



COLLOQUIUM

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Vakgroep: Technische Stromingsleer

In het kader van zijn/haar doctoraalopdracht zal
(naam) G.A. Groote

een voordracht houden getiteld:

Experiments and simulations for control of liquid slugs and gas surges

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Samenvatting:

This presentation describes results of a combined experimental/simulation study carried out in the multi-phase flow team of the Shell Research and Technology Centre (SRTCA) in Amsterdam. During the offshore production of hydrocarbons, gas and oil are transported together through a subsea pipeline connected by a vertical riser to the receiving platform. Depending on, amongst others, the flow rate, fluid composition and pipeline topography, the liquid and gas may accumulate to give so-called liquid slugs and gas surges at the receiving platform. These production irregularities might exceed the given production capacity of the downstream facilities, such as the separator, compressor or heat exchanger. This implies that the production has to be reduced to a lower flow rate (giving so-called production deferment), than possible without the occurrence of slugs and surges. Therefore there is a need to mitigate and control slugs and surges.

Shell has developed such a system, the so-called Shell Smart Choke. At the beginning of this project only testing within the experimental facility of SRTCA had been completed for slugs appearing in risers, so-called severe slugging. The main goals of this project were to:

- Perform experiments to test the Smart Choke control for so-called transient slugs, which are slugs introduced in the pipeline upstream of the riser.

- Simulate the flow in the experimental facility using OLGA, a dynamic pipeline simulator. Develop a model for the Smart Choke. Perform simulations for transient slugging with active Smart Choke control.

Experimental results in the 2" diameter test loop, using water and air, show that the Smart Choke can be effectively tuned to produce the liquid slug in controlled ways. There is good agreement between the simulation results and experimental results. However, the simulation results show fewer fluctuations compared to the experimental results.

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