The Hunt for Black Gold

Trelleborg AB

Despite moves toward greater energy efficiency and a turbulent economic climate, global demand for oil and gas shows no sign of letting up. Consumption in the developed world may be flatlining, but China will more than double its oil consumption from 2000 to 2015, while in India demand will increase by about 75 percent.

Debate continues about when "peak oil" will be reached, but the fact remains that a huge amount of oil is still in the ground – enough to last several decades by most estimates. The problem is that much of the "easy" oil has been found, and demand for energy is taking exploration and production to ever-tougher extremes of geography and climate. The deepwater (more than 500 meters or 1,600 feet) and ultra-deepwater (more than 1,500 meters or about 5,000 feet) energy sector represents one of the major growth areas for the oil and gas industry, but exploiting these reserves presents tough technical challenges.

"This is a very onerous environment," says John Drury, Business Group Director for Trelleborg's [1] business that focuses on the offshore industry. "The risks multiply exponentially with depth, and operators are looking for fail-safe solutions."

One issue with ever-deeper wells is that the hot oil cools and thickens on its way to the surface, slowing the flow and potentially causing blockages. One of Trelleborg's many product lines for the oil and gas industry is thermal insulation material to prevent this cooling.

"Our materials are engineered to cope with environments at extreme depth plus temperatures well in excess of 100°C [212°F]," says Drury.

Safety has long been a priority for the offshore oil and gas industry, but the Deepwater Horizon explosion in the Gulf of Mexico, which resulted in 11 deaths and

the largest accidental oil spill in history, thrust the issue into the spotlight.

“Operators are introducing increased risk-mitigation strategies to avoid these sorts of incidents in the future,” says Drury. “There should be further opportunities for our safety-related products as legislation is introduced.”

Among Trelleborg’s wide range of safety systems for the offshore oil and gas industry are the Elastopipe deluge system for fire protection, microspheres for smothering fires and flexible fire-retardant coatings. Trelleborg is also working on innovative buoyancy solutions that improve safety by reducing the load on the long pipes bringing oil up more than a kilometer (3,000 feet) from the seabed.

The industry, which accounts for about 10 percent of Trelleborg’s total sales, has witnessed increased globalization in recent years as new deepwater fields are exploited, such as off the coast of Vietnam, Brazil and West Africa.

“In Brazil there is heavy investment to enable the construction of ships in the country, whereas historically they might have been built in Korea,” says Drury. “Similarly in Southeast Asia there is a shift toward deeper waters, and at the same time countries in the region are looking to develop more locally based supply chains.”

To capture these opportunities, suppliers including Trelleborg are setting up production in these new markets.

But while the opportunities are plentiful, the competition is tougher than ever.

“There are a lot of building projects ongoing, but people are being very aggressive

to win and everyone is very conscious about margins," says Thor Hegg Eriksen, Business Unit President for Trelleborg's business that focuses on the offshore industry. "This seems a bit of an anomaly for a business that is making so much money on the operator side. But there is not really a direct competitor that is able to offer such a broad product portfolio from as many locations as Trelleborg."

Industry observers see an intriguing period ahead, with expected regulatory changes on safety, national oil companies becoming more outward looking, the rise of Asia as a supplier and consumer, and increased investment in deepwater drilling.

"There are changes going on, and it is an interesting environment," says Eriksen. "But with our core competencies, our ability to work on a global scale and our extensive innovation work, Trelleborg is well positioned to see what happens and to jump on the opportunities as they arise."

On the Rise

To supply this booming market, Trelleborg is investing heavily in Brazil, acquiring an existing factory and building another on a greenfield site. "Brazil is becoming hugely important," says Brian McSharry, President of Trelleborg's U.S. business that focuses on the offshore industry. "We have studied the market conditions and recognized the significant potential, and as a result we have established a major presence there."With the deepwater discoveries off its Atlantic coast representing a third of all worldwide oil discoveries in the past five years, Brazil is widely touted as the next oil giant. Petrobras, which has grown to become the world's third-largest oil and gas company by market capitalization, will be investing some USD 224 billion by 2014, much of it in platforms, rigs and other infrastructure.

The new facility, located in Brazil's oil capital, Macaé, will manufacture a wide range of polymer-based solutions for offshore topside and subsea oil and gas exploration.

"There is no other manufacturing on this scale in the country," says McSharry. "We will be able to reach near capacity relatively quickly, and the size of the facility is such that if we need to expand, we can."

The second factory, at Santana de Parnaiba, was acquired in April 2011, together with a nipple hose technology for transferring oil from floating production, storage and offloading vessels and terminals.

"This product completes our product and solution portfolio," says Managing Director Xavier-Alexandre Delineau. Another line at the factory will produce printing blankets to cater to the growing Latin American printing market.

Petrobras has set aggressive objectives on local content for its projects, so the factories are important for Trelleborg to access Brazil's oil and gas market. "One of our goals is to have two world-class factories serving the global offshore and marine offloading business, and we have a plan in place to sustain and develop our leadership position," Delineau says.

Avoiding Explosive Decompression Failure

When engineers specify a seal material for an application, they have to consider such things as working temperatures, pressure and compatibility with chemicals. In oil and gas applications there are other critical criteria that must be considered, such as explosive decompression.

Inherently, elastomer seals contain voids. Gas or gas mixtures in contact with elastomer surfaces during oil and gas processing are absorbed and saturate elastomer seals. At high pressure this absorbed gas is in a compressed state. When external system pressure is reduced, either rapidly or over a relatively short period of time, the compressed gas nucleates, inflating at the voids within the elastomer. Depending on the strength and hardness of the elastomer, this can cause the elastomer to break or crack.

No elastomer can be completely ED resistant. However, Trelleborg has engineered the XploR range of sealing materials that demonstrates unrivaled ED resistance for each elastomer type.

An Innovative System

The new joints can be stacked alongside buoyant riser joints in the same deck storage area, thanks to strategically placed protective sections spaced within the RiserGuard that transfer loads between the joints and the deck.“We originally developed our RiserGuard product to help protect bare riser joints as they were handled and run on the rig,” says Alan McBride, Vice President of Drilling at Trelleborg’s business that focuses on the offshore industry. “In addition, the product

would enable the riser to be run and pulled quicker, saving valuable rig time."

"Always keen to meet the changing wants and needs of our customers, we recognized the need to be able to stack the riser joints and decided to develop a stackable version of the product," McBride says.

Gushing Up

The starting point of today's mega-billion-dollar oil industry came in the 1850s when Polish pharmacist Ignacy Lukasiewicz distilled clear kerosene from seep oil.

For centuries in North America in what is now the U.S. state of Texas, Native Americans used tar from oil seeps to treat ailments. In more recent history, reservoirs were unearthed when settlers drilled deep for water. Initially, oil was considered a nuisance until its potential was realized.

Because the reservoirs in the region were under several hundred feet of sand, the oil was difficult to extract. Flow was slow, and the drill holes were prone to cave-ins.

At the turn of the past century, engineers at the Spindletop oilfield in Beaumont, Texas, tried pumping mud into the drill hole instead of water to flush out drill cuttings. The mud stuck to the sides of the hole and kept it from caving in.

The result was historic. On January 10, 1901, following a noise like a cannon shot, mud, natural gas and then oil came shooting out of the ground in a gusher that rose to a height of more than 150 feet. Lucas 1, as the well was dubbed, initially flowed at a rate of nearly 100,000 barrels a day, more than all the other producing wells in the U.S. combined.

For more information, please visit www.trelleborg.com *[1].*

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