

DEPARTMENT OF LABOR

Mine Safety and Health Administration

30 CFR Parts 56, 57, and 75

RIN 1219-AB00

Safety Standards for Roof Bolts in Metal and Nonmetal Mines and Underground Coal Mines

AGENCY: Mine Safety and Health Administration, Labor.

ACTION: Proposed rule.

SUMMARY: The Mine Safety and Health Administration (MSHA) is revising its safety standards for roof and rock bolts at metal and nonmetal mines and underground coal mines by updating the reference to the American Society for Testing and Materials (ASTM) standard for roof and rock bolts and accessories. The new reference reflects technological advances in the design of roof and rock bolts and support materials. It would improve the level of protection provided by the standards currently in use.

DATES: Submit written comments on or before June 27, 1997. Submit written comments on the information collection requirements by June 27, 1997.

ADDRESSES: Send written comments on this proposed rule to the Mine Safety and Health Administration, Office of Standards, Regulations, and Variances, 4015 Wilson Boulevard, Room 631, Arlington, Virginia 22203. Commenters are encouraged to send comments on a computer disk or via e-mail to psilvey@msha.gov, along with an original hard copy. Submit written comments on the information collection requirements to the Office of Information and Regulatory Affairs, OMB, New Executive Office Bldg., 725 17th St. NW., Room 10235, Washington, DC 20503, Attn: Desk Officer for MSHA.

FOR FURTHER INFORMATION CONTACT: Patricia W. Silvey, Director; Office of Standards, Regulations, and Variances, MSHA; phone: 703-235-1910, fax: 703-235-5551.

SUPPLEMENTARY INFORMATION:

I. Paperwork Reduction Act

On August 29, 1995, the Office of Management and Budget (OMB) published a final rule in the **Federal Register** (60 FR 44978) implementing the new Paperwork Reduction Act of 1995 (PRA 95). Consistent with PRA 95, these OMB rules expanded the definition of "information" to clarify that a "certification" would involve the collection of "information" if the Agency used it to monitor compliance. Mine operators currently are required to obtain a certification statement that the testing and manufacture of roof and rock bolts comply with the specified standard, and to keep a copy of this certification statement so that it can be made available to miners' representatives and representatives of the Secretary of Labor (the Secretary). Although the proposed rule would not change this requirement, it is now considered an information collection burden because of the expanded definition of "information" under PRA 95. The burden hours and costs associated with roof bolt certifications, therefore, do not reflect any increase for the mining industry.

The collection of information contained in this proposal is subject to review by OMB under the PRA 95. The title, description, and respondent description of the information collection are discussed below with an estimate of the annual information collection burden. Included in the estimate is the time to obtain the manufacturer's signature and file the form.

With respect to the following collection of information, MSHA invites comments on: (1) Whether the proposed collection of information is necessary for proper performance of MSHA's functions, including whether the information will have practical utility; (2) the accuracy of MSHA's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used; (3) ways to enhance the quality, utility,

and clarity of the information to be collected; and (4) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques, when appropriate, and other forms of information technology.

Description: Sections 56.3203(a)(1), 57.3203(a)(1), and 75.204(a)(1) would require the mine operator to obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-95. Sections 56.3203(a)(2), 57.3203(a)(2), and 75.204(a)(2) require that the certification be made available to an authorized representative of the Secretary. MSHA estimates that it would take the mine operator about 3 minutes to obtain a signature and file the form. Agency experience has shown that major roof and rock bolt manufacturers routinely provide a certification to mine operators at the time of the initial contract and update the certification annually. Smaller manufacturers provide a certification at the time of initial contract and upon request from the mine operator.

Description of Respondents: The respondents are mine operators. MSHA estimates that this provision annually affects 653 surface metal and nonmetal mines; 185 underground metal and nonmetal mines; and 973 underground coal mines.

Information Collection Burden: The total estimated annual information collection burden for surface metal and nonmetal mines is about 33 hours at an estimated annual cost of about \$1,180. The total estimated annual information collection burden for underground metal and nonmetal mines is about 9 hours at an estimated annual cost of about \$330. The total estimated annual information collection burden for underground coal mines is about 49 hours at an estimated annual cost of about \$2,040.

