

**In the southern hemisphere a search is on for FCC Unit start-up assistance, and operator and technical training engineering services.**





***The search ends here.***

## **FCC Unit Engineering Services**




### **Experience Counts**

The pool of experienced talent to supply engineering services for your FCC Unit is rapidly diminishing. Carmagen Engineering's consultants have worked on these types of units their entire career, and can provide the technical service, design, operating, and training support that you require to help maximize unit performance and enhance your in-house capabilities.




#### **Services Available**

-  Process Engineering and Design
-  Unit Surveys, including:
  - ⇒ Yield Study
  - ⇒ Energy Study
  - ⇒ Operations and Equipment Reliability Study
-  Start-up Assistance
-  Operator and Technical Training

#### **Project Arrangements**

-  Staffing Options:
  - ⇒ Carmagen Consultants only
  - ⇒ Carmagen Consultants working with Client's Staff
-  Location:
  - ⇒ On-site at Client's Facilities
  - ⇒ At Carmagen's Facilities
-  Project Deliverables depend on Client's needs and can vary from a process design basis memorandum to a process design package that may include mechanical design details for critical equipment

#### **Benefits**

-  Unit Performance Enhancements (Depending on Project Objectives):
  - ⇒ Increased yield selectivity
  - ⇒ Less product downgrading
  - ⇒ Reduced catalyst usage due to attrition, carry-over to Fractionator and/or deactivation
  - ⇒ Reduced energy consumption
  - ⇒ Improved reliability and on-stream factor
-  Optimized capital spending plans
-  Very high benefit to cost ratio

### **Interested?**

Carmagen's staff of over 180 skilled specialists in all Process, Non-Process (Equipment), and Project Management disciplines is available to support client's implementation plans.

*Contact Jerry Lacatena at Carmagen Engineering, Inc. to discuss your needs.*

*All the right people in all the right places.<sup>SM</sup>*



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# A refinery needs a technical consultant for a root cause failure analysis of an expansion joint in an FCCU transfer line standpipe.



## Our Fluidized-Solids Unit Team has the range of skills needed to address all issues in this complex technology.

### Our team has:

- ▮ Provided a team leader and technical consultant for a major incident investigation involving failure of an FCCU refractory lined transfer-line that caused an unscheduled shutdown.
- ▮ Led FCCU unit process and mechanical reliability studies.
- ▮ Developed technical specifications for grid, cyclone, and/or plenum chamber replacement projects. Also provided bid conditioning support, engineering quality control of the contractor's and supplier's work, and turnaround assistance.
- ▮ Performed study of a regenerator grid that enabled a refinery to increase operating flexibility in running their FCCU while still maintaining reliability. The study consisted of a creep-life evaluation of the regenerator grid based on past operations and accounting for various potential combinations of operating temperature and pressure differential across the grid.
- ▮ Performed piping flexibility analysis of FCCU regenerated catalyst transfer line to determine the benefits of replacing the existing line that had experienced hot spots.
- ▮ Conducted a piping stress analysis to revamp high temperature, refractory-lined transfer lines. The analyses included calculation of the metal temperatures for a variety of operating cases, calculation and evaluation of the pipe stresses and the loads on connected equipment.
- ▮ Performed numerous engineering audits of piping stress analyses that were done by contractors on major capital projects. Typically found numerous deficiencies in design and modeling assumptions.
- ▮ Developed technical specification for performing piping stress analyses of refractory lined systems for use on capital projects.



## Carmagen Engineers have:

- Worked on over 50 FCCU grass roots and revamp projects in the mechanical design of reactors, regenerators, and piping layout and stress analysis for major transfer lines, feed piping, and aeration piping.
- Conducted Engineering Design Audits on approximately seven different FCCUs to identify opportunities to improve profitability through improved reliability and reduced maintenance. Audits of mechanical hardware typically include major vessels, piping, slide valves, and refractory-lined systems to identify opportunities to improve individual component performance as well as the overall unit profitability.
- Provided field re-engineering for poorly designed piping systems to accommodate thermal expansion.
- Eliminated acoustically induced vibration in a large flue gas line.
- Redesigned a flue gas line to eliminate vibrations induced by surge forces in the fluid bed.
- Developed designs for large transfer lines to prevent cracking of stainless steel components.
- Developed field fixes during start-up to eliminate piping vibration and thermal expansion problems.
- Participated in a team effort as a technical specialist to identify the cause of continuing failures of an expansion joint in a feed riser.

## Convinced we have the experience?

Bring our Fluidized-Solids Unit Team onboard for your next project or troubleshooting assignment.

You'll get the coordinated efforts of top-of-the-line process design, mechanical, heat transfer, materials, and safety specialists.

*All the right people in all the right places.™*



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