

Mator News

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Provider of innovative consultancy services in **gas/oil/water separation technology** and **condition based maintenance technology** for the oil and gas industry

Probably the best method to optimise the use of chemicals in the separation process

It is often difficult to evaluate the performance of production chemicals in a gas/oil/water separation process. Normally it is easy to detect the lack of chemicals due to clogged lines or pump failure. However, to ensure that the suitable amount and kind of chemicals injected are optimised in order to obtain the maximum throughput and quality of the gas, oil and water phases, is not straightforward procedure.

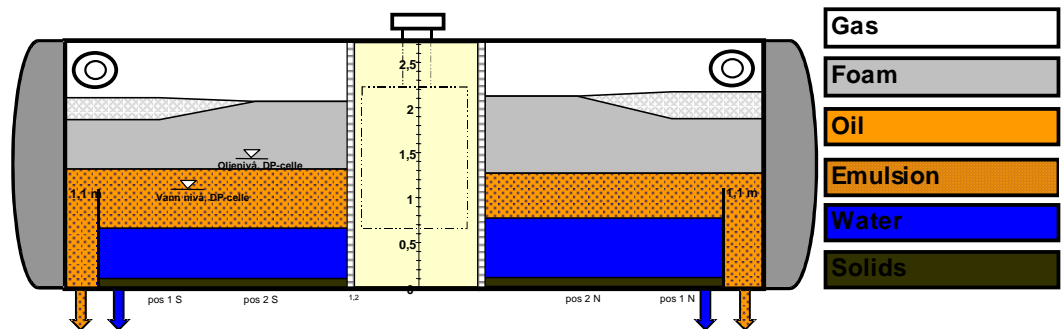
The **neutron backscatter technique** has proven to be one of the best methods in order to optimise the use of chemicals in a separation process. The method provides an opportunity for "on-line" monitoring of the functionality of different types of chemicals. Adjustments of level readings according to actual interface levels enables a more optimal operation of the separator.

For example:

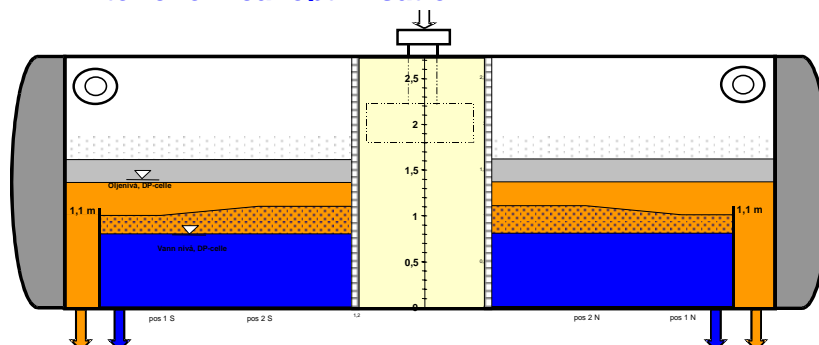
- ♦ **Demulsifier:** Will the emulsion band change in extension or width as a function of injection rate or type of demulsifier ?
- ♦ **Defoamer:** Will the foam height and/or the foam profile (degradation) change as a function of injection rate or type of defoamer under varying conditions ?

The illustration below shows an example from an "on-line" monitoring and optimisation procedure of a chemical injection. The effects on the phase behaviour and separation performance can easily be visualised. The emulsion band is minimised and the extent of the foam layer is dramatically reduced.

Prior to chemical optimisation:



After chemical optimisation:



Process Tuning

- an important contribution to optimisation aimed at increasing regularity and throughput

Process optimisation is often performed within the boundaries of each discipline; the process engineer studies separation parameters and equipment efficiency while the control engineer troubleshoots and tunes control loops. However, in many cases great benefits may be gained by combining forces.

SLUGGING

Many installations experience slugging with sometimes detrimental effects. Slugging is often caused by conditions that are very difficult to change such as GOR, long subsea transport lines, gas lift and riser lengths. Consequences of slugging may be separation problems due to varying flow and level control and in other cases, frequent and short slugs disturbs slow acting temperature controls.

How to deal with this problem on existing installations?

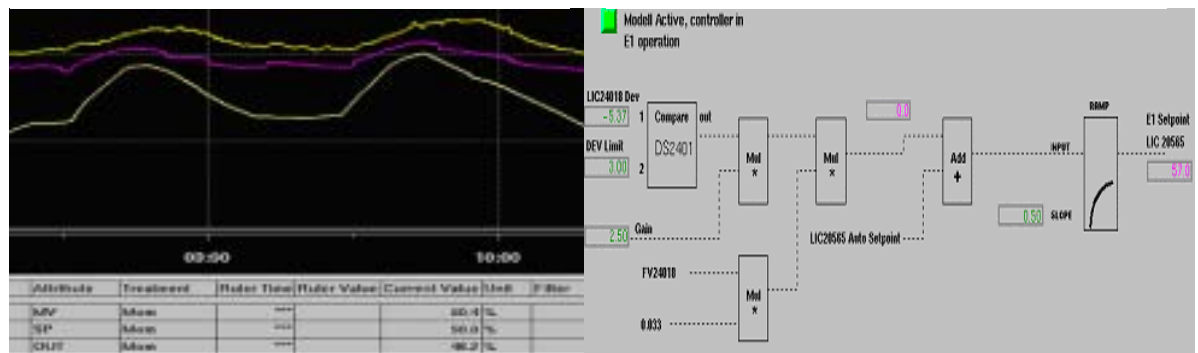
For existing installations it is normally too costly to handle slugging by doing major modifications to pipe geometry, control valves

and separation equipment. However, it might be a solution to use options already available in modern control systems.

FEED FORWARD

One such option is feed forward control. Once a slug is detected in the inlet separator or upstream pipeline this information is used to "prepare" the downstream process for slug handling by changing the controller setpoint. By this approach, both downstream level controllers and temperature controllers are utilized to respond proactively in order to even out the slug and reduce its disturbing effects.

In close cooperation with the control system vendor Mator has developed and implemented feed forward solutions at an installation that frequently experienced trips and process upsets due to slugging. The solutions have been implemented on several level and temperature control loops combined with control loop tuning based on process knowledge about the system. The solutions have greatly reduced the instability problems previously experienced.



Recent Mator projects:

- ◆ **Norsk Hydro Troll C:** 1. stage separator verification study
- ◆ **Shell Draugen:** Produced water mapping
- ◆ **Statoil Åsgard A:** Baseline-, capacity- and antifoam testing
- ◆ **Norsk Hydro Njord:** Antifoam testing
- ◆ **Statoil Staffjord C:** Process separation seminar



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