The following chart summarizes MSHA's estimates by section.

| Regulation in 30 CFR | Number of respondents | Hours per response | Number of responses | Number of responses per respondent | Annual costs | Total hours per regulation |
|----------------------|-----------------------|--------------------|---------------------|------------------------------------|--------------|----------------------------|
| 56.3203(a)(1) | 653 | 0.05 | 653 | 1 | \$1,175 | 32.65 |
| 57.3202(a)(1) | 185 | 0.05 | 185 | 1 | 333 | 9.25 |
| 75.204(a)(1) | 973 | 0.05 | 973 | 1 | 2,043 | 48.65 |
| Total | 1,811 | 0.05 | 1,811 | 1 | 3,551 | 90.55 |

The burden hours and costs associated with roof bolt certifications do not reflect any increase for the mining industry because mine operators

currently are required to perform these activities.

Under section 3507(o) of PRA 95, the Agency has submitted a copy of this

proposed rule to OMB for its review and approval of these information collections. Interested persons are requested to send comments regarding

these burden estimates or any other aspect of these collections of information, including suggestions for reducing these burdens, (1) directly to the Office of Information and Regulatory Affairs, OMB; Attention: Desk Officer for MSHA; 725 17th Street NW., Room 10235; Washington, DC 20503, and (2) to Patricia W. Silvey, Director; Office of Standards, Regulations, and Variances, MSHA; 4015 Wilson Boulevard, Room 631; Arlington, VA 22203.

II. Background

A. Metal and Nonmetal Mines

On October 8, 1986, MSHA published a final rule (51 FR 36194) revising its safety standards for ground control at metal and nonmetal mines. This rulemaking included comprehensive rock bolt standards in Title 30 Code of Federal Regulations (CFR) §§ 56/57.3203 which addressed the quality of rock fixtures and their installation. Roof and rock bolts and accessories are an integral part of ground control systems and are used to prevent the fall of roof, face, and ribs. Accidents involving falls of roof in underground mines or falls of highwall in surface mines have resulted in injuries and fatalities.

These standards currently require that metal and nonmetal mine operators obtain a certification from the manufacturer that rock bolts and accessories are manufactured and tested in accordance with the 1983 American Society for Testing and Materials (ASTM) publication "Standard Specification for Roof and Rock Bolts and Accessories" (ASTM F432-83). The ASTM standard for roof and rock bolts and accessories is a consensus standard used throughout the United States. It contains specifications for the chemical, mechanical, and dimensional requirements for roof and rock bolts and accessories used for ground support systems.

The manufacturer's certification is made available to an authorized representative of the Secretary to attest to the appropriate testing and manufacture of the rock bolts and accessories. Requiring that the mine operator obtain a certification from the manufacturer assures mine operators that the material they use meets technical requirements established to promote safety.

B. Underground Coal Mines

MSHA published a final rule on February 8, 1990, (55 FR 4592) revising paragraphs (a) and (b) of § 75.204. This standard references ASTM publication "Standard Specification for Roof and Rock Bolts and Accessories" (ASTM

F432-88), which was the most recent revision available at that time. The final rule also requires mine operators to obtain a certification from the manufacturer that roof bolts and accessories are manufactured and tested in accordance with ASTM F432-88. To comply with this rule, mine operators are required to provide the certification document, upon request, to an authorized representative of the Secretary to establish that their roof bolts are designed and tested in accordance with the ASTM standard.

This reference to the ASTM standard performs the same function as the reference to the 1983 ASTM standard for metal and nonmetal mining application. That is, the certificate assures mine operators that the material they use meets technical requirements established to promote safety.

III. Discussion

MSHA has found that the existing certification requirement has been successful in maintaining compliance with requirements for roof and rock bolts and accessories. MSHA is proposing to retain the certification requirement and to update existing §§ 56.3203, 57.3203, and 75.204 by replacing the references to outdated ASTM F432-83 and ASTM F432-88 with a new reference to ASTM F432-95.

MSHA participated in the development of ASTM F432-95 through active representation at meetings of the American Mining Congress (predecessor organization to the National Mining Association) Roof Support Group. It was that committee that prepared the revised document for consideration by ASTM. The committee was open to all manufacturers of roof and rock bolts and accessories, and considered comments from all participants in developing the new specifications. MSHA Technical Support personnel conducted both laboratory and field studies which provide supporting data for the various changes. This proposed rulemaking has been followed closely by the National Mining Association, the United Mine Workers of America, and the United Steelworkers, and the Agency does not anticipate any opposition.

MSHA is updating the standards because the Agency believes that ASTM F432-95 is more comprehensive than those referenced in existing standards, that it reflects advances in rock and roof bolt technology, and that it would provide better protection for miners than the standards currently in place. As discussed below, these revisions will not reduce the protection afforded miners by the MSHA standards currently in place.

