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Buying a Mud Recycling System and Don't Know Where to Start?

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BY MIA CRONAN ON MARCH 11, 2015 DIRECTIONAL DRILLING, FEATURES, HORIZONTAL DIRECTIONAL DRILLING
Mud recycling systems were once considered optional equipment. Environmental regulations continue to become more stringent and we must all responsibly make a contribution to protect our fragile ecosystem.

Using mud recyclers are a valuable asset to drilling contractors, as well-conditioned drilling fluid can save resources, time and money by reducing the amount of water and chemicals needed by reusing your bentonite and water. This helps maintain borehole stability with consistent mud properties through the entire circulation of the fluid and you haul off mainly the drilled solids, not the entire mud returns, including the liquid.

Drillers considering a mud recycler often ask: "Where do I start?" There are factors to consider before purchasing (or renting) a mud recycler, and, just like sizing the drill rig, sizing the recycler is equally important to your success. The following are some of the questions to ask yourself before making your purchase:

1. Type of drill rig will you be using?
2. Length of your average bore?
3. GPM of my mud pump or do I need a mud pump on the recycler?
4. Type and size of shakers on the unit?
5. Shaker screen sizes and availability, what is "mesh size"?
6. How do I know if the recycler is working?
7. Purpose of hydrocyclones, and how are they rated?
8. Do I need a trash pump?
9. Parts, service and warranty?

These factors are important to know so that you use a recycler that is sized to clean the mud and protect the components on the rig, pump and cleaner.

Drilling rigs are generally classified as "maxi," "midsize" and "compact. While you can put a maxi recycler with a compact rig, it would not be advisable to do the reverse. Lesson: size accordingly.

Generally, longer bore holes require a larger pit volume in order to properly process the drill solids before sending the fluid back down hole.

As a general rule, size the recycler cleaning capacity to one and a half to two times the pumping volume (max gpm) of the triplex pump. HDD drillers normally run thicker fluids due to the low vertical height and long horizontal lengths of their bores; thicker fluid makes it more difficult for the shakers and cones to

process (separate) the solids from the liquids. This is largely due to the natural coating ability of bentonite — It wants to encapsulate the solids and “hold on” to them. By upsizing the recycler, the solid particles have a second or third opportunity to process through the mud recycler for removal before going back to the rig.

Example: If you are pumping 200 gpm, you would need a 350- to 400-gpm recycler.

Some mud recyclers provide an “onboard” mud pump that was sized specifically to the recycler. This enables the driller to use all available drill rig horsepower toward the rotation and push-pull of the drill pipe, thereby not “robbing” it for an onboard triplex pump.

Most recyclers today use orbital, elliptical or linear motion shakers, and each has a place in different drilling scenarios. With that being said, linear motion shakers generate high G-Forces and are especially effective in shallow formation sections where high-volume, heavy solids are encountered, and have the ability to remove the solids quickly.

When choosing a linear shaker for your mud system, look for a long runway (area of length from the front of the shaker to the end where the cuttings dump off). The longer length shaker bed allows extra time for solids to separate from the liquid, and result in drier solids leaving the mud system for disposal. You can also increase the angle of the shaker bed by five degrees to further increase the travel time of the solids.

Proper shaker screen selection enhances the results of the mud recycler, and, combined with the G-Force of the shaker, works in tandem to maximize solids dryness. In the past, shaker screens were sized by mesh size.



Before buying your recycler, do your research, talk to other drillers, decide what you need and you will be able to make the best decision for you and your company.

Example: 40 mesh screen had 40 openings per square inch of screen area. As a measurement, this left room for a lot of unknown variables, including questioning what gauge wire was used in the manufacture of the screens. The wire gauge altered the size of openings on the screen surface and resulted in changing the size of the solids that the screen could pass or “cut.”

The industry needed a consistent way to measure the “cut point” of the screens, and the API introduced the D100 designation, or D100 “cut point” using the average micron cut of the shaker screen, depending on the wire. Two examples are the CRX Oblong and UF square meshes.

Identification of particle sizes from core samples taken on each drilling location provides drillers valuable information and aids in selecting screens. Drilling contractors should carry a couple of testing tools to measure the effectiveness of a of the mud recycler while drilling. These tools are: a Marsh funnel and cup, sand content kit and mud weight scales. Taking mud samples from the return pit or possum belly before the mud is processed, the underflow and overflow of the cones and the clean mud tank help monitor the

effectiveness of each component of the recycler, and the driller can make component adjustments to achieve maximum efficiency.

In addition to the shale shakers, another way to size the processing capability of the mud recycler is to look at the hydrocyclone. Depending on the size of the mud recycling system, cone size will be 4, 5, 10 or 12 in. Each size cone has a micron “cut point,” and represents the size of the smallest particle the cone can “pull.” Four- and 5-in. cones have a 20-micron “cut point,” and 10- and 12-in. cones have a 74-micron “cut point.” Smaller mud systems normally have two section tanks, with a “dirty” tank under the scalping shaker and a “clean” tank under the mud cleaner (shaker with desilting cones), while larger systems can have three section tanks with scalping, desanding and desilting.

One hydrocyclone processes liquid at a rate of 50 gpm/ 4-in. cone, 80 gpm/ 5-in. cone, and 500 gpm/ 10-in. or 12-in. cone. Some manufacturers’ volume amount for their respective cone sizes may differ than those cited herein, but these are the most common within the industry for reference purposes.

Maintaining proper pressure is essential for the hydrocyclones to work effectively, with the normal operating pressure range for 4- and 5-in. cones of 30 to 40 psi; 10- and 12-in. cones of 23 to 35 psi. Pressure above 45 to 50 psi cause premature internal cone wear, and lower pressure down around 20 to 22 psi is a “red flag” that you better consider rebuilding the centrifugal(s) to maintain pressure in the optimum range.

Borehole returns require transport into the recycler via a “trash” pump properly sized for the job. Different pumps are available, but the three most common are: 1) submersible, 2) semi-submersible, and 3) aboveground centrifugal with a foot valve. Totally submersible pumps are generally the smallest in size, have a flooded suction to help in priming, and though the most convenient option, are usually the most expensive. Semi-submersible trash pumps still have a flooded suction, but the drive motor is not submerged into the fluid. Semi-submersible pumps work well, but are heavier, and longer than the submersible pumps. Another option is an above ground centrifugal pump with a foot valve, and once primed, is dependable and normally used on larger recyclers for their increased volume capacities.

If your drilling crew has never operated a mud recycler, be sure that you are provided with training and try renting a unit to make sure it is the right “fit” prior to purchase. Be familiar with the maintenance requirements of your mud system; usually the owner’s manual is sufficient, but inquire if the manufacturer offers training videos, onsite or plant training sessions and — the most important — technical support.

A manufacturer should stand behind the equipment its builds so don’t settle for a warranty less than one year. Ask questions about the warranty prior to finalizing the purchase.

In an age where protection of our planet is a major concern, so should your choice of mud systems. Choose a recycler that is respectful to the environment and leaves your jobsite as clean as possible. Do your research, talk to other drillers, decide what you need and you will be able to make the best decision for you and your company.

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