Wedging in Diamond Drilling

by Jeff Dagg, Fordia Technical Field Support

Wedging is tricky business. For many years, knowledge of wedges, their use and application, has been closely guarded by a select number of highly skilled individuals with years of drilling knowledge and experience under their belts. Historically, they have been known not to share well. However, directing a bore hole does not have to be so complicated or mysterious.

Placing a deflecting wedge is one of the simplest and oldest methods of influencing the direction of a bore hole. The reasons for doing so are many. It is understood that no matter how carefully planned and drilled, bore holes are rarely straight. Several factors can occur that will have an effect on the direction of the hole, such as weight on bit, formation, bedding planes, or ground that alternates from hard to soft. Often the path of the hole needs to be corrected in order to reach a desired target. Alternatively, wedges are used to side-track lost or broken equipment in the hole, or to intersect multiple targets at depth using a single parent or “Mother Hole”.

Ground conditions will greatly affect the outcome of your wedge. Extremely hard, cherty or siliceous formations will resist deflection as the rock may be harder than the steel, causing the core bit to “bite” into the wedge rather than turn into the ground formation. Adversely, in soft talc-like formations, the bit tends to drill past the wedge with little or no change in direction.

Accurate and consistent hole surveying is essential to keep a handle on deviation. The majority of wedges will produce 1.5 degrees over, for example, a 15m length, as this will place an excessive load on the drill rods and greatly increase the risk of broken rods or stuck equipment. For this reason, wedges should be spaced a spaced a minimum of 5m apart.

Here are a few helpful suggestions to keep in mind when considering placing a wedge:

- Make sure the hole is clear, free from cuttings and sludge and is stable.
- Keep detailed notes of the drill hole, and examine the core to determine the best location to position the wedge.
- Never place a wedge in badly broken or fractured ground, sandy conditions etc.
- Use a suitable lubricant in the circulating waters such as Torqueless™ or a polymer.
- Keep detailed notes, sketches and measured lengths of everything in the hole including the rod string, wedge facet, dropper, adaptors, etc. Once the wedge is placed, note the exact location of the top of the wedge in the drill as caution is required on subsequent trips in and out of the hole.

There are several different styles of wedges available for different applications. Here are a couple of the more common ones.

Hall-Row or By-pass Wedge

Used to direct the hole and usually placed at the bottom of the hole or on top of a cemented section, this wedge can be oriented but remains a permanent fixture in the bore hole. It generally requires up to 4 trips in and out of the hole to set the wedge securely and ready to drill past.

Clappison or Retrievable Wedge

Named after its inventor Mr. Reg Clappison, this wedge can be oriented, and is removed completely after the deflection is made, leaving no steel in the hole. Hole diameter is corrected hole to be drilled one size smaller than the parent hole. The wedge facet is installed at any given point in the casing string, which stays in place. Drilling continues in the next smaller size.

Casing Wedge

An effective retrievable wedge that can be oriented, this style of wedge requires the corrected hole to be drilled one size smaller than the parent hole. The wedge facet is installed at any given point in the casing string, which stays in place. Drilling continues in the next smaller size.

One-Trip Wedge

This wedging system, offered by Fordia, is as the name suggests, a wedge that allows the driller to lock the wedge securely at any point in the bore hole, orient the wedge, and anchor the facet in the desired direction — all in one trip. This is accomplished by its unique 2-stage locking device. The first stage positively locks the wedge at desired depth, without the use of cement or resins and the second locks in the direction or azimuth of the wedge facet. It is not retrievable and remains a permanent fixture in the hole. Fordia’s One-Trip wedge is available in sizes from B to P. These wedges are split in the middle, with a threaded connection just above the wedge face. This makes it much easier to transport and install in shorter sections, especially in underground application or on fly jobs.

Most drillers have a preference when it comes to equipment but technology and driller experience allows manufacturers to improve on existing options. It can be wise to check with a manufacturer’s technical support team for advice and to tap into their combined experience. At Fordia, our mission is to make drillers’ lives easier. Contact us or visit www.fordia.com for more information about wedging or other new products and technologies to help make drilling easier.

Why buy drilling solutions from Fordia?

Because our goal is to help drillers improve their performance.