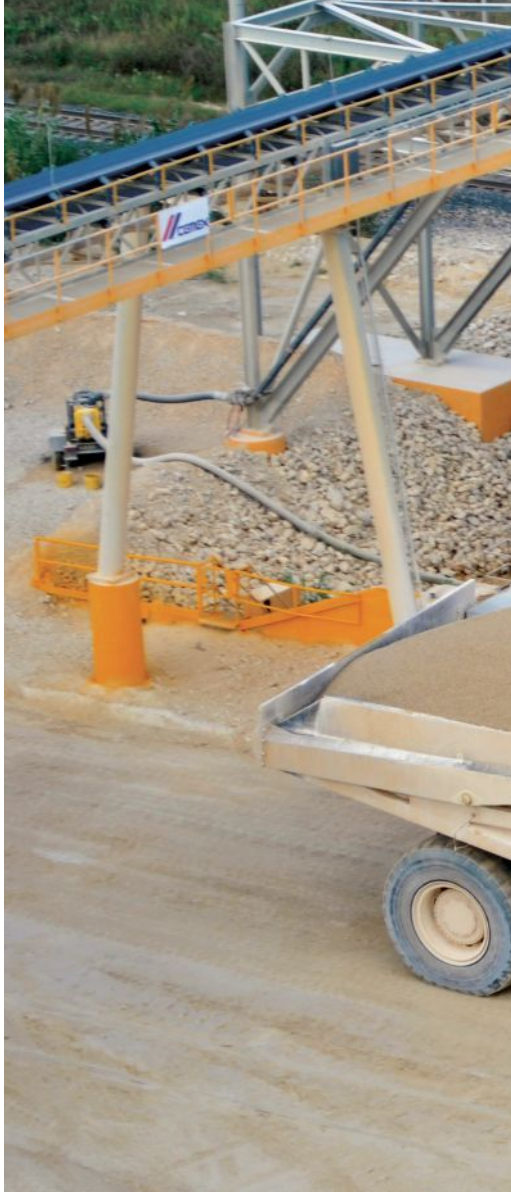
DEVELOPING A PLAYBOOK ON POWERED HAULAGE SAFETY



With a proposed rule targeting surface mobile and powered haulage equipment, the National Institute for Occupational Safety & Health has several tools available that can be incorporated into safety programs

BY **BRIANNA M. EITER** & **MAHIYAR NASARWANJI**

Surface mines are dynamic, challenging work environments involving diverse work activities, the use of complex machinery and a range of mobile and powered haulage equipment.

Between 2003 and 2018, 109 of 739 (15 percent) fatalities at U.S. mines were caused by hazards related to working near or operating mobile and powered haulage equipment at mines employing six or more miners. In the same period, 1,543 nonfatal injuries occurred involving surface mobile equipment at mines employing more than six miners.

MSHA'S PROPOSED RULE

In 2018, MSHA published a request for information (RFI) to gather details from the mining community on the availability, implementation and use of engineering controls in mobile equipment and belt conveyors.

To address the RFI, MSHA last September announced a proposed rule requiring that mine operators employing six or more mine workers develop, implement and update a written safety program for surface mobile and powered haulage equipment.

The purpose of a safety program is to prevent workplace injuries, illnesses and deaths. An effective safety program uses proactive approaches to manage workplace safety and health. A proactive approach includes looking for and fixing hazards before injuries or illnesses are caused, as opposed to taking a reactive approach where hazards are addressed after a mine worker is injured, becomes sick or dies.

