# Fluid Catalytic Cracking Operation
## Optimization & Troubleshooting

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<th>Overview</th>
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<td>RAF/FCCSS-E</td>
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## LEVEL
Skilled

## PURPOSE
This course provides a comprehensive understanding of operating, monitoring and optimizing the catalytic section of the FCC process.

## LEARNING OBJECTIVES
Upon completion of the course, the participants will be able to:
- understand the exact role and process of an FCC unit,
- analyze the importance and impact of operating parameters on product quality,
- know about main potential incidents, their origin, consequences on safety, health and the environment,
- apply the most common preventive measures.

## WAYS AND MEANS
Applications, case studies based on typical industrial situations.

## LEARNING ASSESSMENT
Quiz.

## PREREQUISITES
No prerequisites for this course.

## Agenda

### OVERVIEW OF THE FCC PROCESS
- Aim of the fluid catalytic cracking unit and its place in the refining scheme.
- Characteristics of the feeds, impact on the process; incentive for conversion of heavy cuts.
- Mass balance, characteristics of the products and related treatments.

### PLANT TYPICAL BALANCES
- Interpretation of the operating parameters:
  - Heat balance and catalyst flow rate.
  - Cracking conditions: thermal and catalytic severity, impact on operation and products.
  - Pressure balance, fluidization and catalyst circulation; #P of slide valve and safety.
  - Energy balance: heat recovery in the flue gas line and in the bottom pump-around.

### FCC OPERATING PARAMETERS IN REACTION SECTION
- The following parameters:
  - Different modes of changing the catalyst circulation.
  - Control of the cracking temperature.
  - Effect of the feed temperature, flowrate and chemical composition.
Impact of acceleration or stripping steam. Pressure monitoring are investigated, as well as their effect on balances, #coke, regenerator temperature and yields.

**CATALYST MONITORING**

**OPERATION & OPTIMIZATION**
Different operating situations are analyzed to illustrate: optimization of LCO production; maximization of heavy feed processing under constraint of air flow rate limitation. Modification of the process for maximization of C₃ & C₄ olefins production, or maximization of gasoline.

**INCIDENTS & TROUBLESHOOTING**
Incidents of heat balance: coke build up, afterburning, lack of coke, etc. Incidents of pressure balance: low pressure drop, reverse flow, failure of the wet gas compressor. Incidents on the energy recovery circuits: loss of boiler level, loss of circulation in the bottom pumparound, etc. Main interlock configurations.