UNDERSTANDING WHY WORKERS FALL

Falls are an imminent danger in mining, but having protection equipment and the know-how to use it is the recipe to avoid accidents

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A good fall protection program incorporates not only the use of personal fall protection systems, but solutions to identify, mitigate or eliminate fall hazards.

These solutions may include the elimination of fall hazards through safe work design, bringing the work down to a safe level, the use of guardrails or barriers to mitigate fall risks, and teaching workers how to recognize and plan for fall hazards in their work activities.

Personal fall protection is often the last line of defense for mine workers who work at heights. Still, knowing when and how to use personal fall protection can be the difference between life and death.

ABOUT FALLS

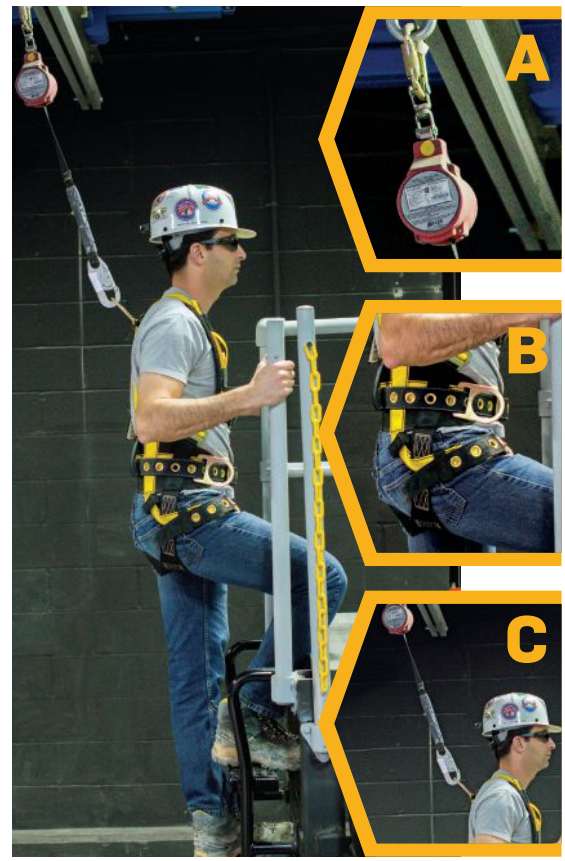
Falls continue to make up a large portion of fatal injuries in mining, and they're the second-leading cause of nonfatal injuries that occur at mine sites.

In fact, the classification of "slip or fall of person" accounted for 55 of the 479 fatal injuries (11 percent) at U.S. mines from 2006 through 2015. Nearly 60 percent of all fatal slips or falls could be attributed to falls from heights. Most of these falls from heights occurred when a mine worker fell through an opening, the failure of a floor or equipment, when a mine worker was ejected or thrown from equipment, or from some other unexpected movement that ultimately led to the worker falling.

The proper use of fall protection could have prevented nearly one-third of these fatal falls. Given that falls continue to be a significant problem, there is a need to better understand them as well as the circumstances leading up to these events.

Injury reports and records of investigations from injuries and fatality analyses can be useful to identify trends over time. For example, a previous analysis of fatal

FALL PROTECTION AS SIMPLE AS A-B-C



Source: NIOSH

A. Anchor. Ensure that the tie-off point, consisting of either an anchorage and anchorage connector or a life line, is directly overhead.

B. Body harness. Be certain to use a full body harness that is sized to fit your height and weight, with a D-ring on the back to attach the lanyard snap-hook. The correct fit adjustments of the straps around the thighs, pelvis, waist and shoulders are critical to the performance of the system.

C. Connecting device. Select the appropriate device between the anchorage connector or lifeline and the D-ring of the full body harness that best suits the conditions of the work environment. Consider the fall distance and the work activity to be performed when making the selection.

ALL IMAGES: NIOSH

slips, trips and falls by the National Institute for Occupational Safety & Health (NIOSH) identified factors such as job type (i.e., laborers, equipment operators, mechanics, truck drivers), what tasks were being performed (i.e., maintenance and repair, operations, construction), and the cause of fatalities (i.e., fall from height, fall from stairs or ladders, fall from equipment). The analysis also identified contributing factors associated with slips, trips and falls such as lack of or misuse of fall protection, equipment failure, inadequate use of barriers, and inadequate operating procedures.