Within MSHA's proposed rule, there are four types of actions mine operators must include in the written safety program:

1. Identify and analyze hazards and reduce the resulting risks related to the movement and operation of surface mobile equipment

2. Develop and maintain procedures and schedules for routine maintenance and non-routine repairs for surface mobile equipment

3. Identify available and newly emerging feasible technologies that can enhance safety and evaluate whether to adopt them

4. Train miners and others to identify and address or avoid hazards related to surface mobile equipment

As the industry

P&Q STAFF

The National Institute for Occupational Safety & Health's ErgoMine app provides an entire audit dedicated to haul trucks.

awaits the final declaration of the MSHA rule, the National Institute for Occupational Safety & Health (NIOSH) has several products available aimed at proactively improving the recognition of hazards related to surface mobile equipment. These products are ready for use and can easily be adapted to address mine site-specific needs – and then incorporated into a safety program.

Three of these NIOSH products are EXAMiner, ErgoMine, and Safety & Health Toolbox Talks.

EXAMINER

EXAMiner is a hazard recognition training software that provides mine workers the opportunity to practice searching for hazards in virtual work environments.

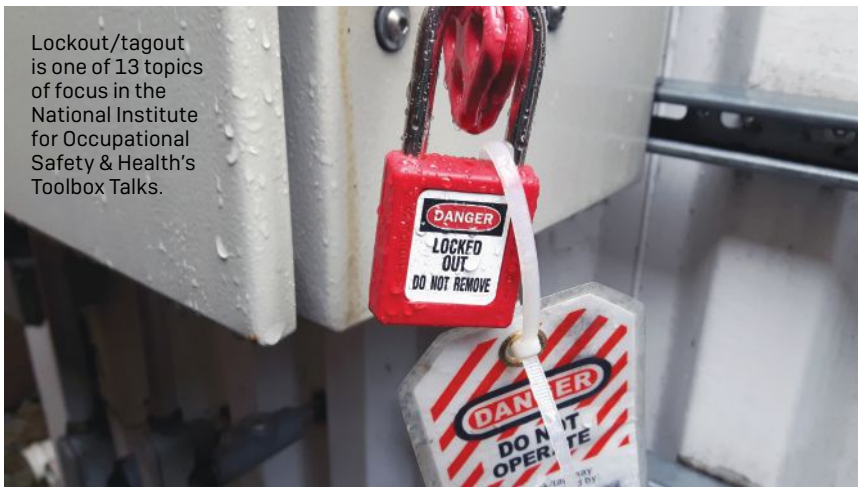
These work environments are represented as panoramic scenes of different mine locations that workers search with the goal of finding hazards. After completing a search, mine workers are provided with feedback on their performance, along with information about the hazards.

EXAMiner is a versatile tool giving users the opportunity to customize hazard recognition training in several ways. First, EXAMiner comes with pre-loaded NIOSH scenes that trainers can use to create custom training content focused on specific work environments or hazard types. Work environments in the pre-loaded NIOSH scenes include the pit, plant, shop, roadways and haul roads.

Trainers can use NIOSH-developed scenarios during training. Each NIOSH scenario is focused on one incident type and made up of NIOSH scenes that include hazards specific to that incident type. While there are other hazards unrelated to the scenario's specific incident type included in the scenes, mine workers are instructed to search scenes only for the hazards associated with the focus incident type.

After completing a scenario, a debrief session gives trainers the opportunity to reinforce information about the hazards with mine workers. Additionally, trainers can fully customize their hazard recognition training content by uploading images of their own work environments into EXAMiner to create mine-specific hazard scenes.

When using this functionality, trainers can upload images that vary in size, location, number and type of hazard. Trainers can also include supplemental information with each hazard to reinforce learning.



Lockout/tagout is one of 13 topics of focus in the National Institute for Occupational Safety & Health's Toolbox Talks.

NIOSH developed EXAMiner as a practical tool for mine operators to train mine workers to search for and find mine hazards. EXAMiner can be readily incorporated into a safety program to address surface mobile equipment.

NIOSH scenes represent a variety of jobsites found at typical surface limestone mines. Many of these scenes focus on incident types and hazards related to surface mobile equipment. Mine operators can, therefore, use NIOSH scenes to build scenarios to train all workers to identify hazards related to surface mobile equipment.

