule should specifically name the hazardous environmental conditions which would require replacement of windows, others stated that the performance language of the proposed rule permitted flexibility to address each circumstance. The final rule requires window replacement only when hazardous environmental conditions such as extreme cold weather, rain, snow, or dust affect the ability of the equipment operator to safely operate the equipment.

Paragraph (c) requires that operators' stations be free of materials which could impair safe operation of the equipment and prohibits modification of the station in a manner which would impair visibility. Commenters were concerned that the standard, as proposed, could be interpreted as prohibiting some factory installed equipment options. The standard would only prohibit options that obscure visibility or otherwise affect safety. It is unlikely that factory installed equipment would hinder safe operation or impair visibility since

manufacturers take these concerns into account in designing equipment.

Section 56/57.14104 Tire repairs. This final standard appeared in the proposed rule for loading, hauling, and dumping and replaces existing §§ 56/57.9069. It addresses the safety procedures and devices to be employed when tires are being repaired. Serious injuries and fatalities have occurred to miners who have been engaged in tire repair. In several instances, multi-piece rims have separated during repair. Tremendous force can accompany such a separation. For example, a size ten hundred twenty tire inflated to 100 psi, creates a pressure of 41,600 pounds against the rim flange. In the proposed rule, these hazards were addressed by requiring tire deflation before repairs were started and by using devices during tire inflation to constrain wheel components in the event of an explosive separation. As an alternative, the proposal would have permitted devices that allow persons to stand clear of the trajectory of such a separation. In response to commenters, the final rule clarifies several aspects of these requirements.

The proposed rule required that tires be deflated before repairs are started. The final rule retains this requirement and specifies that before repairing a tire, the valve core must be partially removed to allow for gradual deflation. The proposed rule also provided that when repair was necessary on either tire of a dual wheel, both tires were to be deflated before either was removed from the equipment. Many commenters objected to this provision. They believed that this requirement could increase the probability of a hazard since two tires would need to be reinflated after repair of the defective tire had been completed. The commenters believed that the hazards associated with tire repairs were greatest during re-inflation of the tire. MSHA had proposed that both tires be deflated where dual wheels were involved because in some repair instances the inner wheel rim has separated violently, forcing the outer tire and rim to fly off. However, this hazard must be weighed against the hazards associated with tire inflation. MSHA agrees that requiring both tires to be deflated would increase the probability of an injury since wheel rim separation is always a risk during tire inflation. For this reason, the final rule does not contain the requirement to deflate both tires. MSHA notes that the final rule's provision for the use of devices that allow persons to stand outside of the potential trajectory of the lock ring should diminish the potential

for injury in the event of separation of the inner wheel's rim.

Several comments were directed to the scope of the standard. One commenter asked whether the standard would apply where brake or axle repair was involved. Another questioned whether re-inflation of a tire, apart from any repair, is covered by the standard. The standard is intended to address hazards to persons which are associated with the performance of repair work on tires. Since brake and axle repair do not directly involve tire work the standard does not apply to those situations. However, tire re-inflation, even apart from any repair, involves direct work on tires and can pose the same hazard of sudden wheel rim failure. Therefore, the provisions of paragraph (b), involving the use of a restraining device or a stand-off inflation device, apply to tire inflation in all situations. Should a malfunction occur while using a stand-off inflation device which requires the need to approach the tire, the following precautions should be taken: The tire should either be deflated, or a safety cage, chain or restraint should be used, and the tire should be approached from the side.

Commenters also stated that the standard should apply to single as well as multi-piece wheel rims. Other commenters believed that the standard should adopt the Occupational Safety and Health Administration's (OSHA) provisions for the servicing of wheels (29 CFR 1910.177) which applies to single and multi-piece wheels. MSHA agrees that both wheel types can present hazards during deflation and inflation, and the requirements of the rule apply to both. Similarly, in answer to one commenter's request for clarification, this standard applies to all wheeled vehicles, both on and off road types. A review of mining accidents from 1978 to 1980 associated with tire repairs, indicates that 54 injuries occurred which included 6 fatalities from tire explosions. After reviewing these accidents and the OSHA provisions, MSHA believes that the final rule will provide the appropriate level of protection against the hazards associated with tire repairs.

Commenters stated that the standard did not specify the strength required for tire cages or other restraining devices. The final rule includes performance language which requires that the device must be capable of constraining all wheel rim components during an explosive separation. Although some commenters did not believe that a stand-off inflation device should be permitted as an alternative to a

restraining device, MSHA has allowed this alternative since both devices furnish protection from explosive separation. One commenter noted that the standard did not clarify whether tire repairs could be performed on loaded, or unloaded, jacked-equipment. These related repair aspects are addressed by §§ 56/57.14105. Editorially, the standard uses the more commonly recognized "multi-piece rim" in place of the proposed rule's reference to "wheel locking rims".

Section 56/57.14105 Procedures during repairs or maintenance. This final standard clarifies the requirements of existing §§ 56/57.14029. Prior to the performance of repairs or maintenance on machinery or equipment, the power must be off and the machinery or equipment blocked against hazardous motion. The final rule allows an exception to this requirement which permits machinery and equipment motion or activation to the extent necessary for adjustment or testing, as long as persons are not exposed to hazardous motion. The existing standard had permitted this exception only when it was necessary for making adjustments.

The proposed rule included a requirement that the power also be "locked-out". Commenters pointed out that for some types of mechanical equipment this requirement was not practical. For example, some types of self-propelled mobile equipment start without an ignition key system. These commenters also noted that where electrically powered equipment is involved, §§ 56/57.12016 and 56/57.12017 require that power switches be locked-out. MSHA agrees that many types of mechanically-powered equipment cannot be locked-out practically and that other standards address lock-out requirements for electrically powered equipment. The final rule, therefore, does not contain the proposed "lock-out" requirement.

56/57.14108 Falling object protection. This final standard revises and clarifies existing §§ 56/57.14013 and was proposed in Subpart H. It addresses the injuries and fatalities which have occurred to operators of certain types of mining equipment as a result of falling objects. The rule requires that protective structures be provided on fork-lift trucks, front-end loaders, and bulldozers if the equipment is used in an area where falling objects could present a hazard to the equipment operator.

The existing standard required that this equipment be provided with "substantial canopies when necessary to protect the operator." The final rule

retains the performance-oriented language while requiring that the strength of the structure be consistent with the anticipated loads. It further clarifies that the protection is required when the equipment is used in an environment which could create a hazard of falling objects. If hazards such as falling ground near a bank, highwall or face, or toppling materials at a storage facility or materials handling site could be anticipated, a structure must be provided. An evaluation would be necessary to determine the anticipated weights and forces of the falling object so that sufficient strength can be built into the structure.

In many instances, fork-lift trucks, front-end loaders, and bulldozers are equipped at time of manufacture with structures which meet the applicable falling object protective structures (FOPS) specifications of SAE or the American National Standards Institute (ANSI). These specifications are based on extensive engineering studies which have taken into account anticipated weights and forces of falling objects. Structures meeting these specifications, therefore, would comply with this standard.

The standard also allows for on-site fabrication and installation of structures other than those which meet the specifications of SAE and ANSI standards provided that the necessary strength requirements are considered.

The proposed rule provided for compliance through incorporation by reference of the SAE and ANSI standards. Some commenters preferred the approach of the existing standard's requirement to provide "substantial" canopies on the listed equipment. They considered the incorporation by reference in the proposal to be an "unnecessary complexity". In contrast, other commenters preferred the incorporation by reference approach because it required a measured degree of safety. A third group of commenters requested that the standard permit both approaches. Agency experience has indicated that the necessary degree of safety can be achieved through either alternative and the final rule, therefore, recognizes structures which meet the SAE or ANSI standards as well as those which meet the standards' performance requirements as acceptable for compliance with the rule.

Commenters also contended that the incorporated documents contained in the proposed rule may not address all types and sizes of the listed equipment which is found at metal and nonmetal mines and may not be appropriate in all situations.

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 standards 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

opening requirement, other commenters supported the 1/8 inch requirement.

The 1/8 inch opening has been recognized as a setting which provides reliable protection from the serious hazard of material being drawn into the grinding wheel. The opening is also identical to the ANSI recommended practice for grinding wheel tool rest settings which that organization has advocated for four decades.

A risk associated with the variable setting approach is that each individual may have to adjust the tool rest opening prior to using the grinding machine. Failure to make the adjustment or misjudgment as to the maximum safe opening, could cause a serious injury if the material gets drawn into the grinder. Maintaining a maximum 1/8 inch opening provides protection regardless of the size of the material being worked or whether the opening is checked prior to use. For these reasons, MSHA believes that a fixed 1/8 inch maximum opening more effectively addresses the hazard than would a requirement permitting variable openings.

Commenters also suggested that the standard include two additional safety practices for stationary grinding machines. One suggestion was the inclusion of the "ring test" to verify that new grinding wheels are nondefective prior to their installation on a grinding machine. Another commenter suggested that the standard prohibit the practice of grinding items on the side of the wheel, instead of the surface edge. These situations are addressed by §§ 56/57.14205, which require that tools and equipment be used according to the manufacturer's specification and instructions.

Section 56/57.14118 Hand-held power tools. This final standard revises existing §§ 56/57.14010. It addresses operating controls for certain classes of hand-held power tools. The existing standard required constant pressure operating switches, or their equivalent, for these tools. The final standard clarifies these requirements and lists the tools to which it applies. It requires power drills, disc sanders, grinders, circular saws, and chain saws to be equipped with operating controls requiring constant hand or finger pressure. Many power drills, disc sanders, and grinders are also equipped with devices which can lock-on the operating controls. Under the final rule, these tools are to be operated only by using the constant pressure switch when they are being operated by hand. Circular saws and chain saws are prohibited from having devices which "lock-on" the operating controls.

Under the proposed rule, the standard would have prohibited the presence, as well as the use, of lock-on devices for each of these classes of power tools. Although commenters agreed that circular and chain saws should not be equipped with lock-on devices, several commenters objected to the proposal's requirement to forbid lock-on devices on power drills, disc sanders, and grinders because many of them are sold with these devices and the proposal would have required their removal.

Commenters suggested that improper removal of the devices could result in increased hazards for persons using the tools in the hand-held mode. Commenters also were concerned that the devices were permitted for certain work areas regulated by OSHA, but under the proposal would have been prohibited at mines.

The final standard recognizes that many power drills, sanders, and grinders are manufactured with lock-on devices as a standard feature. One reason these tools come equipped with lock-on devices is to permit their use in machine stands. For example, a hand-held drill secured in a machine stand can serve as a drill press. Although the lock-on devices need not be removed, the standard continues to prohibit their use when the tool is operated in the hand-held mode. Commenters acknowledge the potential for serious injury when loss of control occurs. Some manufacturers of these power tools have also recognized the potential hazards and advise that the lock-on feature be utilized only when the portable tool is placed in a stationary machine. By not requiring the lock-on feature to be removed, these power tools can be used in stationary machines at mines and can continue to be used at work sites inspected by OSHA, to the extent permitted by applicable standards.

Some commenters believed that use of a lock-on device could lessen fatigue for the tool operator. MSHA, however, believes that the devices should not be substituted for rest when the users of power tools become fatigued.

Section 56/57.14130 Roll-over protective structures (ROPS) and seat belts. This final standard is derived from and replaces existing §§ 56/57.9088. It applies only to surface mining equipment, and specifies the types of equipment which must have roll-over protective structures and seat belts to protect equipment operators in event of an accident.

Many commenters were directed to the scope of equipment covered by this standard. Some commenters wanted the standard to include underground

equipment while others were opposed to such an extension. A third group wanted to exempt equipment which operates in flat areas.

The final standard retains the existing standard's scope and would apply to surface mines and surface areas of underground mines. MSHA's accident data does not support requiring ROPS in underground mines. However, accident data strongly supports the need for ROPS for surface equipment. From 1933 through 1986, 21 miners were killed while operating the type of equipment addressed by the roll-over and seat belt protection requirements of this standard. In 16 of these fatal accidents the equipment rolled over. In 11 instances no roll-over protective structures (ROPS) were provided. In 18 of these accidents seat belts were not worn: either because they were not provided (12) or, were provided but not worn (6). As to the suggested exemption for flat areas, mining equipment is exposed to varying terrains, and equipment may be susceptible to a roll-over in level or near level areas under certain conditions, often depending upon the distribution of the load on the equipment. The final standard updates the existing standard's references to SAE documents to reflect the most current publications.

The terminology used to describe the equipment is taken from the referenced SAE documents, but the rule does not expand the classes of equipment from those addressed by the existing rule. In the proposed rule, MSHA published a table which compared the existing standard's terminology with the new terminology for these classes of self-propelled mobile equipment. To aid in the transition to this new terminology, the comparison table has been republished in this preamble:

COMPARISON TABLE

Current SAE and final rule terminology	Existing standard terminology
Crawler tractors and crawler loaders.	Front-end loaders, tractors, and dozers.
Graders	Motor graders
Wheel loaders and wheel tractors.	Front-end loaders and tractors.
The tractor portion of semi-mounted scrapers, dumpers, water wagons, bottom-dump wagons, rear dump wagons and towed fifth wheel attachments.	Self-propelled scrapers. Off-road wheeled prime movers.

COMPARISON TABLE—Continued

Current SAE and final rule terminology	Existing standard terminology
Skid-steer loaders	Front-end loaders
Agricultural tractors.....	Agricultural tractors.

Commenters questioned whether particular types of equipment would require ROPS. The Comparison Table is intended to assist in answering these questions and will resolve most matters. For example, one commenter asked whether fork-lift trucks are required to have ROPS. Since this equipment is not listed in the standard or the comparison table, it is not required to have ROPS. The specific SAE documents can also be consulted in resolving particular questions and MSHA district offices will assist mine operators in these matters.

The standard requires roll-over protective structures (ROPS) and seat belts for certain classes of self-propelled mobile equipment. The performance requirements for these safety devices are based upon technical documents developed by SAE. These documents are incorporated by reference in this rule in recognition of the extensive engineering criteria which must be considered when constructing and installing roll-over protective structures. ROPS must be able to provide protection from varying forces exerted from numerous directions in a roll-over situation. A predictable level of performance is best provided by construction which meets the specifications of these SAE documents.

Some commenters suggested that the ROPS label information be made available at the mine as an alternative to affixing it to the structure. This concept has not been included in the final rule because it could result in a mix-up as to which equipment was matched to a particular model of ROPS. In most instances, these labels are secured to the structure by welding, riveting or some other relatively permanent method. The chance of dislodgment during equipment use is remote.

The proposed rule would have required ROPS to be installed in accordance with the recommendations of the manufacturer and also specified the grades of bolts to be used for attachment purposes. Some commenters were concerned that this provision could result in the use of inappropriate bolts in some instances. In response to these comments, the final rule does not refer to specific bolts since the manufacturer's recommendations will

provide the correct grade of bolt to be used.

This final standard also requires that ROPS be maintained to assure that the performance requirements continue to be met. When a ROPS is subjected to a roll-over, or abnormal structural loading, either the equipment manufacturer or a registered professional engineer with knowledge and experience in ROPS design must recertify that the ROPS continues to meet the performance requirements of this standard. A similar recertification would also be in order if the ROPS undergoes modifications or repairs for any other reason.

Several manufacturers of ROPS stated that proper repairs or alterations require knowledge as to how the specific type of ROPS performs during plastic deformation. Some of these commenters believed that only manufacturers should be permitted to make repairs, while other commenters believed that engineers with the experience described above were fully qualified. Plastic deformation relates to the designed partial collapse of some ROPS during a roll-over or abnormal structural loading, in order to absorb some of the impact from those events. Sometimes a ROPS may outwardly appear to be sound after such an event while having undergone subtle damaging effects to its integrity. In the final rule, MSHA has retained the provision allowing registered engineers with knowledge and experience in ROPS design to certify that the ROPS complies with the standard. This knowledge and experience should include, where applicable, information relating to performance of the specific type of ROPS during plastic deformation.

The final rule continues the existing exemption for equipment manufactured prior to July 1, 1988, since much of that equipment could not structurally support ROPS.

Some commenters were concerned that ROPS which were acceptable under the existing standard would no longer be in compliance. The final standard's updated references apply only as of the effective date of this rule. The standard's new requirement applies to ROPS installed after the effective date of this rule. Equipment currently in compliance under existing §§ 58/57.9088 will continue to be in full compliance with the new standard as long as the affected piece of equipment remains in service.

