DEPARTMENT OF LABOR

Mine Safety and Health Administration

30 CFR 56 and 75

RIN 1219-AB91

[Docket No. MSHA-2018-0016]

Safety Improvement Technologies for Mobile Equipment at Surface Mines, and for Belt Conveyors at Surface and Underground Mines

Agency: Mine Safety and Health Administration, Labor.

ACTION: Request for Information.

SUMMARY: Mining safety could be substantially improved by preventing accidents that involve mobile equipment at surface coal mines and metal and nonmetal mines and belt conveyors at surface and underground mines. The Mine Safety and Health Administration (MSHA) is taking a number of actions related to mobile equipment and belt conveyors to improve miners' safety, including providing technical assistance, conducting awareness campaigns, and developing best practices and training materials. MSHA is also considering the role of engineering controls that would increase the use of seatbelts, enhance equipment operators' ability to see all areas near the machine, warn equipment operators of potential collision hazards, prevent equipment

operators from driving over a highwall or dump point, and help prevent entanglement hazards related to working near moving or re-energized belt conveyors. MSHA is seeking information and data on engineering controls that could reduce the risk of accidents and improve miner safety. MSHA is also seeking suggestions from stakeholders on: best practices, training materials, policies and procedures, innovative technologies, and any other information they may have to improve safety in and around mobile equipment, and working near and around belt conveyors.

MSHA will hold stakeholder meetings to provide the mining community an opportunity to discuss and share information about the issues raised in this notice. A separate notice announcing stakeholder meetings will be published in the *Federal Register* at a later date.

DATES: Comments must be received or postmarked by midnight Eastern Daylight Time on [INSERT DATE 180 DAYS AFTER THE DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Comments must be identified with "RIN 1219-AB91" and may be sent to MSHA by any of the following methods:

- *Federal E Rulemaking Portal*: http://www.regulations.gov. Follow the on-line instructions for submitting comments.
- *E Mail*: zzMSHA-comments@dol.gov.
- *Mail*: MSHA, Office of Standards, Regulations, and Variances, 201 12th Street South, Suite 4E401, Arlington, Virginia 22202-5452.
- *Hand Delivery or Courier*: 201 12th Street South, Suite 4E401, Arlington, Virginia, between 9:00 a.m. and 5:00 p.m. Monday through Friday, except Federal holidays. Sign in at the receptionist's desk on the 4th floor East, Suite 4E401.
- *Fax*: 202-693-9441.

Instructions: All submissions must include "RIN 1219-AB91" or "Docket No. MSHA 2018-0016." Do not include personal information that you do not want publicly disclosed. MSHA will post all comments without change to http://www.regulations.gov and http://arlweb.msha.gov/currentcomments.asp, including any personal information provided.

Docket: For access to the docket to read comments and background information, go to http://www.regulations.gov, or http://www.msha.gov/currentcomments.asp. To review

comments and background information in person go to MSHA, Office of Standards, Regulations, and Variances, 201 12th Street South, Arlington, Virginia, between 9:00 a.m. and 5:00 p.m. EDT Monday through Friday, except Federal holidays. Sign in at the receptionist's desk on the 4th floor East, Suite 4E401.

Email Notification: To subscribe to receive an email notification when MSHA publishes rulemaking documents in the Federal Register, go to https://www.msha.gov/subscriptions.

FOR FURTHER INFORMATION CONTACT: Sheila A. McConnell, Director, Office of Standards, Regulations, and Variances, MSHA, at mcconnell.sheila.a@dol.gov (email), 202-693-9440 (voice), or 202-693-9441 (fax). These are not toll-free numbers.

Supplementary Information

I. Mobile Equipment at Surface Mines

Mobile equipment used at surface coal mines, surface metal and nonmetal mines, and the surface areas of underground mines is a broad category that includes bulldozers, front end loaders, service trucks, skid steers, haul trucks, and many other types of vehicles and equipment. Accidents involving mobile equipment have historically accounted for a large number of the fatalities

in mining, especially in metal and nonmetal mines. In 2017, for example, nearly 40 percent of the 28 mining fatalities and more than 30 percent of injuries involved mobile equipment.

Since 2007, 61 miners have been killed in accidents involving mobile equipment. MSHA conducted an investigation of all of these accidents. MSHA determined that contributing factors in many of these accidents included: 1) no seatbelt, seatbelt not used, or inadequate seatbelts; 2) larger vehicles striking smaller vehicles; and 3) equipment operators' difficulty in detecting the edges of highwalls or dump points, causing equipment to fall from substantial heights.

