



Technology with a purpose

Successful process automation is enabling refiners to increase productivity, improve asset utilisation, reduce maintenance costs and increase the quality of their products. Richard Timoney explains the economic effects of fieldbus.

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Richard Timoney, Fieldbus Foundation

BUSINESS CONDITIONS HAVE NEVER BEEN TOUGHER IN THE HYDROCARBON processing industry. Economic uncertainty, rising costs and tighter regulations all challenge the bottom line. Expanding global markets mean greater competition from a broader spectrum of industry participants. In this difficult environment, refining companies need technology with a purpose – matching their automation initiatives to strategic business objectives. They are looking for real change in the way they utilise assets, optimise processes and implement new production strategies. Likewise, petroleum producers are seeking real opportunities to minimise downtime, increase throughput, reduce capital equipment costs and lower operating expenses.

FOUNDATION™ fieldbus is a digital network architecture that uses the power of field intelligence to improve plant performance. This enabling technology has been proven in installations around the world, with major oil and gas companies choosing it for the most demanding production applications.

Understanding the technology

Developed by the not-for-profit Fieldbus Foundation, FOUNDATION fieldbus is an open, non-proprietary control technology resulting from the cooperative efforts of leading plant automation equipment suppliers and end users. A powerful, all-digital, two-way communications system, fieldbus is intended for use in mission-critical applications where the proper transfer and distribution of data, control loop integrity, and the ability to integrate disparate control systems are essential.

FOUNDATION fieldbus replaces proprietary automation systems and networks with a single, open, integrated fieldbus architecture. The FOUNDATION protocol provides a complete, complementary fieldbus solution: H1 (31.25kbit/s) fieldbus for continuous control, and high speed Ethernet (HSE) for high-performance control applications and plant information integration. HSE provides a high-speed (100Mbit/s) Ethernet backbone for device, subsystem and enterprise integration, enabling a leaner plant hierarchy. It also supports high-performance control applications using the same open and interoperable function blocks as devices on the H1 network.

Typical applications for FOUNDATION fieldbus technology include: closed-loop continuous control, batch sequencing, high-speed

process automation, information integration, recipe management, data gathering, legacy system integration and network integration.

Refining operations can employ FOUNDATION fieldbus to interconnect field equipment such as transmitters, flowmeters, sensors and valves on a single network. The technology was specifically designed to enable true distributed control by providing control capability at the device level, across the plant and business enterprise. Doing so frees valuable plant computing resources for real-time production control.

Shell and Infracore Höchst

Shell, a leading adopter of FOUNDATION technology, identified fieldbus reinstrumentation projects as a key means of improving plant stability and reliability, maximise asset utilisation, reduce operating and maintenance fixed costs, and improve variable costs. For Shell, a 1 per cent improvement in plant asset utilisation enabled by fieldbus technology generates savings of \$2m per year, and a 1 per cent reduction in operating fixed costs saves an additional \$1m per year. Development projects also benefit from reductions in selection, engineering, construction, start-up and overhead costs. By providing real-time critical data on process and plant equipment, fieldbus is a key data source for asset management and optimisation programmes, generating additional savings from reductions in plant staffing and forced outage rates, and increases in plant efficiency.

Recently, Infracore Höchst, an independent industrial service provider and site operator based in Frankfurt, Germany, conducted an evaluation confirming the suitability of FOUNDATION fieldbus for use by the German chemical industry. The evaluation was conducted in a formal, vendor-neutral environment, and was intended to prove that FOUNDATION fieldbus meets the strict engineering and safety requirements of the German market. The Infracore study documented that end users see significant operating expenditure (OPEX) reductions enabled by fieldbus technology over the life of a project. Specific benefits include: increased asset utilisation, reduced maintenance costs, reduced downtime, higher yields, better quality and improved regulatory compliance.

In a follow-up study, Infracore verified the capital expenditure (CAPEX) savings realised from implementing fieldbus-based controls versus

traditional analogue technology using remote I/O. Apart from reduced engineering, wiring and component costs, the study showed that fieldbus enables faster commissioning through standard coding, reduced errors and improved error diagnosis. It also enhances quality by eliminating many systematic sources of error (allowing prevention of errors before they can occur). Errors can be recognised, and rectified, faster than in a conventional system.

Furthermore, the Infrserv analysis indicated that fieldbus reduces training costs by eliminating manufacturer-specific 'code decryption', and thus minimises device-specific training requirements. Infrserv also noted that the automation project life cycle can be shortened through accelerated loop check-out, commissioning and start-up times.

Justifying fieldbus projects

FOUNDATION fieldbus is not a solution to all of the challenges facing the hydrocarbon processing industry. Rather, it is a means to the solution: an enabling technology providing end users with the

freedom to choose and the power to integrate best-in-class automation solutions across the plant enterprise.

FOUNDATION fieldbus is a powerful change agent that allows oil and gas companies to capture the opportunity for improved business results. Indeed, fieldbus represents a different way of thinking (integrating predictive intelligence in the automation architecture) and a better way of working (improving plant efficiency, capacity and throughput). The technology is well suited to today's demanding business model, which not only requires improvements in product quality, regulatory compliance and time-to-market, but also ongoing reductions in capital expenditures and operating costs. ●

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