Switching to MIDW technology improved margins for refiner.

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Switching to MIDW technology from a cracking based dewaxing catalyst had a positive impact on the margin of a US refiner.

Challenge:

Improve diesel yield and quality

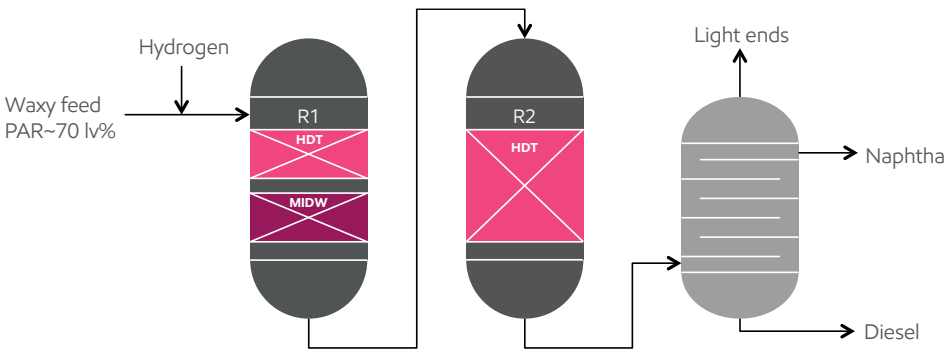
A US refiner using a cracking-based dewaxing catalyst in a 3 kbd Diesel Hydrotreating Unit (HDT) to process a high paraffin content local crude was achieving diesel yield of 20 to 40% based on a cloud point reduction target ranging from 20 to 60°F.

The major challenge with paraffin-containing distillate feeds and conventional cracking dewaxing technologies is the over-cracking of diesel to less valuable products: LPG and Naphtha. By contrast, isomerization of the paraffin produces a high diesel yield and the isomerized paraffin has a very high diesel quality.

HDT configuration

In one case, a refiner's distillate hydrotreater includes a two-bed lead reactor (R1) followed by a single-bed lag reactor (R2). R1 is loaded with hydrotreating and cracking dewaxing catalyst, while R2 is loaded only with hydrotreating catalyst. Figure 1 shows the distillate HDT configuration.

Figure 1: HDT configuration



Solution:

Switch to MIDW™ technology

ExxonMobil Catalysts & Licensing technical experts concluded that a drop-in catalytic solution could meet the refiner's needs with existing hardware. The experts recommended changing to MIDW, which would enable the refiner to:

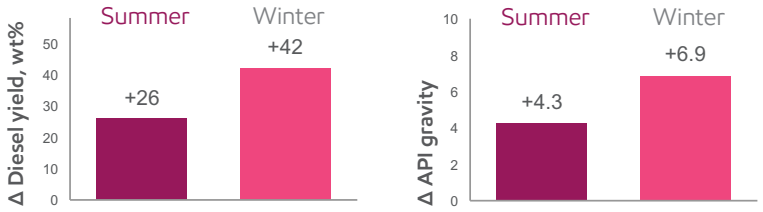
- Meet the desired diesel cloud and pour point specifications
- Significantly improve diesel yield and quality relative to cracking dewaxing technology
- Use existing hardware, thereby minimizing capital expenditure

Following an economic and risk analysis, conducted with ExxonMobil, the refiner implemented MIDW as a drop-in catalyst. Only small modifications were needed, costing less than $0.5M, which was recovered in less than two months of operating the new system.

Estimated benefits — $6M to $12M/yr, or $5.50 per barrel processed

Figure 2 compares MIDW with cracking dewaxing for a high N-paraffin (~70 lv%) distillate feed for the client's summer and winter specifications. Improvement with MIDW ranged from 26 to 42 wt% diesel yield.

Figure 2: Estimated improvement in HDT effluent properties by switching from a cracking dewaxing catalyst to MIDW



Estimated dollars per barrel processed

$5.50

Estimated winter diesel yield improvement

> 40%

Catalyst investment recovered in

Less than 2 months

For more information, visit:
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