Seatbelts

MSHA has preliminarily determined that mobile equipment operators are more likely to survive rollover and tipping accidents when they are wearing a seatbelt. MSHA examined 38 fatal accidents that occurred since 2007 involving mobile equipment in which the deceased was not wearing a seatbelt. MSHA determined that 35 of the victims (92 percent) might have survived had they been wearing a seatbelt. The Agency believes that engineering controls could increase the use of seatbelts by equipment operators. For example, engineering control devices could ensure that

mobile equipment operators use a seatbelt by affecting equipment operation in the event the operator does not fasten the seatbelt.

Other engineering controls could increase equipment seatbelt use without impeding or halting machine operation. These controls include high-visibility seatbelt materials and warning devices, such as warning lights and audible warning signals,that remind the equipment operator to fasten the seatbelt. Some warning signals stop after a period of time; others continue until the seatbelt is fastened. Additional engineering controls could promote seatbelt usage by making equipment operation impractical or uncomfortable, or by notifying mine management if the seatbelt is not used (or not used properly).

Large Equipment Striking Smaller Equipment

There are areas around mobile equipment in which the equipment operator cannot see other miners, equipment, or structures (i.e., “blind areas”). Mobile equipment size and shape and the operator’s cab location can each create unique blind areas. Blind areas have contributed to mobile equipment operators driving over highwalls or dump points, colliding with other equipment, and striking miners. Engineering controls, such as collision warning systems and collision avoidance systems, could provide equipment

operators with additional information about their surroundings and help reduce accidents. These systems could provide warnings when other vehicles, miners, or structures pose a potential collision hazard. Collision avoidance systems could provide an additional level of safety by activating machine controls, such as automatic braking, to avoid collisions.

Autonomous mining systems may also have the potential to improve miner safety. Autonomous mining systems, which are controlled remotely, do not require an on-board operator, thereby removing the miner from hazardous situations. In addition, autonomous mining systems are equipped with GPS technology and use enhanced safety features, such as collision avoidance systems, which can indicate the location of other nearby equipment and miners, thereby reducing striking accidents and fatalities.

Highwalls and Dump Points

Since 2007, there have been 20 fatal accidents in surface coal and metal and nonmetal mines involving bulldozer operators and haul truck drivers who traveled over the edge of the highwall or dump point. Systems that integrate technologies such as GPS, radar, and radio frequency identification tagging could help equipment operators better identify the edges of highwalls or dump

points. Other practices, such as ground markers and aerial markers, also could help equipment operators identify their locations relative to the edges of highwalls or dump points when pushing or dumping material. Devices that provide visual, audible, or other signals could also warn equipment operators of hazards surrounding their locations.

II. Belt Conveyors at Surface and Underground Mines

Since 2007, there have been 17 fatalities related to working near or around belt conveyors, of which 76 percent were related to miners becoming entangled in belt drives, belt rollers, and discharge points. Factors that contribute to entanglement hazards include inadequate or missing guards, inadequate or an insufficient number of crossovers in strategic locations, and/or inappropriate lock out/tag out procedures. Systems that can sense a miner's presence in hazardous locations; ensure that machine guards are properly secured in place; and/or ensure machines are properly locked out and tagged out during maintenance would reduce fatalities.

IV. Information Request

MSHA is requesting information from the mining community regarding the types of engineering controls available, how to implement such engineering controls, and how these controls could be used in mobile equipment and belt conveyors to reduce accidents, fatalities and injuries. When responding—

- Address your comments to the topic and question number. For example, the response to questions regarding seatbelts, Question 1, would be identified as "A.1".
- Please provide sufficient detail in your responses to enable adequate Agency review and consideration. Where possible, include specific examples to support the rationale for your position.
- Please identify the relevant information on which you rely. Include experiences, data models, calculations, studies and articles, and standard professional practices.
- Please provide specific information on the technological and economic feasibility of the engineering and administrative controls included in

this notice, as well as any additional controls or practices which you may suggest.

MSHA invites comment in response to the questions below as well as on issues related specifically to the impact on small mines.

A. Seatbelts

Seat belt interlocks are engineering controls that prevent or otherwise affect equipment operation. MSHA is particularly interested in engineering controls that affect equipment operation when the seatbelt is not properly fastened.

