

SRF Achieves Better Controllability using FOUNDATION Fieldbus™ Technology



RESULTS

- Precise control with wide plant capacity turn-down ratio (100:1)
- Control deviation achieved less than 0.6%
- Reduction in control variability by 2.4% over conventional control
- 50 manhours saving per month due to reduction in manual Analytical measurement
- Faster re-ranging/recalibration provided a saving of 240 manhours during post-startup period



APPLICATION

Technology Validation (Pilot) Plant for Vapor Phase Fluorination process developed in-house.

CUSTOMER

SRF Limited, Chemicals Business, Bhiwadi, Rajasthan, India.

SRF Limited is a leading manufacturer and supplier of Tyre Cord Fabric, Chloromethanes and Refrigerant Gases, Belting Fabrics and Packaging Films in India and other exports markets.

CHALLENGE

SRF was setting up a plant for validating the in-house developed technology as a precursor to a large-scale commercial plant. The plant shall be used as pilot for generating data for engineering various gas phase reaction technologies. The measurement shall be exhaustive and accurate. The control has to be stringent to verify theoretical design at various loads. The plant was designed as a swing plant to operate for different processes HFC 134a and HFC 32 etc., with varying operating parameters. The instruments need to have wide rangeability to accommodate different operating parameters.

"Using FOUNDATION fieldbus technology in our pilot plant, we are able to have precise control with a wide plant capacity turn-down ratio and able to gather engineering data. This is a significant benefit as the data will be used for designing a larger commercial plant. We also observed less deviation for closed loop controls compared to the conventional DCS. We are fully satisfied in choosing this technology with Emerson Process Management"

R. Rajasekaran
Associate Vice President, R&D, SRF Limited

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SOLUTION

SRF Limited chose Emerson's PlantWeb® digital architecture with FOUNDATION fieldbus technology to gain the full benefits of latest technologies, including intelligent field devices and asset management software. The project included:

- DeltaV™ Process Automation System
- Rosemount® pressure and temperature transmitters, magnetic and vortex flowmeters (all FOUNDATION fieldbus)
- MicroMotion® FOUNDATION fieldbus Coriolis flowmeters
- Fisher® valves with FOUNDATION fieldbus FIELDVUE® digital valve controllers

Due to delay in the delivery of the main reactor, the plant was commissioned with a smaller reactor at 1/100th the capacity to stabilize the downstream systems. The loading was also less as compared to the design that was enabled by the high rangeability exhibited by the instruments and control valves. The valve maintained the process variable at the required set point even at 1% opening and the flow meters sensing even to 0.1% variation in the valve opening. This accurate control at low range is a significant advantage of using FOUNDATION fieldbus technology.

Due to high sensitivity and accuracy of the digital instruments, the controls are accurate. The deviations in the control loops are found to be less than 0.6% in most of the control loops. The same loops behave even better with deviations less than 0.3% when the control functions are executed from the field devices. In a similar plant using single loop controls and conventional DCS system with auto-tuned control loops, the deviation is observed as high as 2 ~ 3%.

Owing to the corrosive and toxic application (hydrofluoric acid composition in 80% of the process streams), Micro Motion mass flow meters were selected for flow measurements. After commissioning the plant, the system was configured to indicate temperature and density of the process fluid. This knowledge on the process fluid composition resulted in better control and improved the performance of the plant. This on line analysis of composition eliminated manual analytical requirement and improved safety. As a result, a net saving of 50 manhours per month was derived.

During the post-startup period, the ranges of the instruments were required to be changed frequently for improvement in process operations. This was enabled from the DeltaV digital control system with fieldbus technology which otherwise would have involved in removing and recalibrating the instruments offline. 240 manhours was saved during the post-startup period.

The accurate process control enabled the plant to produce high quality product at all plant loads right from day one. The design data was also verified and provided data for engineering larger size plant.

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