Commenters also addressed the requirement for equipment operators to wear seat belts. Many commenters supported this provision. Others noted that its successful implementation will

require educational efforts and, in some instances, disciplinary sanctions for failure to abide by the provision. To address commenters' concerns and after reviewing the above statistics, the final rule requires that seat belts be worn by the equipment operator. Some commenters also urged that an exception be permitted for situations when the equipment operator needs to stand in order to operate the equipment. Graders and loaders were cited as examples of equipment which require the operator to stand occasionally. MSHA has reviewed these concerns but concludes that a harness and safety line must be used in the limited instances where equipment operators might be required to stand while operating the equipment. Standing exposes the equipment operator to a higher risk of losing control of the equipment and falling from it. Commenters noted that in many instances equipment operators have been run over by their own equipment after jumping or falling off. Assisting equipment operators in maintaining control of the equipment by keeping the operator seated and in command of the equipment's controls diminishes the potential for a roll-over. Therefore, where operators must stand, the standard requires that a harness and safety line be used. Standing should rarely be required since the controls on graders and loaders are designed to be properly operated from a seated position.

Many comments were directed to the requirement for seat belts. The proposed rule referenced a single document for seat belts, SAE J386, April 1980, which requires equipment operators to wear seat belts. The final standard incorporates by reference, SAE's latest publication, SAE J386, "Operator Restraint Systems for Off-Road Work Machines", 1985.

Some commenters believed that the standard should also add SAE document J 1194 for agricultural tractor seat belts. MSHA agrees and the final rule includes this reference.

The final standard also provides that belts shall be maintained in functional condition, and replaced when necessary to assure proper performance.

Commenters also stated "that it would be extremely difficult to keep seat belts 'free' from grease, oil, or other deteriorating agents as proposed". The final rule deletes this requirement for clean belts but retains the criteria for maintenance and replacement of seat belts.

Section 58/57.14131 *Seat belts for surface haulage trucks.* This new standard requires that seat belts be

provided and worn in haulage trucks at surface mines and surface areas of underground mines. Under the existing §§ 56/57.9088, seat belts are required only for equipment which was provided with ROPS. Commenters stated that the seat belt requirement should be expanded to include haulage trucks. At the public hearings, commenters continued to advocate this position and they cited the occurrence of many fatalities involving haulage trucks which may have been avoided had seat belts been present and in use. No commenters were opposed to requiring seat belts for haulage trucks.

MSHA agrees that seat belts in haulage trucks would save lives provided that they were appropriate for the equipment in which they were installed. A review of 308 accidents from 1982 to 1984, involving off-highway trucks with seat belts, indicates that 130 were related to the nonuse of seat belts, including 6 fatalities. Therefore, the final rule adds haulage trucks as a category of equipment for which seat belts are required and specifies that the belts meet SAE requirements. MSHA expects that this requirement will have only a minimal cost effect since, as stated by one equipment manufacturer at the public hearings, seat belts are a standard feature on such equipment whether ROPS are present or not.

Section 56/57.14132 Horns and backup alarms for surface equipment. This revises existing §§ 56/57.9087. It requires that manually-operated horns or other audible warning devices provided on self-propelled mobile equipment be maintained in a functional manner. It is applicable to surface mines and surface areas of underground mines only, because the construction of load, haul, dump vehicles generally used underground, is such that the view to the rear is less likely to be obstructed. The standard protects persons from the hazard of backing equipment when the equipment operator's view to the rear is obstructed. Where there is an obstructed view, reverse movement alarms or the presence of an observer is required. This revised standard clarifies the application of the horn and backup alarm requirements, provides alternative compliance methods and exempts rail equipment.

Horns are provided on self-propelled mobile equipment for several purposes. An equipment operator may sound a horn to signal that equipment motion is imminent. The operator may also need to warn nearby persons of the presence of the moving equipment in their work area. Horns are also sounded to attract the attention of other equipment

operators in the area when a collision may be likely to occur. Equipment manufacturers evaluate the need for horns on self-propelled mobile equipment as part of the design process and take into account factors which include: The size and operating speed of the equipment; the operating noise of the equipment and other equipment in the area; the likelihood that persons traveling on foot might be in the area; and the presence or absence of a cab or enclosure on the affected equipment or nearby equipment.

Standards 56/57.9087 required that these audible warning devices be provided on all "heavy duty" mobile equipment. "Heavy duty" was not defined, and application of the horn requirement was a source of confusion and controversy. During the rulemaking process, commenters suggested that "certain types of equipment be exempted from the rule if it is small, slow-moving, provide good visibility for the operator, is track equipment operated at extremely slow speeds coupled with high engine noise, or is not equipped with horns and would have to be retrofitted."

Several commenters felt that a horn was not necessary so long as the operator's view to the front was not obstructed. MSHA believes that the equipment operator's good visibility to the front does not negate the need for a functioning horn since persons on foot or aboard other equipment may need to be warned of a developing hazard.

The Agency recognizes that many of the commenters' concerns are taken into account by equipment designers when determining whether or not a horn should be provided on a specific type of self-propelled mobile equipment. The final rule, therefore does not require that a horn be installed on specific types of equipment. However, where a horn is provided as a design feature on a piece of equipment it must be maintained in functional condition.

The standard also addresses situations where the equipment is operated in a reverse direction with the operator's view to the rear obstructed. Under these circumstances, reverse movement alarms or the presence of an observer is required. Existing §§ 56/57.9087, requires an automatic reverse signal alarm which is audible above the surrounding noise level or an observer to signal when it was safe to back up. The final rule retains these two alternatives and provides additional compliance methods which have been developed in recent years.

Wheel-mounted bell alarms are permitted provided they sound at least

once for each three feet of reverse movement. Bell alarms are appropriate and effective in some instances because they do not rely upon an electrical source for initiation. In muddy conditions, however, they can become clogged and rendered useless. Mine operators must evaluate roadway conditions at their mine site to determine whether bell alarms would be appropriate.

Recent advances in backup alarm technology have resulted in the development of discriminating backup alarms, commonly referred to as proximity devices, which are an acceptable compliance alternative under the revised standard provided that they offer coverage of the entire "blind area". These discriminating backup alarm systems employ infrared light, ultrasonics or radar and the alarm is activated only when a person or object is detected in the obstructed area of view. Ultrasonic and radar systems have been found to provide more effective coverage of the "blind area". One of the advantages of these new systems is the fact that the alarm is sounded only when a hazard exists, rather than every time equipment is put in reverse. The constant sounding of a conventional backup alarm system may become an accustomed sound of the mining environment and therefore be less noticeable and effective as a warning. Additional information on discriminating backup alarms is available from the Bureau of Mines, 2401 E Street NW., Washington, DC, 20241 (see Technology News Bulletin No. 255, August, 1986, and Information Circular No. 9079, 1988).

All audible reverse alarm systems acceptable as complying with this standard must be sufficiently loud to be heard above the surrounding noise level.

MSHA has received numerous petitions for modification of the audible backup alarm requirement from mining operations which are located near residential areas and operate on multiple shifts. In these instances, mine operators requested that they be allowed to use reverse-activated strobe lights in order to comply with local noise ordinances. Strobe lights are effective as warning devices under darkened conditions. The final rule provides that these strobe lights may be used in place of audible alarms during night operations only.

Section 57.14160 Mantrip trolley wire hazards underground. This final standard appears as proposed. No comments were received. It is derived from existing § 57.9115, and is applicable underground only. It provides

protection for miners being transported on trolley-powered mantrips by requiring that the mantrip be covered if there is a danger of persons contacting the energized trolley wire.

Section 57.14161 Makeshift couplings. This final standard appears as proposed since no comments were received. It is derived from existing § 57.9098, and is applicable underground only. It addresses the hazards which exist when improper devices are used for connecting individual cars or components of a train. Couplings other than those designed for the specific equipment are permitted only during the movement of disabled rail equipment provided that no hazard to persons is created.

Section 57.14162 Trip lights. This final standard appears as proposed since no comments were received. It is derived from existing § 57.9112, and is applicable underground only. It provides for a visible signal in the darkened underground environment as an indication to miners that passing trains have cleared their area and that backing trains are approaching.

Safety Practices And Operational Procedures

Section 56/57.14200 Warnings prior to starting or moving equipment. This final standard revises existing §§ 56/57.9005. It requires that equipment operators give an effective warning prior to starting crushers and before moving self-propelled equipment.

Commenters were concerned about the scope of the proposed standard since it did not specify the types of equipment to which it applied. They also noted that some types of equipment would need to be started in order to actuate the warning devices.

The final standard specifies that it applies to self-propelled mobile equipment and crushers. It also clarifies that a warning must be given before starting a crusher and before moving the equipment.

Section 56/57.14201 Conveyor start-up warning. This final standard revises existing §§ 56/57.9006. It addresses the concern that persons be clear of conveyors before they are started. As with the existing standard, the final standard provides that in situations where the conveyor operator can observe the entire length of the conveyor from the starting switch, a visual check is required to make certain that persons are in the clear. Where the conveyor operator cannot view the entire conveyor length from the starting switch, a system which provides visible or audible warning of the impending conveyor movement is required. The

final standard also requires that the warning must be repeated if conveyor motion does not occur within 30 seconds after the warning is given.

Commenters questioned how the standard would be applied for multi-conveyor systems. Whether a single belt or several belts are involved in the conveyor system, the deciding factor in determining whether a visual check or a warning device is required is the ability of the conveyor operator to see the entire length of the conveyor from the starting switch. Where the entire length cannot be seen, the warning device is required.

Some commenters believed the 30-second interval between the warning and the start of the conveyor is too short and recommended a 60-second interval be permitted to allow multiple belt systems sufficient time to start. MSHA has retained the 30 second interval to assure that the warning will be effective. Longer intervals may result in a lapse of attention or disregard of the warning. In most instances, belt systems will be able to start within 30 seconds after the warning is given. MSHA believes that in the few instances where systems take longer to start, improved safety will be provided by repeating the warning when motion does not begin within 30 seconds.

The standard does not specify the minimum amount of time between the warning and the conveyor start-up. Sufficient time must be allowed, however, for affected persons to leave the hazardous area.

Section 56/57.14202 Manual cleaning of conveyor pulleys. This final standard renumbers, but otherwise does not change, existing §§ 56/57.14033. Commenters supported the retention of this standard which prohibits manual cleaning of conveyor pulleys when the conveyor is in motion to prevent entanglement of persons in the pulleys.

Section 56/57.14203 Application of belt dressing. This final standard replaces and clarifies existing §§ 56/57.14034. As with the existing standard, the final standard prohibits the manual application of belt dressing while belts are in motion except where a pressurized-type applicator is used that does not require reaching inside the guards.

Some commenters believed that any applicator which does not require reaching inside the guard should be permitted. MSHA did not adopt this suggestion because only pressurized belt dressing applicators afford protection from the risk of persons or the applicator becoming ensnared by belt movement. Because this standard applies only to the manual application

of belt dressing, it does not restrict the use of mechanical means of application, such as drip-type devices.

Section 56/57.14204 Machinery lubrication. This final standard replaces and revises existing §§ 56/57.14035. Manual lubrication of machinery while it is in motion often exposes persons to a risk of harm. Serious injuries have occurred when persons have attempted to apply lubricant from outside a guard by using a hand-held extension, such as a stick coated with lubricant. For these reasons, the final standard continues to prohibit the manual lubrication of machinery while it is in motion, where application of the lubricant may expose persons to injury.

The existing standard and the proposed standard specifically allowed for lubrication of operating machinery through the use of extended fittings and cups. This provision has been removed from the final standard at the suggestion of commenters because it is unnecessary. The performance-oriented language of the final standard allows for the use of these types of devices since they do not expose persons to the hazards addressed.

Section 56/57.14205 Machinery, equipment, and tools. This final standard makes editorial changes to existing § 56/57.14036.

Some commenters considered the requirement to use machinery, equipment, and tools according to the manufacturer's specifications and instructions as proposed in § 56/57.14208, to be unrealistic in some mining situations. They proposed that this standard be deleted. MSHA agrees that the manufacturers' specifications and instructions could go beyond the intent of this regulation. However, MSHA notes that serious mining accidents can occur from the misuse of equipment. For example, haulage trucks can be loaded beyond their design capacity, and braking and suspension systems can fail. MSHA has therefore, retained the requirement that machinery, equipment, and tools shall not be used beyond the design capacity intended by the manufacturer where such use may create a hazard to persons.

This final standard permits mine operators to modify the machinery, equipment, or tools they purchase from manufacturers to suit their particular mining needs provided that hazards to persons aren't created. Overloading of equipment, such as haulage vehicles and cranes, that can create a hazard to equipment operators and other persons in the area would not be permitted by this standard.

Some commenters also considered this standard to be duplicative of § 56/57.14200 (defects affecting the safe operation of machinery, equipment, or tools). The focus of this standard is the safe use and modification of mining equipment while § 56/57.14200 address defective equipment. Defects may exist or develop in equipment even when used within the design capacity intended by the manufacturers or when it has been modified safely.

Section 56/57.14206 Securing movable parts. This final standard consolidates existing §§ 56/57.9031 and 56/57.9032. Together these standards address safety procedures to be followed to secure movable parts when moving equipment between work areas, and when this type of equipment is unattended or not in use.

Paragraph (a) addresses the procedures to be used when moving this equipment between workplaces. Commenters believed the standard should recognize that the extent to which a movable part needs to be secured depends on the type of equipment involved. These commenters were concerned that the proposed rule's requirement for movable parts to be secured in a safe travel position could imply type of physical or mechanical restraint system in each instance. The final rule clarifies that the movable part is to be positioned in the travel mode. Mechanical securing would only be necessary when required for safe travel. For example, when a drill mast or boom is mounted on a piece of mobile equipment it would be insufficient to only place the boom in its travel mode. The drill mast would also need to be mechanically secured to prevent it from moving about during travel between workplaces. In contrast, securing a bulldozer blade would require lowering of the blade to the normal travel position.

Paragraph (b), which addresses the procedures for securing these movable parts when equipment is unattended or not in use, has also been clarified in the final rule to reflect that the method of securing depends upon the movable part involved. In each instance the objective is to prevent movement of the movable part when it could create a hazard to persons.

Section 56/57.14207 Parking procedures for unattended equipment. This final standard consolidates existing §§ 56/57.9036 and 56/57.9037 and sets forth the procedures to be followed to prevent mobile equipment from moving when left unattended. Whenever equipment is unattended, the standard requires that the controls be placed in the park position and the parking brake,

if provided on the equipment, be set. In addition, when mobile equipment is parked on a grade, the wheels or tracks must also be either chocked or turned into bank or rib. Except for an editorial change deleting the reference to the underground term "rib" in Part 56, the final standard adopts the wording of the proposed standard.

Several comments were directed to the proposed standard's requirement for setting the parking brake. Some commenters stated that they experienced continual maintenance problems with parking brakes because employees chronically forget to disengage them before moving equipment. Others stated that maintenance problems with parking brakes develop from the failure to use them. These commenters believed that it would be better to save the parking brake for emergency situations. As an alternative, they suggested having the vehicle cut a ditch in the road or be turned into a berm or rib. They also believed that it was unnecessary to apply the parking brake when the vehicle was on level ground. MSHA has considered each of these viewpoints, but believes that parking brakes should be fully utilized for their intended purpose. Although a parking brake might be engaged as a last resort to provide an additional means of slowing a vehicle in an emergency situation, it is not designed or intended for that purpose. Parking brakes are intended for the purpose of keeping stopped equipment stationary. In contrast, many types of self-propelled mobile equipment used in mining are designed with an emergency braking system that is distinct from the parking brake. Manufacturers advise, in their equipment operating instructions, that parking brakes are to be applied any time the equipment is stopped and is to remain stationary. In some instances vehicle manufacturing design prevents starting of the equipment unless the brake is engaged.

The requirement for application of the parking brake applies regardless of whether a level surface or a grade is involved. In some situations it would be difficult to accurately detect whether the surface is level or on a grade which may cause a vehicle to overcome its own rolling resistance. Grades as little as one to three percent can cause a vehicle to overcome its own inertia. In those limited situations where training is ineffective to remind employees to disengage the parking brake before moving vehicles, warning lights or an inter-lock system that prevents equipment from moving until the brake is released can be installed.

