Jet Fuels

Background

This case study data was collected during development tests of a jet fuel water filter. A Jorin InVA was used to obtain data on the water droplet size distribution and water concentration in the jet fuel. The InVA is an on-line instrument that can be used for monitoring the physical characteristics of multiple classes of dispersed objects within a given fluid stream. The InVA system uses image analysis techniques and sets of user-defined descriptive parameters (such as shape factor and optical density) to differentiate between the various species of objects present within a sample. This allowed the InVA to distinguish between the solids contaminants in the fuel and isolate only the water droplets.

Results

Figure 1 shows the water concentration that was recorded in the jet fuel. The initial data collected was the baseline water concentration in the jet fuel. At approximately 15:00, the fuel was routed through the filter and an immediate reduction in water concentration was observed. This reduction in water concentration shows how effective the filter was, however the water droplet sizes were seen to increase as shown in Figure 2, due to the filter element coalescing the water droplets and a small proportion of these droplets passing through.

4 further step changes were made where more water was added to the fuel to observe the critical concentration of water at which the element became saturated. As the water concentration downstream increased, the size of the droplets decreased gradually back to baseline conditions.

Conclusions

This case study highlights how on-line particle analysis quickly enables understanding of filter performance and, therefore, how easy it would be to fully characterize a vast range of conditions in a matter of days using an InVA where water and solid particles can be differentiated and tested both independently and together.

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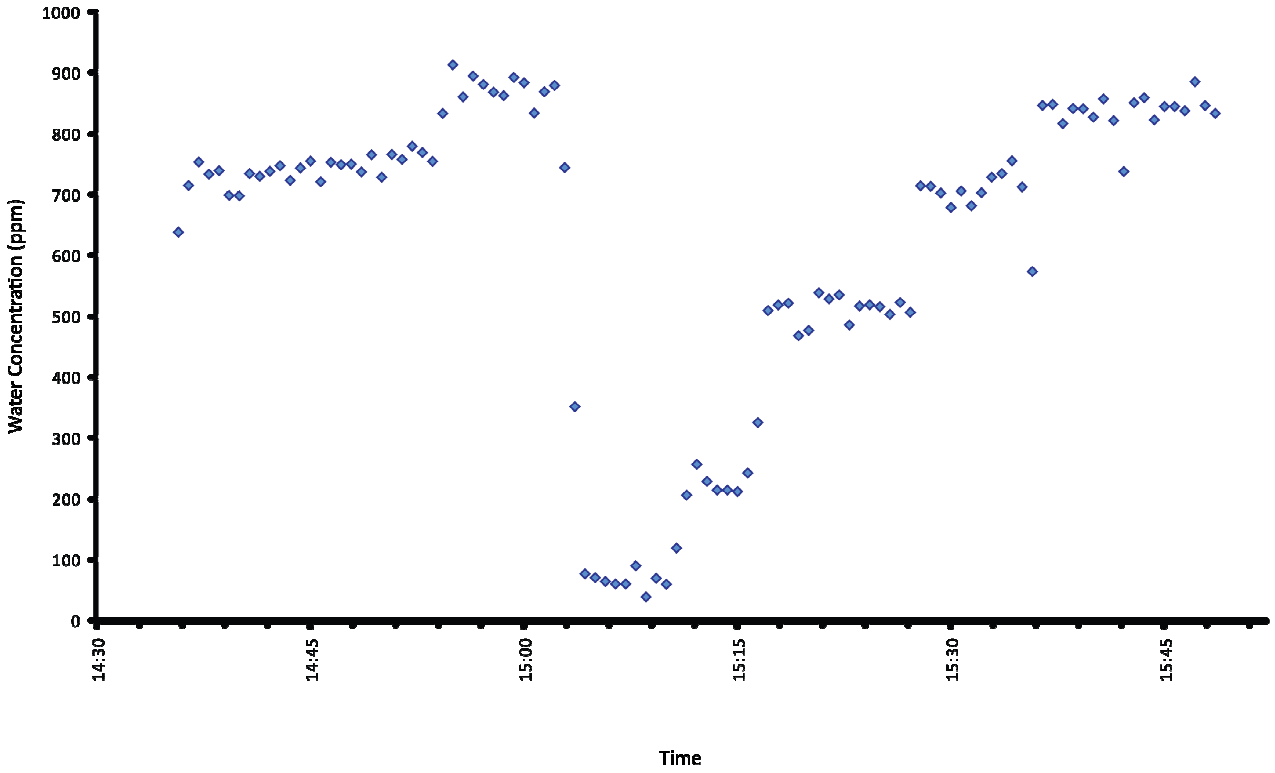

