Next-Level Hydrocracker Flexibility: Unlocking High Performance in Today's Turbulent Markets

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Abstract
Volatile margins and declining demand in traditional fuel products in key markets combined with increased competition from new and very efficient refining capacity make this one of the most challenging periods that the industry has ever known.

Among the many options that refiners can take to maintain or enhance their competitiveness, three are emerging that leverage the hydrocracker's flexibility. These will be explored in this paper: processing heavier, cheaper crudes; processing non-standard feeds; and exploiting the enhanced margins in lubricant base oils or petrochemicals in some markets.
Introducing such changes, however, without risking reliability or product quality issues, requires in-depth understanding of a wide range of issues, from corrosion control and metals removal through to hydrocracker process configuration and the implementation of the right catalyst system.
So, in this presentation we will describe:
the challenges imposed by heavier, cheaper crudes and how to mitigate them. Such crudes are typically high in total acid number, aromatics content, metals and nitrogen. Consequently, a refiner may need to look into using more active pretreatment catalysts and catalysts that have both higher activity and selectivity. It will likely need to take other steps too, such as using special metallurgy, corrosion ninhibiting chemicals and guard catalysts, and introducing appropriate controls on the crude blends.

Novel configurations that have enhanced hydrocrackers' contributions to overall refinery margin. These include a coker–hydrocracker line-up, which can result in zero fuel oil production and provide robustness in crude flexibility; a solvent deasphalter–hydrocracker line-up, which can be one of the lowest capital cost options for residue conversion; and a hydrocracker–base oils line-up in which the process configuration and the application of the right catalyst system are important to maximising both the yield and the quality of the final base oil products.

How some leading refiners have leveraged the flexibility of their hydrocrackers and the value this has had on their bottom line.

The presentation will include case studies on Grupa LOTOS' deasphalted, oil hydrocracker and Hyundai Oilbank's lubricant base oils project.

The information in this presentation could help refiners to adapt their units to handle extreme feeds or to capture new business opportunities in petrochemicals or lubricant base oils, both of which could transform the economics of their assets.