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(Reissue PIL I10-V-07)

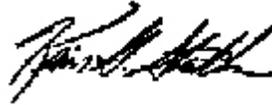
PROCEDURE INSTRUCTION LETTER NO. I12-V-07

FROM:

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SUBJECT:

Reissue of I10-V-07 - Tensioned Cable Bolts

**Scope**

This Procedure Instruction Letter (PIL) applies to Coal Mine Safety and Health (CMS&H) District Managers and coal mine enforcement personnel.

**Purpose**

This PIL establishes procedures to evaluate tensioned cable bolts for use as required support for compliance with Title 30 Code of Federal Regulations (30 C.F.R.) § 75.204(b) and 75.221(a)(9).

**Procedure Instructions**

Because tensioned cable bolts are not addressed in ASTM F32-95 CMS&H District Managers shall evaluate requests for approval of tensioned cable bolts. In determining whether to approve tensioned cable bolts, the District Manager should base his decision on the demonstration or tests specified in 30 C.F.R. § 75.204(b). These tests or demonstrations may include:

Component Tests: Laboratory tests should be conducted to determine the strength and compatibility of all of the individual components of the cable bolts. Any components covered by ASTM F432-95 must meet those specifications. The manufacturer should specify all other components. Any changes to the original components or additional

components added to the support would warrant additional testing. Once a specific design has been successfully tested, no further testing should be required unless the quality of the components is suspected of being inferior.

Installation Procedure: Roof bolter operators should be trained in safe handling and proper installation techniques. In-mine testing should be conducted to determine if the supports can be installed safely and reliably. These tests should ensure that the safety of the operator is not jeopardized during the handling and installation of the tensioned cable bolts.

Pull Tests: Underground pull tests should be completed to determine the anchorage capacity and displacement characteristics of the support for the anchor length used. If the anchor length or type is modified, additional anchorage tests should be conducted.

Tension Tests: Underground tests should be conducted to determine the installed load range of the supports and verify that the tension level can be achieved and maintained as required in 30 C.F.R. § 75.204(f). These tests should be done with a load-measuring device that is capable of indicating the installed load of the support. Any anomalies that occur during the test, e.g. spring-back, should be noted in order to determine the effect on the installed load and the ability to comply with the regulations.

Test Area: Depending on the District's experience with tensioned cable bolts as required support and the roof conditions at a specific mine, a test area may be warranted. If deemed necessary, a test area could be established to demonstrate the effectiveness of the tensioned cable bolts. A test area can range from an area of the mine where a number of bolts are installed for observational purposes up to a fully instrumented area monitoring roof sag and bolt loading.

Based on District experience with the test area, the District could then review the tests or demonstration results of the bolts at the mine for possible inclusion in the mine's roof control plan.

The Mine Safety and Health Administration (MSHA) shall require that tensioned cable bolts, approved as required support, list specifications in the approved roof control plan. Technical Support will be available to assist in the evaluation of tensioned cable bolts. Some manufacturers have multiple designs of tensioned cable bolts. Listing a specification in the roof control plan will eliminate confusion between MSHA and the mine operator regarding the approval of a particular tensioned cable bolt. The listed specifications should include the following:

- Each component of the system should be specified including all dimensions. For example, if a threaded tube is used, the tube length, tube thread strength, and thread length should be listed.

- A drawing depicting all components used with the system. This drawing should show the location of each component.
- For the cable itself, the plan should have a specification that includes the type of strand, (e.g. 7-strand epoxy coated), a minimum strength requirement, and the head/housing should be capable of breaking the cable without failing.
- Each cable bolt should have a marking to identify the length, manufacturer, and type of cable (epoxy, galvanized, or etc.).
- Minimum resin cartridge length (actual length of the cartridge and not the grouted length), cartridge diameter and hole diameter should be listed.
- The installation procedure and remedial action if a bolt is improperly installed. For example, if the bolt is not properly tensioned, the head sprung back, or a spinner occurs, then another bolt should be installed.
- Tension range and a method of determining it in order to comply with 30 C.F.R. § 75.204(f)(4) of the regulations. Also, a procedure should be established to verify this method.

### **Background**

Tensioned roof bolts have been used successfully to control mine roof since the 1940s. Tensioned cable bolts represent a unique and somewhat complex approach to this well-established means of roof control. The key elements of these supports are substantial anchorage, the ability to be tensioned, strength of components and the installation of long supports without couplings.

The ability to maintain tension is an essential component to any partially grouted system used as required support. It has been determined that several factors should be addressed when considering tensioned cable bolts as a required roof support system. Additional factors may also need to be considered to address mine specific conditions, such as highly corrosive mine water in the roof strata. The component tests and demonstration may then require an evaluation of the measures to be taken to arrest or slow corrosion or to limit the expectations as to the safe, useful application life of a specific roof support appliance.

### **Authority**

30 C.F.R. Part 75.204(b)

### **Internet Availability**

The PIL may be viewed on the World Wide Web by accessing the MSHA home page ([www.msha.gov](http://www.msha.gov)) and choosing "Compliance Info" and "Procedure Instruction Letter."

**Issuing Office and Contact Person**

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**Distribution**

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