
From: Moore, Todd [mailto:ToddMoore@consolenergy.com]
Sent: Wednesday, March 31, 2010 9:29 AM
To: zzMSHA-Standards - Comments to Fed Reg Group
Subject: RIN 1219-AB65

2010 MAR 31 A 12: 06

The attached comments are offered in response to the MSHA "Request for Information" dated February 1, 2010, regarding the use of proximity detection systems in underground coal mines.

These comments are being submitted by Todd Moore, on behalf of Consol Energy, located at CNX Center, 1000 Consol Energy Drive, Canonsburg PA, 15317.

Please contact me if you have any questions or require any additional comment.

Thank you for allowing us to comment on this issue.

Sincerely,

J. Todd Moore
Consol Energy
Director-Safety Services
724-485-4387 office
304-281-9721 cell

AB65-COMM-5

Proximity Detection Systems

3/31/2010

1. Ultimately the best protection will be "Smart" systems which would not allow the machine to function in any manner that could injure the operator or other miner. Since this technology does not yet exist, the system should stop relevant machine motion, not a complete E Stop, when stop zone is intruded. This will be important for efficient operation. For example, when moving from place to place, miners must approach hazardous locations relevant to the RCCM to hang trailing cables. The miner needs to be able to walk up, hang the cable, and retreat from the RCCM not causing an EStop condition which requires additional time to restart the pump. In the event that the PD system fails, the RCCM should default to the lowest tram speed until repairs to the PD System are made, similar to how continuous methane monitors were initially implemented on continuous miners.

Rational- PD Systems have been in existence for several years but very little actual testing has been accomplished in UG mining due to repeated system failures.

2. Motion sensing systems (with ultra sonic), heat sensing systems (infra-red), radar systems, laser systems and any other potential systems to inhibit accidental contact of the RCCM and the operator or other miner should be explored before concluding that electromagnetic field based systems are required..
3. Industry normally considers acceptable reliability to be 99.5% or greater, availability for all components for a monitoring system. This is based on: $[(\text{Minutes RCCM available for active operation}) - (\text{Minutes PD system delays operation})] + [\text{Minutes RCCM available for active operation}]$.

Maybe discuss this being a training service.

4. Prox. System failures should stop RCCM operation. The PD System should continuously check itself for operation. This could include communications, field generation, field sensing, etc and could include adaptive learning to improve these checks. Also, visual and audible indicators should be used to assist the first steps to trouble shooting. Once PD System failure has been identified, miner tram should default to the lowest tram speed until corrected.

At the start of each shift and each time that the RCCM is energized i.e. Power Supply Disruption, Breaker Trip. Each person that is working in close proximity to the miner will intentionally activate the PD System by entering into the Stop Zone and observing a PD Stop of the RCCM; similar to all other pre-op checks.

5. The System should be included in the weekly permissibility examinations and the qualified maintenance person should do the checks. The checks should include verification of basic operation and quick verification of the most important zone geometries.
6. We have discussed extensively and until live operating feedback is received, we believe the System should only provide a Stop function for miner operators and include a warning added for other miners.
7. Potential hazard areas must be closely and intensely studied in all differing heights of coal seam thicknesses and mining widths. Additionally all mining methods and types must be studied to ensure that the PD hazard area does not eliminate or reduce current "Safe Operators Locations" and as a result "Flush" the operator or other miners out of a currently safe location. This could place them in a more dangerous location.

In depth studies must be conducted to determine best sizes and shapes of zones before PD Systems are required so as to prevent the occurrence of accidents caused by poorly conceived zones.

8. With the exception of the fatals that occurred during maintenance, most fatals have occurred, I believe, when the miner was being trammed from mining place to mining place in high speed tram. Due to this fact, the Protection Zones must be the largest when the RCCM is in high tram mode. All other zones must be carefully studied as described in Item7 above.
9. Until the "Smart" systems, described in Item1 are developed, it will be very difficult to prevent "maintenance" type RCCM accidents by the installation of current PD technology. In most of these maintenance events, multiple persons were involved and the victim was in a hazardous location. The PD system could be developed to limit stop zone intrusions to one person or location for maintenance functions.
10. Override functions must be provided for any type of PD System. Possible scenarios include:
 - a) System failure which allows a miner to become trapped, pinned or crushed by the machine resulting in the need to operate the machine while the individual is in the Stop Zone.
 - b) PD System failure when deteriorating roof conditions dictate the immediate relocation of the RCCM to prevent possible "covering up" of the RCCM due to roof falls.
 - c) Any other scenarios that would increase the hazard to miners when the PD System is active or is preventing the emergency movement of the RCCM.
11. Possible sources of interference include: VHF radios, UHF radios, magnetic sources, methane monitors, CO monitors, iron rich water.

Known sources of interference include: VFDs, parasitic coupling to; cables, waterlines, wire mesh, roof bolts, roof straps and any other metallic objects.

