The Spin 101
Understanding HDD Swivels
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When it comes to selecting the right swivel for directional drilling applications there are several things to keep in mind. HDD swivels are designed specifically for directional drilling applications. Standard swivels are not designed to withstand the difficult and challenging conditions that occur in directional boring.

HDD swivels prevent rotational torque from interfering with the product (cable, conduit, etc.) that is being installed. If an HDD swivel is not used in this application, the product could very easily be damaged from the pressure placed on it from the drill, whether its rotational torque or static pulling force.

To determine the correct swivel, calculating the working load rating suitable for the job is the first step. These loads include tension and compressive ratings. The correct load rating is based on the properties of the product being pulled, the pull force and torque ratings of the directional drill/bore rig and the ground conditions.

So, you need to look at the length of pull, the weight of pipe or cable, reamed hole size, friction of pipe or cable against side walls of reamed hole, etc. Most directional drilling contractors have their own ways of calculating or determining the expected loads. Most of the force placed on HDD swivels is tensile load. HDD swivels may also experience some compressive load. These loads vary depending upon the requirements of the job.

Once you have these calculations the next step is determining the type of HDD swivel you need.

Standard vs. Break-Away HDD Swivels
HDD swivels come in two basic configurations, standard and break-away. Break-away Swivels for directional drilling are designed to provide both the swivel rotation and serve as the break link for product pull-back. Standard HDD swivels do not separate, whereas break-away swivels include a break-away pin which allows the swivel to separate at the desired tensile load. Even though break-away swivels do separate, they are still re-usable. Typically, when a break-away pin breaks, contractors are able to order and install a new replacement pin.

Using a break-away swivel can help mitigate the potential for overstressing cable or conduit being pulled in during directional drilling operations. This is usually specified in the project. In addition, break-away swivels eliminate the use of “weak link" pipe or wire sections and shorten the gap between the reamer and pulling eye.

When selecting a break-away swivel, make sure to choose a swivel with a breaking load of less than or equal the tension limit of the cable or conduit being pulled. This will ensure

that the swivel actually functions as the weak link and separates before the product being installed is damaged.

Swivels come in many load ratings to meet each job requirement. HDD break-away swivels typically start at 150lb and go up to 40,000lb break load depending on style. Standard HDD swivels can have a tension rating range anywhere from 1,800 lbs. to 120,000 lbs. with some maxi rig swivels providing a tension rating up to 550,000 lbs.

Other Design Considerations

Another consideration when looking at HDD swivels is the profile of the swivel itself. Some swivels are designed with a sleeker style body to prevent them from getting hung-up or caught on obstructions. Also, many swivels feature a double clevis design, with a clevis connection on each end of the swivel. Threaded or thread-in style swivels feature a clevis on one end of the swivel and threaded connection either male or female that threads directly into the drill stem or a backreamer, for example.

How the swivels are engineered is also important. Some swivels contain ball bearings others utilize needle bearings. Needle bearings are prone to bending and, once they bend, they tend to bind up, preventing the swivel from rotating smoothly and ultimately failing. Ball bearing swivels are often able to better withstand lateral stress and have a much higher shear strength, helping improve the longevity of the swivel.

Once you have determined the correct load rating of the swivel, and type of swivel you need make sure that the clevis is large enough to fit the eyelet or tang you will be attaching to the clevis of the swivel. Showing up on the jobsite with a part that doesn't fit costs time and money.

Swivel Maintenance

Typically, HDD swivels are double sealed to keep contaminants out. Both break-away and standard HDD swivels are greaseable and need to be greased after each use to purge any contaminants that may have penetrated past the seals into the swivel.

Some lubricants can have adverse reactions when exposed to bentonite products, which are very common in HDD projects. So, choosing the proper lubricant for your HDD swivel is important. The use of a calcium-based lubricant may be required. Some manufacturers, like Condux, offer specially formulated lubricants that are compatible for use in a bentonite clay environment.

It's an extreme pressure, multiservice lubricant designed specifically for use in directional drilling/boring applications. These are manufactured from the high-quality petroleum oil and thickened with a unique calcium complex soap. The thickener resists breakdown caused by bentonite, which is common with lithium-based lubricants.

Finally, replacement parts including clevis pins, lock nuts, and break-away pins are a necessity. Check with the manufacturer first to make sure that parts are available for your HDD swivels.

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