A. New Products Addressed

ASTM F432-95 covers products not addressed by the current standards including grouting materials, large diameter bolts, thread deformed bars, and formable anchorage devices.

1. Grouting Materials

Grouting materials, which were not addressed by either ASTM F432-88 or ASTM F432-83, are extensively covered by ASTM F432-95. The term "grouting materials" is used in ASTM F432-95 to include any chemical materials (such as polyester, polyurethane, or epoxy resins) that are used to anchor mine roof bolts. While grouted bolts have been used successfully to support mine roofs since the 1970's, each manufacturer has a different method to describe proper application of grouting materials and their performance characteristics. This lack of standardization has caused confusion and occasional misapplication of a particular grout formulation and, therefore, has resulted in improperly grouted boreholes. Improperly grouted boreholes can result in poor bolt performance and, potentially, an inadequately supported roof. A survey of MSHA field personnel revealed that improper borehole grouting has been a contributing factor in roof fall accidents. Under ASTM F432-95, there are specific requirements regarding strength, cure rate, cartridge volume, and labeling that will standardize the production and application of grouting materials and reduce the likelihood that grouted bolts will be improperly installed.

2. Large Diameter Bolts

Similarly, large diameter bolts, ranging in size from 1 1/8 inch to 1 1/2 inch, are now addressed by ASTM F432-95. MSHA field personnel report that these large diameter bolts are growing in popularity and are being used in areas of adverse roof conditions where smaller diameter bolts would fail. ASTM F432-95 provides standard strength and thread tolerance limits that ensure minimum performance levels and the interchangeability of components produced by different manufacturers. Compatibility is essential in ensuring that components acquired from different sources function properly when used together, such as mechanical anchors from one manufacturer and bolts from another, and provide an adequate margin of safety.

3. Thread Deformed Bars and Formable Anchorage Devices

Two new technologies, thread deformed bars and formable anchorage

devices, also are addressed by ASTM F432-95. These bolting systems were not in use at the time ASTM F432-83 and ASTM F432-88 were adopted; but, their effectiveness has been demonstrated at a number of mines, which has led MSHA to approve their use in roof control plans. ASTM F432-95 provides specific manufacturing, strength, and identification requirements for these products to ensure that minimum performance levels are met and that reliable products are available to the mine operator. Updating the roof control standards which reference the ASTM specifications covering these systems would reduce the time required by mine operators to receive approval to use these devices in the roof control plan, and eliminate the need for repetitive and time consuming underground tests.

B. Additional Safety Benefits

ASTM F432-95 provides a number of additional safety benefits, including strength standards for couplers, tolerances for external and internal threads, dimensions for hardened washers, and bolt grading and identification systems.

1. Couplers

Couplers are devices which connect two bolt sections. ASTM F432-95 increases the strength standard for couplers and requires couplers to withstand the full breaking loads of the bolts with which they are used. In comparison, ASTM F432-88 requires only that couplers support the minimum yield and tensile loads of the connected bolts. In practice, roof bolt strengths often exceed the minimum strength requirements of ASTM F432-88 by a substantial margin, often in excess of 8,000 pounds. The new coupler requirements will ensure that the full strength of the bolting system is achieved and that catastrophic bolt failure, through premature coupler breakage, is prevented.

2. Internal and External Threads

New tolerances have been established under ASTM F432-95 for both external threads primarily used for bolts, as well as internal threads used in couplers, anchor plugs, and nuts. MSHA experience indicates that the current thread tolerances of ASTM F432-88 and ASTM F432-83 are relatively tight and have been linked to thread seizure problems occasionally experienced during the installation of tensioned roof bolts. Thread seizure or binding can be caused by expansion anchor compression on bolt threads or the jamming of threads by small metal

shards produced during the planned shearing of torque inhibiting pins or plugs. Thread seizure during roof bolt installation can significantly influence the torque-tension relationship. In turn, the torque check required by §§ 56.3203(f)(2), 57.3203(f)(2), and 75.204(f)(3), (4), and (5) may not indicate bolt tension accurately and, thus, fail to detect bolt installations that are not in compliance with those standards. The revised requirements of ASTM F432-95 would allow a slightly looser fit between mating threads (0.003 inch), which would reduce the possibility of thread seizure without affecting the strength of the component parts. The net result would be the improved reliability of roof bolt installations through more consistent bolt tensioning.

