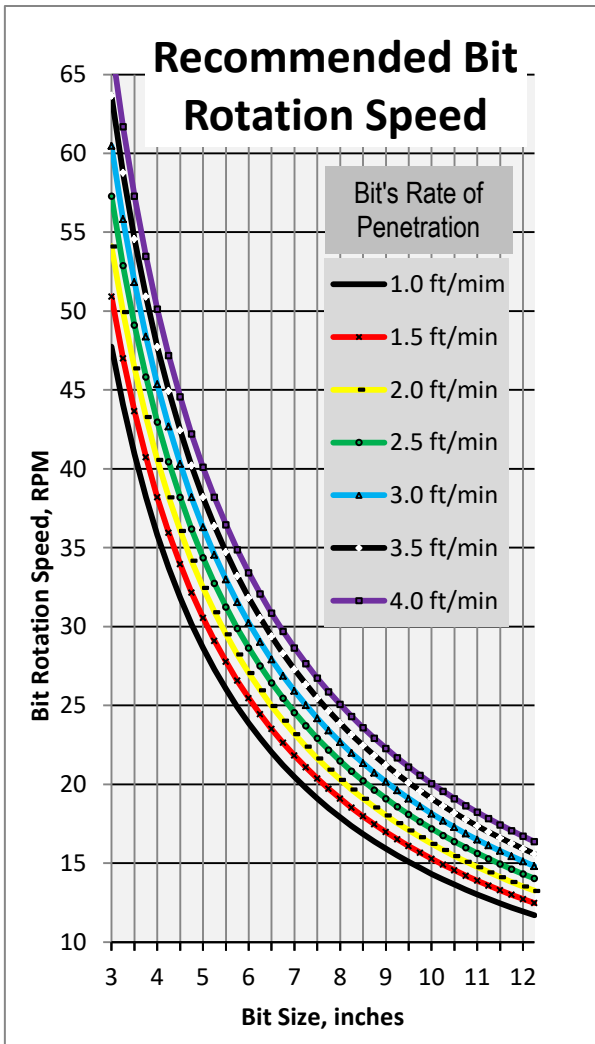




Welcome to the 3<sup>rd</sup> and final installment of our 3 part technical series on DTH Hammers & Bits. Rock Hog's last installment focused on hammer maintenance, service schedules, inspection, disassembly and assembly.

In this week's installment we'll be focusing on the drill bit.



### The Drill Bit

A quality Rock Hog hammer requires a quality bit. Rock Hog recommends using the proven Rock Hog line of DTH bits. A full range of sizes and face styles are available through your Rock Hog representative.

The bit is what carries the hammer piston energy to the rock. Therefore the condition of the bit cutting face should be checked after the completion of each hole drilled.

As the bit accumulates drill time, the buttons and steel will start to show a wear pattern. The pattern and rate of wear will vary greatly depending on the formation being drilled.

In soft formations such as limestone where the bit wears slowly, watch the buttons for "snakeskin" on the surface. These surface cracks must be ground off to prevent button failure.

In hard formations where the bit wears quickly, watch the size of the flats on the buttons. The buttons should be sharpened when the width of the flat is no wider than 1/2 the diameter to help prevent bit failure.

Some formations wash the steel away quickly. In this case the buttons start to protrude excessively. The buttons need to be ground down to prevent them from breaking off.

### **Dull buttons are the single biggest contributor to slowed penetration and excessive stress to the bit and hammer.**

If a bit must be changed before a hole is complete, make sure the gage diameter of the bit used to complete the hole is no larger than the bit just removed. Using a larger bit will result in probable loss of the gage buttons before the bit reaches the bottom of the hole. For this reason, always keep 1 or 2 worn bits that are in good condition on the drill rig.

