

J. H. FLETCHER & CO. Box 2187 – Huntington, WV 25722-2187 – 304/525-7811 – FAX 304/525-4025

# IMPORTANT SAFETY NOTICE

INFORMATION BULLETIN NO. 122

**TO: OWNERS AND OPERATORS OF J.H. FLETCHER & CO.  
UNDERGROUND COAL MINING EQUIPMENT**

**FROM: J.H. FLETCHER & CO.  
RISK MANAGEMENT DEPARTMENT**

**DATE: DECEMBER 2013**

**SUBJECT: ROOF BOLTER OPERATION**

The United States Department of Labor Mine Safety and Health Administration (MSHA) recently issued an Accident Prevention Alert following an accident involving a whipping drill steel ([www.msha.gov/Alerts/ProperDrilling52013.pdf](http://www.msha.gov/Alerts/ProperDrilling52013.pdf)). Questions have been presented to J.H. Fletcher & Co. (Fletcher®) after the MSHA Alert. Fletcher is addressing those questions with this Bulletin.

Rotation is a potential hazard associated with any roof bolter or machine that drills holes.

When using any Fletcher® roof bolter there are five simple rules to remember:

1. Don't rotate a drill steel or bolt at a speed beyond its failure limit.
2. Don't rotate a long, unrestrained drill steel or roof bolt.
3. Don't rotate a coupled drill steel string at full rotation speed unless the coupling is in the hole.
4. Don't rotate the drill head unless both hands are a safe distance away.
5. Don't rotate a drill steel or bolt while feeding beyond its failure limit.

Practice these five common sense "Don't Spin" rules to promote safety.<sup>1</sup>

<sup>1</sup> Fletcher DOES NOT manufacture drill steels, roof bolt insertion tools, or roof bolts that are used with the roof bolter. Questions regarding drill steels, roof bolt insertion tools or roof bolts should be directed to the manufacturers of those items.

Every roof bolting machine has an Operator's Manual, a Parts Book and a Service Manual. There is also an Orientation Video that is supplied with most machines. Each operator should be familiar with the Operator's Manual and Orientation Video. Notify Fletcher if you need an Operator's Manual or Orientation Video for your machine.

1. Don't rotate a drill steel or bolt at a speed beyond its failure limit.

Fletcher's experience has shown, and Fletcher has stated, drill rotation should never exceed 700 RPM unless specific safeguards are in place to prevent drill steel failure.

A speed of 700 RPM may be excessive, depending on several factors involving the drill steel or roof bolt, such as unsupported length, quality, wear, and strength. Each operator should consult the product use instructions regarding the maximum speed and thrust provided by the respective manufacturers of each drill steel, drill insertion tool and roof bolt.

2. Don't rotate a long, unrestrained drill steel or roof bolt.

Collaring the hole is the process of starting the hole in the roof or rib. Feed and rotation controls should be feathered by the operator when collaring a hole, starting slow until the drill steel is into the roof or rib enough to stabilize the free end of the drill steel. On a machine not fitted with drill guides, Fletcher recommends using a short starter steel. For all machines, Fletcher recommends a deep well drill head chuck for collaring the hole. A deep well chuck provides at least 3" (76mm) of engagement with the drill steel or drilling tools. Deep chuck compatible drill steels and bolt installation tools should always be used.

Fletcher does not manufacture and has not tested all drill steels available on the market. Fletcher has conducted testing using a manufacturer's 7/8" hex and a 7/8" round dry vacuum drill steel. The testing included placing different length steels in a deep chuck drill head and leaving the other end in free air. In this testing, starter steels were rotated up to 700 rpm. Our testing showed failure occurred on a 4' long starter steel at 700 RPM. The tested 3' long starter steel did not fail at 700 rpm. Fletcher's conclusion is that the 4' starter steel should not be used unless rotation is decreased to a safe level, below 700 RPM. Fletcher testing was on an arm feed machine with no drill guide.