3. Hardened Washers

ASTM F432-95 provides revised dimensions and tolerances for hardened washers that are used to enhance the uniformity of installed roof bolt tension. Current dimensions listed in ASTM F432-83 and ASTM F432-88 are such that it is impossible to use hardened washers with many deformed bars because the center hole dimensions are too small. In addition, the restricted outside diameter (2 inches nominal) prevents the effective use of hardened washers with large diameter bolts (i.e., 1½ inch diameter) because of the grossly reduced bearing surface. The revised hardened washer dimensions of ASTM F432-95 are compatible with the bolts currently in use and ensure that the benefits of uniform bolt tension can be achieved with those systems.

4. Uniform Grading Systems

ASTM F432-95 also contains a revised bolt grading system that would cover existing products and establish grade intervals for high strength bolts that may be developed in the future. The current reference standards of ASTM F432-83 and ASTM F432-88 are limited to grades currently in use. This essentially precludes the immediate use of higher strength bolts. The use of higher strength bolts now requires often unnecessary and time consuming tests to allow for MSHA approval of these bolts for use in an individual mine.

In addition, the current system uses a single symbol for bolt head identification to designate both grade and diameter. Given the variety of bolting systems in use (5/8, 3/4, 7/8, 1, and 1½ inch diameters; grades 40, 55, 60, 75; plain and rebar bolts), a large number of symbols are used. Consequently, under the current system, identifying the grade and diameter of a

bolt used underground, from the bolt head, has become difficult and extremely confusing. This increases the potential for the inadvertent use of bolt types either not prescribed by the roof control plan or not suitable for the roof conditions encountered. The revised grading and identification system of ASTM F432-95 would allow for the introduction of new high strength bolting systems and make it easier for miners to verify the grade and diameter of the bolts in use by looking at the bolt head.

A grading system also has been established in ASTM F432-95 for threaded tapered plugs used in expansion anchors that specify minimum non-seizure and non-stripping loads for the bolt and plug threads. This system would enable mine operators to select expansion anchors with strength characteristics that are compatible with the bolting system in use, and ensure that thread seizure will not occur during bolt installation.

5. Low Strength Bolts

Finally, ASTM F432-95 would eliminate the use of low strength grade 30 bolts permitted by both ASTM F432-83 and 88, and delete certain chemical and grade requirements contained in those versions that unnecessarily restrict new technology. As a result, ASTM F432-95, through its improved specifications, would provide additional safety to miners as compared to the current specifications.

MSHA expects that the elimination of the use of grade 30 bolts would not adversely impact the mining industry. MSHA allows a year for mine operators to use existing inventory. Further, MSHA experience indicates that the majority of mine operators are no longer using the 30 grade bolts and that they are no longer being manufactured.

C. Existing Inventory

This proposal would allow mine operators to use inventories of roof support components meeting the design criteria of ASTM F432-83 and ASTM F432-88 for up to one year from the effective date of the final rule. After that year, only roof support components meeting ASTM F432-95 would be permitted to be installed. This one-year period will not result in a diminution of safety to miners and will allow mine operators, including small mines and seasonal operations, to exhaust existing supplies of roof support materials on site. It also would allow miners who use roof support materials to become sufficiently trained in the use of roof bolts and accessories that meet the requirements of ASTM F432-95. MSHA

specifically solicits comments from the mining community as to the suitability of this time period. MSHA is proposing that mine operators, however, could start using components meeting the ASTM F432-95 standard upon the effective date of the final rule.

MSHA also believes that the one-year time period gives sufficient time for roof bolt manufacturers to consume present tooling, exhaust inventories of products meeting current specifications, and produce and make available to mine operators quantities of roof bolts meeting the design criteria of ASTM F432-95. MSHA specifically solicits comments from the mining community on whether this time period is adequate to supply mine operators with the kind and quantity of roof bolts needed.

IV. Executive Order 12866 and Regulatory Flexibility Act

Executive Order 12866 requires that regulatory agencies assess both the costs and benefits of proposed regulations. MSHA estimates that the cost impact of the proposed rule is the same as under the existing rule. The primary benefit of the proposed rule is that it provides for advancements in roof bolt technology and, therefore, would increase protection for miners. MSHA has determined that this proposed rule does not meet the criteria of a significant regulatory action and, therefore, has not prepared a separate analysis of costs and benefits. The analysis contained in this preamble meets MSHA's responsibilities under Executive Order 12866 and the Regulatory Flexibility Act.