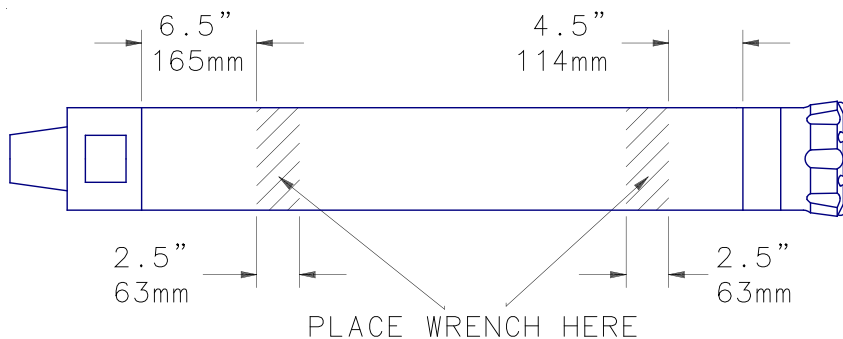


## Breaking Threads Loose

When breaking the chuck thread loose to change bits, or the backhead loose to do hammer maintenance, follow these guidelines:

- **ALWAYS USE A WRAP-AROUND WRENCH** this is to prevent pinching the sleeve out-of-round.
- **KEEP SHARP JAWS IN THE WRENCH** the wear sleeve is very hard to give a long service life. Only quality hardened or diamond-tipped jaws in good condition will grip the sleeve.
- **DO NOT WELD ON THE SLEEVE** welding on the hardened sleeve will crack the sleeve and voids any warranty on the sleeve.

PLACE THE WRENCH AS SHOWN BELOW



## Monitoring

As the hammer accumulates drill time, these areas need to be monitored to determine when to service the hammer.

**External surfaces:** Rock Hog hammer parts are made from the best materials and hardened for long life, but eventually these surfaces will wear away. The rate of wear depends on the formation being drilled, drilling speed and airflow. Make periodic checks to know what condition the parts are in.

Normally the chuck wears out first. Check the wall thickness on the bit shoulder end. When it measures 5/16" (8mm) or less at any point, replace the chuck. The service life of the chuck also heavily depends on the condition of the drill bit.

The wear sleeve will normally wear more on the chuck end. When the outside diameter reaches 4.75" (120.7mm), flip the sleeve. Once either end has worn down to a 4.55" (115.6mm) diameter, replace the sleeve. The service life of the sleeve also heavily depends on the condition of the chuck.

**Chuck splines:** Check the condition of the chuck splines each time the bit is removed. **Do not put a chuck with badly worn splines on a new bit.**

**Shoulder Gap:** A hand-tight backhead will not be seated on the sleeve. Once the backhead is torqued down, this gap will close and the backhead will seat on the sleeve. This clamps the internal parts to prevent part movement. Periodically check the gap between the sleeve and hand-tight backhead. If the gap falls below .08" (2.0mm), refer to Section 3.4-step 10.



**Operating pressure:** This is the best way to know what condition the internal parts are in. As internal parts wear, the operating pressure, and therefore the penetration rate, will drop. Only the operator can say when hammer performance has dropped below an acceptable level at which time the hammer must be serviced. If the pressure goes up after the hammer has been in service for some time, this would indicate the piston is sticking or the air passages inside the hammer are becoming restricted.

## **Storage**

### **Overnight**

When drilling is complete for the day, shut off water and any other injections except the oil and allow air and oil only to blow through the hammer for a minute or two. This will blow out most of the water and other injections and coat all the internal parts with oil. **If the hammer is in a wet hole, bring the hammer above the water level before blowing it out.**

### **Short term**

If the hammer will be off the rig for no more than 3 weeks, blow air and oil only through the hammer for a minute or two before taking it off the rig. This will blow out most of the water and other injections and coat all the internal parts with oil. Store that hammer in a dry area with the ends covered. The storage area should have a steady temperature to prevent surface condensation during temperature swings.

### **Long term**

A used hammer going into storage for a month or more should be torn down with all parts cleaned, dried, oiled and stored assembled or disassembled in a dry, steady temperature area. This is to prevent surface corrosion. **Surface corrosion is a main cause of part failure in hammers.**



## DTH Bit Face Styles

Shown here are Rock Hog's standard face designs. The number of blow holes, flushing grooves and buttons will vary depending on the size and face style of the bit.

Standard options such as larger, extra, or longer gauge buttons are available.