To build on earlier work and provide additional insight into factors leading up to falls, NIOSH researchers performed an analysis of imminent danger orders issued by the Mine Safety & Health Administration (MSHA) in the metal/nonmetal mining sector from 2010 to 2017. Imminent danger orders, much like fatal and nonfatal injury records, can

FALL PROTECTION AS EASY AS 1-2-3

1. Select & Inspect. Select a stable anchorage and connector with the required strength, a full body harness that fits, and a lanyard type and length based on the application and distance. Inspect your harness and lanyard for wear. Remove all damaged items.

2. Put on. Put on your full body harness and make the necessary adjustments for a correct fit. A proper fit of the straps around the thighs, pelvis, waist and shoulders is critical to the performance of the system.

3. Tie off. Attach the lanyard to the full body harness D-ring first and then connect the snap-hook of the lanyard to the anchorage connector or lifeline.

Source: NIOSH, Centers for Disease Control & Prevention.

SAFETY
FALL PROTECTION

provide insight into factors related to falls and help build a clearer picture of how these life-threatening situations occur.

WHAT ARE IMMINENT DANGER ORDERS?

Within the Federal Mine Safety & Health Act of 1977, imminent danger is defined as "the existence of any condition or practice in a coal or other mine which could reasonably be expected to cause death or serious physical harm before such condition or practice can be abated."

To protect mine workers from these conditions, MSHA can issue imminent danger orders to immediately remove mine workers from high-risk areas. Once issued, an imminent danger order serves as an immediate withdrawal order from the adverse condition and may cover an affected service area, equipment or activity.

Orders may be issued verbally in person or over the phone if MSHA receives a hazard complaint. But they are not applicable to an incident that already occurred.

Imminent danger orders are typically issued verbally first, then made into written orders that identify the imminent danger situation. The orders must include the person to whom the order was issued, the time and date when the order was issued, a short descriptive narrative of the hazardous conditions that constitute imminent danger, and a description of the area where mine workers were withdrawn from and are prohibited from entering or re-entering until the hazard is remediated.

ANALYSIS OF IMMINENT DANGER ORDERS

Between 2010 and 2017, MSHA issued 1,999 imminent danger orders at surface and underground metal/nonmetal mine sites. Of the 1,999 orders, 1,793 (90 percent) were issued at surface mines, and the remaining 206 orders were issued at underground mine sites.

NIOSH researchers built a classification system based on MSHA's "Classification of Mine Accidents" to categorize the data and identify the circumstance that predominantly contributed to the issuance of the imminent danger order. More than half (1,007) of the original 1,999 orders were classified into the category of "slip or fall of person."

Following this initial classification, an additional coding scheme was applied to the cases within the "slip or fall of person" category to determine the primary and secondary factors for issuing the imminent danger order; the working surface (location) of the order; and the activity being conducted at the time of the order.

FINDINGS

The analysis revealed that fall protection was the primary factor for issuing the fall-related imminent danger orders and was usually due to a worker not using fall protection – accounting

for nearly 74 percent of cases.

The top five work locations attributed to fall-related imminent danger orders were truck, conveyor, screen, crusher and highwall. These work surfaces were grouped based on the type of work and location into three common work situations: working on a truck, working in a plant area, and working near a highwall.

While the analysis of imminent danger orders in this study revealed that, in most cases, appropriate use of fall protection may have allowed the worker to perform the task safely, consideration of the workplace design may also help to eliminate the fall risk and need for fall protection. Truck drivers, for example, should not have to put themselves in fall-from-height situations to remove excess materials due to poor loading practices. Moreover, providing tarping or hatching stations may eliminate the need for fall protection when tarping a load or opening and closing hatches.

These findings indicate that not using fall protection and the improper use of fall protection remains a significant problem in the mining industry. However, the results do not explain why mine workers may not always choose to use fall protection when it is provided.

REINFORCING PROPER USE

As a first step toward preventing fall-related imminent danger situations, it is essential that mine workers know how to safely use their personal fall protection equipment and when its use is necessary.

To help reinforce the proper use of personal fall protection, NIOSH developed two infographics on fall protection ("As Simple as ABC" and "As Easy as 123" that may be posted in useful areas.

The infographics provide a simple way to remember the three key components of personal fall protection equipment and three easy steps to appropriately use fall protection. Visit "Slip, Trip & Fall Prevention for Mining" at cdc.gov/niosh/mining/content/STFprevention.html for more information. **P&Q**

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