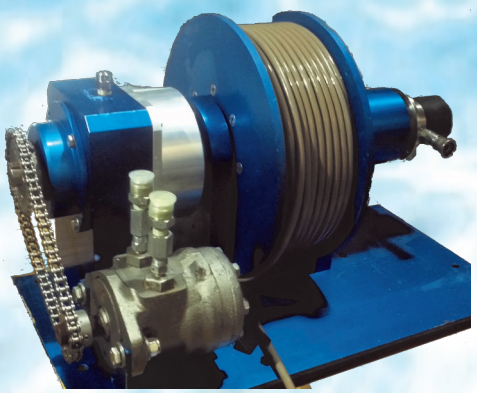
SOLID FOUNDATION CRITICAL FOR OCEAN OIL

Well before construction even begins on a deep water well, much research is done to first determine if oil is even present. Once the area on the ocean floor is leased (not purchased) from the government, the process of determining where the rig will be placed begins. Remember, many wells are in water at depths of up to a mile or more. Eons of decaying plant and animal life as well as silt have settled to the bottom of the sea, making the ocean floor much different than terra firma.

A deep water oil rig is not built on a foundation on the ocean floor per se; instead, it is anchored to the floor and is allowed to move. Determining where the anchors are placed is critical to the stability of the rig. Information about the soil strength must be collected and analyzed. In the past, this process has taken place from the ship at the surface via thousands of feet of drill-string suspended below the vessel. It is a painstakingly slow method and, at times, is not totally accurate. Gregg Drilling, in conjunction with Schilling Robotics and MARL Technologies has designed an apparatus called the Gregg Seafloor Drill System.

The Gregg Seabed CPT being lowered into the ocean depths

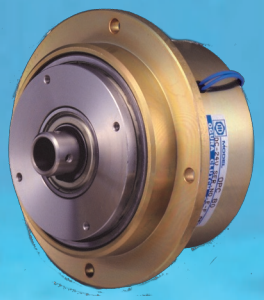


Information cable which carries data from penetration cone. Tension is controlled by Ogura OPC-80N

It is a seabed-based remote drilling system that allows the operators to control an ROV (remotely operated vehicle) sitting on the ocean floor from the ship. The heart and soul of the method is the Seabed CPT (Cone Penetration Testing) System.

The CPT, sitting on the ocean floor, uses negative pressure to force a cone-shaped probe into the seabed to depths of up to 150 feet. By pressurizing the inside of the probe and modifying the load cell design inside the cone, the CPT is insensitive to external hydrostatic pressure, which can reach 5000 psi at a working depth of close to 10,000 feet. This process allows for much more accurate density, shear strength and depth readings as well as tip resistance of the cone in soil that has the consistency of what has been described as “oatmeal”.

One of the many hurdles Ron Boggess, the designer of the CPT system, had to overcome was finding a way to maintain the correct amount of tension on the cable which provides feedback from the probe and relays to the control station. Ron came to Ogura to find a solution and selected the OPC-80N Electromagnetic Mag-Particle Clutch which is designed to deliver high performance under constant slip conditions. The OPC clutch operates by attracting magnetic particles together as the magnetic field in the clutch increases. The more voltage/current going to the clutch coil, the higher the attraction of the particles. This is an almost linear relationship, so the clutches are extremely fast acting and can react quickly to either increase or decrease the tension on the cable, even on a stormy sea. While some modifications were necessary, the OPC is providing consistent and repeatable torque in places few humans have ever seen.•



Ogura OPC Clutch

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