Commenters also asked MSHA to explain the standard's requirement to place the operating controls in the park position. These commenters noted that placing the controls in neutral is the park position for some vehicles, while low gear is used for others. Due to these variations, MSHA used the term "park position" to convey that the controls are to be placed in the position recommended by the manufacturer when equipment is unattended.

Section 56/57.14208 Warning devices. This final standard consolidates existing §§ 56/57.9049 and 56/57.9068. The proposed standard addressed the need for warning devices in three distinct situations involving mobile equipment. It required warning devices when parked mobile equipment creates a hazard to persons in vehicles; when mobile equipment is carrying extended loads; and when restricted clearances create a hazard to persons in mobile equipment. During the realignment of standards within Subparts H and M, it became apparent that the third situation, restricted clearances, addressed warnings which would be located on roadways, railroads, and loading and dumping sites rather than warnings affixed to the machinery and equipment. This requirement was, therefore, transferred to Subpart H as §§ 56/57.9306. Warnings on parked mobile equipment and extended loads being transported on equipment are retained within this final standard.

Paragraph (a) is derived from existing §§ 56/57.9068 and requires that visible warning devices be used when parked mobile equipment creates a hazard to persons in vehicles. Warning devices are required when the location of a parked vehicle poses a risk that a moving piece of equipment may strike it. The warning device alerts the operator of the moving equipment of the presence and hazardous location of the parked equipment.

Paragraph (b) is derived from existing §§ 56/57.9049. The final standard provides that when mobile equipment has loads that extend beyond its sides, or more than four feet beyond its rear, warning flags, or where visibility is limited, warning lights, must be at the end of the projection. Commenters believed the standard should permit the alternative of allowing persons to walk alongside the extended load, carrying the warning flag or light. MSHA agrees and the final standard permits this procedure.

Although some commenters believed the standard should only require warning flags or lights when visibility is

limited, MSHA has retained these requirements for all instances involving extended loads. Even where visibility is not limited, the fact that a load is extended may not always be readily recognizable. The warning device serves to alert other persons of this condition and acts as a depth perception aid.

Commenters also suggested that the standard permit a vehicle to travel behind an extended load as an alternative to the flag or light. The requirement to provide a warning flag or light is a standard safety practice regardless of whether a vehicle with an extended load would be traveling on a mine site or highway. Since the warning flag or light also serves as a perception aid, even to a trailing vehicle, MSHA believes that the warning device is still needed on the projecting loads in those instances.

Commenters also suggested that rail equipment be excluded on the basis that §§ 56/57.9330 address those hazards. Under this final standard, rail equipment continues to be covered because the same hazards to persons exist with regard to the equipment, regardless of the type of wheels or tracks used.

Section 56/57.14209 Safety procedures for towing. This final standard replaces existing §§ 56/57.9070. It sets forth the safety procedures to be followed when a piece of equipment is being towed. The final standard clarifies the requirements of the existing standard by stating the practices required to ensure that the towed piece of equipment remains under control.

The standard requires that a tow bar or other effective means of control be used for towing. In addition to this primary rigging, a safety chain or wire rope must be used as a secondary control mechanism, unless there is a person on the towed piece of equipment who has control over its braking and steering. One commenter asked MSHA to clarify whether the tongue of a utility trailer would constitute the primary rigging. Primary rigging refers to the principal means of connection between the towing and towed equipment. For a trailer, this would typically be the tongue. In each instance, the principal consideration is the use of an effective primary means of control in conjunction with a secondary mechanism to control the towed equipment should the primary connection fail.

Commenters also questioned whether this standard would apply when small trailers are being towed at slow speeds. These procedures apply whenever mobile equipment is being towed, since the potential for loss of control always exists.

Procedures for moving rail equipment are contained in §§ 56/57.14218.

Section 56/57.14210 Movement of dippers, buckets, loading booms, or suspended loads. This final standard is derived from existing §§ 56/57.9025. It prohibits dippers, buckets, loading booms, or suspended loads from being located over the operators' stations of self-propelled mobile equipment until the equipment operator is out of the station and in a safe location. However, an exception was provided for equipment that is specifically designed to protect the equipment operator from falling objects. Commenters supported the wording of the proposed standard and it is unchanged in this final standard.

Section 56/57.14211 Blocking equipment in a raised position. This final standard is derived from existing §§ 56/57.14030. Because of the realignment of standards, the standard is now retained in Subpart M.

When persons work on top of, under, or from mobile equipment in a raised position, or a raised portion of that equipment, there is a hazard that the raised portion may descend without warning. Miners have been seriously injured or killed when raised equipment or raised components of equipment have fallen unexpectedly. This standard sets forth safety requirements that are intended to prevent these occurrences.

Several aspects of the proposal have been clarified in the final rule. Although commenters recognized that this standard addresses both raised mobile equipment and raised components of such equipment, they requested clarification and stated that the standard should separate these different aspects. The final standard does this by providing separate paragraphs.

Paragraph (a) addresses the situation when the mobile equipment itself has been raised and persons are working on top of, under, or working from it to reach objects that are otherwise not accessible. In those situations, the equipment must be blocked or mechanically secured to prevent it from accidentally rolling or falling.

Paragraph (b) provides the same requirement to block or mechanically secure a raised component on a piece of mobile equipment when persons are working on top of, under, or working from it. In addition, when work on a raised component is being performed, the mobile equipment itself must be blocked or secured to prevent it from rolling.

Commenters asked whether it was necessary to block the raised component if work is being performed on an entirely separate component. The final

standard clarifies, in paragraph (c), that securing must be done if persons are exposed to the hazard of accidental lowering of the component.

Paragraph (d) provides a compliance alternative for blocking of raised components. Elevated mobile work platforms and other types of equipment provided with functional load-locking devices or devices that prevent free and uncontrolled descent need not be blocked against falling. As discussed during the public hearings, load-locking devices work by fixing the raised component in position to prevent it from an unplanned descent. The devices can operate mechanically or hydraulically. The final standard also permits use of any other device that prevents free and uncontrolled descent should there be a sudden failure of the system that is holding up the raised component. An example of this type of device would be a check valve or flow restrictor which provides a controlled drift-down rate.

Some commenters stated that "the standard should permit persons to work from the buckets of front-end loaders when performing quick repairs, thereby avoiding the need to use specifically designed mobile work platforms". MSHA does not believe this use of loader buckets is safe unless the buckets are provided with a device that controls descent. As noted by other commenters, loaders are designed to handle ore and materials and are not intended to be used as work platforms. Unstable footing inside the loader bucket and the potential for accidental unloading by the relatively quick-action dumping mechanism of the bucket make front-end loaders unsafe as makeshift mobile work platforms, unless a load-locking device, or other device that prevents free and uncontrolled descent is installed on the equipment. In those instances, the equipment would be effectively modified to be considered a specifically designed mobile work platform.

Similarly, a forklift truck with an attached work basket and load-locking device would be permitted.

Although some commenters favored having the standard only address the hazards associated with raised components, MSHA's experience has been that many accidents and fatalities have occurred when the mobile equipment itself is raised and it has not been sufficiently secured to prevent accidental rolling or falling.

A few commenters also questioned the requirement for blocking the mobile equipment when a component is raised if the equipment is on level ground. Even when it is possible to assure that the

equipment is on level ground, blocking is a sound precaution. At times, work from the raised component may cause the mobile equipment to move due to drive line slack or the shifting of the elevated weight. There is also a possibility that another vehicle may bump the equipment. Blocking the mobile equipment provides an element of additional security for these situations. Editorially, the final standard substitutes the words "on top of" for "on" in referring to work performed on the mobile equipment or its raised component. Commenters suggested this change to permit persons to perform non-hazardous activities such as changing bits on a lowered boom of a jumbo drill when standing to the side of the boom. Paragraph (c) also recognizes these non-hazardous situations, by requiring the securing of raised components only when persons are exposed to the hazard of accidental lowering.

Another issue raised by commenters was whether cranes would be specifically excluded from the scope of this standard. Some commenters favored such an exclusion, preferring to have a separate rulemaking for cranes. Others believed that while cable systems on cranes should be excluded, hydraulic systems on cranes should be included. They stated that equipment such as a crane, which uses a hydraulic telescoping boom with a cable on the end, or a cherry picker should have load-locking devices on the hydraulic system portion when they are used as elevated mobile work platforms.

If a crane is modified to be used as a mobile work platform, then it also must comply with paragraph (d) of this standard and have either a load-locking or an anti-free-descent device installed. These devices were also accepted as compliance with the existing standards.

Section 56/57.14212 Chains, ropes and drive belts. This final standard consolidates and replaces existing §§ 56/57.14031 and 56/57.14032. It addresses the hand and arm injuries which can occur when chain, rope, or drive belts are moved onto sprockets, pulleys or drums while in motion. The standard requires that these chains, ropes, and drive belts be guided mechanically unless the equipment has been specifically designed for hand feeding. Commenters supported the consolidation of these standards.

Section 56/57.14213 Ventilation and shielding for welding. This final standard revises existing §§ 56/57.14045. As with the existing standard, this final standard requires that welding operations be well-ventilated. It also

clarifies that shielding must be provided where arc flash could be hazardous to persons. Without the protection provided by shielding, the intensity of light from arc flash can damage the eyesight of persons exposed. Shielding also provides protection from metals being projected during welding.

Welding fumes and gases are created as a direct by-product of the work activity and as a result, unlimited amounts of these harmful fumes and gases are continuously released into the work environment during welding in a manner which could impair visibility. For these reasons the standard requires that the welding area be well-ventilated to remove the fumes and gases from the work environment. This is especially important where the welding is carried out in confined spaces.

One commenter suggested that the ventilation requirement be deleted on the basis that the air quality standards address this hazard. MSHA has retained the welding ventilation requirement of this standard in the final rule because of the always present fumes and gases from welding, in areas which are not well-ventilated. The accumulation of welding fumes and gases can present a safety hazard by impairing visibility of the welder and other workers in the area if no ventilation is provided. If inhaled, welding fumes and gases can rapidly lead to disorientation and irreversible physical harm to the welder.

Section 56/57.14214 Train warnings. This final standard, revises existing §§ 56/57.9009 and sets forth situations when train operators are required to sound an audible warning.

A commenter questioned whether a switch engine would be considered a train if no railcar were attached. The hazard to persons exists when locomotives are moved individually as well as when they are coupled to railcars. The standard is applicable in both situations.

Section 56/57.14215 Coupling or uncoupling cars. This final standard, consolidates existing §§ 56/57.9085 and 57.9097. It sets forth the safety procedures to be followed when coupling or uncoupling railcars so that persons will not be injured by the movement of the train or be placed in a hazardous position while performing the coupling or uncoupling.

Some commenters suggested that this standard be deleted from Part 56 on the basis that it was not applicable to surface mining operations. However, the final standard continues to apply to both Part 56 and Part 57 since some surface operations use rail haulage.

Section 56/57.14216 Backpoling. This final standard, prohibits backpoling of

trolleys except where it is unavoidable due to inadequate clearance to reverse the trolley pole. It retains the substantive requirements of existing §§ 56/57.9046. Backpoling is the practice of moving a trolley wire-powered train with the trolley pole pointed in the direction of movement rather than trailing the movement. When backpoling, the pole is more likely to become disengaged from the trolley wire or to catch an object and break. Miners have been electrocuted from such backpoling hazards. The final rule prohibits this practice except where it is absolutely unavoidable. Where backpoling is necessary, the standard provides that it be done only at the minimum tram speed of the trolley.

Some commenters believed this standard was not applicable to surface mining operations. MSHA recognizes that trolleys are more commonly encountered at underground mines; however, they are used at some surface operations. In either setting, the hazards of backpoling exist. Therefore, the final standard continues to apply to surface as well as underground mining operations.

Section 56/57.14217 Securing parked railcars. This final standard revises existing §§ 56/57.9047. It is applicable to surface and underground mines and provides protection for miners against unintended movement of railcars. No comments were received on this standard and it appears in the final rule as proposed.

Section 56/57.14218 Movement of equipment on adjacent tracks. This final standard replaces existing §§ 56/57.9086. It is applicable to surface and underground mines and requires that any connective devices between a locomotive on one track and rail equipment on another track be of sufficient strength for the task. When inappropriate connecting devices are used to move rail equipment, the device can fail during movement and the uncontrolled rail equipment can pose a hazard to miners in the area. No comments were received on this standard and it appears in the final rule as proposed.

Section 56/57.14219 Brakeman signals. This final standard replaces existing §§ 56/57.9052. It is applicable to surface and underground mines and requires that when communicative signals cannot be clearly understood they shall be interpreted as a stop signal so that the instructions can be verified and train movement can proceed safely. No comments were received on this standard and it appears in the final rule as proposed.

I. Derivation Table.

The following derivation table lists the number of each standard in both subparts of the final rule, the number of the standard in the applicable proposed rule, and the number of the existing standard.

New No.	Proposed No.	Old No.
56/57.900	56/57.9000	56/57.2
56/57.9100	56/57.9101	56/57.9071
56/57.9101	56/57.9205	56/57.9017, .9023, .9024, 57.9113
56/57.9102	56/57.9305	56/57.9035
56/57.9103	56/57.9307	56/57.9050
56/57.9104	56/57.9313	56/57.9059
57.9160	57.9362	57.9116
56/57.9200	56/57.9102	56/57.9040, .9041, .9067, .9085
56/57.9200(h)	56/57.14202	56/57.9014
56/57.9201	56/57.9104	56/57.9045
56/57.9202	56/57.9105	56/57.9062, .9106
57.9260	57.9160	57.9099
57.9261	57.9360	57.9096
56/57.9300	56/57.9203	56/57.9022
56/57.9301	56/57.9402	56/57.9054
56/57.9302	56/57.9303	56/57.9020, .9056
56/57.9303	56/57.9400	56/57.9063
56/57.9304	56/57.9404	56/57.9055
56/57.9305	56/57.9403	56/57.9058
56/57.9306	56/57.9112(c)	56/57.9060, 57.9104
56/57.9307	56/57.9311	56/57.9016
56/57.9308	56/57.9310	56/57.9028
56/57.9309	56/57.9500	56/57.9064
56/57.9310	56/57.9501	56/57.9072, 57.9105, .9106
56/57.9311	56/57.9401	56/57.9057
56/57.9312	56/57.9502	57.9107
56/57.9313	Deleted	56/57.9053
56/57.9314	56/57.9405	56/57.9061
56/57.9315	56/57.9204	56/57.9074
56/57.9316	56/57.9206	56/57.9027
56/57.9317	56/57.9208	56/57.9030
56/57.9318	56/57.9103	56/57.9039
56/57.9319	56/57.9308	56/57.9051
56/57.9330	56/57.9330	56/57.9083
57.9360	57.9363	57.9110, .9111
57.9361	57.9560	57.9103
57.9362	57.9660	57.9102
Deleted	Deleted	56/57.9019
Deleted	Deleted	56/57.9042
Deleted	Deleted	57.9114
56/57.14100	56/57.9100, 56/57.9200, 58.14200	56/57.9001, 56/57.9002, 58.14026
56/57.14101	56/57.9202	56/57.9003
56/57.14102	56/57.9300	56/57.9048
56/57.14103	56/57.9201	56/57.9010, .9011, .9012
56/57.14104	56/57.9111	56/57.9069
56/57.14105	58.14203	56/57.14029
56/57.14106	56/57.9209	56/57.14013
56/57.14107	58.14100	56/57.14001, .14003
56/57.14108	58.14101	56/57.14002
56/57.14109	58.14103	56/57.9007
56/57.14110	58.14107	56/57.14011
56/57.14111	56/57.9800	56/57.9015
56/57.14112	58.14102	56/57.14006, .14007

New No.	Proposed No.	Old No.
56/57.14113	58.14104	56/57.9013
56/57.14114	56/57.9700	56/57.9028
56/57.14115	58.14105	56/57.14008
56/57.14116	58.14108	56/57.14010
56/57.14130	56/57.9230	56/57.9088
56/57.14131	N/A	N/A
56/57.14132	56/57.9231	56/57.9087
57.14160	57.9361	57.9115
57.14161	57.9364	57.9098
57.14162	57.9365	57.9112
56/57.14200	56/57.9701	56/57.9005
56/57.14201	56/57.14201(G)	56/57.9006
56/57.14202	58.14205(G)	56/57.14033
56/57.14203	58.14206(G)	56/57.14034
56/57.14204	58.14207(G)	56/57.14035
56/57.14205	58.14208(G)	56/57.14036
56/57.14206	56/57.9108	56/57.9031, .9032
56/57.14207	56/57.9109	56/57.9036, .9037
56/57.14208	56/57.9112	56/57.9068, .9049
56/57.14209	56/57.9107	56/57.9070
56/57.14210	56/57.9207	56/57.9025
56/57.14211	56/57.9110	56/57.14030
56/57.14212	58.14204(G)	56/57.14031, .14032
56/57.14213	58.14209(G)	56/57.14045
56/57.14214	56/57.9312	56/57.9009
56/57.14215	56/57.9309	56/57.9065, 57.9097
56/57.14216	56/57.9301	56/57.9046
56/57.14217	56/57.9302	56/57.9047
56/57.14218	56/57.9304	56/57.9066
56/57.14219	56/57.9306	56/57.9052
56/57.9200(h)	58.14202	56/57.9014
56/57.15014	N/A	56/57.14014

J. Distribution Table.

For the convenience of the reader, the following distribution table has been included as a guide in cross-referencing existing standard numbers with the section numbers used in both final rules.