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Fletcher's recommendations are general guidelines based on its knowledge, experience and feedback from customers and vendors. Fletcher recommends each owner and operator to have drill steel, drill insertion tool and roof bolt suppliers provide usage instructions, limitations, and warnings similar to that which resin suppliers provide. These manufacturers know the tolerances, fatigue and stress limitations of the different drill steels, drill rotation tool(s) and/or roof bolt(s). The manufacturer specifications for the original drill steel, drill rotation tool and/or roof bolt must be followed based upon their respective design engineering, manufacturing and quality control systems.

When a drill guide is used, these limitations apply to the length of drill steel with measurement beginning above the drill guide.

Both rotation speed and drill steel free length increases the risk for drill steel failure. Decreased strength due to worn or inferior quality drill steels also increases the potential for drill steel failure.

Each operator has the ability to limit the feed and rotation speed. Fletcher insists that the operator never withdraw a drill steel from the roof while activating rotation. The operator must stop rotation before exiting the hole to prevent whipping steel. Fletcher has provided the guideline of 12" as a reasonable length at which to stop rotation as the hole is being exited. When using coupled steels, stop rotation before the coupling exits the hole. The important point is to stop rotation before the end of the drill steel in the chuck exits the hole.

3. Don't rotate a coupled drill steel string at full rotation speed unless the coupling is in the hole.

While 3' starter steel is a maximum recommended starter steel length when rotating at 700 rpm, varying mine conditions, such as seam height and bolt length, may dictate a different choice for a starter steel. Another factor in the decision to use a longer starter steel is reduction in the number of stacked drill steels when drilling a deep hole. The safety advantage of fewer stacked drill steels outweighs the 3' maximum starter steel length as long as rotation speed is reduced to a safe level for the starter steel being used.

Keep all stacked drill steel couplings (connection point) in the hole. It is necessary to feather feed and rotation until the coupling is in the hole. Stop rotation prior to the coupling exiting the hole. A longer starter steel may allow a deep hole to be drilled with two sections of stacked drill steels versus three sections. Reducing the number of drill steel sections is often desirable.

If starter drill steels longer than 3' are used, it is essential that the operator reduce rotation speed to a safe level. Please contact Fletcher if there is any question regarding how to reduce rotation speed.

Remember, "**DON'T SPIN UNLESS IT'S IN**", referencing the drill steel and all couplings.

4. Don't rotate the drill head unless both hands are a safe distance away.

Hands off drilling is an essential safety rule. Operators must keep hands (and all body parts) away from a drill steel, bolting tools and roof bolts before engaging rotation. Deep well chucks and bolt insertion tools must be used to facilitate hands off operation.

Operators must use the proper gloves. Rubber gloves ARE NOT safe for use while operating a roof bolter because rubber gloves and other style of gloves designed to increase adhesion or grip only increase the risk of an operator being inadvertently injured by rotating equipment.

Hands off drilling means: ***Never touch a rotating component.***

5. Don't rotate a drill steel or bolt while feeding beyond their failure limit.

A sign of a hazard for which drilling must immediately STOP is bowing of the drill steel. Drill steel bowing is an indication of a possible drill steel failure (breakage). If the drill steel bows the operator MUST STOP drilling and discuss the situation with the mine supervisor. Corrective action should be taken such as lowering the machine's feed pressure setting.

Within the Parts Book and Service Manual Fletcher provides guidelines for machine maintenance personnel. This guidance includes specified pressure settings for feed pressures. Maintenance personnel should follow those guidelines as appropriate.

Fletcher can provide replacement Parts Books and Service Manuals, per machine serial number, upon request.

Only trained maintenance personnel should adjust or modify feed pressures. Trained maintenance personnel have the knowledge of additional risks and appropriate safety precautions to take when removing guards or covers that protect hydraulic system access points. All guards and covers must be replaced after any maintenance is performed. Trained maintenance personnel must understand the effect of adjusting hydraulic valve settings.

Increasing or tampering with feed pressure (or any hydraulic pressure setting) can cause component malfunction and failure which may lead to serious injury or death. Never make unauthorized adjustments to the drill feed or any hydraulic pressure setting.

