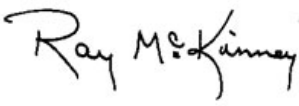


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PROGRAM INFORMATION BULLETIN NO. P06-04

FROM: MARK E. SKILES 
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SUBJECT: Delayed Application of Spring Applied-Hydraulically Released Brakes;
Rubber-Tired Diesel and Electric-Powered Equipment

Who needs this information?

Mine Safety and Health Administration (MSHA) personnel, underground coal mine operators, miners' representatives, diesel and electric-powered rubber-tired machine manufacturers, and repair shop facilities should have this information.

Why is MSHA issuing this bulletin?

This Program Information Bulletin (PIB) informs the mining community of a hazard that can be created by an excessive delay in the application of a spring applied-hydraulically released brake. This PIB also discusses ways to eliminate the hazard.

What equipment does this hazard affect?

This hazard may affect any rubber-tired, self-propelled diesel or electric-powered machine that uses spring applied-hydraulically released wet or caliper-disk brakes. These brakes are known as "automatic emergency-parking brakes" when installed on rubber-tired electric-powered equipment under §75.523-3 and as "supplemental braking systems" when installed on rubber-tired diesel-powered equipment under §75.1909(c), or approved under part 36.

How do spring applied-hydraulically released brakes work?

These brakes consist of a spring that forces brake pads against a stationary disk to stop and hold a machine. Since these brakes do not rely on a continuous supply of hydraulic pressure, but rather a spring to hold the brakes applied, they are highly reliable as parking brakes. To release the brakes, hydraulic pressure is supplied to compress the spring and move the pads away from the disk.

What hazard is created by an excessive delay in the application of a spring applied-hydraulically released brake?

Although reliable as a parking brake, two problems can arise with this design. First, if insufficient hydraulic pressure is provided to keep the brakes retracted the brakes can drag and create a fire hazard. The second, the subject of this PIB, is that the amount of time it takes for the hydraulic pressure that holds the spring compressed to decrease to zero for full application of the brakes can be excessive. This delay in the full application of the brake can allow a machine placed in “park” to drift unexpectedly or, in the case of an emergency application of the brake, to increase the stopping distance of the machine. In either case, the moving machine can strike other machines or personnel potentially causing serious injury.

What is recommended to eliminate this hazard?

The hazard of an excessive delay in the full application of a spring applied-hydraulically released brake can be eliminated by ensuring the hydraulic release pressure is able to bleed off quickly. There are many ways to achieve this, larger brake lines, lower viscosity fluid, etc. When spring applied-hydraulically released brake systems were introduced on mining equipment in the 1980s, equipment manufacturers and MSHA recognized that these brake systems must provide for a near instantaneous brake engagement after the brake is activated to ensure safe braking performance. MSHA evaluated the performance capability of spring applied-hydraulically released brake systems and found that in most cases a full brake engagement within 0.3 seconds can be practically achieved and is recommended for the safe operation of machines equipped with these brakes.

How can the application time of a spring applied-hydraulically released brake system be checked?

First, consult the equipment manufacturer. They may have specific instructions for testing the system. They may also have test data showing the application time of the system as originally built. MSHA’s Approval and Certification Center can also assist in tests of the brake’s application time. Contact Eugene Hennen at 304-547-2057 or e-mail: Hennen.Eugene@dol.gov.

What is the background of this PIB?

During an underground coal mine inspection, an MSHA Inspector asked the operator of a Ramcar to park and exit the vehicle, which was positioned on a grade. The operator activated the supplemental (park) brake to hold the Ramcar stationary, released the

service brake, and then exited the operator's compartment. The Ramcar subsequently rolled several feet down the grade before coming to a stop. The movement of the Ramcar resulted from an excessive delay in the full application of the supplemental (park) brake after it was activated and the service brake released. The Ramcar was equipped with supplemental brakes that utilized spring applied-hydraulically released wet-disc brakes. The unexpected, uncontrolled movement of the machine presented a serious safety hazard.

What is the authority for this PIB?

The authority for this PIB is Title 30 Code of Federal Regulations §§ 75.1907 (b) (3); 75.1909 (c) (3) and (d); and 75.523-3 (b) (1) and (d).

Who are the MSHA contact persons for this PIB?

Coal Mine Safety and Health, Safety Division

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Is this PIB available on the internet?

This PIB may be viewed on the World Wide Web by accessing MSHA's home page at (<http://www.msha.gov>) and choosing "Compliance Info," and "Program Information Bulletins."

Who will receive this PIB?

Program Policy Manual Holders

Miners' Representatives

Underground Coal Mine Operators

Manufacturers of rubber-tired, self-propelled diesel or electric-powered equipment

Owners of rubber-tired, self-propelled diesel and electric-powered equipment

Special Interest Groups