Old No.	New No.
56/57.2	56/57.9000
56/57.9001	56/57.14100
56/57.9002	56/57.14100
56/57.9003	56/57.14101
56/57.9005	56/57.14200
56/57.9006	56/57.14201
56/57.9007	56/57.14108
56/57.9009	56/57.14214
56/57.9010	56/57.14103
56/57.9011	56/57.14103
56/57.9012	56/57.14103
56/57.9013	56/57.14113
56/57.9014	56/57.9200(h)
56/57.9015	56/57.14111
56/57.9016	56/57.9307
56/57.9017	56/57.9101
56/57.9019	Removed
56/57.9020	56/57.9302
56/57.9022	56/57.9300
56/57.9023	56/57.9101
56/57.9024	56/57.9101
56/57.9025	56/57.14210
56/57.9026	56/57.14114
56/57.9027	56/57.9316
56/57.9028	56/57.9308
56/57.9030	56/57.9317
56/57.9031	56/57.14206
56/57.9032	56/57.14206
56/57.9034	56/57.9202
56/57.9035	56/57.9102

Old No.	New No.
56/57.9036	56/57.14207
56/57.9037	56/57.14207
56/57.9039	56/57.9318
56/57.9040	56/57.9200
56/57.9041	56/57.9200
56/57.9042	Removed
56/57.9045	56/57.9201
56/57.9046	56/57.14216
56/57.9047	56/57.9302
56/57.9048	56/57.14102
56/57.9049	56/57.14208
56/57.9050	56/57.9103
56/57.9051	56/57.9319
56/57.9052	56/57.14219
56/57.9053	56/57.9313
56/57.9054	56/57.9301
56/57.9055	56/57.9304
56/57.9058	56/57.9302
56/57.9057	56/57.9311
56/57.9058	56/57.9305
56/57.9059	56/57.9104
56/57.9060	56/57.9306
56/57.9061	56/57.9314
56/57.9062	56/57.9202
56/57.9063	56/57.9303
56/57.9064	56/57.9309
56/57.9065	56/57.14215
56/57.9068	56/57.14218
56/57.9067	56/57.9200
56/57.9068	56/57.14208
56/57.9069	56/57.14105
56/57.9070	56/57.14209
56/57.9071	56/57.9100
56/57.9072	56/57.9310
56/57.9073	56/57.14100
56/57.9074	56/57.9315
56/57.9083	56/57.9330
56/57.9085	56/57.9200
56/57.9087	56/57.14132
56/57.9088	56/57.14130
57.9096	57.9261
57.9097	56/57.14215
57.9098	57.14161
57.9099	57.9260
57.9102	57.9362
57.9103	57.9361
57.9104	57.9306
57.9105	57.9310
57.9106	57.9310
57.9107	57.9312
57.9110	57.9360
57.9111	57.9360
57.9112	57.14162
57.9113	57.9101
57.9114	Removed
57.9115	57.14160
57.9116	57.9160
56/57.9001	56/57.14100
.9002	
56/57.9003	56/57.14101
56/57.9005	56/57.14200
56/57.9006	56/57.14201
56/57.9007	56/57.14108
56/57.9009	56/57.14214
56/57.9010	56/57.14103
56/57.9011	56/57.14103
56/57.9012	56/57.14103
56/57.9013	56/57.14113
56/57.9014	56/57.9200(h)
56/57.9015	56/57.14111
56/57.9016	56/57.9307
56/57.9017	56/57.9101
56/57.9019	Removed
56/57.9020	56/57.9302
56/57.9022	56/57.9300
56/57.9023	56/57.9101
56/57.9024	56/57.9101
56/57.9025	56/57.14210
56/57.9026	56/57.14114
56/57.9027	56/57.9316
56/57.9028	56/57.9308
56/57.9030	56/57.9317
56/57.9031	56/57.14206
56/57.9032	56/57.14206
56/57.9034	56/57.9202
56/57.9035	56/57.9102
56/57.9036	56/57.14207
.9037	
56/57.9048	56/57.14216
56/57.9047	56/57.14217
56/57.9048	56/57.14102
56/57.9048	56/57.14208
.9068	
56/57.9052	56/57.14102
56/57.9065	56/57.14215

Old No.	New No.
56/57.9066	56/57.14218
56/57.9069	56/57.14104
56/57.9070	56/57.14209
56/57.9073	56/57.14100
56/57.9087	56/57.14132
56/57.9088	56/57.14130
57.9097	56/57.14215
57.9098	57.14161
57.9112	57.14162
57.9115	57.14160
56/57.14001	56/57.14107
56/57.14002	56/57.14108
56/57.14003	56/57.14107
56/57.14006	56/57.14112
.14007	
56/57.14008	56/57.14115
56/57.14010	56/57.14116
56/57.14011	56/57.14110
56/57.14013	56/57.14108
56/57.14014	56/57.15014
56/57.14026	56/57.14100
56/57.14029	56/57.14105
56/57.14030	56/57.14211
56/57.14031	56/57.14212
.14032	
56/57.14033	56/57.14202
56/57.14034	56/57.14203
56/57.14035	56/57.14204
56/57.14036	56/57.14205
56/57.14045	56/57.14213

III. Executive Order 12291 and the Regulatory Flexibility Act

In accordance with Executive Order 12291, MSHA has prepared an analysis to identify potential costs and benefits associated with the revisions to the Agency's standards for machinery and equipment and for loading, hauling, and dumping at metal and nonmetal mines. The Agency has incorporated this analysis into the Regulatory Flexibility Analysis required by the Regulatory Flexibility Act. The Agency prepared a separate analysis for each of Subpart H and Subpart M. Because of the interrelationship between these two subparts, however, MSHA has combined these separate analyses in the summary below. MSHA has determined that the final rule will neither result in major cost increases nor have a combined effect of \$100 million or more annually on the economy. Because the final rule does not meet the criteria for a major rule, a Regulatory Impact Analysis is not necessary.

The Regulatory Flexibility Act requires that, in developing regulatory proposals, agencies evaluate and include, wherever possible, compliance alternatives which minimize any adverse impact on small businesses. For purposes of the Regulatory Flexibility Act, MSHA has defined small business entities as mining operations with fewer than 20 employees. The final rule contains several alternatives to the existing regulations, some of which will especially benefit small operations. In addition, the final rule clarifies

compliance responsibilities, updates standards to reflect advances in technology, adopts more performance-oriented criteria, and transfers standards to more appropriate subparts. Performance-oriented standards maximize flexibility by establishing safety objectives without limiting the means to achieve them.

The primary benefit of the final rule, however, is the improved protection that the standards will provide to persons who could be endangered by hazards associated with loading, hauling, and dumping activities and the use of machinery and equipment. During the five year period from January 1983 through December 1987, the metal and nonmetal mining industry experienced 316 work-related fatalities. Fifty two percent (164) of these fatalities were directly related to haulage accidents and mishaps in the use of machinery and equipment. The Health and Safety Analysis Center of the Agency has categorized these 164 deaths as follows: Powered haulage—104; nonpowered haulage—2; machinery—55; and, handtools—3. Twenty five of these incidents occurred in underground mines; 139 at surface operations. The Agency anticipates that full compliance with these improved standards will prevent between 10 and 15 fatalities on an annual basis.

In the following summary of the Regulatory Flexibility Analysis, MSHA has compared the costs and benefits associated with the final rule with the costs of the existing requirements. A copy of the full analysis for Subpart H and for Subpart M is available upon request.

In developing cost estimates, the Agency has taken into consideration industry-wide safety practices. Current compliance costs are related to the requirements for labor and equipment purchase and maintenance. In calculating the costs of the existing requirements and the final rule, the Agency annualized capital expenditures and included annual operating costs.

MSHA estimates that the annualized capital costs and operating costs for compliance with the existing requirements amount to approximately \$36.1 million, compared to approximately \$37.4 million for the final rule. The final rule represents a \$1.3 million (3.5%) increase in annual compliance costs over the existing standards. One final standard contributes new compliance costs of about \$18,590 for the installation of seat belts on surface haulage trucks. Revision of two existing requirements, for testing brakes and replacing cab

windows, increases compliance costs by \$1,376,731 under the final rule. Revision of three existing requirements, for makeshift couplings, for records of examinations, and for warnings prior to starting equipment, decreases compliance costs by \$114,890 under the final rule. In addition, under the final rule, 38 standards do not pose compliance costs and 37 standards impose the same compliance costs as under the existing rule.

The final rule affects about 11,290 metal and nonmetal mining operations employing about 189,101 miners. About 84% of the mines or 9,465 are considered as small business entities and they employ about 31% or 57,704 of the miners. Annual compliance costs under the final rule average about \$1,936 per small mine which represents a 4.9% increase over that required for compliance with the existing requirements. Small mines incur about 48% of the total compliance cost under the existing standard and about 49% of the total compliance cost under the final rule. The final rule does not represent a significant economic impact on a substantial number of small businesses under the criteria of the Regulatory Flexibility Act.

IV. Paperwork Reduction Act

Subpart H does not contain any recordkeeping or retention requirements subject to the Paperwork Reduction Act of 1980. The retention provision of the recordkeeping requirement in existing standard 56/57.9001, which is replaced by standard 56/57.14100, would be modified in the final rule to require that records of equipment defects affecting the safety of self-propelled mobile equipment be retained from the date they are recorded until the defects are corrected. The recordkeeping burden itself has been modified in that only those defects not corrected immediately are required to be recorded.

Information collection requirements contained in this regulation have been approved by the Office of Management and Budget (OMB), under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511) and have been assigned OMB control number 1219-0089.

V. List of Subjects in 30 CFR Parts 56 and 57

Mine safety and health, Incorporation by reference, Loading, hauling, and dumping, Machinery and equipment, Metal and nonmetal mining, Personal protection, Travelways.

Date: August 15, 1988.

David C. O'Neal,

Deputy Assistant Secretary for Mine Safety and Health.

Title 30, Chapter I, Subchapter N of the Code of Federal Regulations, Parts 56 and 57, is amended as set forth below:

PART 56—SAFETY AND HEALTH STANDARDS—SURFACE METAL AND NONMETAL MINES

1. The authority citation for Part 56 continues to read as follows:

Authority: 30 U.S.C. 811.

Subpart A—General

§ 56.2 [Amended]

2. In § 56.2 the definitions of "berm" and "trip light" are removed.

3. Subpart H is revised to read as follows:

Subpart H—Loading, Hauling, and Dumping

Sec.

56.9000 Definitions.

Traffic Safety

56.9100 Traffic control.

56.9101 Operating speeds and control of equipment.

56.9102 Movement of independently operating rail equipment.

56.9103 Clearance on adjacent tracks.

56.9104 Railroad crossings.

Transportation of Persons and Materials

56.9200 Transporting persons.

56.9201 Loading, hauling, and unloading of equipment or supplies.

56.9202 Loading and hauling large rocks.

Safety Devices, Provisions, and Procedures for Roadways, Railroads, and Loading and Dumping Sites

56.9300 Berms or guardrails.

56.9301 Dump site restraints.

56.9302 Protection against moving or runaway railroad equipment.

56.9303 Construction of ramps and dumping facilities.

56.9304 Unstable ground.

56.9305 Truck spotters.

56.9306 Warning devices for restricted clearances.

56.9307 Design, installation, and maintenance of railroads.

56.9308 Switch throws.

56.9309 Chute design.

56.9310 Chute hazards.

56.9311 Anchoring stationary sizing devices.

56.9312 Working around drawholes.

56.9313 Roadway maintenance.

56.9314 Trimming stockpile and muckpile faces.

56.9315 Dust control.

56.9316 Notifying the equipment operator.

56.9317 Suspended loads.

56.9318 Getting on or off moving equipment.

56.9319 Going over, under, or between railcars.

56.9330 Clearance for surface equipment.

Subpart H—Loading, Hauling, and Dumping

§ 56.9000 Definitions.

The following definitions apply in this subpart:

Berm. A pile or mound of material along an elevated roadway capable of moderating or limiting the force of a vehicle in order to impede the vehicle's passage over the bank of the roadway.

Mobile equipment. Wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Traffic Safety

§ 56.9100 Traffic control.

To provide for the safe movement of self-propelled mobile equipment—

(a) Rules governing speed, right-of-way, direction of movement, and the use of headlights to assure appropriate visibility, shall be established and followed at each mine; and

(b) Signs or signals that warn of hazardous conditions shall be placed at appropriate locations at each mine.

§ 56.9101 Operating speeds and control of equipment.

Operators of self-propelled mobile equipment shall maintain control of the equipment while it is in motion.

Operating speeds shall be consistent with conditions of roadways, tracks, grades, clearance, visibility, and traffic, and the type of equipment used.

§ 56.9102 Movement of independently operating rail equipment.

Movement of two or more pieces of rail equipment operating independently on the same track shall be controlled for safe operation.

§ 56.9103 Clearance on adjacent tracks.

Railcars shall not be left on side tracks unless clearance is provided for traffic on adjacent tracks.

§ 56.9104 Railroad crossings.

Designated railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing. These crossings shall also be planked or filled between the rails.

Transportation of Persons and Materials

§ 56.9200 Transporting persons.

Persons shall not be transported—

(a) In or on dippers, forks, clamshells, or buckets except shaft buckets during shaft-sinking operations or during inspection, maintenance and repair of shafts.

(b) In beds of mobile equipment or railcars, unless—

(1) Provisions are made for secure travel, and

(2) Means are taken to prevent accidental unloading if the equipment is provided with unloading devices;

(c) On top of loads in mobile equipment;

(d) Outside cabs, equipment operators' stations, and beds of mobile equipment, except when necessary for maintenance, testing, or training purposes, and provisions are made for secure travel. This provision does not apply to rail equipment.

(e) Between cars of trains, on the leading end of trains, on the leading end of a single railcar, or in other locations on trains that expose persons to hazards from train movement.

(1) This paragraph does not apply to car droppers if they are secured with safety belts and lines which prevent them from falling off the work platform.

(2) Brakemen and trainmen are prohibited from riding between cars of moving trains, but may ride on the leading end of trains or other locations when necessary to perform their duties;

(f) To and from work areas in overcrowded mobile equipment;

(g) In mobile equipment with materials or equipment unless the items are secured or are small and can be carried safely by hand without creating a hazard to persons; or

(h) On conveyors unless the conveyors are designed to provide for their safe transportation.

§ 56.9201 Loading, hauling, and unloading of equipment or supplies.

Equipment and supplies shall be loaded, transported, and unloaded in a manner which does not create a hazard to persons from falling or shifting equipment or supplies.

§ 56.9202 Loading and hauling large rocks.

Large rocks shall be broken before loading if they could endanger persons or affect the stability of mobile equipment. Mobile equipment used for haulage of mined material shall be loaded to minimize spillage where a hazard to persons could be created.

Safety Devices, Provisions, and Procedures for Roadways, Railroads, and Loading and Dumping Sites

§ 56.9300 Berms or guardrails.

