VariPig

Case Study

710km Åsgard pipeline with variable diameter from 42” to 28”

Over 700km pipeline lengths, on dewatering operations requiring dual diameters

About VariPig:

VariPig is a multi-diameter pipeline pigging solution, designed to run on the pipe centerline. VariPig provides support in all diameters, including large diameter pipeline changes.

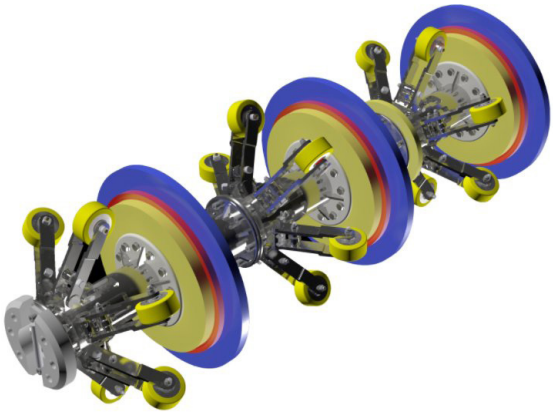
Features and Benefits:

- True centerline running
- Reduced drive pressure, for major cost-savings in long distance and deepwater pipelines
- Suspension arm design ensures even and consistent sealing disc wear
- Upto 100% diameter change possible
- Repeatable, efficient performance vs standard utility pigs
- Adaptability for different functions, including pipeline commissioning, operational cleaning and providing adrive module for 3rd party tools

The Client

The operator for this critical project was Gassco, with the Technical Service Provider (TSP) being Statoil.

The Åsgard Transport project concerned the pipeline carrying rich gas from the Åsgard field in the Norwegian Sea, through to Kårstø, one of the world's most prominent natural gas processing complexes.



VariPig - multi-diameter pipeline pigging solution

Upto 75% differential in pipe diameter, with less than 0.2% deviation from the pipe centreline

The Challenge

Back in the late 1990s the majority of previously designed commissioning pigs adhered to traditional design concepts, in that all functions of the pig could be met with a relatively simple low cost design. The Åsgard multi diameter gas transporter line was totally different.

The pipeline length would be 710km with a 42" diameter—with the final 500 metres reducing to a 28" diameter. A critical consideration of this new pig would be drive disc and support disc wear.

An initial design study identified the following system requirements:

- Near centerline running in all diameters
- Low running friction
- Differential drive pressure to be kept as low as possible
- Ability to accommodate auxiliary components, such as magnet packs, and electronic pipeline gauging packages

The Solution

By applying basic hydraulic sealing design principles, FTL decided that contrary to previous designs, the support function of the pig should be completely separate from the sealing and drive function.

Due to the expected high rate of wear that the sealing discs would have to withstand, it was decided to take the hitherto unprecedented step for a commissioning pig to mount the whole unit on a self-supporting and self-centering suspension system.

By careful design, the potential to overload the wheel assemblies when passing from the larger to smaller diameter pipeline sections was avoided. Additionally, a slow rotary motion would be imparted to the whole pig train to even out wear on the sealing discs.

Improved efficiency and reduced water in glycol slugs, from 3-4% down to 0.4% with VariPig

The Benefit

Following the initial pipeline cleaning and gauging operation all six pigs were reconfigured for the dewatering operation pig train. These were launched with glycol slugs between the first four pigs, and dry air between the last pigs. This was to pick up the remaining glycol and water in the line from pipe components, such as tees.

At the end of the run, the three glycol slugs were sampled and percentage water content was measured to indicate the overall efficiency of the operation.

It was found that only 0.4% water in glycol was recorded in the last liquid slug, compared with 3-4% from previous dewatering.

The key benefit was significantly reduced operational downtime on the Åsgard pipeline start up, resulting in long term cost savings.

"FTL's VariPig solution has provided the most efficient dewatering operation we've ever completed."
Project spokesperson

In-depth Solutions

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