Case Study 1D - Separator Optimisation

Background

Jorin's client was experiencing an on-going problem with high oil in water concentrations from their installed separator. It was understood that the interface level within the vessel fluctuated and it was believed these fluctuations presented a high degree of variability in water quality, leading to problems with control of their produced water separation process.

Aim

To investigate the effect of variation in separator interface levels on both the oil in water concentration and droplet size distributions leaving the separator and then based on these findings, to recommend an optimum interface level.

Results

On site, analysis was conducted using Jorin's mobile ViPA technology which is designed and constructed to operate in hazardous environments.

A graph of oil concentrations is shown in Figure 1 and the mean oil droplet sizes are shown in Figure 2. Initial conditions were that the interface level was at 21% and both oil concentrations and drop sizes exhibited high degrees of variability. The interface level was then increased to 27% and both the oil concentration and the degree of variation in oil concentration was recorded to decrease, however, the degree of variation in oil drop size increased. The decrease in oil concentration was beneficial to the downstream process while the increased variability in drop sizes were not found to be detrimental to performance.

A graph of solids concentrations is shown in Figure 3 and the mean solid particle sizes are shown in Figure 4. As discussed above, initial conditions were at 21% and the solid concentration exhibited high degrees of variability. The increase in interface level to 27% resulted in a decrease in the degree of variance of solids concentration. The decrease in solids concentration was beneficial to the downstream process while the solids particle size were not found to be detrimental to performance.

Jorin Limited
Jorin House, 32, Ashville Way, Whetstone, Leicestershire. LE8 6NU.
Tel: +44 (0)116 275 3300 Fax: +44 (0)116 275 3322 email: info@jorin.co.uk web-site: www.jorin.co.uk
Company Registration Number: 3601205

Conclusions

It is evident that the variability of interface levels has an effect on process stability and efficiency. On this basis, a control system that more adequately manages the vessels' interface is warranted; together with an operational practice that maintains an interface level of 27% would reduce the workload of the downstream separation process plant.

These results clearly show the benefit of installing ViPA based technology downstream of separators to provide real time concentration and size measurements.

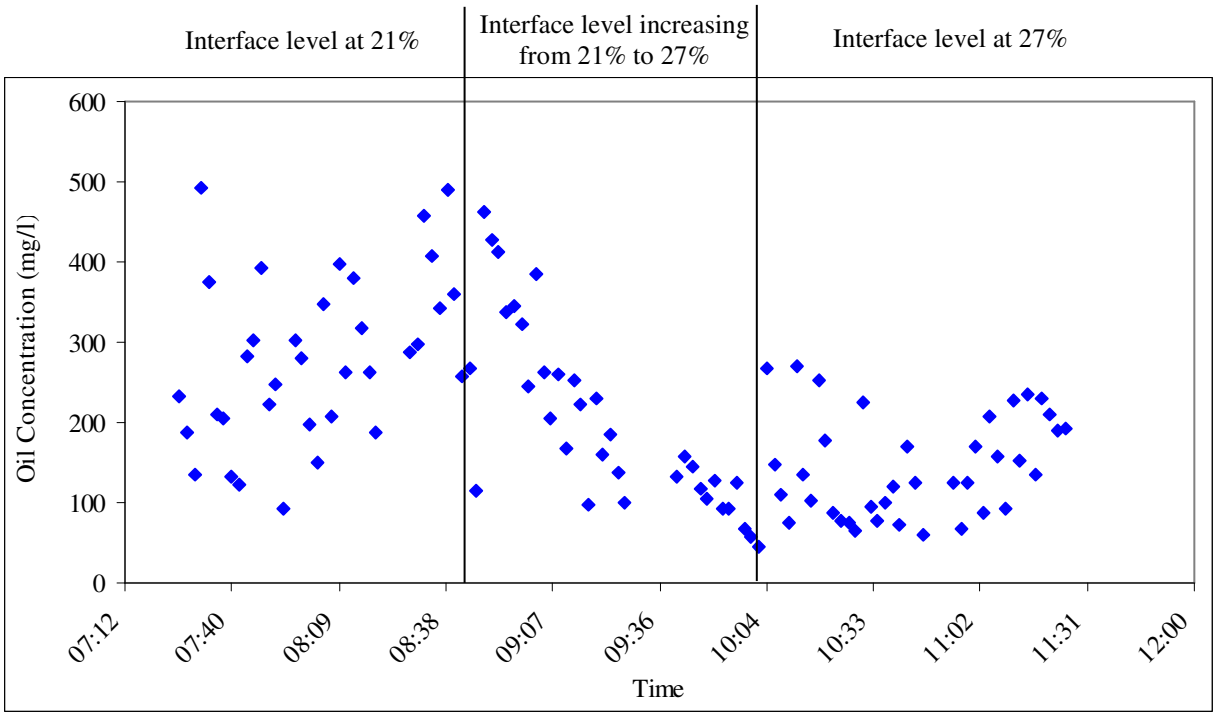

Figure 1: Oil concentrations downstream of the separator

Jorin Limited
Jorin House, 32, Ashville Way, Whetstone, Leicestershire. LE8 6NU.
Tel: +44 (0)116 275 3300 Fax: +44 (0)116 275 3322 email: info@jorin.co.uk web-site: www.jorin.co.uk
Company Registration Number: 3601205