EXAMiner also gives mine operators the ability to create custom training materials based on specific types of mobile equipment or unique work processes used at their sites by uploading their own images into the software. Using this functionality gives mine operators the opportunity to highlight site-specific hazards and draw attention to mine locations or tasks where workers are at increased risk of exposure to mobile equipment.

In addition, training materials can easily be updated as mobile equipment changes and mining progresses because mine operators are able to continuously upload new images and create new materials using EXAMiner.

ERGOMINE

ErgoMine, meanwhile, is a mobile application designed for the mining industry to help mine workers and mine safety and health professionals conduct safety and ergonomics evaluations, with the goal of preventing injuries, illnesses and fatalities.

ErgoMine is designed for both iOS and Android and can be used on smartphones and tablets. The app has four main components: safety and ergonomics audits; slip, trip and fall prevention checklists; musculoskeletal disorder (MSD) assessment forms; and a fix list to document hazards and track hazard remediation.

The app helps users conduct thorough safety and ergonomics audits for haul trucks, bagging operations and maintenance and repair work. Each audit is divided into sections, and users respond to simple questions to audit the workplace.

After conducting an audit using ErgoMine, the app automatically generates recommendations to help users fix any hazards identified. The slip, trip and fall prevention checklists help users identify hazards on walkways, stairs and fixed ladders. Like the ergonomics audits, the app automatically generates recommendations to help remediate any hazards identified based on the responses to the checklist items.

The recommendations, along with responses to the audit and checklist items, can be emailed to anyone directly from the app.

MSD forms include a hand tool assessment, manual tasks assessment, ergonomic workplace improvements assessment, risk factor reporting card and a musculoskeletal symptom evaluation based on the Nordic Musculoskeletal Questionnaire. All of the MSD assessment forms help identify the key risk factors associated with overexertion injuries and MSDs, which include forceful exertions, extreme postures and repetitive tasks.

The fix list can be used to make note of hazards identified when using the app, and users can add in any other hazard they identified. The fix list helps track the needed changes, and the hazards can be checked off the list once fixed. Throughout the app, users can take pictures of the hazards identified to help document and track them.

NIOSH developed ErgoMine as a tool that can be used by mine workers to conduct safety and ergonomic evaluations at mines – even those with varying levels of safety and ergonomics knowledge. ErgoMine helps with the first item that mine operators need to include in a written safety program – namely, to proactively identify, collect and review information about hazards at mines.

ErgoMine takes it a step further by providing recommendations to help fix the hazards. It provides an entire audit dedicated to haul trucks, which are often associated with injuries and fatalities. The haul truck audit includes all aspects of use, including training, policy, roads, pre-shift inspections, ingress and egress, driving, cab layout, loading and dumping. Most elements of the haul truck audit could also be used

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for other mobile equipment.

The maintenance and repair audit, ladder checklist and MSD assessment forms could also be used to identify hazards related to mobile equipment use for tasks such as ingress and egress, refueling, and routine and unscheduled maintenance and repair.

Keeping track of hazards and ensuring they are fixed in a timely manner is also an essential part of a safety program. The fix list in ErgoMine allows users to enter any hazard they identify in the workplace, take a picture of it and track if the hazard is fixed.

TOOLBOX TALKS

Safety & Health Toolbox Talks provides materials for a series of presentations and discussions about safety- and health-related topics at surface mines.

Each of the 13 topics includes information that can be shared with miners along with questions to encourage discussion about hazards miners may encounter in their work environments. Toolbox Talks are based on a combination of information, including interviews with stone, sand and gravel mine workers about hazards and risks at their worksite, as well as MSHA nonfatal and fatal injury data. Topics include slips and falls, ground control, lockout/tagout, customer traffic, seat belts and powered haulage. Toolbox Talks are available as an interactive web-based tool, as an Android app and as a PDF file.