1. What are the advantages, disadvantages, and costs associated with a seatbelt interlock system?
2. Are seatbelt interlock systems available that could be retrofitted, and if so, onto which types of machines and how? What are the costs associated with retrofitting machines with these systems?
3. Are some types of mobile equipment unsuited for use with seatbelt interlock systems, and if so, which machines and why?
4. Reliability is the ability of a system to perform repeatedly with the same result. Please provide information on how to determine the reliability of seatbelt interlock systems.

Some engineering controls encourage and promote seatbelt use without directly preventing or affecting equipment operation. These engineering controls include audible and visual warning devices, such as lights and buzzers/bells that remind equipment operators to fasten their seatbelts.

5. What are the advantages, disadvantages, and costs associated with these warning devices?

B. Collision Warning Systems and Collision Avoidance Systems

MSHA is also interested in collision warning systems and collision avoidance systems that may help prevent accidents by decreasing equipment blind areas and reducing collisions. These systems detect obstacles and provide the equipment operators with information about their location. The installation of the systems would likely need to be customized to account for variations in height, articulation, and other equipment design features. Such systems would likely also need to have the capability to adjust to mining conditions and environments such as road conditions, weather, and traffic patterns. They would also need to be designed and installed to minimize distractions such as nuisance alarms and unnecessary stops, and to be compatible with other technologies, such as GPS, radar,

radio frequency identification tagging, electromagnetic systems, cameras, peer-to-peer networks, and path prediction technologies.

6. What are the advantages, disadvantages, and costs associated with collision warning systems and collision avoidance systems?
7. Please provide information on how collision warning systems and collision avoidance systems can protect miners, e.g., warning, stopping the equipment, or other protection. Include your rationale. Include successes or failures, if applicable.
8. What types of mobile equipment can, and should, be equipped with collision warning and collision avoidance systems? For example, systems that work well on haul trucks may not work well on other mobile equipment; certain types of equipment may be more likely to be used near smaller vehicles; or some types of equipment may have larger blind areas.
9. Collision warning systems and collision avoidance systems may require multiple technologies that combine positioning/location, obstacle detection, path prediction, peer-to-peer communication, or alarm functions. What combination of technologies

would be most effective in surface mining conditions? Please provide your rationale.

10. Please describe situations, if any, in which it would be appropriate to use a collision warning system rather than a collision avoidance system.
11. Please describe any differences between a surface coal environment and a surface metal and nonmetal environment that would influence your response to the questions above.

C. Highwall and Dump Points

Various technologies, such as GPS, can be used to provide equipment operators better information regarding their location in relation to the edge of highwalls or dump points. Other mechanisms, such as ground markers and aerial markers, also could help equipment operators identify their location when pushing or dumping material.

12. Which technologies or systems can prevent highwall and dump point overtravel? Please describe the advantages, disadvantages, and costs associated with these technologies or systems.
13. Many surface mines use GPS on equipment for tracking, dispatching, and positioning. How can these systems be used to provide equipment

operators better information on their location with respect to highwall or dump points?

14. What are the advantages, disadvantages, and costs associated with ground and aerial markers?

D. Autonomous Mobile Equipment

15. Please identify the types of autonomous mobile equipment in use at surface mines.

16. Please describe the advantages and disadvantages associated with autonomous mobile equipment.

17. Please provide information related to any experience with testing or implementing autonomous mobile equipment, including costs and benefits.

E. Belt Conveyors

18. What technologies are available that could provide additional protections from accidents related to working near or around belt conveyors? Can these technologies be used in surface and underground mines?

19. Please provide information related to any experience with testing or implementing systems that sense a miner's presence in hazardous locations; ensure that machine guards are properly secured in place; and/or ensure machines are

properly locked out and tagged out during maintenance. Please also include information and data on the costs and benefits associated with these systems.

F. Training and Technical Assistance

20. Please provide suggestions on how training can increase seatbelt use and improve equipment operators' awareness of hazards at the mine site.

21. Please provide suggestions on how training can ensure that miners lock and tag conveyor belts before performing maintenance work.

G. Benefits and Costs

MSHA requests comment on the costs, benefits, and the technological and economic feasibility of suggested engineering controls to improve miners' safety. Your answers to these questions will help MSHA evaluate options and determine an appropriate course of action.

H. Other Information

22. Please provide any data or information that may be useful to MSHA to determine non-regulatory initiatives the Agency should explore.

Authority: 30 U.S.C. 811, 813(h).

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