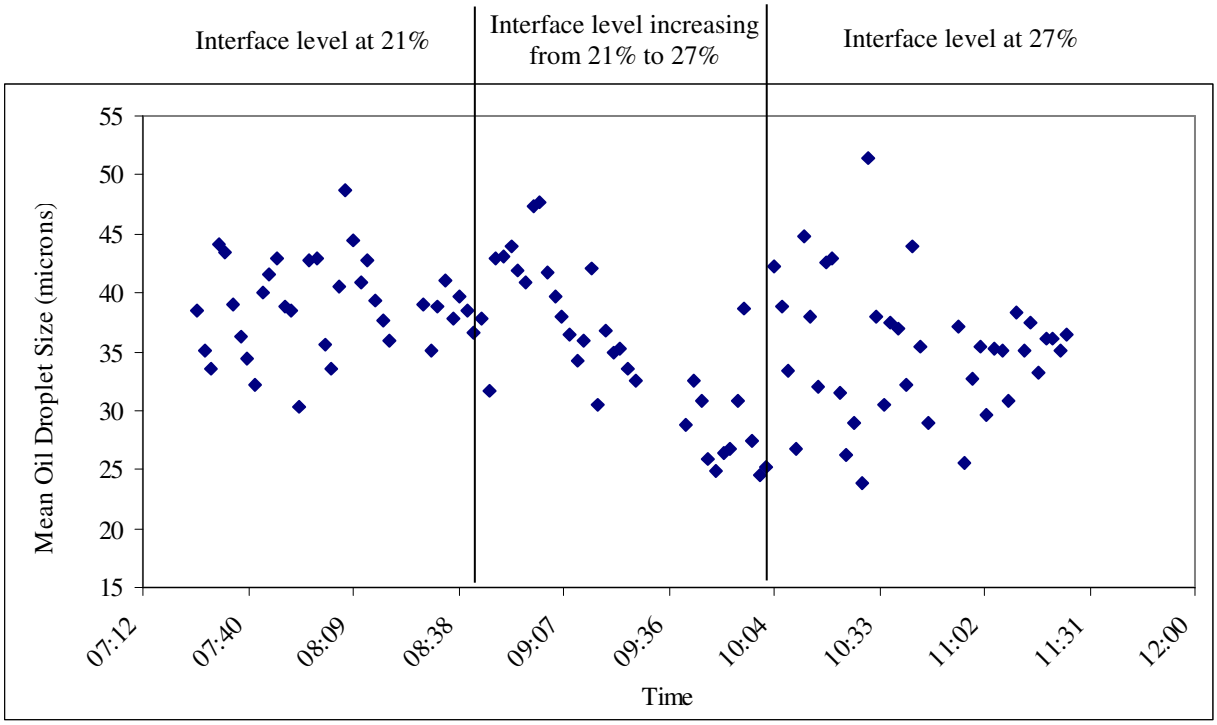

Figure 2: Mean oil droplet size distribution downstream of the separator

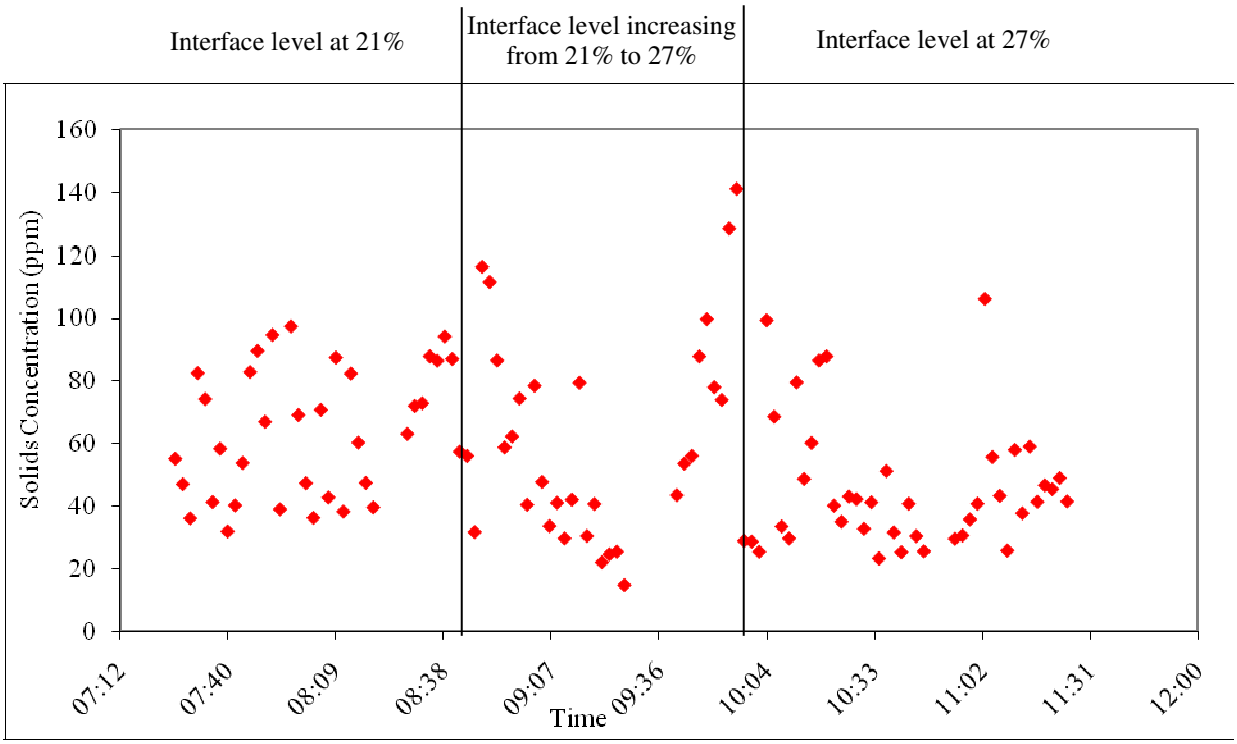

Figure 3: Solids concentrations downstream of the separator

Jorin Limited
Jorin House, 32, Ashville Way, Whetstone, Leicestershire. LE8 6NU.
Tel: +44 (0)116 275 3300 Fax: +44 (0)116 275 3322 email: info@jorin.co.uk web-site: www.jorin.co.uk