Adjustments should only be made by trained and experienced personnel with knowledge of the recommended pressure settings and the adjustment procedure provided by Fletcher in its Service Manual for a specific machine.

If a machine's feed force does not seem to be adequate, there may be many different reasons. Some of these reasons may be (in no particular order):

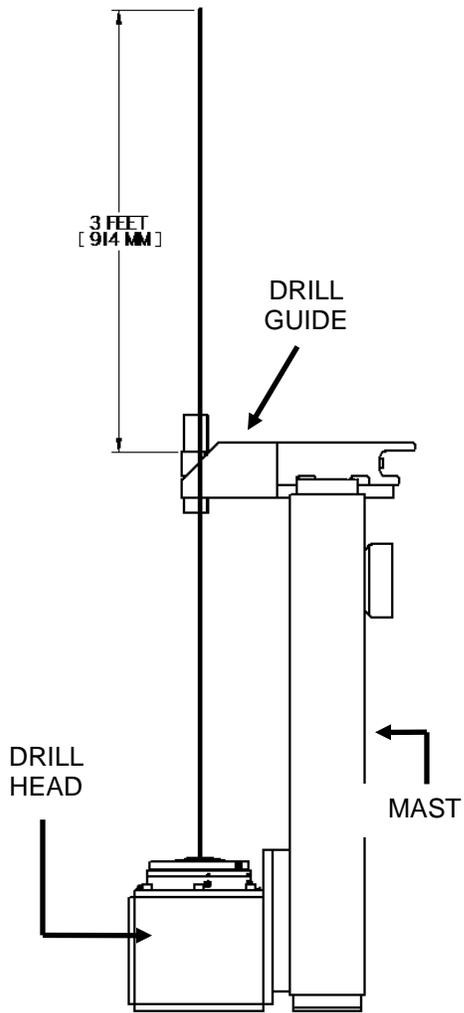
- Stab foot is not contacting mine floor (causes wear and tear on bushings; reduces amount of force available to install bolts)
- Low available hydraulic pressure due to a problem with the machine (a worn pump will happen over time)
- Cold oil (always bring machine to normal operating temperature before making any machine pressure setting adjustments)
- Low hydraulic fluid level
- Contaminated hydraulic oil
- Dirty filters, including pressure filters, return line filters, suction strainers and dust filters (dirty filters impair drilling efficiency and overall component performance)
- Misaligned drill boom or mast (misalignment will cause crooked drilling and an unstable boom/mast)
- Worn boom pins, boom bushings, boom wear pads, mast wear pads, carriage rollers, mast rollers and mast channels (will cause misalignment during drilling and bolt insertion and can lead to broken drill steels and bent bolts)
- Clogged or improperly maintained dust suppression system (you can only drill as fast as you can remove dust from the hole)
- Dull or damaged drill bits (a dull, cracked or aged bit will not readily penetrate roof strata)
- Worn or damaged drill steels or use of multiple steels
- Friction of the mast, carriage, and drill guide could reduce available feed force
- Improperly stored, out of date or semi-hardened resin

Fletcher recommends mine management discuss this Bulletin with all production and maintenance employees who have contact with the machine, a drill steel, drill insertion tool and/or roof bolt. Mine management is responsible for instructing and monitoring your maintenance personnel to confirm that they are adhering to the specifications of the original manufacturer. An informative video summarizing the information in this bulletin will be available on the JHF website in the near future. Every operator should read this bulletin and watch the video as soon as possible. Fletcher has also developed a safety poster (see Attachment 1) to display at your mine to remind operators of possible rotation hazards and how to avoid them. The video, part no. 543895, and the poster, part no. 543865, may be ordered, free of charge, from the website or by calling the Risk Management Department, 304/525-7811, ext. 241.