Systems must be designed and tested with these possible and known sources of interference before a requirement for PD is issued.

12. Currently PD Systems must be limited to RCCMs that are considered "Place Change" miners and that do not have integral bolters attached to them. Some RCCMs are operated with 2 integral roof bolt stations (one operator on each side), and 2 rib pinning stations (one operator on each side). When you combine the RCCM operator and a tube/vent man that continually works around the RCCM, it quickly becomes obvious that a PD System that would protect all 6 persons would require so many "Quiet" zones that it would actually provide protection to no one and possibly raise the hazard to each person.
13. Same as Item 12 above.
14. PD Systems for equipment other than RCCMs must be developed, tested and evaluated in the same manner as the PD Systems for RCCMs, i.e. all seam heights, mining widths, mining practices, worker locations, equipment speed, etc.

PD Systems must be designed to inhibit accidental contact with mining equipment, while still allowing "intentional contact" by miners that are required to contact the machine in the performance

of their normal duties. I.e. roof bolters, coal hauler operators, shuttle car operators, loading machine operators, scoop operators, scoop "hook-up men", ECT.

15. The PD system for a non-remote controlled machine could take into account the visibility limitations which result from the operators fixed position. This could extend the range of a stop zone from hazardous positions due to possible crushing injury to areas where the operator has no visibility and might contact the miner.
16. Due to the fact that the operation of PD systems on two separate pieces of UG equipment has yet to be attempted or tested in the U.S.A. there is no "experience" to rely on for answering this question. This fact further illustrates the need for additional testing of these systems before a requirement of these systems on UG equipment can safely be made. In addition to the lack of testing of two pieces of PD protected equipment, I believe that no testing has been conducted on PD systems utilizing more than one or possibly two personal wearable pads (PWDs).
17. Once again it must be stated that NO experience has been gained in the U.S.A. related to this question due to the fact that no adequate testing has yet to be conducted in the U.S.A. utilizing multiple systems on multiple pieces of equipment and NO experience has been gained in the U.S.A. on the effect that multiple PWDs will have on these systems.
18. Due the fact that these are devices built by man, it is a fact that these devices can and will fail. Because of these two facts PD systems must be used as "TRAINING DEVICES ONLY" and cannot be used as a failsafe device that can be relied on by the miners to "protect" them from being crushed or pinned by the piece of equipment that has a PD system installed on it. Miners must be made aware of this simple fact and instructed never to assume that the machine will automatically stop before crushing or pinning them against the rib.
19. Miners must be trained as stated above. As with all equipment and job duties, task training must be provided and annual retraining would be required.
20. The mere fact that MSHA choose to make the statement "For example, would the operator need to operate the machine from a different location, such as one that might introduce additional hazards, to remain outside of a predefined danger zone?" in this "request for information" absolutely reinforces the fact that much more development and testing must be completed to ensure that we do not move the operator or other miners from an area of safety into an area where they are exposed to greater hazards presented to them by requiring these systems. This certainly reemphasizes the fact that the requirement for PD systems on UG equipment must be currently limited to installation on the "place change" RCCM until much more testing has been conducted on each additional piece of equipment before considering a "blanket requirement" for all mobile equipment.
21. When a requirement for PD systems becomes a reality, a phased in approach must be considered. This approach should have an implementation date for "new or rebuilt" miners and a second implementation date for any miners that remain UG, keeping in mind that these systems should only be required on "place change" type miners. RCCMs that are not economically feasible for the installation of PD systems could have the fast tram settings removed in order to allow for the moving of the machine in the slowest tram mode only.
22. The mining industry has no current experience to rely on at this time.

23. Since PD systems are "training devices" only, much valuable information could be derived from data logging. 1) If a PWD is assigned to each employee and only to that employee, any intrusions by that person into the stop zone would be recorded and these intrusions could be reviewed by the appropriate officials and this information could be used to better train the employee. 2) All intrusions into the stop zone should be recorded. 3) Information should be kept on a revolving memory chip/disc on the machine for a 30 day period.
24. As previously stated additional testing must be conducted in differing seam heights, mining widths and mining methods before implementing a requirement for PD systems on all place change miners.
25. The major factor influencing the installation of PD systems by the industry, I believe, is due to the lack of adequate testing and proving of the systems. Numerous issues were identified during the initial testing that included: 1) The early versions of PD systems were designed for activation only when the RCCM place change miner was being moved from one mining place to the next, it could be and was easily circumvented by allowing the cutter head to remain in the on position when tramming the miner. 2) These early systems provided only one PWD for the entire crew which was worn by the RCCM operator. 3) This device had no way to link to the PD system and could be left hanging on a roof bolt outby the detection zone while the RCCM operator continued to operate the machine. 4) When the PD system failed or was turned off, little or no attempt was made to maintain the systems operability. 5) Interference and or parasitic coupling was an issue and remains an issue with some systems even today!