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PROGRAM INFORMATION BULLETIN NO. P11-19

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SUBJECT: Re-Issue of P08-13 - Use of Single-boom Roof Bolting Machines

**Who needs this information?**

Coal mine operators, miners and miners' representatives, and Mine Safety and Health Administration (MSHA) enforcement personnel should have this bulletin.

**What is the purpose of this bulletin?**

The purpose of this Program Information Bulletin (PIB) is to identify the advantages of using the "bar" or "beam"-type Automated Temporary Roof Support (ATRS) used on dual-boom roof bolting machines as opposed to using the "safety-arm"-type ATRS system used on single-boom roof bolting machines.

**What is the background for this PIB?**

On June 10, 2005 and January 10, 2006, fatal roof fall accidents occurred in which the required support capacity of the ATRS system on two roof bolting machines was exceeded. The bolting machines in both of these accidents were single-boom machines equipped with "safety-arm"-type ATRS systems required to elastically support a deadweight load of at least 11,250 pounds. Although the weight of the roof fall material in both cases exceeded this required load, the occurrence of these accidents has nevertheless raised concerns regarding the adequacy of such "safety-arm" support systems under certain mining conditions.

**Information**

Under 30 C.F.R. § 75.209, the required load support capacity of all ATRS systems is based on the mine roof area intended to be supported during roof bolt installation. In the United States, most roof bolting machines can be categorized into two types: single-

boom and double-boom. For most single-boom bolting machines, one roof bolt is installed from one machine setting and then the machine is re-positioned for the next bolt installation. The area intended to be supported for these single-boom machines is a five feet by five feet square encompassing the bolt location. A three foot thick layer of rock with a density of 150 pounds per cubic foot is assumed to be supported, resulting in a required support capacity under § 75.209 of 11,250 pounds for the ATRS system on this type of machine.

Dual-boom roof bolting machines with “bar” or “beam”-type ATRS systems are used to install multiple roof bolts from one machine and ATRS-setting position. This in turn means that the “area intended to be supported” is much larger, resulting in typical required load capacities in excess of 33,750 pounds.

Obviously, with load support capacities at least three times that of single-boom safety-arm ATRS systems, bar-type ATRS systems have a much greater potential to prevent roof falls. Also, in addition to their larger support capacity, bar-type ATRS systems have several other inherent advantages when compared to safety-arm ATRS systems on single-boom bolters. The roof area being supported for a bar-type ATRS, during one machine setting, spans the width of the opening. The straight-line beam design of the bar system provides a much better “break line” aspect to the support when it comes to stopping a roof fall that begins in the unsupported cut in by the ATRS system. On the other hand, a safety-arm’s ring or individual roof contact pads are an isolated break point around which the fall can continue out by much more easily.

In addition, as the dual-boom bar-equipped machine is trammed from bolt row to bolt row, a consistent effective ATRS position is achieved. In contrast, because single-boom machines are squirm-steered from bolt to bolt, they require significantly more machine operator attention in order to properly position the ATRS between the unsupported roof and the operator. Improper operator positioning has been a contributing factor in seven roof fall fatalities involving single-boom machines since 1992.

Another advantage of dual-boom bolters with bar-type ATRS systems compared to single-boom bolter systems also results from the time involved. Because far less time is spent positioning the machine, and because there are two drill booms compared to one, dual-boom bolters can bolt a cut in less than half the time it takes a typical single-boom machine. For some types of mine roof, the resulting decrease in roof sag from timely bolt installation can greatly improve overall roof control.

With this in mind, roof bolting operators should consider the following before using a single-boom bolter:

- Bar-type ATRS systems can withstand at least 3 times the load a single-boom bolter ATRS can. Whenever possible, use an ATRS bar-equipped bolting machine.

- Bar-type ATRS systems are much better at acting as a “break line” in stopping falls from riding outby. Mine roof that exhibits such “ride-out” characteristics when it falls may require a bar-type ATRS system.
- As the dual-boom bar-equipped machine is trammed from bolt row to bolt row, a consistent effective ATRS position is achieved. In contrast, proper machine/ ATRS position requires significantly more machine operator attention when bolting with single-boom bolters. The machine must be properly angled to maximize the protection afforded by the ATRS; the ATRS must be between the machine operator and unsupported roof.
- Dual-boom bolters can bolt a cut in less than half the time it takes a typical single-boom machine. For some types of mine roof, the resulting decrease in roof sag from timely bolt installation can greatly improve overall roof control.
- Mine roof that is especially susceptible to time-related sag failure may require even further limitations with single-boom bolters. Some mines have a cut-depth limit of 12 feet when using a single-boom bolter.

**Authority**

The Federal Mine Safety and Health Act of 1977, as amended, 30 U.S.C. § 801 et seq.; 30 C.F.R. § 75.209.

**Internet Availability**

This PIB may be viewed on the Internet by accessing MSHA's home page at [www.msha.gov](http://www.msha.gov) then choosing "Compliance Info and then Program Information Bulletin."

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