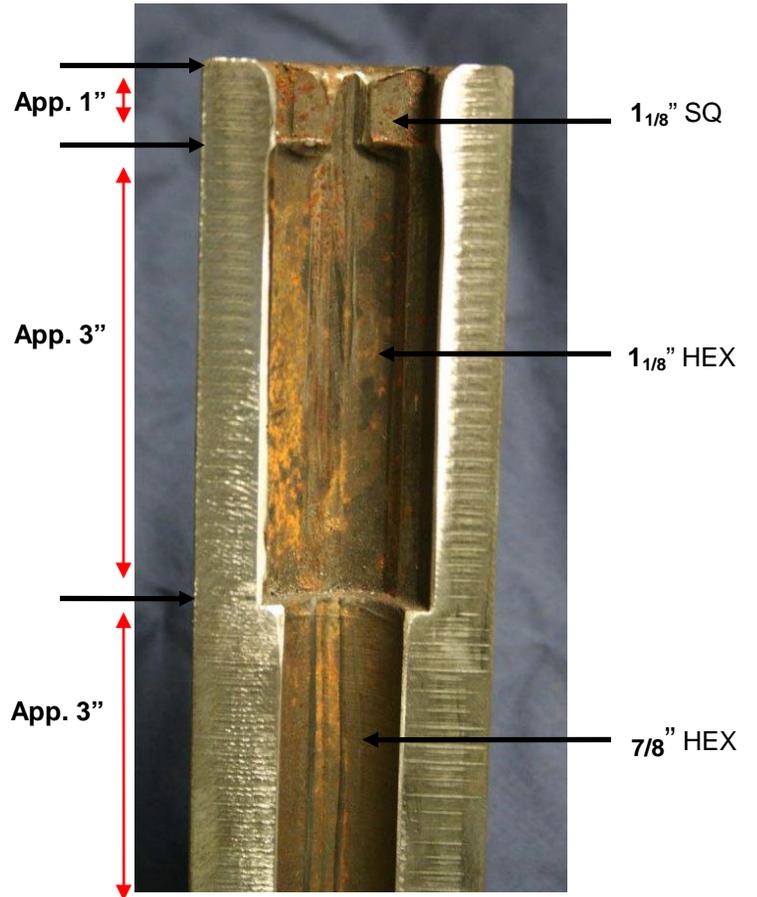
Fletcher encourages all operators and owners to contact Fletcher with questions about these, or any, subjects concerning the operation of our equipment. You may call your Fletcher Field Representative or the Fletcher office directly at any time. Also, visit our website at [www.jhfletcher.com](http://www.jhfletcher.com) to review all previous Newsletters and Bulletins issued by Fletcher on these, and other, important safety and machine operation subjects.

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DOCUMENT, CONTACT THE RISK MANAGEMENT DEPARTMENT

**Appendix**



**RECOMMENDED  
DRILL STEEL  
LENGTH ABOVE  
DRILL GUIDE**



**CUTAWAY VIEW  
OF A 3 STEP  
DRILL CHUCK**

# **DANGER**

## **MOVING PARTS CAN CRUSH AND CUT**

**DIFFERENT HAZARDS MAY EXIST DUE TO ROTATION. HAZARDS MAY INCLUDE:**



## **FOLLOW FLETCHER'S FIVE SIMPLE RULES DURING DRILLING** (SEE BULLETIN 122).

- 1. DON'T ROTATE A DRILL STEEL OR BOLT AT A SPEED BEYOND ITS FAILURE LIMIT.**
- 2. DON'T ROTATE A LONG, UNRESTRAINED DRILL STEEL OR ROOF BOLT.**
- 3. DON'T ROTATE A COUPLED DRILL STEEL STRING AT FULL ROTATION SPEED UNLESS THE COUPLING IS IN THE HOLE.**
- 4. DON'T ROTATE THE DRILL HEAD UNLESS BOTH HANDS ARE A SAFE DISTANCE AWAY.**
- 5. DON'T ROTATE A DRILL STEEL OR BOLT WHILE FEEDING BEYOND ITS FAILURE LIMIT.**

**NEVER EXPOSE YOURSELF TO ROOF BOLTING RISKS THAT WILL RESULT IN SERIOUS INJURY OR DEATH.**

