



Fieldbus showcase: PEMEX Refinacion, Mexico

PEMEX Refinacion needed to modernise six process plants at its Veracruz refinery, which was originally built in 1906 and was equipped with 30-year-old pneumatic instrumentation. It also wanted to lay the groundwork for future construction of 16 new plants to cater for the growing market in Mexico.

The project focused on the modernisation and automisation of three natural gas stabiliser units, a gasoline hydrodesulphuriser unit, a kerosene hydrodesulphuriser unit and a diesel hydrodesulphuriser unit. It also required modernising the field instrumentation, heaters and compressor protection systems and a new distributed control system, to be delivered with Foundation Fieldbus technology.

ABB won the contract with an integrated IndustrialIT automation solution covering everything from field to business management. It installed ControllIT AC800F redundant controllers to integrate data transparently from three different fieldbuses: Foundation Fieldbus for modulating control, ModBus for mass flow meters and PROFIBUS for discrete I/O.

Discrete and modulating control strategies are shared between controllers and field instruments. Control Builder F, the unified configuration tool, performs system configuration, system commissioning and field instruments configuration while the human-system interface OperateIT carries out operation, history and OPC server functions.

The communication network uses state-of-the-art switching technology with basic filtering and address learning. A fiber optic Fast Ethernet backbone links the OperateIT stations in the central control room to the controllers in the satellite rooms. I/O interfaces located in the field communicate with the controllers by fiber optic links.

The network comprises a total of 76 Foundation Fieldbus H1 segments. Topology is a bus-tree combination depending on instruments physical location, with device allocation based on power consumption, control strategies (complete control strategies per segment), cycle time and physical location.

The intelligent field devices deliver the data through the H1 communication protocol, while Ethernet connects the high performance process control applications. The combined fieldbus solution of H1 segments and Ethernet makes it possible to fully integrate the fundamental and complex process control technology, and the hybrid, batch, and binary control sub-systems,



ABB has delivered the largest Foundation fieldbus solution in the oil and gas industry, to PEMEX in Mexico

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and monitor applications at a higher level. This fieldbus technology is the key to optimised enterprise performance. In addition, the flat, integrated architecture minimises system downtime, optimises performance and reduces costs.

Benefits

The control room is now instantly alerted to operation and quality problems and process changes can be made at once.

Before: Someone had to go to the plant every six hours, take a sample, send the sample to the lab, wait for the results and then make necessary adjustments.

After: Staff get results in five to 10 minutes.

Safety and emergency responses have dramatically improved.

Before: If there was a failure in the plant, the regulators and valves had to be closed manually. It took 20 minutes to shut down the plant and about two hours to re-start it.

After: It takes about four to five minutes to put a plant in safety mode and 10 to 15 minutes to re-start it.

The modernisation has brought additional cost savings in terms of spare parts and maintenance.

Before: PEMEX had no diagnostics capabilities for its old pneumatic instruments. Most readings, tests and adjustments were handled manually and the whole plant had to be shut down before a problem could be identified. PEMEX handled 1300 equipment maintenance requests a year.

After: Predictive maintenance means PEMEX staff are alerted to the cause of instrument failures when, if not before, they occur. Equipment maintenance requests were expected to drop by up to 60 per cent.

Even more future benefits

With all six plants completely automated, PEMEX now has access to detailed production reports, histories and mass balances that were previously unavailable, thereby capturing even more cost savings and production increases. And its new flexibility and quality control allow it to assess intelligent, future-oriented solutions.

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