

# MODELLING & SIMULATION

## INTRODUCTION

IndianOil R&D has successfully developed comprehensive kinetic models for different secondary processing units. Built on structure oriented lumping approach, these models can capture the underlying reaction mechanism of a process in great details which is reflected through their excellent prediction capability for different refinery units. Backed up by huge micro-reactor and pilot plant infrastructure at R&D centre, the process models have widespread application in process troubleshooting, optimization and revamp studies, catalyst evaluation and remaining life assessment. Combining R&D's proprietary reactor models with existing column simulations/ new designs developed using ASPEN, PRO-II and CHEMCAD platforms, various Refinery projects have been executed and substantial expertise has been developed to simulate the entire process flow sheet which are invaluable tools for overall unit profitability and refinery wide optimization.

## MODEL PORTFOLIO

- FCC/RFCC Model
- DHDS/DHDT Model
- Hydrocracker Model
- CRU Model
- HGU Model
- Isomerization Model
- Flow sheet Simulation of FCCU Gascon section
- Data generation with several refinery configurations /cases for LP package development and tuning
- Data generation for Indmax Process Technology

## FACILITIES

Latest version of Aspen Engineering Suite, ChemCAD, Pro-II, AutoCAD, Cadworks etc

## SERVICES OFFERED

- Performance monitoring of various secondary refining units.
  - Troubleshooting for Crude columns as well as other process units.
  - Optimization of secondary unit performance with changing feed quality & plant severity.
  - Generation of LP vectors for various secondary processing units.
  - Heat integration studies for refinery columns including basic design of proposed columns and exchangers.
  - Design and rating of different types of heat exchangers, fired heaters, specialized columns such as Amine Absorbers, Adsorption columns etc.
  - Heat exchanger network optimization through Pinch Analysis.
  - Preparation of BDEP for in-house processes.
  - Revamp/ value addition studies for secondary processing units.\*
  - Cycle length prediction and remaining life assessment for CRU catalyst. \*
  - New catalyst/ additive evaluation. \*
  - Data generation for process scale-up.\*
  - Preparation of basic design package for in-house processes. \*
  - Preparation of feasibility report for alternate process schemes to improve overall unit profitability. \*
- \* Along with micro reactor/ pilot plant experiment

## Major Achievements

- FCC Model licensed to M/s Intercat.
- FCC Model continuously being used for catalyst evaluation.
- Data generation for Indmax Process Technology.
- Hydrocracker model used for various troubleshooting studies of commercial Hydrocrackers such as low diesel pour point problem, low second stage conversion etc.
- CRU Model used for Benzene management studies for various IOC refineries as well as MS-blend property prediction for various Euro specification.

- DHDS Model used for plant performance monitoring in some refineries.
- Data generation with several refinery configurations/ cases for LP package development and tuning.

Projects using commercial simulation packages:

- BDEP preparation for Sour Water Stripper for M/s Toyo Engg. Pvt. Limited.
- Adequacy check for RFCC Gascon section for revamped capacity.
- Heat Integration study for FCC Main Fractionator.