(a) Berms or guardrails shall be provided and maintained on the banks of roadways where a drop-off exists of sufficient grade or depth to cause a vehicle to overturn or endanger persons in equipment.

(b) Berms or guardrails shall be at least mid-axle height of the largest self-

propelled mobile equipment which usually travels the roadway.

(c) Berms may have openings to the extent necessary for roadway drainage.

(d) Where elevated roadways are infrequently traveled and used only by service or maintenance vehicles, berms or guardrails are not required when the following criteria are met:

(1) Locked gates are installed at the entrance points to the roadway.

(2) Signs are posted warning that the roadway is not bermed.

(3) Reflectors are installed at 25-foot intervals along the perimeter of the elevated roadway.

(4) A maximum speed limit of 15 miles per hour is posted.

(5) Road surface traction is not to be impaired by weather conditions, such as sleet and snow, unless corrective measures are taken to improve traction.

(e) This standard is not applicable to rail beds.

§ 56.9301 Dump site restraints.

Berms, bumper blocks, safety hooks, or similar impeding devices shall be provided at dumping locations where there is a hazard of overtravel or overturning.

§ 56.9302 Protection against moving or runaway railroad equipment.

Stopblocks, derail devices, or other devices that protect against moving or runaway rail equipment shall be installed wherever necessary to protect persons.

§ 56.9303 Construction of ramps and dumping facilities.

Ramps and dumping facilities shall be designed and constructed of materials capable of supporting the loads to which they will be subjected. The ramps and dumping facilities shall provide width, clearance, and headroom to safely accommodate the mobile equipment using the facilities.

§ 56.9304 Unstable ground.

(a) Dumping locations shall be visually inspected prior to work commencing and as ground conditions warrant.

(b) Where there is evidence that the ground at a dumping location may fail to support the mobile equipment, loads shall be dumped a safe distance back from the edge of the unstable area of the bank.

§ 56.9305 Truck spotters.

(a) If truck spotters are used, they shall be in the clear while trucks are backing into dumping position or dumping.

(b) Spotters shall use signal lights to direct trucks where visibility is limited.

(c) When a truck operator cannot clearly recognize the spotter's signals, the truck shall be stopped.

§ 56.9306 Warning devices for restricted clearances.

Where restricted clearance creates a hazard to persons on mobile equipment, warning devices shall be installed in advance of the restricted area and the restricted area shall be conspicuously marked.

§ 56.9307 Design, installation, and maintenance of railroads.

Roadbeds and all elements of the railroad tracks shall be designed, installed, and maintained to provide safe operation consistent with the speed and type of haulage used.

§ 56.9308 Switch throws.

Switch throws shall be installed to provide clearance to protect switchmen from contact with moving trains.

§ 56.9309 Chute design.

Chute-loading installations shall be designed to provide a safe location for persons pulling chutes.

§ 56.9310 Chute hazards.

(a) Prior to chute-pulling, persons who could be affected by the draw or otherwise exposed to danger shall be warned and given time to clear the hazardous area.

(b) Persons attempting to free chute hangups shall be experienced and familiar with the task, know the hazards involved, and use the proper tools to free material.

(c) When broken rock or material is dumped into an empty chute, the chute shall be equipped with a guard or all persons shall be isolated from the hazard of flying rock or material.

§ 56.9311 Anchoring stationary sizing devices.

Grizzlies and other stationary sizing devices shall be securely anchored.

§ 56.9312 Working around drawholes.

Unless platforms or safety lines are used, persons shall not position themselves over drawholes if there is danger that broken rock or material may be withdrawn or bridged.

§ 56.9313 Roadway maintenance.

Water, debris, or spilled material on roadways which creates hazards to the operation of mobile equipment shall be removed.

§ 56.9314 Trimming stockpile and muckpile faces.

Stockpile and muckpile faces shall be trimmed to prevent hazards to persons.

§ 56.9315 Dust control.

Dust shall be controlled at muck piles, material transfer points, crushers, and on haulage roads where hazards to persons would be created as a result of impaired visibility.

§ 56.9316 Notifying the equipment operator.

When an operator of self-propelled mobile equipment is present, persons shall notify the equipment operator before getting on or off that equipment.

§ 56.9317 Suspended loads.

Persons shall not work or pass under the buckets or booms of loaders in operation.

§ 56.9318 Getting on or off moving equipment.

Persons shall not get on or off moving mobile equipment. This provision does not apply to trainmen, brakemen, and car droppers who are required to get on or off slowly moving trains in the performance of their work duties.

§ 56.9319 Going over, under, or between railcars.

Persons shall not go over, under, or between railcars unless:

- (a) The train is stopped; and
- (b) The train operator, when present, is notified and the notice acknowledged.

§ 56.9330 Clearance for surface equipment.

Continuous clearance of at least 30 inches from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks at all locations where possible or the area shall be marked conspicuously.

4. Subpart J is amended by adding a new § 56.11008, to read as follows:

Subpart J—Travelways and Escapeways

§ 56.11008 Restricted clearance.

Where restricted clearance creates a hazard to persons, the restricted clearance shall be conspicuously marked.

5. Subpart M is revised to read as follows:

Subpart M—Machinery and Equipment

Sec.

56.14000 Definitions.

Safety Devices and Maintenance Requirements

56.14100 Safety defects; examination, correction and records.

56.14101 Brakes.

56.14102 Brakes for rail equipment.

56.14103 Operators' stations.

- Sec.
 58.14104 Tire repairs.
 58.14105 Procedures during repairs or maintenance.
 58.14108 Falling object protection.
 58.14107 Moving machine parts.
 58.14108 Overhead drive belts.
 58.14109 Unguarded conveyors with adjacent travelways.
 58.14110 Flying or falling materials.
 58.14111 Slusher, backlash guards and securing.
 58.14112 Construction and maintenance of guards.
 58.14113 Inclined conveyors: backstops or brakes.
 58.14114 Air valves for pneumatic equipment.
 58.14115 Stationary grinding machines.
 58.14116 Hand-held power tools.
 58.14130 Roll-over protective structures (ROPS) and seat belts.
 58.14131 Seat belts for haulage trucks.
 58.14132 Horns and back-up alarms.

Safety Practices and Operational Procedures

- 58.14200 Warnings prior to starting or moving equipment.
 58.14201 Conveyor start-up warning.
 58.14202 Manual cleaning of conveyor pulleys.
 58.14203 Application of belt dressing.
 58.14204 Machinery lubrication.
 58.14205 Machinery, equipment, and tools.
 58.14206 Securing movable parts.
 58.14207 Parking procedures for unattended equipment.
 58.14208 Warning devices.
 58.14209 Safety procedures for towing.
 58.14210 Movement of dippers, buckets, loading booms, or suspended loads.
 58.14211 Blocking equipment in a raised position.
 58.14212 Chains, ropes, and drive belts.
 58.14213 Ventilation and shielding for welding.
 58.14214 Train warnings.
 58.14215 Coupling or uncoupling cars.
 58.14218 Backpoling.

- Sec.
 58.14217 Securing parked railcars.
 58.14218 Movement of equipment on adjacent tracks.
 58.14219 Brakeman signals.
 Appendix I for Subpart M—National Consensus Standards

Subpart M—Machinery and Equipment

§ 58.14000 Definitions.

The following definitions apply in this subpart.

Mobile equipment. Wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Travelway. A passage, walk, or way regularly used or designated for persons to go from one place to another.

Safety Devices and Maintenance Requirements

§ 58.14100 Safety defects; examination, correction and records.

(a) Self-propelled mobile equipment to be used during a shift shall be inspected by the equipment operator before being placed in operation on that shift.

(b) Defects on any equipment, machinery, and tools that affect safety shall be corrected in a timely manner to prevent the creation of a hazard to persons.

(c) When defects make continued operation hazardous to persons, the defective items including self-propelled mobile equipment shall be taken out of service and placed in a designated area posted for that purpose, or a tag or other effective method of marking the defective items shall be used to prohibit further use until the defects are corrected.

(d) Defects on self-propelled mobile equipment affecting safety, which are not corrected immediately, shall be reported to and recorded by the mine operator. The records shall be kept at the mine or nearest mine office from the date the defects are recorded, until the defects are corrected. Such records shall be made available for inspection by an authorized representative of the Secretary.

§ 58.14101 Brakes.

(a) *Minimum requirements.* (1) Self-propelled mobile equipment shall be equipped with a service brake system capable of stopping and holding the equipment with its typical load on the maximum grade it travels. This standard does not apply to equipment which is not originally equipped with brakes unless the manner in which the equipment is being operated requires the use of brakes for safe operation. This standard does not apply to rail equipment.

(2) If equipped on self-propelled mobile equipment, parking brakes shall be capable of holding the equipment with its typical load on the maximum grade it travels.

(3) All braking systems installed on the equipment shall be maintained in functional condition.

(b) *Testing.* (1) Service brake tests shall be conducted when an MSHA inspector has reasonable cause to believe that the service brake system does not function as required, unless the mine operator removes the equipment from service for the appropriate repair;

(2) The performance of the service brakes shall be evaluated according to Table M-1.

TABLE M-1

Gross vehicle weight lbs.	Equipment speed, MPH										
	10	11	12	13	14	15	16	17	18	19	20
Service Brake Maximum Stopping Distance—Feet											
0-36000	34	38	43	48	53	59	64	70	76	83	89
36000-70000	41	46	52	58	62	70	76	83	90	97	104
70000-140000	48	54	61	67	74	81	88	95	103	111	119
140000-250000	56	62	69	77	84	92	100	108	116	125	133
250000-400000	59	66	74	81	89	97	105	114	123	132	141
Over 400000	63	71	78	86	94	103	111	120	129	139	148

Stopping distances are computed using a constant deceleration of 9.66 FPS² and system response response times of .5, 1, 1.5, 2, 2.25 and 2.5 seconds for each increasing weight category respectively. Stopping distance values include a one-second operator response time.

TABLE 2.—THE SPEED OF A VEHICLE CAN BE DETERMINED BY CLOCKING IT THROUGH A 100-FOOT MEASURED COURSE AT CONSTANT VELOCITY USING TABLE 2. WHEN THE SERVICE BRAKES ARE APPLIED AT THE END OF THE COURSE, STOPPING DISTANCE CAN BE MEASURED AND COMPARED TO TABLE 1.

Miles per hour	10	11	12	13	14	15	16	17	18	19	20
Seconds Required to Travel 100 Feet.....	6.8	6.2	5.7	5.2	4.9	4.5	4.3	4.0	3.8	3.6	3.4

(3) Service brake tests shall be conducted under the direction of the mine operator in cooperation with an according to the instructions provided by the MSHA inspector as follows:

(i) Equipment capable of traveling at least 10 miles per hour shall be tested with a typical load for that particular piece of equipment. Front-end loaders shall be tested with the loader bucket empty. Equipment shall not be tested when carrying hazardous loads, such as explosives.

(ii) The approach shall be sufficient length to allow the equipment operator to reach and maintain a constant speed between 10 and 20 miles per hour prior to entering the 100 foot measured area. The constant speed shall be maintained up to the point when the equipment operator receives the signal to apply the brakes. The roadway shall be wide enough to accommodate the size of the equipment being tested. The ground shall be generally level, packed, and dry in the braking portion of the test course. Ground moisture may be present to the extent that it does not adversely affect the braking surface.

(iii) Braking is to be performed using only those braking systems, including auxiliary retarders, which are designed to bring the equipment to a stop under normal operating conditions. Parking or emergency (secondary) brakes are not to be actuated during the test.

(iv) The tests shall be conducted with the transmission in the gear appropriate for the speed the equipment is traveling except for equipment which is designed for the power train to be disengaged during braking.

(v) Testing speeds shall be a minimum of 10 miles per hour and a maximum of 20 miles per hour.

(vi) Stopping distances shall be measured from the point at which the equipment operator receives the signal to apply the service brakes to the final stopped position.

(4) Test results shall be evaluated as follows:

(i) If the initial test run is valid and the stopping distance does not exceed the corresponding stopping distance listed in Table 1, the performance of the service brakes shall be considered

acceptable. For tests to be considered valid, the equipment shall not slide sideways or exhibit other lateral motion during the braking portion of the test.

(ii) If the equipment exceeds the maximum stopping distance in the initial test run, the mine operator may request from the inspector up to four additional test runs with two runs to be conducted in each direction. The performance of the service brakes shall be considered acceptable if the equipment does not exceed the maximum stopping distance on at least three of the additional tests.

(5) Where there is not an appropriate test site at the mine or the equipment is not capable or traveling at least 10 miles per hour, service brake tests will not be conducted. In such cases, the inspector will rely upon other available evidence to determine whether the service brake system meets the performance requirement of this standard.

§ 56.14102 Brakes for rail equipment.

Braking systems on railroad cars and locomotives shall be maintained in functional condition.

§ 56.14103 Operators stations.

(a) If windows are provided on operators' stations of self-propelled mobile equipment, the windows shall be made of safety glass or material with equivalent safety characteristics. The windows shall be maintained to provide visibility for safe operation.

(b) If damaged windows obscure visibility necessary for safe operation, or create a hazard to the equipment operator, the windows shall be replaced or removed. Damaged windows shall be replaced if absence of a window would expose the equipment operator to hazardous environmental conditions which would affect the ability of the equipment operator to safely operate the equipment.

(c) The operator's stations of self-propelled mobile equipment shall—

- (1) Be free of materials that could create a hazard to persons by impairing the safe operation of the equipment; and
- (2) Not be modified, in a manner that obscures visibility necessary for safe operation.

§ 56.14104 Tire repairs.

(a) Before a tire is removed from a vehicle for tire repair, the valve core shall be partially removed to allow for gradual deflation and then removed. During deflation, to the extent possible, persons shall stand outside of the potential trajectory of the lock ring of a multi-piece wheel rim.

(b) To prevent injury from wheel rims during tire inflation, one of the following shall be used:

(1) A wheel cage or other restraining device that will constrain all wheel rim components during an explosive separation of a multi-piece wheel rim, or during the sudden release of contained air in a single piece rim wheel; or

(2) A stand-off inflation device which permits persons to stand outside of the potential trajectory of wheel components.

§ 56.14105 Procedures during repairs or maintenance.

Repairs of maintenance of machinery or equipment shall be performed only after the power is off, and the machinery or equipment blocked against hazardous motion. Machinery or equipment motion or activation is permitted to the extent that adjustments or testing cannot be performed without motion or activation, provided that persons are effectively protected from hazardous motion.

§ 56.14106 Falling object protection.

(a) Fork-lift trucks, front-end loaders, and bulldozers shall be provided with falling object protective structures if used in an area where falling objects could create a hazard to the equipment operator.

(b) The protective structure shall be capable of withstanding the falling object loads to which it would be subjected.

§ 56.14107 Moving machine parts.

(a) Moving machine parts shall be guarded to protect persons from contacting gears, sprockets, chains, drive, head, tail, and takeup pulleys, flywheels, couplings, shafts, fan blades, and similar moving parts that can cause injury.

(b) Guards shall not be required where the exposed moving parts are at least seven feet away from walking or working surfaces.

§ 56.14108 Overhead drive belts.

Overhead drive belts shall be guarded to contain the whipping action of a broken belt if that action could be hazardous to persons.

§ 56.14109 Unguarded conveyors with adjacent travelways.

Unguarded conveyors next to the travelways shall be equipped with—

(a) Emergency stop devices which are located so that a person falling on or against the conveyor can readily deactivate the conveyor drive motor; or

(b) Railings which—

(1) Are positioned to prevent persons from falling on or against the conveyor;

(2) Will be able to withstand the vibration, shock, and wear to which they will be subjected during normal operation; and

(3) Are constructed and maintained so that they will not create a hazard.

§ 56.14110 Flying or falling materials.

In areas where flying or falling materials generated from the operation of screens, crushers, or conveyors present a hazard, guards, shields, or other devices that provide protection against such flying or falling materials shall be provided to protect persons.

§ 56.14111 Slusher, backlash guards and securing.

(a) When persons are exposed to slushing operations, the slushers shall be equipped with rollers and drum covers and anchored securely before slushing operations are started.

(b) Slushers rated over 10 horsepower shall be equipped with backlash guards, unless the equipment operator is otherwise protected.

