Four Steps to Efficient Core Drilling

by Jim Palmer

Core drilling can be an intimidating task if an operator is unsure of how to go about it. With all the unknown factors that can arise, it is difficult for an inexperienced operator to know what they are getting into. A core drill, core bit, water hose, anchor, electric cords, wrenches and appropriate Personal Protective Equipment (PPE) are provided, and the operator is ready to go. But are they truly ready?

Core drillers often find it is not just about having all the necessary equipment to do the job, but that they have the training and knowledge to use the equipment safely and correctly to achieve the required results. There are four easy-to-learn steps that all operators should bear in mind before starting to drill.

WATER

When drilling with a wet core bit, one of the most important factors is water. Many drillers think the more water used, the better. This is not correct. As the diamonds work on grinding away the concrete, water helps form concrete slurry by mixing with concrete dust and debris. This slurry helps the grinding process by not only keeping the core bit cool, but also making sure the diamonds remain exposed by allowing the bit to come into contact with particles in the slurry. Without enough water, there is nothing to create the slurry and the diamonds will continue to grind the same particles. Too much water, and all the concrete dust particles will wash away, leaving nothing to help keep the diamonds exposed. For best results, operators should apply water until the slurry begins to look like heavily-creamed coffee. This consistency proves to be the most effective when wet core drilling.
**ANCHOR**

Proper rig anchoring is essential to insure a straight core. The best method of anchoring the drill rig is using physical anchors rated for core drilling. In addition, the use of proper tools and techniques to set the anchor will produce optimum results. Using a base vacuum is also recommended if applicable, providing the surface is smooth and the vacuum gasket is in good working order. It is not safe to use a vacuum base when drilling into a wall or ceiling. Always make sure that the vacuum filter bottle is free of water or debris, as the presence of either will compromise the vacuum. A vacuum gage is recommended to ensure that you have a visual indication that an adequate vacuum is available for drilling.

Many rigs also have a ceiling jack that allows the operator to shore the top of the mast up to an overhead area with a sturdy piece of wood. Never stand on a rig to hold it down, as this is an unsafe practice. Standing on a rig causes a ‘ribbing’ effect on the core, and will eventually cause the bit to bind up in the hole.

**SPEED**

Setting a motor to the correct revolutions per minute (rpm) could be the difference between grinding properly and glazing the diamond segments. Diamonds perform optimal cutting at a predetermined surface speed, therefore every core bit should be run at the proper rpm. The smaller the bit diameter, the faster the bit should be run. These ratings are standard with almost all manufacturers in the industry. Many electric core drills have multiple speeds, so an operator is able to use different size core bits and operate them at the appropriate speed. The table above shows a range of standard core bits and their recommended operating speeds.

With conventional brush type motors, as the motor current rises from feed pressure the rpm starts to drop. This causes a decrease in surface feet per minute (sfm) and can slow the production rate of drilling. Therefore, an amp meter is a tool that can assist the operator in getting the most out of a drill motor by maintaining a more constant rpm or sfm. Drilling should not be carried out above the rated amp draw of the motor.

**POWER**

In order to maintain the correct drilling speed, the operator needs the necessary amount of power to do the job. The majority of core drills are electric-powered, and it is recommended that an amp meter is used when drilling with this type of core drill. Operators should look to push the drill motor to its maximum rated amperage, but without exceeding it. Exceeding the rated amperage of the motor will result in the motor becoming bogged down, resulting in lower productivity. Operating the motor at a higher rate than its maximum amperage will cause the internal components of the electric drill motor to overheat and wear prematurely. The same principles also apply when drilling with a hydraulic motor. It is important to maintain the correct flow to ensure the correct drilling speed is being maintained.

Core drilling can be a daunting task for a new operator, but by understanding and following these four steps the operator will have the knowledge to core holes productively, while saving both time and money. Always remember that safety is paramount.

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