Technology News

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New Ideas For Keeping Miners Away From Unsupported Roof

Objective

Improve the health and safety of underground mine workers by finding ways of keeping them away from unsupported areas of the mine.

Background

Roof falls have been the leading cause of fatal accidents in the underground coal mining industry. During 1985-89, 92 coal miners were killed by falls of roof and rib, with more than 4,000 miners injured. According to accident investigation reports from the Mine Safety and Health Administration, 47% of the victims of these fatal roof fall accidents were in the area of unsupported roof at the time they were killed. There is an urgent need to find out why miners go under unsupported roof and to devise strategies for preventing this unsafe behavior.

Approach

To discover what can be done to prevent miners from going under unsupported roof, confidential interviews were conducted with 297 miners who work in the face crews of 6 different coal mines. The interview topics included company policies and actions regarding going under unsupported roof, how foremen react to people who go under unsupported roof, circumstances likely to cause some people to go under unsupported roof and how to prevent these situations, and observations concerning those who go under unsupported roof.

Interview Findings

The following are a few of the findings from the interviews:

(1) When asked how likely it is that their foreman would report them if he or she saw them go under unsupported roof twice within the same week, 53% of the interviewed miners indicated "likely," 22% said they had no idea, and 25% said "unlikely."

(2) 82% stated that they could recall an instance in which they had unintentionally gone under unsupported roof. Of those who could recall such an instance, 24% indicated that the most recent incident had occurred within the past month.

(3) 49% indicated that they had seen a coworker under unsupported roof within the past 6 months. Of those who reported having observed this, 72% stated that they believed the person was aware that he or she was inby supports, i.e., that it was an intentional act. When asked what the coworker was doing while under unsupported roof, the activities mentioned most frequently were:

- Walking through unbolted crosscuts
- Operating a continuous miner

- Hanging or extending ventilation tube
- Retrieving things left laying on the ground
- Marking the roof for bolts
- Rock dusting
- Operating a scoop
- Repairing or restoring power to a remote continuous miner
- Examining a roof fall
- Operating a roof bolter.

The interviewees identified several ways to modify equipment and work procedures that would hopefully eliminate many of the circumstances that cause people to go under unsupported roof. One problem is the proper positioning of a roof bolting machine prior to installing a new row of bolts. Going inby the last row of bolts to measure and mark the roof prior to installing the next row of bolts is unsafe because unsupported roof could unexpectedly fall on the person measuring the roof.

One employee at a coal mine in eastern Ohio came up with an innovative idea for eliminating the need for anyone to get close to unsupported roof in order to determine the proper spacing between rows of bolts. He suggested welding flexible wire antennas onto the bolter's temporary roof support system. These antennas serve as a convenient gauge for determining whether the next row of bolts is going to be spaced the appropriate distance from the rib and from the last row of bolts bordering the area of unsupported roof. This simple equipment modification allows bolting machine operators to establish the proper spacing between bolts quickly and accurately, and eliminates the need for anyone to go near unsupported roof to take measurements.

If you are aware of any changes in equipment or work procedures that would help to keep miners from going under unsupported roof, please contact Robert H. Peters at the address given below.

For more Information

U.S. Bureau of Mines Information Circular (IC) 9300, "Miners' Views About Why People Go Under Unsupported Roof and How To Stop Them," by Robert H. Peters identifies several situations that are apt to tempt workers to perform things under unsupported roof and lists the ideas proposed by miners to prevent these situations. Another recently published Bureau report that also pertains to this topic is IC 9283, "Strategies for Encouraging Miners To Stay Away From Unsupported Roof and Perform Self-Protective Actions," also by Robert H. Peters. This report provides guidance to mining companies in the form of four techniques for influencing miners to avoid unsafe acts as going under unsupported roof: (1) incentives and feedback, (2) disciplinary actions, (3) training, and (4) nondirective techniques.

A single free copy of the above publications may be obtained by writing to the Bureau's Publication Distribution Section, P.O. Box 18070, Cochrans Mill Road, Pittsburgh, PA 15236. Additional information may be obtained by contacting:

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Figure 1.—Antenna used by bolting machine operators to gauge the distance between rows of bolts. Arrow indicates antenna. (Courtesy Jerry Taylor, Ohio Valley Coal Co., Powhatan No. 6 Mine.)