(c) This standard does not apply to air tuggers of 10 horsepower or less that have only one cable and one drum.

§ 56.14112 Construction and maintenance of guards.

(a) Guards shall be constructed and maintained to—

(1) Withstand the vibration, shock, and wear to which they will be subjected during normal operation; and

(2) Not create a hazard by their use.

(b) Guards shall be securely in place while machinery is being operated, except when testing or making adjustments which cannot be performed without removal of the guard.

§ 56.14113 Inclined conveyors: backstops or brakes.

Backstops or brakes shall be installed on drive units of inclined conveyors to prevent the conveyors from running in reverse, creating a hazard to persons.

§ 56.14114 Air valves for pneumatic equipment.

A manual master quick-close type air valve shall be installed on all pneumatic-powered equipment if there is a hazard of uncontrolled movement when the air supply is activated. The valve shall be closed except when the equipment is being operated.

§ 56.14115 Stationary grinding machines.

Stationary grinding machines, other than special bit grinders, shall be equipped with—

(a) Peripheral hoods capable of withstanding the force of a bursting wheel and enclosing not less than 270 of the periphery of the wheel;

(b) Adjustable tool rests set so that the distance between the grinding surface of the wheel and the tool rest is not greater than $\frac{1}{8}$ inch; and

(c) A safety washer on each side of the wheel.

§ 56.14116 Hand-held power tools.

(a) Power drills, disc sanders, grinders and circular and chain saws, when used in the hand-held mode shall be operated with controls which require constant hand or finger pressure.

(b) Circular saws and chain saws shall not be equipped with devices which lock-on the operating controls.

§ 56.14130 Roll-over protective structures (ROPS) and seat belts.

(a) *Equipment included.* Roll-over protective structures (ROPS) and seat belts shall be installed on—

(1) Crawler tractors and crawler loaders;

(2) Graders;

(3) Wheel loaders and wheel tractors;

(4) The tractor portion of semi-mounted scrapers, dumpers, water wagons, bottom-dump wagons, rear-dump wagons, and towed fifth wheel attachments;

(5) Skid-steer loaders; and

(6) Agricultural tractors.

(5) *ROPS construction.* ROPS shall meet the requirements of the following Society of Automotive Engineers (SAE) publications, as applicable, which are incorporated by reference:

(1) SAE J1040, "Performance Criteria for Roll-Over Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines," 1986; or

(2) SAE J1194, "Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors", 1983.

(c) *ROPS labelling.* ROPS shall have a label permanently affixed to the structure identifying—

(1) The manufacturer's name and address;

(2) The ROPS model number; and

(3) The make and model number of the equipment for which the ROPS is designed.

(d) *ROPS installation.* ROPS shall be installed on the equipment in accordance with the recommendations of the ROPS manufacturer.

(e) *ROPS maintenance.* (1) ROPS shall be maintained in a condition that meets the performance requirements applicable to the equipment. If the ROPS is subjected to roll-over or abnormal structural loading, the equipment manufacturer or a registered professional engineer with knowledge and experience in ROPS design shall recertify that the ROPS meets the applicable performance requirements before it is returned to service.

(2) Alterations or repairs on ROPS shall be performed only with approval from the ROPS manufacturer or under the instructions of a registered professional engineer with knowledge and experience in ROPS design. The manufacturer or engineer shall certify that the ROPS meets the applicable performance requirements.

(f) *Exemptions.* (1) This standard does not apply to—

(i) Self-propelled mobile equipment manufactured prior to July 1, 1969;

(ii) Over-the-road type tractors that pull trailers or vans on highways;

(iii) Equipment that is only operated by remote control; and

(2) Self-propelled mobile equipment manufactured prior to October 24, 1988, that is equipped with ROPS and seat belts that meet the installation and performance requirements of 30 CFR 56.9088 (1986 edition) shall be considered in compliance with paragraphs (b) and (c) of this section.

(g) *Wearing seat belts.* Seat belts shall be worn by the equipment operator except that when operating graders from a standing position, the grader operator shall wear safety lines and a harness in place of a seat belt.

(h) *Seat belts construction.* Seat belts shall meet the requirements of SAE J386, "Operator Restraint Systems for Off-Road Work Machines", 1985; or SAE J1194, "Roll-Over Protective Structures (ROPS) For Wheeled Agricultural Tractors", 1983, as applicable, which are incorporated by reference.

(i) *Seat belt maintenance.* Seat belts shall be maintained in functional condition, and replaced when necessary to assure proper performance.

(j) *Publications.* Publications incorporated by reference in this section have been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a). Copies are available from the Administrator for Metal and Nonmetal Mine Safety and Health, MSHA, 4015 Wilson Blvd., Arlington, Virginia 22203, and may be examined at any Metal and Nonmetal District Office. Copies may also be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096./

(Approved by the Office of Management and Budget under Control Number 1219-0089)

§ 56.14131 Seat belts for haulage trucks.

(a) Seat belts shall be provided and worn in haulage trucks.

(b) Seat belts shall be maintained in functional condition, and replaced when necessary to assure proper performance.

(c) Seat belts required under this section shall meet the requirements of SAE J386, "Operator Restraint Systems for Off-Road Work Machines", 1985, which is incorporated by reference in accordance with 5 U.S.C. 552(a).

(d) Publications incorporated by reference in this section have been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a). Copies are available from the Administrator for Metal and Nonmetal Mine Safety and Health, (MSHA), 4015 Wilson Blvd., Arlington, VA 22203, and may be examined at any Metal and Nonmetal District Office. Copies may also be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

§ 56.14132 Horns and backup alarms.

(a) Manually-operated horns or other audible warning devices provided on self-propelled mobile equipment as a safety feature shall be maintained in functional condition.

(b)(1) When the operator has an obstructed view to the rear, self-propelled mobile equipment shall have—

(i) An automatic reverse-activated signal alarm;

(ii) A wheel-mounted bell alarm which sounds at least once for each three feet of reverse movement;

(iii) A discriminating backup alarm that covers the area of obstructed view; or

(iv) An observer to signal when it is safe to back up.

(2) Alarms shall be audible above the surrounding noise level.

(3) An automatic reverse-activated strobe light may be used at night in lieu of an audible reverse alarm.

(c) This standard does not apply to rail equipment.

Safety Practices and Operational Procedures

§ 56.14200 Warnings prior to starting or moving equipment.

Before starting crushers or moving self-propelled mobile equipment, equipment operators shall sound a warning that is audible above the surrounding noise level or use other effective means to warn all persons who could be exposed to a hazard from the equipment.

§ 56.14201 Conveyor start-up warnings.

(a) When the entire length of a conveyor is visible from the starting switch, the conveyor operator shall visually check to make certain that all persons are in the clear before starting the conveyor.

(b) When the entire length of the conveyor is not visible from the starting switch, a system which provides visible or audible warning shall be installed and operated to warn persons that the conveyor will be started. Within 30 seconds after the warning is given, the conveyor shall be started or a second warning shall be given.

§ 56.14202 Manual cleaning of conveyor pulleys.

Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

§ 56.14203 Application of belt dressing.

Belt dressings shall not be applied manually while belts are in motion unless a pressurized-type applicator is used that allows the dressing to be applied from outside the guards.

§ 56.14204 Machinery lubrication.

Machinery or equipment shall not be lubricated manually while it is in motion where application of the lubricant may expose persons to injury.

§ 56.14205 Machinery, equipment, and tools.

Machinery, equipment, and tools shall not be used beyond the design capacity intended by the manufacturer where such use may create a hazard to persons.

§ 56.14206 Securing movable parts.

(a) When moving mobile equipment between workplaces, booms, forks, buckets, beds, and similar movable parts of the equipment shall be

positioned in the travel mode and, if required for safe travel, mechanically secured.

(b) When mobile equipment is unattended or not in use, dippers, buckets and scraper blades be lowered to the ground. Other movable parts, such as booms, shall be mechanically secured or positioned to prevent movement which would create a hazard to persons.

§ 56.14207 Parking procedures for unattended equipment.

Mobile equipment shall not be left unattended unless the controls are placed in the park position and the parking brake, if provided, is set. When parked on a grade, the wheels or tracks of mobile equipment shall be either chocked or turned into a bank.

§ 56.14208 Warning devices.

(a) Visible warning devices shall be used when parked mobile equipment creates a hazard to persons in other mobile equipment.

(b) Mobile equipment, other than forklifts, carrying loads that project beyond the sides or more than four feet beyond the rear of the equipment shall have a warning flag at the end of the projection. Under conditions of limited visibility these loads shall have a warning light at the end of the projection. Such flag or lights shall be attached to the end of the projection or be carried by persons walking beside or behind the projection.

§ 56.14209 Safety procedures for towing.

(a) A properly sized tow bar or other effective means of control shall be used to tow mobile equipment.

(b) Unless steering and braking are under the control of the equipment operator on the towed equipment, a safety chain or wire rope capable of withstanding the loads to which it could be subjected shall be used in conjunction with any primary rigging.

(c) This provision does not apply to rail equipment.

§ 56.14210 Movement of dippers, buckets, loading booms, or suspended loads.

(a) Dippers, buckets, loading booms, or suspended loads shall not be swung over the operators' stations of self-propelled mobile equipment until the equipment operator is out of the operator's station and in a safe location.

(b) This section does not apply when the equipment is specifically designed to protect the equipment operator from falling objects.

§ 56.14211 Blocking equipment in a raised position.

(a) Persons shall not work on top of, under, or work from mobile equipment in a raised position until the equipment has been blocked or mechanically secured to prevent it from rolling or falling accidentally.

(b) Persons shall not work on top of, under, or work from a raised component of mobile equipment until the component has been blocked or mechanically secured to prevent accidental lowering. The equipment must also be blocked or secured to prevent rolling.

(c) A raised component must be secured to prevent accidental lowering when persons are working on or around mobile equipment and are exposed to the hazard of accidental lowering of the component.

(d) Under this section, a raised component of mobile equipment is considered to be blocked or mechanically secured if provided with a functional load-locking device or a device which prevents free and uncontrolled descent.

(e) Blocking or mechanical securing of the raised component is required during repair or maintenance of elevated mobile work platforms.

§ 56.14212 Chains, ropes, and drive belts.

Chains, ropes, and drive belts shall be guided mechanically onto moving pulleys, sprockets, or drums except where equipment is designed specifically for hand feeding.

§ 56.14213 Ventilation and shielding for welding.

(a) Welding operations shall be shielded when performed at locations where arc flash could be hazardous to persons.

(b) All welding operations shall be well-ventilated.

§ 56.14214 Train warnings.

A warning that is audible above the surrounding noise level shall be sounded—

(a) Immediately prior to moving trains;

(b) When trains approach persons, crossings, other trains on adjacent tracks; and

(c) Any place where the train operator's vision is obscured.

§ 56.14215 Coupling or uncoupling cars.

Prior to coupling or uncoupling cars manually, trains shall be brought to a complete stop, and then moved at minimum tram speed until the coupling or uncoupling activity is completed. Coupling or uncoupling shall not be attempted from the inside of curves unless the railroad and cars are

designed to eliminate hazards to persons.

§ 56.14218 Backpoling.

Backpoling of trolleys is prohibited except where there is inadequate clearance to reverse the trolley pole. Where backpoling is required, it shall be done only at the minimum tram speed of the trolley.

§ 56.14217 Securing parked railcars.

Parked railcars shall be blocked securely unless held effectively by brakes.

§ 56.14218 Movement of equipment on adjacent tracks.

When a locomotive on one track is used to move rail equipment on adjacent tracks, a chain, cable, or drawbar shall be used which is capable of meeting the loads to which it could be subjected.

§ 56.14219 Brakeman signals.

When a train is under the direction of a brakeman and the train operator cannot clearly recognize the brakeman's signals, the train operator shall bring the train to a stop.

Appendix I for Subpart M—National Consensus Standards

Mine operators seeking further information regarding the construction and installation of falling object protective structures (FOPS) may consult the following national consensus standards, as applicable.

MSHA STANDARD 56.14106, FALLING OBJECT PROTECTION.

Equipment	National consensus standard
Front-end loaders and bulldozers.	Society of Automotive Engineers (SAE) minimum performance criteria for falling object protective structures (FOPS) SAE J231—January, 1981.
Fork-lift trucks.....	American National Standards Institute (ANSI) safety standard for low lift and high lift trucks, B 56.1, section 7.27—1983; or, American National Standards Institute (ANSI) standard, rough terrain fork lift trucks, B56.6—1987.

6. Subpart N is amended by adding a new § 56.15014 to read as follows:

Subpart N—Personal Protection

§ 56.15014 Eye protection when operating grinding wheels.

Face shields or goggles in good condition shall be worn when operating a grinding wheel.

PART 57—SAFETY AND HEALTH STANDARDS—UNDERGROUND METAL AND NONMETAL MINES

7. The authority citation for Part 57 continues to read as follows:

Authority: 30 U.S.C. 811.

Subpart A—General

§ 57.2 [Amended]

8. In § 57.2 the definitions of "berm" and "trip light" are removed.

9. Subpart H is revised to read as follows:

Subpart H—Loading, Hauling, and Dumping

Sec.

57.9000 Definitions.

Traffic Safety

57.9100 Traffic control.

57.9101 Operating speeds and control of equipment.

57.9102 Movement of independently operating rail equipment.

57.9103 Clearance on adjacent tracks.

57.9104 Railroad crossings.

Transportation of Persons and Materials

57.9200 Transporting persons.

57.9201 Loading, hauling, and unloading of equipment or supplies.

57.9202 Loading and hauling large rocks.

57.9280 Supplies, materials, and tools on mantrips.

57.9281 Transporting tools and materials on locomotives.

Safety Devices, Provisions, and Procedures for Roadways, Railroads, and Loading and Dumping Sites

57.9300 Berms or guardrails.

57.9301 Dump site restraints.

57.9302 Protection against moving or runaway railroad equipment.

57.9303 Construction of ramps and dumping facilities.

57.9304 Unstable ground.

57.9305 Truck spotters.

57.9308 Warning devices for restricted clearances.

57.9307 Design, installation, and maintenance of railroads.

57.9308 Switch throws.

57.9309 Chute design.

57.9310 Chute hazards.

57.9311 Anchoring stationary sizing devices.

57.9312 Working around drawholes.

57.9313 Roadway maintenance.

57.9314 Trimming stockpile and muckpile faces.

57.9315 Dust control.

57.9316 Notifying the equipment operator.

57.9317 Suspended loads.

57.9318 Getting on or off moving equipment.

57.9319 Going over, under, or between railcars.

57.9330 Clearance for surface equipment.

57.9360 Shelter holes.

57.9361 Drawholes.

57.9362 Protection of signalmen.

Subpart H—Loading, Hauling, and Dumping**§ 57.9000 Definitions.**

The following definitions apply in this subpart:

Berm. A pile or mound of material along an elevated roadway capable of moderating or limiting the force of a vehicle in order to impede the vehicle's passage over the bank of the roadway.

Mobile equipment. Wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Traffic Safety**§ 57.9100 Traffic control.**

To provide for the safe movement of self-propelled mobile equipment—

(a) Rules governing speed, right-of-way, direction of movement, and the use of headlights to assure appropriate visibility, shall be established and followed at each mine; and

(b) Signs or signals that warn of hazardous conditions shall be placed at appropriate locations at each mine.

§ 57.9101 Operating speeds and control of equipment.

Operators of self-propelled mobile equipment shall maintain control of the equipment while it is in motion. Operating speeds shall be consistent with conditions of roadways, tracks, grades, clearance, visibility, and traffic, and the type of equipment used.

§ 57.9102 Movement of independently operating rail equipment.

Movement of two or more pieces of rail equipment operating independently on the same track shall be controlled for safe operation.

§ 57.9103 Clearance on adjacent tracks.

Railcars shall not be left on side tracks unless clearance is provided for traffic on adjacent tracks.

§ 57.9104 Railroad crossings.

Designated railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing. These crossings shall also be planked or filled between the rails.

§ 57.9160 Train movement during shift changes.

During shift changes, the movement of underground trains carrying rock or material shall be limited to areas where the trains do not present a hazard to persons changing shifts.

Transportation of Persons and Materials**§ 57.9200 Transporting persons.**

Persons shall not be transported—

(a) In or on dippers, forks, clamshells, or buckets except shaft buckets during shaft-sinking operations or during inspection, maintenance and repair of shafts.