Figure 1: Water concentration in jet fuel

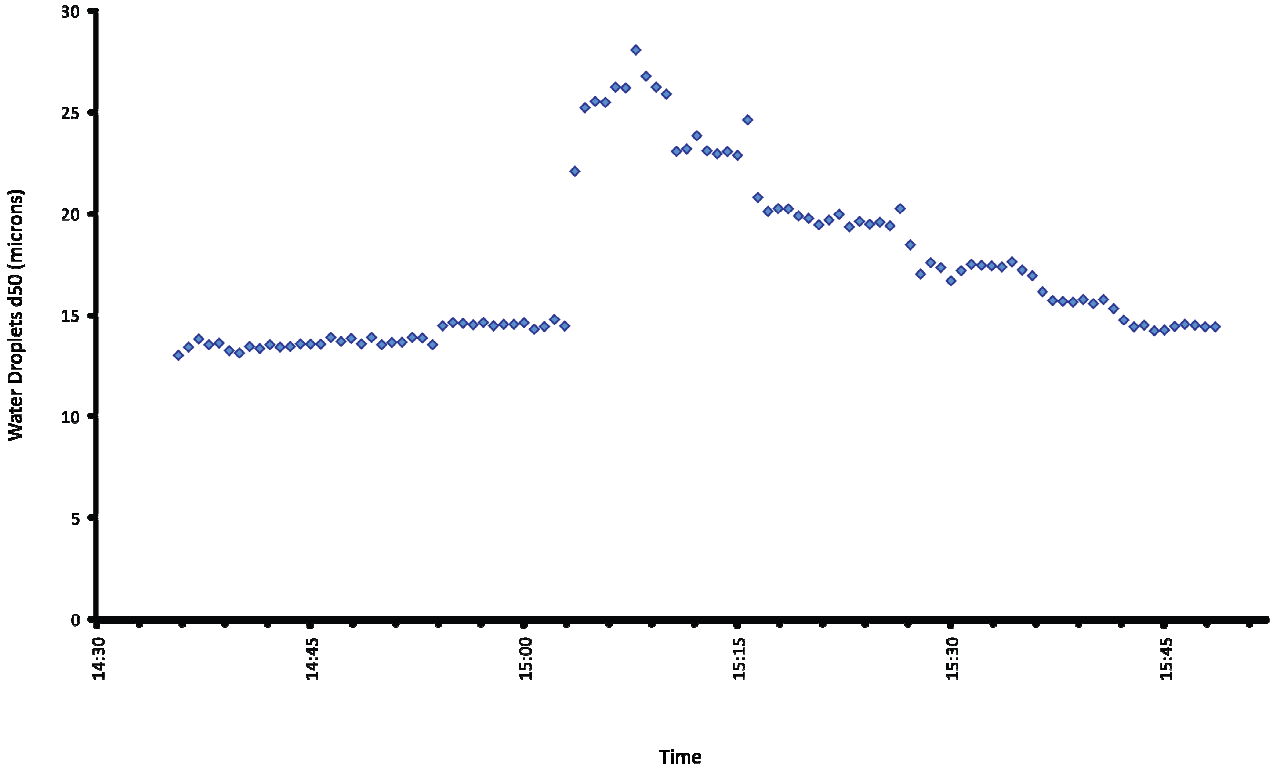

Figure 2: Water d50 droplet size in jet fuel

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