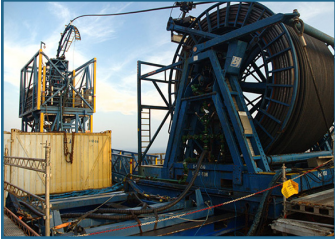


interface

FORCE MEASUREMENT SOLUTIONS. CASE STUDY

Coil Tubing Load Cells



Since 1968, Interface has been making world class low profile load cells. Interface has applied that expertise in creating our model 3400 family of coil tubing load cells. The 3400 Load Cell Series has endured the rigors of the tough oilfield environment for decades. This product is available in capacities from 20K up to 300Klbf and incorporates a stainless steel, hermetic design to IP68. Also included is an intrinsically safe, 4-20mA output. This product family has been approved for use in hazardous environments by ATEX.

Background

The main natural resources used to power our country are oil and natural gases found deep within the earth. In order to harvest these resources, drilling companies in the energy industry need the most advanced processes, technology and tools to safely and efficiently perform the extraction. One extraction methodology starts with drilling a wellbore, which is essentially a 17,000 to 24,000 feet deep hole within the earth, created so piping can be run down into it to access oil and gas reserves. However, the wellbore is unstable without some type of structure to keep it from caving in. In order to stabilize this wellbore to allow for the delivery of extraction tools and harvesting, the industry adopted the use of steel coil tubing. This structure is installed in the wellbore to create a wall to hold back the earth and keep it from collapsing in on the extraction equipment. The advantage of utilizing coiled tubing is it allows extraction crews the ability to work on a live well without interrupting the production of oil and gas. Coiled tubing operations also increase the speed of which materials and fluids can be extracted with fewer personnel. Even in horizontal drilling applications, the rigidity of coiled tubing allows it to be pushed into the wellbore, creating a more versatile solution in today's modern well operations and services.

Challenge

The coil tubing process has been used for decades, but not without its own set of unique challenges. The purpose of the tubing is to protect and optimize the insertion and extraction process. However, there is also a complicated and delicate insertion process for the coil tubing itself. The tubing is forced into the wellbore using a coil tubing injector head at an insertion rate of 50-100 feet per minute. During the injection process, the tubing is subject to damage such as buckling, which creates a failure condition called "lock up."



3410 Coil Tubing Load Cell



3420 Coil Tubing Load Cell



3416 Coil Tubing Load Cell



3432 Coil Tubing Load Cell

When this failure occurs, the tubing insertion must be aborted, which can cost the drilling company a lot of time and money. To avoid coil tubing failure, a drilling company turned to Interface to create a force measurement solution that would allow it to monitor force feedback on the coil tubing during the insertion process. This solution was not available commercially, so Interface leveraged its custom solutions department to design a force measurement system capable of enduring the unique environment presented by the wellbore.

Interface's Solution

To safely install coil tubing and avoid damages in the process, Interface engineers worked with the drilling company to discover the challenges associated with the wellbore. Because a wellbore is a highly explosive environment, worker safety on site was the most critical factor in the design process. Interface has a long history of designing and manufacturing explosive environment rated products. To protect a device from harsh environment, hermetically seal the device. The next step was re-engineering Interface's LowProfile® load cell to be able to install it on a coil tubing injector head and travel into the wellbore. Since the wellbore is relatively unstable and delicate, Interface designed its load cell to provide "force measurement feedback" to ensure that the coil tubing does not collapse, crumple, or crimp when being inserted. The resulting product from Interface's custom solution department was the 3410 Intrinsically Safe LowProfile Load Cell.

Results

Since its development, the 3410 has endured the rigors of the tough oilfield environment change for many years. With this custom load cell, Interface's drilling customer in the energy industry is able to safely and efficiently stabilize its wellbore's using coil tubing. The 3410 is highly accurate and provides real-time monitoring capabilities to avoid costly and time-consuming failures. It also provides the user with the peace of mind that they aren't exposed to potential explosions.

For more information on the 3410 Intrinsically Safe LowProfile Load Cell and other Interface applications used in the energy industry, please visit www.interfaceforce.com/solutions/energy/.

About Interface

Interface is the world's trusted leader in technology, design, and manufacturing of force measurement solutions. We guarantee the highest quality performance of load cells, torque transducers, multi-axis sensors, wireless telemetry, instrumentation, and calibration. We empower engineers around the world to measure force and performance at the highest degree. Our clients are the who's who in aerospace, automotive and vehicle, medical devices, energy, test and measurement, and industrial manufacturing. Interface, Inc., was founded in 1968 and is a US-based, women-owned technology manufacturing company headquartered in Arizona.

