CIT CHEMICAL & BIOPHARMACEUTICAL ENGINEERING STUDENT HELPS REFINE GASOLINE PRODUCTION

BACKGROUND

In 2016, Irving Oil acquired the Whitegate refinery located near Cork. The Whitegate facility is Ireland's only refinery, processing up to 75,000 barrels of crude oil per day and producing transportation and heating fuels such as gasoline, diesel and kerosene. Built-in 1959, it has a workforce of 160 employees as well as many contract personnel. CIT Chemical & Biopharmaceutical Engineering student, Naina Thomas, undertook her work placement in Irving Oil at Whitegate Refinery. Naina's placement offered her the chance to undertake her final year research project at the refinery.

THE NEED

Naina said that the concept of doing the research project with Irving Oil evolved towards the end of her placement. "I had asked my supervisor, John Ahern, about it and he helped me with the choice of the project and developed the outcomes he would like to see that would be of benefit to the refinery".

In gasoline processing, an isomerization unit is used to convert straight-chained alkanes in the light virgin naphtha to their isomers. These isomers, i.e. branched alkanes, have higher octane numbers, providing more effective combustion within engines, making them more desirable. The final multi-component distillation column in this unit is known as a deisohexaniser column. In Whitegate Refinery, this is the tallest column: it has 80 trays to facilitate the difficult separation due to the narrow relative volatility of the components.

THE SOLUTION

Naina's objective was to optimize this de-isohexaniser column for gasoline production. Through her research she developed a model which can be used to find optimum process parameters using various scenario testing and brought economic valuation to the test model.

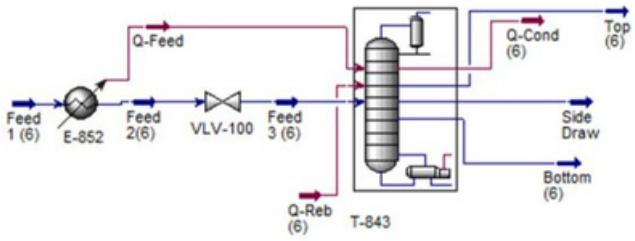

Fig. 2 HYSIS converged model of de-isohexaniser column

BENEFITS OF THE ENGAGEMENT

The results of her project can also be used by third-party companies to develop advanced process control algorithms for the de-isohexaniser column. John Ahern, Naina's Industrial Supervisor, said that Whitegate Oil Refinery has a long and proud history of working with third level institutes to provide industrial placements in a variety of disciplines. "The students bring a valued energy and enthusiasm to the workplace that can be mentored to return a valuable resource to the company," he added.

"Companies will often identify small projects that will bring value, but the engineering resource to work on them are not always available. This is where the industrial research placement can provide the answer, the student is in the unique position of having the experience of working for the company, but not the distraction of the day to day operations."

- John Ahern, Industrial Supervisor, Whitegate Oil Refinery.

Contact us to connect your Enterprise with MTU. Email us at extended.campusCork@mtu.ie to discuss a collaboration to suit your needs!