Special face designs are available on a made-to-order basis. Contact your Rock Hog representative for details.

### **CONCAVE**

This is the most common face style used in the market today. The dish type face gives excellent penetration in medium and hard rock formations, while maintaining a straight hole. This face has excellent air flushing characteristics. Concave is the predominate face style for the majority of drilling conditions.

### **FLAT**

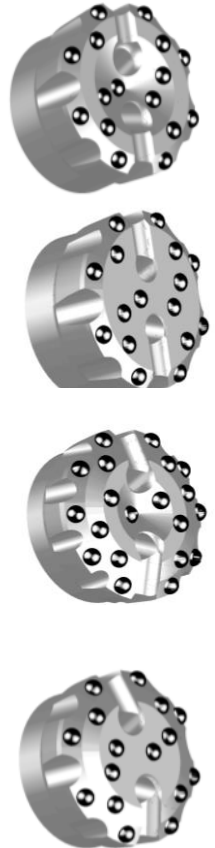
The flat face bit, as the name implies, is flat across the bit front. This bit is very aggressive in drilling applications and is suited best for very hard rock and in hard rock with broken formation. Used primarily in blast hole work, the bit tends to lead off in deep holes. Rock Hog flat face bits come with standard face slots to aid in keeping the cutting face clean.

### **CONVEX**

This face has been utilized in very hard drilling formations where the face of the bit tends to be prematurely worn away. The convex style tends to keep the drilling face intact longer by drilling with the two rows of buttons on the convex face. This face style gives good hole penetration.

### **KAVEX**

This face is a combination of convex / concave. It is recommended for abrasive formations in the hard and very hard range where other bit faces wear away quickly. The kavex is designed to provide improved cleaning of cuttings thus reducing body wear. The concave center helps drill a straight hole.





## Button Shapes & Grades

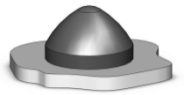
### **DOMED (SPHERICAL or HEMI-SPHERICAL)**

This button is the most common shape utilized in DTH Bits. This type of shape is the strongest and most resistant to breakage. The domed shape provides excellent penetration in medium rock, hard rock, broken hard rock formations, and in all types of drilling. This is the standard button that will be quoted unless specified otherwise.



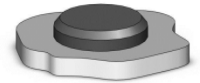
### **BALLISTIC**

Normally this button is used in less hard consolidated drilling formations. This type of button is very aggressive and drills faster than dome. However, because the ballistic tip protrudes out farther than domed, the ballistic is prone to breakage if used in the wrong formations. Care should be used when drilling with this type of button. Ballistic buttons yield high penetration rates and efficient rock breakage.



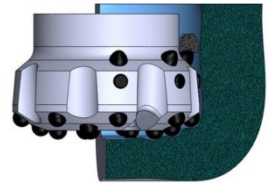
### **WEAR PAD (FLAT TOP BUTTONS)**

Wear Pads are used in conjunction with either of the two types of buttons previously mentioned. These flat top buttons are placed on the bit skirt, behind the gauge row buttons. They are utilized to enhance bit life in areas where extreme body wear has occurred on the bit skirt.



### **REVERSING BUTTONS**

Reversing buttons are often utilized on bits with oversized heads and on standard heads where clearance allows. The reversing buttons are used most often in broken rock formations to allow the bit to drill slowly up and out of the hole, when broken rock has fallen in behind the bit and hammer. Either ballistic or domed buttons can be used and the number of buttons is variable. This concept is also used on the backhead or topsub of the DTH hammer for the same purpose.



### **CARBIDE SIZE IN ROCK HOG DTH BITS**

Rock Hog's engineers have chosen the best all-around button size and number of buttons for each size bit. Large carbides tend to last longer, are less likely to have shear failure, and require less frequent sharpening. Smaller carbides tend to drill faster, however the sharpening interval is more frequent and they wear out faster. DTH bits tend to have larger buttons on the gauge row and smaller buttons in the center.

### **GRADES**

Rock Hog uses only carbide grades with excellent resistance to wear and with high toughness properties. Along with our long proven standard grades are Rock Hog's premium grades.