The Regulatory Flexibility Act (RFA) requires regulatory agencies to consider a rule's impact on small entities. Under the RFA, MSHA must use the Small Business Administration (SBA) definition for a small mine of 500 or fewer employees or, after consultation with the SBA Office of Advocacy, establish an alternative definition for the mining industry by publishing that definition in the **Federal Register** for notice and comment. MSHA traditionally has considered small mines to be those with fewer than 20 employees. For the purposes of the RFA and this certification, MSHA has analyzed the impact of the proposed rule on all mines, on those with fewer than 20 employees, and on those with fewer than 500 employees, and has concluded that there is no cost impact on the mining industry.

The Agency has provided a copy of this proposed rule and regulatory flexibility certification statement to the SBA Office of Advocacy. In addition, MSHA will mail a copy of the proposed rule, including the preamble and

regulatory flexibility certification statement, to all affected mine operators.

Regulatory Flexibility Certification

In accordance with section 605 of the RFA, MSHA certifies that this proposed rule would not have a significant economic impact on a substantial number of small entities. No small governmental jurisdictions or nonprofit organizations are affected.

Under the Small Business Regulatory Enforcement Fairness Act (SBREFA) amendments to the RFA, MSHA must include in the proposed rule a factual basis for this certification. The Agency also must publish the regulatory flexibility certification in the **Federal Register**, along with its factual basis.

Factual Basis for Certification

MSHA has used a qualitative approach in concluding that the proposed rule would not have a significant economic impact on a substantial number of small entities. MSHA anticipates that the cost of purchasing roof and rock bolts and accessories would not increase as a result of the proposed requirement that they meet the new ASTM specification (ASTM F432-95). This ASTM standard incorporates technological advances that are currently available and being used by the mining industry. Although MSHA does not expect any cost increases as a result of this proposed rule, there may be minimal costs which the Agency is not able to predict at this time. For this reason, MSHA solicits comments from the mining industry, especially small mines and roof bolt manufacturers, as to the impact of the proposed rule, both costs and benefits. With respect to costs, the Agency requests that commenters provide supporting information.

V. Unfunded Mandates Act

For purposes of the Unfunded Mandates Reform Act of 1995, as well as E.O. 12875, this proposed rule does not include any Federal mandate that may result in increased expenditures by State, local, and tribal governments, or increased expenditures by the private sector of more than \$100 million.

List of Subjects

30 *CFR* Parts 56 and 57

Mine safety and health, Surface mining, Underground mining.

30 *CFR* Part 75

Coal, Mine safety and health, Underground mining.

Dated: April 17, 1997.

J. Davitt McAteer,

Assistant Secretary for Mine Safety and Health.

For the reasons set out in the preamble, MSHA proposes to amend chapter I of title 30 of the Code of Federal Regulations as follows:

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.

2. Section 56.3203 is amended by revising the introductory text of paragraph (a), paragraph (a)(1), and the introductory text of paragraph (b) to read as follows:

§ 56.3203 Rock fixtures.

(a) On and after April 28, 1998, for rock bolts and accessories addressed in ASTM F432-95, "Standard Specification for Roof and Rock Bolts and Accessories," the mine operator shall—

(1) Obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-95; and

(2) * * *

(b) Fixtures and accessories not addressed in ASTM F432-95 may be used for ground support provided they—

* * * * *

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

3. The authority citation for part 57 continues to read as follows:

Authority: 30 U.S.C. 811.

4. Section 57.3203 is amended by revising the introductory text of paragraph (a), paragraph (a)(1), and the introductory text of paragraph (b) to read as follows:

§ 57.3203 Rock fixtures.

(a) On and after April 28, 1998, for rock bolts and accessories addressed in ASTM F432-95, "Standard Specification for Roof and Rock Bolts and Accessories," the mine operator shall—

(1) Obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-95; and

(2) * * *

(b) Fixtures and accessories not addressed in ASTM F432-95 may be

used for ground support provided they—

* * * * *

PART 75—MANDATORY SAFETY STANDARDS—UNDERGROUND COAL MINES

5. The authority citation for part 75 continues to read as follows:

Authority: 30 U.S.C. 811.

6. Section 75.204 is amended by revising the introductory text of

paragraph (a), paragraph (a)(1), and the introductory text of paragraph (b) to read as follows:

§ 75.204 Roof bolting.

(a) On and after April 28, 1998, for roof bolts and accessories addressed in ASTM F432-95, "Standard Specification for Roof and Rock Bolts and Accessories," the mine operator shall—

(1) Obtain a manufacturer's certification that the material was

manufactured and tested in accordance with the specifications of ASTM F432-95; and

(2) * * *

(b) Roof bolts and accessories not addressed in ASTM F432-95 may be used, provided that the use of such materials is approved by the District Manager based on—

* * * * *

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