

Improving Fluid Catalytic Cracking Unit Performance through Low Cost Debottlenecking

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Abstract : Most Fluid Catalytic Cracking Units (FCCUs) are big profit makers and hence, always operated with several constraints. It is the primary source for production of gasoline, light olefins as petrochemical feedstocks, feedstock for alkylate & oxygenates, LPG, etc. in a refinery. Increasing unit capacity and improving product yields as well as qualities such as gasoline RON have dramatic impact on the refinery economics. FCCUs are often debottlenecked significantly beyond their original design capacities. Depending upon the unit configuration, operating conditions, and feedstock quality, the FCC unit can have a variety of bottlenecks. While some of these are aimed to increase the feed rate, improve the conversion, etc., the others are aimed to improve the reliability of the equipment or overall unit. Apart from investment cost, the other factors considered generally while evaluating the debottlenecking options are shutdown days, faster payback, risk on investment, etc. A low-cost solution such as replacement of feed injectors, air distributor, steam distributors, spent catalyst distributor, efficient cyclone system, etc. are the preferred way of upgrading FCCU. It also has lower lead time from idea inception to implementation. This paper discusses various bottlenecks generally encountered in FCCU and presents a case study on improvement of performance of one of the FCCUs in IndianOil through implementation of cost-effective technical solution including use of improved internals in Reactor-Regeneration (R-R) section. After implementation reduction in regenerator air, gas superficial velocity in regenerator and cyclone velocities by about 10% and improvement of CLO yield from 10 to 6 wt% have been achieved. By ensuring proper pressure balance and optimum immersion of cyclone dipleg in the standpipe, frequent formation of perforations in regenerator cyclones could be addressed which in turn improved the unit on-stream factor.

Keywords : FCC, low-cost, revamp, debottleneck, internals, distributors, cyclone, dipleg

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