Company Registration Number: 3601205

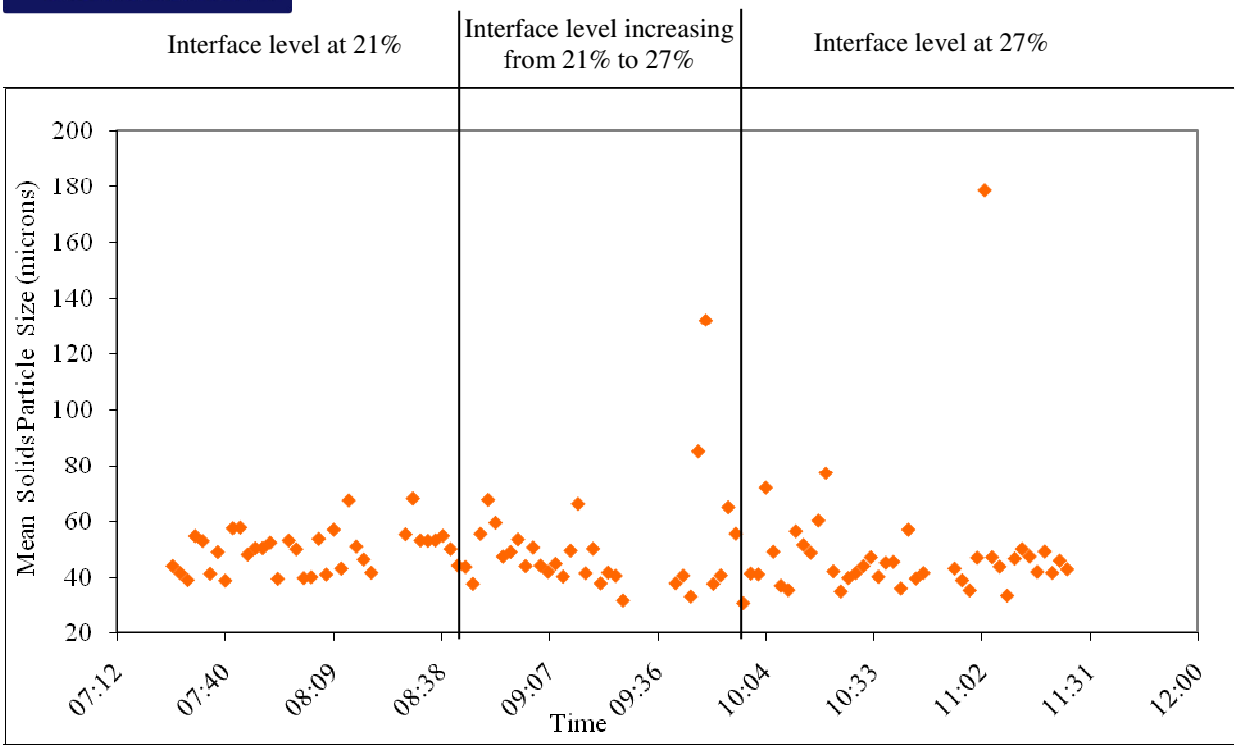

Figure 4: Mean solid particle size distribution downstream of the separator

Jorin Limited
Jorin House, 32, Ashville Way, Whetstone, Leicestershire. LE8 6NU.
Tel: +44 (0)116 275 3300 Fax: +44 (0)116 275 3322 email: info@jorin.co.uk web-site: www.jorin.co.uk
Company Registration Number: 3601205