(b) In beds of mobile equipment or railcars, unless—

(1) Provisions are made for secure travel, and

(2) Means are taken to prevent accidental unloading if the equipment is provided with unloading devices;

(c) On top of loads in mobile equipment;

(d) Outside cabs, equipment operators' stations, and beds of mobile equipment, except when necessary for maintenance, testing, or training purposes, and provisions are made for secure travel. This provision does not apply to rail equipment.

(e) Between cars of trains, on the leading end of trains, on the leading end of a single railcar, or in other locations on trains that expose persons to hazards from train movement.

(1) This paragraph does not apply to car droppers if they are secured with safety belts and lines which prevent them from falling off the work platform.

(2) Brakemen and trainmen are prohibited from riding between cars of moving trains but may ride on the leading end of trains or other locations when necessary to perform their duties;

(f) To and from work areas in overcrowded mobile equipment;

(g) In mobile equipment with materials or equipment unless the items are secured or are small and can be carried safely by hand without creating a hazard to persons; or

(h) On conveyors unless the conveyors are designed to provide for their safe transportation.

§ 57.9201 Loading, hauling, and unloading of equipment or supplies.

Equipment and supplies shall be loaded, transported, and unloaded in a manner which does not create a hazard to persons from falling or shifting equipment or supplies.

§ 57.9202 Loading and hauling large rocks.

Large rocks shall be broken before loading if they could endanger persons or affect the stability of mobile equipment. Mobile equipment used for haulage of mined material shall be loaded to minimize spillage where a hazard to persons could be created.

§ 57.9260 Supplies, materials, and tools on mantrips.

Supplies, materials, and tools, other than small items that can be carried by hand, shall not be transported underground with persons in mantrips.

Mantrips shall be operated independently of ore or supply trips.

§ 57.9261 Transporting tools and materials on locomotives.

Tools or materials shall not be carried on top of locomotives underground except for secured rerailing devices located in a manner which does not create a hazard to persons.

Safety Devices, Provisions, and Procedures for Roadways, Railroads, and Loading and Dumping Sites**§ 57.9300 Berms or guardrails.**

(a) Berms or guardrails shall be provided and maintained on the banks of roadways where a drop-off exists of sufficient grade or depth to cause a vehicle to overturn or endanger persons in equipment.

(b) Berms or guardrails shall be at least mid-axle height of the largest self-propelled mobile equipment which usually travels the roadway.

(c) Berms may have openings to the extent necessary for roadway drainage.

(d) Where elevated roadways are infrequently traveled and used only by service or maintenance vehicles, berms or guardrails are not required when the following criteria are met.

(1) Locked gates are installed at the entrance points to the roadway.

(2) Signs are posted warning that the roadway is not bermed.

(3) Reflectors are installed at 25-foot intervals along the perimeter of the elevated roadway.

(4) A maximum speed limit of 15 miles per hour is posted.

(5) Road surface traction is not to be impaired by weather conditions, such as sleet and snow, unless corrective measures are taken to improve traction.

(e) This standard is not applicable to rail beds.

§ 57.9301 Dump site restraints.

Berms, bumper blocks, safety hooks, or similar impeding devices shall be provided at dumping locations where there is a hazard of overtravel or overturning.

§ 57.9302 Protection against moving or runaway railroad equipment.

Stopblocks, derail devices, or other devices that protect against moving or runaway rail equipment shall be installed wherever necessary to protect persons.

§ 57.9303 Construction of ramps and dumping facilities.

Ramps and dumping facilities shall be designed and constructed of materials capable of supporting the loads to which they will be subjected. The ramps and

dumping facilities shall provide width, clearance, and headroom to safely accommodate the mobile equipment using the facilities.

§ 57.9304 Unstable ground.

(a) Dumping locations shall be visually inspected prior to work commencing and as ground conditions warrant.

(b) Where there is evidence that the ground at a dumping location may fail to support the mobile equipment, loads shall be dumped a safe distance back from the edge of the unstable area of the bank.

§ 57.9305 Truck spotters.

(a) If truck spotters are used, they shall be in the clear while trucks are backing into dumping position or dumping.

(b) Spotters shall use signal lights to direct trucks where visibility is limited.

(c) When a truck operator cannot clearly recognize the spotter's signals, the truck shall be stopped.

§ 57.9306 Warning devices for restricted clearances.

Where restricted clearance creates a hazard to persons on mobile equipment, warning devices shall be installed in advance of the restricted area and the restricted area shall be conspicuously marked.

§ 57.9307 Design, installation, and maintenance of railroads.

Roadbeds and all elements of the railroad tracks shall be designed, installed, and maintained to provide safe operation consistent with the speed and type of haulage used.

§ 57.9308 Switch throws.

Switch throws shall be installed to provide clearance to protect switchmen from contact with moving trains.

§ 57.9309 Chute design.

Chute-loading installations shall be designed to provide a safe location for persons pulling chutes.

§ 57.9310 Chute hazards.

(a) Prior to chute-pulling, persons who could be affected by the draw or otherwise exposed to danger shall be warned and given time to clear the hazardous area.

(b) Persons attempting to free chute hangups shall be experienced and familiar with the task, know the hazards involved, and use the proper tools to free material.

(c) When broken rock or material is dumped into an empty chute, the chute shall be equipped with a guard or all

persons shall be isolated from the hazard of flying rock or material.

§ 57.9311 Anchoring stationary sizing devices.

Grizzlies and other stationary sizing devices shall be securely anchored.

§ 57.9312 Working around drawholes.

Unless platforms or safety lines are used, persons shall not position themselves over drawholes if there is danger that broken rock or material may be withdrawn or bridged.

§ 57.9313 Roadway maintenance.

Water, debris, or spilled material on roadways which creates hazards to the operation of mobile equipment shall be removed.

§ 57.9314 Trimming stockpile and muckpile faces.

Stockpile and muckpile faces shall be trimmed to prevent hazards to persons.

§ 57.9315 Dust control.

Dust shall be controlled at muck piles, material transfer points, crushers, and on haulage roads where hazards to persons would be created as a result of impaired visibility.

§ 57.9316 Notifying the equipment operator.

When an operator of self-propelled mobile equipment is present, persons shall notify the equipment operator before getting on or off that equipment.

§ 57.9317 Suspended loads.

Persons shall not work or pass under the buckets or booms of loaders in operation.

§ 57.9318 Getting on or off moving equipment.

Persons shall not get on or off moving mobile equipment. This provision does not apply to trainmen, brakemen, and car droppers who are required to get on or off slowly moving trains in the performance of their work duties.

§ 57.9319 Going over, under, or between railcars.

Persons shall not go over, under, or between railcars unless—

- (a) The train is stopped; and
- (b) The train operator, when present, is notified and the notice acknowledged.

§ 57.9330 Clearance for surface equipment.

Continuous clearance of at least 30 inches from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks at all locations where possible or the area shall be marked conspicuously.

§ 57.9360 Shelter holes.

(a) Shelter holes shall be—

(1) Provided at intervals adequate to assure the safety of persons along underground haulageways where continuous clearance of at least 30 inches cannot be maintained from the farthest projection of moving equipment on at least one side of the haulageway; and

(2) At least four feet wide, marked conspicuously, and provide a minimum 40-inch clearance from the farthest projection of moving equipment.

(b) Shelter holes shall not be used for storage unless a 40-inch clearance is maintained.

§ 57.9361 Drawholes.

To prevent hazards to persons underground, collars of open drawholes shall be free of muck or materials except during transfer of the muck or material through the drawhole.

§ 57.9362 Protection of signalmen.

Signalmen used during slushing operations underground shall be located away from possible contact with cables, sheaves, and slusher buckets.

10. Subpart J is amended by adding a new § 57.11008, to read as follows:

Subpart J—Travelways and Escapeways

§ 57.11008 Restricted clearance.

Where restricted clearance creates a hazard to persons, the restricted clearance shall be conspicuously marked.

11. Subpart M is revised to read as follows:

Subpart M—Machinery and Equipment

Sec.

57.14000 Definitions.

Safety Devices and Maintenance Requirements

57.14100 Safety defects; examination, correction and records.

57.14101 Brakes.

57.14102 Brakes for rail equipment.

57.14103 Operators' stations.

57.14104 Tire repairs.

57.14105 Procedures during repairs or maintenance.

57.14106 Falling object protection.

57.14107 Moving machine parts.

57.14108 Overhead drive belts.

57.14109 Unguarded conveyors with adjacent travelways.

57.14110 Flying or falling materials.

57.14111 Slusher, backlash guards and securing.

57.14112 Construction and maintenance of guards.

57.14113 Inclined conveyors: backstops or brakes.

- 57.14114 Air valves for pneumatic equipment.
- 57.14115 Stationary grinding machines.
- 57.14118 Hand-held power tools.
- 57.14130 Roll-over protective structures (ROPS) and seat belts for surface equipment.
- 57.14131 Seat belts for surface haulage trucks.
- 57.14132 Horns and back-up alarms for surface equipment.
- 57.14160 Mantrip trolley wire hazards underground.
- 57.14181 Makeshift couplings.
- 57.14182 Trip lights.
- Safety Practices and Operational Procedures**
- 57.14200 Warnings prior to starting or moving equipment.
- 57.14201 Conveyor start-up warning.
- 57.14202 Manual cleaning of conveyor pulleys.
- 57.14203 Application of belt dressing.
- 57.14204 Machinery lubrication.
- 57.14205 Machinery, equipment, and tools.
- 57.14206 Securing movable parts.
- 57.14207 Parking procedures for unattended equipment.
- 57.14208 Warning devices.
- 57.14209 Safety procedures for towing.
- 57.14210 Movement of dippers, buckets, loading booms, or suspended loads.
- 57.14211 Blocking equipment in a raised position.
- 57.14212 Chains, ropes, and drive belts.
- 57.14213 Ventilation and shielding for welding.
- 57.14214 Train warnings.
- 57.14215 Coupling or uncoupling cars.
- 57.14218 Backpoling.
- 57.14217 Securing parked railcars.
- 57.14218 Movement of equipment on adjacent tracks.
- 57.14219 Brakeman signals.
- Appendix I for Subpart M—National Consensus Standards

Subpart M—Machinery and Equipment

§ 57.14000 Definitions.

The following definitions apply in this subpart.

Mobile equipment. Wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Travelway. A passage, walk, or way regularly used or designated for persons to go from one place to another.

Safety Devices and Maintenance Requirements

§ 57.14100 Safety defects; examination, correction and records.

(a) Self-propelled mobile equipment to be used during a shift shall be inspected by the equipment operator before being placed in operation on that shift.

(b) Defects on any equipment, machinery, and tools that affect safety shall be corrected in a timely manner to prevent the creation of a hazard to persons.

(c) When defects make continued operation hazardous to persons, the defective items including self-propelled mobile equipment shall be taken out of service and placed in a designated area posted for that purpose, or a tag or other effective method of marking the defective items shall be used to prohibit further use until the defects are corrected.

(d) Defects on self-propelled mobile equipment affecting safety, which are not corrected immediately, shall be reported to, and recorded by, the mine operator. The records shall be kept at

the mine or nearest mine office from the date the defects are recorded, until the defects are corrected. Such records shall be made available for inspection by an authorized representative of the Secretary.

§ 57.14101 Brakes.

(a) *Minimum requirements.* (1) Self-propelled mobile equipment shall be equipped with a service brake system capable of stopping and holding the equipment with its typical load on the maximum grade it travels. This standard does not apply to equipment which is not originally equipped with brakes unless the manner in which the equipment is being operated requires the use of brakes for safe operation. This standard does not apply to rail equipment.

(2) If equipped on self-propelled mobile equipment, parking brakes shall be capable of holding the equipment with its typical load on the maximum grade it travels.

(3) All braking systems installed on the equipment shall be maintained in functional condition.

(b) *Testing.* (1) Service brake tests shall be conducted on surface-operated equipment at underground mines when an MSHA inspector has reasonable cause to believe that the service brake system does not function as required, unless the mine operator removes the equipment from service for the appropriate repair;

(2) The performance of the service brakes shall be evaluated according to Table M-1.

TABLE M-1

Gross vehicle weight lbs.	Equipment Speed, MPH										
	10	11	12	13	14	15	16	17	18	19	20
Service Brake Maximum Stopping Distance—Feet											
0-36,000.....	34	38	43	48	53	59	64	70	76	83	89
36,000-70,000	41	46	52	58	62	70	76	83	90	97	104
70,000-14,0000	48	54	61	67	74	81	88	95	103	111	119
140,000-250,000	56	62	69	77	84	92	100	108	116	125	133
250,000-400,000	59	66	74	81	89	97	105	114	123	132	141
Over-400,000.....	63	71	78	86	94	103	111	120	129	139	148

Stopping distances are computed using a constant deceleration of 9.66 FPS² and system response times of .5, 1, 1.5, 2, 2.25 and 2.5 seconds for each of increasing weight category respectively. Stopping distance values include a one-second operator response time.

TABLE 2.—THE SPEED OF A VEHICLE CAN BE DETERMINED BY CLOCKING IT THROUGH A 100-FOOT MEASURED COURSE AT CONSTANT VELOCITY USING TABLE 2. WHEN THE SERVICE BRAKES ARE APPLIED AT THE END OF THE COURSE, STOPPING DISTANCE CAN BE MEASURED AND COMPARED TO TABLE 1.

Miles per hour	10	11	12	13	14	15	16	17	18	19	20
Seconds required to travel 100 feet..	6.8	6.2	5.7	5.2	4.9	4.5	4.3	4.0	3.8	3.6	3.4

(3) Service brake tests shall be conducted under the direction of the mine operator in cooperation with and according to the instructions provided by the MSHA inspector as follows:

(i) Equipment capable of traveling at least 10 miles per hour shall be tested with a typical load for that particular piece of equipment. Front-end loaders shall be tested with the loader bucket empty. Equipment shall not be tested when carrying hazardous loads, such as explosives.

(ii) The approach shall be of sufficient length to allow the equipment operator to reach and maintain a constant speed between 10 and 20 miles per hour prior to entering the 100 foot measured area. The constant speed shall be maintained up to the point when the equipment operator receives the signal to apply the brakes. The roadway shall be wide enough to accommodate the size of the equipment being tested. The ground shall be generally level, packed, and dry in the braking portion of the test course. Ground moisture may be present to the extent that it does not adversely affect the braking surface.

(iii) Braking is to be performed using only those braking systems, including auxiliary retarders, which are designed to bring the equipment to a stop under normal operating conditions. Parking or emergency (secondary) brakes are not to be actuated during the test.

(iv) The tests shall be conducted with the transmission in the gear appropriate for the speed the equipment is traveling except for equipment which is designed for the power train to be disengaged during braking.

(v) Testing speeds shall be a minimum of 10 miles per hour and a maximum of 20 miles per hour.

(vi) Stopping distances shall be measured from the point at which the equipment operator receives the signal to apply the service brakes to the final stopped position.

(4) Test results shall be evaluated as follows:

(i) If the initial test run is valid and the stopping distance does not exceed the corresponding stopping distance listed in Table 1, the performance of the service brakes shall be considered

acceptable. For tests to be considered valid, the equipment shall not slide sideways or exhibit other lateral motion during the braking portion of the test.

(ii) If the equipment exceeds the maximum stopping distance in the initial test run, the mine operator may request from the inspector up to four additional test runs with two runs to be conducted in each direction. The performance of the service brakes shall be considered acceptable if the equipment does not exceed the maximum stopping distance on at least three of the additional tests.

(5) Where there is not an appropriate test site at the mine or the equipment is not capable of traveling at least 10 miles per hour, service brake tests will not be conducted. In such cases, the inspector will rely upon other available evidence to determine whether the service brake system meets the performance requirements of this standard.

§ 57.14102 Brakes for rail equipment.

Braking systems on railroad cars and locomotives shall be maintained in functional condition.

§ 57.14103 Operators' stations.

(a) If windows are provided on operators' stations of self-propelled mobile equipment, the windows shall be made of safety glass or material with equivalent safety characteristics. The windows shall be maintained to provide visibility for safe operation.

(b) If damaged windows obscure visibility necessary for safe operation, or create a hazard to the equipment operator, the windows shall be replaced or removed. Damaged windows shall be replaced if absence of a window would expose the equipment operator to hazardous environmental conditions which would affect the ability of the equipment operator to safely operate the equipment.