NIOSH developed Toolbox Talks as a tool supervisors or foremen can use to inform and engage miners about safety and health topics at mines. The tool not only trains miners about safety and health hazards, but it can be used to start a discussion about safety and health as it relates to the unique hazards at a worksite.

The Toolbox Talks are suited for a brief safety talk during the workday when miners can be reminded about specific safety and health hazards or be informed of site-specific hazards. The Toolbox Talks can also be used as part of a more detailed training session, such as the annual refresher training.

Toolbox Talks has modules related to traffic, seat belts and powered haulage. Hence, they can be used as part of a safety program to train miners to be aware, identify and address or avoid hazards related to surface mobile equipment.

GOING FORWARD

Before formalizing its proposed rule, MSHA sought comments and feedback from the mining community to determine the best approach to safety programs for surface mobile equipment.

Within the proposed rule, MSHA indicates that keeping programs flexible – not imposing mandates – and allowing mine operators to develop their own safety programs is essential to success. While MSHA endeavors to finalize the proposed rule, NIOSH already provides tools that can be used as part of a safety program. Access all three NIOSH tools at cdc.gov/niosh/mining/works. **P&Q**

Brianna M. Eiter and Mahiyar Nasarwanji are with the National Institute for Occupational Safety & Health. The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the NIOSH, Centers for Disease Control & Prevention. Mention of any company or product does not constitute endorsement by NIOSH.

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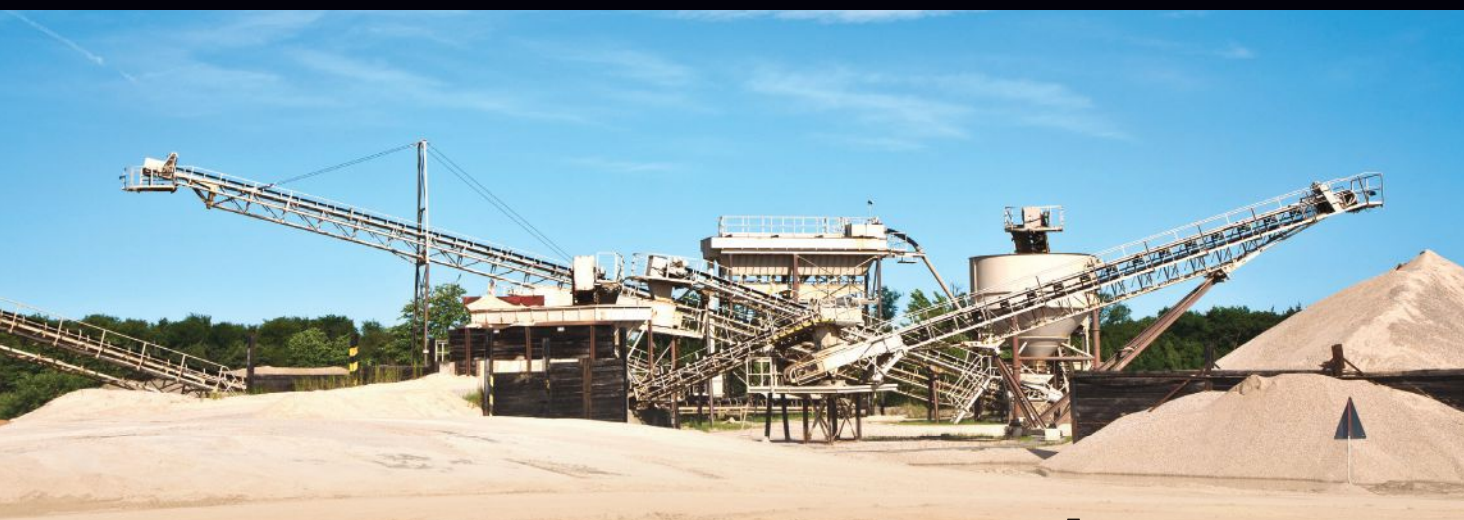

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