Decanter Solutions for Offshore Drilling

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Modern drilling emulsions form a closed circuit from which no solids emerge. As a result, everything that gets into the emulsion due to the drilling process must be separated out. While riddle screens and hydrocyclones separate coarse-grained particles, the decanter deals with small particles.

Natural gas and petroleum have been won from the seabed for many years. The United States had already built the first oil drilling platforms off the coast at the end of the 19th century, but building the drilling platforms far out at sea was still unimaginable for the oil pioneers. Their rigs stood in water just a few meters deep and were connected to land by a pier. Things are much different today. Operating offshore gas and oil rigs in the deep sea has become a common business. Advanced developments in drilling and conveying technology are also making it possible to pump from ever deeper water depths. For this kind of drilling, which has to take place in a closed loop system, flushing is used. Modern separation technology allows the flushing or drilling fluids to be treated as optimally as possible to guarantee the best functioning of the drilling system. Decanter centrifuges play a decisive role here.

Drilling mud decanter centrifuges on an oil rig near Nigeria.

Treatment of drilling fluids

Flushing has a number of different functions in drilling and therefore is given special attention. The most important are:

- Transporting the drilled rock to the surface;
- Driving, lubricating, and cooling the drill head;
- Stabilizing the drill hole;
- Thickening the drill hole so that materials such as oil, gas, or water do not penetrate it; and
- Providing information about the rock mass.

In order to accurately solve all of these tasks, the flushing fluid needs to have very specific properties and be matched to the substrate. That is why it is important that it be altered as little as possible in its composition. The flushing fluid is influenced by thermal and chemical factors and when it takes on drilling solids. Treating the flushing or drilling fluid is done to remediate the influence of the drilling solids.

Separation of solids

Part of the drilling solids can be separated using shale shakers. Shale shakers have a mesh of up to 25 Mμ. They can effectively separate approximately 10% to 30% of the drilling solids.

Desilting systems

Hydrocyclones have been used for years to further eliminate solids from the drilling fluid. These systems can be used to treat the entire mass of drilling fluid. Centrifugal force is used to separate a concentration of solid particles up to a tiny size of 10 Mμ depending on various factors (such as stone size in relation to specific weight of the particle, viscosity, etc.). The disadvantage is that a significant amount of fluid is lost with the solids.

Decanter centrifuges

Adding a downstream decanter centrifuge can counteract the disadvantages of conventional desilting systems. The decanter separates the residual fluid from the relatively highly thickened solids in the desilting tailwater.

Where is the use of a decanter recommended?

- When maximum safety and speed are needed as well as less wear on the boring mill;
- Wherever additional costs arise from multiple uses of drilling fluid material;
- Wherever the production and remediation of mud pits present problems with surface protection and ground water protection and make significant investment necessary;
- When drilling mud pits cannot be placed near the dilling rig, resulting in transport costs for removing flushing fluids. This is particularly relevant for offshore platforms; and
- When the oil flushing form solids needs clarifying.

Results from use

Experiences in the past months have shown that drilling mud not completely separated by shale shakers needed to be separated with Flottweg Decanters. Depending on the size and throughput of the centrifuge, a magnitude of approximately 1.5 T of drilling solids per cubic meter centrifugal cake could be separated. Overall, the volume concentration of the centrifugal cake was about 50 to 60 vol.% solids. The specific weight of the centrifugal cakes was a magnitude of about 2.0 kg/L or higher.

By using decanters at various bore holes, it was possible to partially or even completely forego having to transport the recovered flushing fluids. Only the solids in the centrifuge cake needed to be transported to the mud pit with the remaining flushing fluid.

The following numbers prove that using decanter technology in bore holes is extremely economical and cost-efficient, and the advantages are obvious. The price of polymers, various stabilizers, corrosion inhibitors, anti-foaming agents, and surfactants are a significant cost factor in drilling. Since decanter centrifuges make it possible to run the flushing fluid in a closed loop system, noticeably less flushing material is needed, which results in a significant savings potential.

In addition, less water needs to be used (exchange fluid). Plus, the process harbors even greater savings potential in terms of the disposal costs. The personnel needed for setting up the flushing and implementing the material can be employed for other important tasks.

Flottweg's top-performing decanters reflect the knowledge and experience in clarifying all types of flushing fluids from drilling. The sturdiness, ease of operation, reliability, space-saving compact design, and technical advancement all make the Flottweg Decanter prized and recognized worldwide. Flottweg Decanters are also available as platform solutions with all of the important components. This makes transportation easier and provides customers with a plug-and-play solution.

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