(c) The operators' stations of self-propelled mobile equipment shall—

(1) Be free of materials that may create a hazard to persons by impairing the safe operation of the equipment; and

(2) Not be modified, in a manner that obscures visibility necessary for safe operation.

§ 57.14104 Tire repairs.

(a) Before a tire is removed from a vehicle for tire repair, the valve core shall be partially removed to allow for gradual deflation and then removed. During deflation, to the extent possible, persons shall stand outside of the potential trajectory of the lock ring of a multi-piece wheel rim.

(b) To prevent injury from wheel rims during tire inflation, one of the following shall be used:

(1) A wheel cage or other restraining device that will constrain all wheel rim components during an explosive separation of a multi-piece wheel rim, or during the sudden release of contained air in a single piece rim wheel; or

(2) A stand-off inflation device which permits persons to stand outside of the potential trajectory of wheel components.

§ 57.14105 Procedures during repairs or maintenance.

Repairs or maintenance on machinery or equipment shall be performed only after the power is off, and the machinery or equipment blocked against hazardous motion. Machinery or equipment motion or activation is permitted to the extent that adjustments or testing cannot be performed without motion or activation, provided that persons are effectively protected from hazardous motion.

§ 57.14106 Falling object protection.

(a) Fork-lift trucks, front-end loaders, and bulldozers shall be provided with falling object protective structures if used in an area where falling objects could create a hazard to the operator.

(b) The protective structure shall be capable of withstanding the falling object loads to which it could be subjected.

§ 57.14107 Moving machine parts.

(a) Moving machine parts shall be guarded to protect persons from contacting gears, sprockets, chains, drive, head, tail, and takeup pulleys, flywheels, coupling, shafts, fan blades, and similar moving parts that can cause injury.

(b) Guards shall not be required where the exposed moving parts are at

least seven feet away from walking or working surfaces.

§ 57.14108 Overhead drive belts.

Overhead drive belts shall be guarded to contain the whipping action of a broken belt if that action could be hazardous to persons.

§ 57.14109 Unguarded conveyors with adjacent travelways.

Unguarded conveyors next to travelways shall be equipped with—

(a) Emergency stop devices which are located so that a person falling on or against the conveyor can readily deactivate the conveyor drive motor; or

(b) Railings which—

(1) Are positioned to prevent persons from falling on or against the conveyor;

(2) Will be able to withstand the vibration, shock, and wear to which they will be subjected during normal operation; and

(3) Are constructed and maintained so that they will not create a hazard.

§ 57.14110 Flying or falling materials.

In areas where flying or falling materials generated from the operation of screens, crushers, or conveyors present a hazard, guards, shields, or other devices that provide protection against such flying or falling materials shall be provided to protect persons.

§ 57.14111 Slusher, backlash guards and securing.

(a) When persons are exposed to slushing operations, the slashers shall be equipped with rollers and drum covers and anchored securely before slushing operations are started to protect against hazardous movement before slushing operations are started.

(b) Slashers rated over 10 horsepower shall be equipped with backlash guards, unless the equipment operator is otherwise protected.

(c) This standard does not apply to air tuggers of 10 horsepower or less that have only one cable and one drum.

§ 57.14112 Construction and maintenance of guards.

(a) Guards shall be constructed and maintained to—

(1) Withstand the vibration, shock, and wear to which they will be subjected during normal operation; and

(2) Not create a hazard by their use.

(b) Guards shall be securely in place while machinery is being operated, except when testing or making adjustments which cannot be performed without removal of the guard.

§ 57.14113 Inclined conveyors: backstops or brakes.

Backstops or brakes shall be installed on drive units of inclined conveyors to prevent the conveyors from running in reverse, creating a hazard to persons.

§ 57.14114 Air valves for pneumatic equipment.

A manual master quick-close type air valve shall be installed on all pneumatic-powered equipment if there is a hazard of uncontrolled movement when the air supply is activated. The valve shall be closed except when the equipment is being operated.

§ 57.14115 Stationary grinding machines.

Stationary grinding machines, other than special bit grinders, shall be equipped with—

(a) Peripheral hoods capable of withstanding the force of a bursting wheel and enclosing not less than 270° of the periphery of the wheel;

(b) Adjustable tool rests set so that the distance between the grinding surface of the wheel and the tool rest is not greater than 1/8 inch; and

(c) A safety washer on each side of the wheel.

§ 57.14116 Hand-held power tools.

(a) Power drills, disc sanders, grinders and circular and chain saws, when used in the hand-held mode shall be operated with controls which require constant hand or finger pressure.

(b) Circular saws and chain saws shall not be equipped with devices which lock-on the operating controls.

§ 57.14130 Roll-over protective structures (ROPS) and seat belts for surface equipment.

(a) *Equipment included.* Roll-over protective structures (ROPS) and seat belts shall be installed on—

(1) Crawler tractors and crawler loaders;

(2) Graders;

(3) Wheel loaders and wheel tractors;

(4) The tractor portion of semi-mounted scrapers, dumpers, water wagons, bottom-dump wagons, rear-dump wagons, and towed fifth wheel attachments;

(5) Skid-steer loaders; and

(6) Agricultural tractors.

(b) *ROPS construction.* ROPS shall meet the requirements of the following Society of Automotive Engineers (SAE) publications, as applicable, which are incorporated by reference:

(1) SAE J1040, "Performance Criteria for Roll-Over Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines," 1986; or

(2) SAE J1194, "Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors", 1983.

(c) *ROPS labeling.* ROPS shall have a label permanently affixed to the structure identifying—

(1) The manufacturer's name and address;

(2) The ROPS model number; and

(3) The make and model number of the equipment for which the ROPS is designed.

(d) *ROPS installation.* ROPS shall be installed on the equipment in accordance with the recommendations of the ROPS manufacturer.

(e) *ROPS maintenance.* (1) ROPS shall be maintained in a condition that meets the performance requirements applicable to the equipment. If the ROPS is subjected to a roll-over or abnormal structural loading, the equipment manufacturer or a registered professional engineer with knowledge and experience in ROPS design shall recertify that the ROPS meets the applicable performance requirements before it is returned to service.

(2) Alterations or repairs on ROPS shall be performed only with approval from the ROPS manufacturer or under the instructions of a registered professional engineer with knowledge and experience in ROPS design. The manufacturer or engineer shall certify that the ROPS meets the applicable performance requirements.

(f) *Exemptions.* (1) This standard does not apply to—

(i) Self-propelled mobile equipment manufactured prior to July 1, 1969;

(ii) Over-the-road type tractors that pull trailers or vans on highways;

(iii) Equipment that is only operated by remote control; and

(2) Self-propelled mobile equipment manufactured prior to [insert date 60 days after date of publication], that is equipped with ROPS and seat belts that meet the installation and performance requirements of 30 CFR 57.9088 (1988 edition) shall be considered in compliance with paragraphs (b) and (c) of this section.

(g) *Wearing seat belts.* Seat belts shall be worn by the equipment operator except that when operating graders from a standing position, the grader operator shall wear safety lines and a harness in place of a seat belt.

(h) *Seat belts construction.* Seat belts shall meet the requirements of SAE J386, "Operator Restraint Systems for Off-Road Work Machines", 1985; or SAE J1194, "Roll-Over Protective Structures (ROPS) For Wheeled Agricultural Tractors", 1983, as applicable, which are incorporated by reference.

(i) *Seat belt maintenance.* Seat belts shall be maintained in functional condition, and replaced when necessary to assure proper performance.

(j) *Publications.* Publications incorporated by reference in this section have been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a). Copies are available from the Administrator for Metal and Nonmetal Mine Safety and Health, MSHA, 4015 Wilson Blvd., Arlington, Virginia 22203, and may be examined at any Metal and Nonmetal District Office. Copies may also be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

(Approved by the Office of Management and Budget under Control Number 1219-0089)

§ 57.14131 Seat belts for surface haulage trucks.

(a) Seat belts shall be provided and worn in haulage trucks.

(b) Seat belts shall be maintained in functional condition, and replaced when necessary to assure proper performance.

(c) Seat belts required under this section shall meet the requirements of SAE J386, "Operator Restraint Systems for Off-Road Work Machines", 1985, which is incorporated by reference in accordance with 5 U.S.C. 552(a).

(d) Publications incorporated by reference in this section have been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a). Copies are available from the Administrator for Metal and Nonmetal Mine Safety and Health, MSHA, 4015 Wilson Blvd., Arlington, VA 22203, and may be examined at any Metal and Nonmetal District Office. Copies may also be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

§ 57.14132 Horns and backup alarms for surface equipment.

(a) Manually-operated horns or other audible warning devices provided on self-propelled mobile equipment as a safety device shall be maintained in a functional condition.

(b)(1) When the operator has an obstructed view to the rear, self-propelled mobile equipment shall have—

(i) An automatic reverse-activated signal alarm;

(ii) A wheel-mounted bell alarm which sounds at least once for each three feet of reverse movement;

(iii) A discriminating backup alarm that covers the area of obstructed view; or

(iv) An observer to signal when it is safe to back up.

(2) Alarms shall be audible above the surrounding noise level.

(3) An automatic reverse-activated strobe light may be used at night in lieu of an audible reverse alarm.

(c) This standard does not apply to rail equipment.

§ 57.14160 Mantrip trolley wire hazards underground.

Mantrips shall be covered if there is danger of persons contacting the trolley wire.

§ 57.14161 Makeshift couplings.

Couplings used on underground rail equipment shall be designed for that equipment, except that makeshift couplings may be used to move disabled rail equipment for repairs if no hazard to persons is created.

§ 57.14162 Trip lights.

On underground rail haulage, trip lights shall be used on the rear of pulled trips and on the front of pushed trips.

Safety Practices and Operational Procedures

§ 57.14200 Warnings prior to starting or moving equipment.

Before starting crushers or moving self-propelled mobile equipment, equipment operators shall sound a warning that is audible above the surrounding noise level or use other effective means to warn all persons who could be exposed to a hazard from the equipment.

§ 57.14201 Conveyor start-up warnings.

(a) When the entire length of a conveyor is visible from the starting switch, the conveyor operator shall visually check to make certain that all persons are in the clear before starting the conveyor.

(b) When the entire length of the conveyor is not visible from the starting switch, a system which provides visible or audible warning shall be installed and operated to warn persons that the conveyor will be started. Within 30 seconds after the warning is given, the conveyor shall be started or a second warning shall be given.

§ 57.14202 Manual cleaning of conveyor pulleys.

Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

§ 57.14203 Application of belt dressing.

Belt dressings shall not be applied manually while belts are in motion unless a pressurized-type applicator is

used that allows the dressing to be applied from outside the guards.

§ 57.14204 Machinery lubrication.

Machinery or equipment shall not be lubricated manually while it is in motion where application of the lubricant may expose persons to injury.

§ 57.14205 Machinery, equipment, and tools.

Machinery, equipment, and tools shall not be used beyond the design capacity intended by the manufacturer, where such use may create a hazard to persons.

§ 57.14206 Securing movable parts.

(a) When moving mobile equipment between workplaces, booms, forks, buckets, beds, and similar movable parts of the equipment shall be positioned in the travel mode and, if required for safe travel, mechanically secured.

(b) When mobile equipment is unattended or not in use, dippers, buckets and scraper blades shall be lowered to the ground. Other movable parts, such as booms, shall be mechanically secured or positioned to prevent movement which would create a hazard to persons.

§ 57.14207 Parking procedures for unattended equipment.

Mobile equipment shall not be left unattended unless the controls are placed in the park position and the parking brake, if provided, is set. When parked on a grade, the wheels or tracks of mobile equipment shall be either chocked or turned into a bank or rib.

§ 57.14208 Warning devices.

(a) Visible warning devices shall be used when parked mobile equipment creates a hazard to persons in other mobile equipment.

(b) Mobile equipment, other than forklifts, carrying loads that project beyond the sides or more than four feet beyond the rear of the equipment shall have a warning flag at the end of the projection. Under conditions of limited visibility these loads shall have a warning light at the end of the projection. Such flags or lights shall be attached to the end of the projection or be carried by persons walking beside or behind the projection.

§ 57.14209 Safety procedures for towing.

(a) A properly sized tow bar or other effective means of control shall be used to tow mobile equipment.

(b) Unless steering and braking are under the control of the equipment operator on the towed equipment, a

safety chain or wire rope capable of withstanding the loads to which it could be subjected shall be used in conjunction with any primary rigging.

(c) This provision does not apply to rail equipment.

§ 57.14210 Movement of dippers, buckets, loading booms, or suspended loads.

(a) Dippers, buckets, loading booms, or suspended loads shall not be swung over the operators' stations of self-propelled mobile equipment until the equipment operator is out of the operator's station and in a safe location.

(b) This section does not apply when the equipment is specifically designed to protect the equipment operator from falling objects.

§ 57.14211 Blocking equipment in a raised position.

(a) Persons shall not work on top of, under, or work from mobile equipment in a raised position until the equipment has been blocked or mechanically secured to prevent it from rolling or falling accidentally.

(b) Persons shall not work on top of, under, or work from a raised component of mobile equipment until the component has been blocked or mechanically secured to prevent accidental lowering. The equipment must also be blocked or secured to prevent rolling.

(c) A raised component must be secured to prevent accidental lowering when persons are working on or around mobile equipment and are exposed to the hazard of accidental lowering of the component.

(d) Under this section, a raised component of mobile equipment is considered to be blocked or mechanically secured if provided with a functional load-locking device or devices which prevent free and uncontrolled descent.

(e) Blocking or mechanical securing of the raised component is required during repair or maintenance of elevated mobile work platforms.

§ 57.14212 Chains, ropes, and drive belts.

Chains, ropes, and drive belts shall be guided mechanically onto moving pulleys, sprockets, or drums except where equipment is designed specifically for hand feeding.

§ 57.14213 Ventilation and shielding for welding.

(a) Welding operations shall be shielded when performed at locations where arc flash could be hazardous to persons.

(b) All welding operations shall be well-ventilated.

§ 57.14214 Train warnings.

A warning that is audible above the surrounding noise level shall be sounded—

(a) Immediately prior to moving trains;

(b) When trains approach persons, crossing, other trains on adjacent tracks; and

(c) Any place where the train operator's vision is obscured.

§ 57.14215 Coupling or uncoupling cars.

Prior to coupling or uncoupling cars manually, trains shall be brought to a complete stop, and then moved at minimum tram speed until the coupling or uncoupling activity is completed. Coupling or uncoupling shall not be attempted from the inside of curves unless the railroad and cars are designed to eliminate hazards to persons.

§ 57.14216 Backpoling.

Backpoling of trolleys is prohibited except where there is inadequate clearance to reverse the trolley pole. Where backpoling is required, it shall be done only at the minimum tram speed of the trolley.

§ 57.14217 Securing parked railcars.

Parked railcars shall be blocked securely unless held effectively by brakes.

§ 57.14218 Movement of equipment on adjacent tracks.

When a locomotive on one track is used to move rail equipment on adjacent

tracks, a chain, cable, or drawbar shall be used which is capable of withstanding the loads to which it could be subjected.

§ 57.14219 Brakeman signals.

When a train is under the direction of a brakeman and the train operator cannot clearly recognize the brakeman's signals, the train operator shall bring the train to a stop.

Appendix I for Subpart M—National Consensus Standards

Mine operators seeking further information regarding the construction and installation of falling object protective structures (FOPS) may consult the following national consensus standards, as applicable.

MSHA STANDARD 57.14106, FALLING OBJECT PROTECTION

Equipment	National consensus standard
Front-end loaders and bulldozers.	Society of Automotive Engineers (SAE) minimum performance criteria for falling object protective structures (FOPS) SAE J231—January, 1981.
Fork-lift trucks.....	American National Standards Institute (ANSI) safety standard for low lift and high lift trucks, B 56.1, section 7.27—1983; or American National Standards Institute (ANSI) standard, rough terrain fork lift trucks, B 56.6—1987.

12. Subpart N is amended by adding a new § 57.15014 to read as follows:

Subpart N—Personal Protection

§ 57.15014 Eye protection when operating grinding wheels.

Face shields or goggles in good condition shall be worn when operating a grinding wheel.

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