

# Maintain Your Compact Drill Rig

BY JIM SCHILL, TECHNICAL WRITER

The compact directional drilling market in North America has exploded over the last several years. With the long anticipated bevy of last mile fiber-to-the-home work finally having an impact and glut of gas, water and sewer service and lateral work going around, the compact directional drill has found many stages to demonstrate its capability.

Finding work for these drills is one thing, but keeping them in top operational condition is another. With its multitude of considerations, drill maintenance can be extensive, but applying a little common sense will go a long way to keeping your rig up and running. According to John Olander, directional drilling specialist for TT Technologies, Aurora, Ill., compact drill rig care begins on the jobsite.

“Avoiding accidents and promoting safety are the primary ways crews can help keep their directional drilling equipment performing at its best,” Olander says. “It provides the basis for all successful drilling operations. Equipment works better when crews are being safe and following proper drilling procedures. It sounds simple and it is. But it’s important.”

Another key to drill rig maintenance is knowing your rig. “Drill crews need to know about the equipment they’re using,” Olander explains. “They need to know what the capabilities are and make sure they stay within correct and proper usage standards. Most things break when you exceed their tolerance levels. The same is true of drill rigs. And it’s maybe even truer of compact rigs because it seems natural to want to try to push them to their limits or see how much they can do. That can lead to problems and some can be more serious than just equipment failure.”

But beyond working smart and working safe, physical drill rig maintenance is grounded in daily checks and



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inspections. These checks help alert crews to potential maintenance issues, as well as potential safety hazards.

## Drill Stem

Proportionately, the drill stem represents the most expensive drill consumable, yet it is easily the most abused. “In compact drill rigs the tendency is to exceed the minimum bend radius,” says Olander. “This is most likely due to the fact that the drill is often operating in tight

working conditions. This puts a tremendous amount of stress on the stems. So rod inspection is a must before each use.”

Stems should also be inspected after each use and checked for clarity and adequate lubrication, as the threads should not be used dry. Olander recommends using only lubricants specified by the manufacturer, which is typically a high-pressure copper carrying lubricant. Threads should be checked for significant wear and should be removed from rotation if wear is too severe. In addition, bent rods can transfer additional stress to adjacent rods in the drill string and increase the possibility of failures. But Olander says changing rod rotation also helps extend their life.

“Lead rods should be moved to different locations in the drill string from use to use. The lead rods endure the highest amount of stress during drill operations. If left in the lead position they will tend to fail sooner.”

Finally, Olander suggests checking the drill string drive chuck for wear on a regular basis. He said the condition of the drive chuck can significantly affect the life of the drill string and suggests keeping the chuck within 20 percent of new.

## The Vice

While inspecting the drill stems, giving the vice a quick look is also a must. Inspection items include

checking the vice and jaw assembly for wear or chipping. Check to see if pivot points at the wrench and cylinder ends are loose and replace bushings and pins, if needed. Finally, check to make sure that all grease fittings accept grease and that they are greased as needed.

### Hydraulics

The importance of keeping a drill rig's hydraulic system in tip-top shape cannot be overstated. Operators should perform a daily walk around and check for hydraulic oil leaks. Olander suggests grabbing a flashlight and looking under the machine to check for leaks.

"A small leak will in time turn into a larger leak, so look for dampness," Olander says. "These small non-dripping leaks usually occur at the hose crimp or at the thread of the fitting. Those are obvious indicators that the hose is going to fail. Replace those hoses as quickly as possible. Of course, make sure to observe all safety precautions when performing checks, especially around live hydraulics."

Hoses that are also susceptible to scuffing, abrasion or other damage — because of their location — should be checked regularly. Abrasion-resistant material like spiral wraps or hose sleeves should be replaced when needed. Olander recommends specifically checking hydraulic hoses that power the tracks for looseness or movement that can cause wear. Hoses with broken wire braids should be replaced immediately.

Hydraulic filters also need attention. Many hydraulic filters today have o-rings as the sealing component. Simply tightening the fitting, as Olander points out, may not fix leak problems.

"O-rings need to be replaced as needed. However, the o-rings used in hydraulic fittings are not the o-rings found in many of the 'off-the-shelf' assortment kits," says Olander. "They are slightly different in hardness and size. Some manufacturers will specify a specific o-ring grade for high pressure or temperature. It's always best to contact the manufacturer or follow their recommendations in situations like this."

### Engine

The easiest way to keep the engine running at peak performance is to service it according to manufacturer recommendations. Olander says that operators should, however, keep a close eye on things especially if it's mounted on vibration insulators. The insulators should be checked often for cracking, swelling or deterioration.

Checking engine oil is a standard and changing it completely should be an annual event. Other areas that need consistent maintenance include the radiator and the hydraulic oil cooler. While checking and changing the engine oil seems basic, what's often overlooked is anti-freeze. Olander said that changing the anti-freeze in the radiator at regular intervals is a must. Keeping both the



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radiator and the hydraulic oil cooler clean and free of debris is also essential. Olander says, "If oil has entered the fins of the radiator and/or the hydraulic oil cooler, a detergent is needed to remove the oil film. It is very important to remove any trace of oil from the fins because the oil attracts and holds dust. That dust acts as an insulator and can cause both components to run hotter than normal."

### Tracks

Most compact rigs incorporate a track system for on-site positioning and transport. These tracks should be inspected before each use for tears or visible damage. The track sprocket bolts should be tightened when loose and track drive tension should be monitored and adjusted when needed. Also, checking the drive gear case oil level and replacing when needed will help add life to the track system and ensure that it functions properly.

According to Olander, the easiest maintenance tip he can give is, "Keep your compact rig clean. Dirt and debris ultimately lead to problems. A clean rig runs better." Running through a simple pre-bore checklist will help ensure that equipment and operators run smoothly. In general, a standard pre-bore equipment check should include:

- Drill stem for fatigue or wear.
- O-ring on the drill stem.
- Bore rig fluids for start-up.
- Bentonite fluid. Has it been mixed and is the mixing system ready for operation?
- All hoses and electrical cables. They should all be operational and connected correctly.
- All communications (radio or hand signal). These should be agreed upon between location operator and bore rig operator.
- That all safety precautions have been applied.
- The strike alert system has been tested and is in good working condition. **UC**