

Diesel Hydrotreater Stripper Delivers Product Quality Improvement at MOL's Danube Refinery

RESULTS

- Variability of Diesel Flashpoint and Naphtha Final Boiling point reduced by 4.95°C
- Increased Diesel and Naphtha yield as a result of reduced variability, worth \$600,000 per year
- Reduced column steam consumption equates to savings of \$100,000 per year
- Improved column stability
- Real-time indication of product quality specifications

APPLICATION

SmartProcess® Distillation Optimizer has been installed and commissioned on the diesel stripper (distillation column) in the Diesel Hydrotreater unit at MOL's Danube Refinery.

SmartProcess applications are Emerson's pre-engineered Model Predictive Control templates for specific process units which includes DeltaV™ PredictPro, on-line calculations and operator graphics.

CUSTOMER

MOL Nyrt, Danube Refinery, Hungary.

CHALLENGE

MOL required a solution to serve as a pilot APC project on the Diesel Hydrotreater (GOK3) plant at the Danube Refinery. Emerson carried out a study to evaluate the potential benefits from APC on the GOK3 plant and identified the diesel stripper column as the ideal candidate that ensured a quick return on investment.

This column separates naphtha as the top and diesel as the bottom product. There is no reboiler as the feed carries all the energy required for the fractionation process. MP Steam is injected at the base of the column as stripping steam. The column is required to maximize production of either naphtha or diesel depending on demand.

The key challenges for the advanced control system were:

- Reduce variability in Diesel Flashpoint and in Naphtha FBP by 4.5°C
- Maximize yield of more-valuable product according to market demand
- Reduce operator action required in routine process control
- Maintain on-spec production as product specifications change.



“The true potential of our DeltaV system with Emerson's profound and sophisticated project management provided quick and smooth implementation.”

Ferenc Török
Project Manager,
MOL Nyrt, Danube Refinery



For more information:
www.EmersonProcess.com/DeltaV



SOLUTION

Emerson's SmartProcess Distillation Optimizer application was used to deliver this advanced control solution on the diesel stripper column. This pre-engineered template for advanced control is based on Emerson's PredictPro (MPC), inferential analysis and optimization software. Because PredictPro is embedded within the DeltaV system, these APC applications run in the dual redundant DeltaV controllers every few seconds giving extremely high levels of performance and reliability.

This application includes the calculation of pressure compensated temperatures—providing a more accurate indication of composition than raw temperature measurements. These are used as constraints by the PredictPro software as it optimizes the column pressure and reflux ratio. The predictive capability of PredictPro enables improved control stability, disturbance rejection and optimization of column pressure and reflux ratio, within product quality constraints.

In order to minimize stripping steam consumption, a ratio controller was implemented which adjusts the stripping steam flow as a ratio of the flow of feed to the column.

The APC system was implemented according to Emerson design (approved by MOL) and subjected to an extended test period before final handover to MOL. The APC system was very quickly and easily adopted by the plant operators because of its ease-of-use and the fact that it had a similar look and feel as the existing regulatory controls.

A post-project audit revealed reduction in stripping steam consumption and in the variability of the Diesel flashpoint and Naphtha final boiling point which far outstripped expectation. As a result of the reduced variability, the column is now operating much closer to the product quality constraint limit resulting in increased product yield. The operators are freed-up to apply their expert process knowledge towards process improvements and optimization and not to focus on routine process control.

Emerson's regulatory and advanced control tools, as well as its engineering and consultancy services, have been instrumental in realizing additional value of the DeltaV system investment at this MOL site and in delivering significant benefit to the refinery's bottom-line.

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“This DeltaV advanced process control solution has exceeded our expectations and delivered in excess of \$600,000 through an increase in diesel and naphtha yield in its first year.”

Atila Poszmick

Head of Process Automation,
MOL Nyrt, Danube Refinery

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