



Juhua Group Corp.
Zhejiang Province, China

Simpler is better.

This useful truth was recently reconfirmed by Juhua Group Corp., a chemical firm in Zhejiang Province, China. The company used SYSTEM302 from Smar, Houston, Tex. , to successfully start China's first FOUNDATION fieldbus control system in October 1998. Juhua installed the fieldbus system in a low-temperature air separation unit at its ammonia plant.

Zhu Huaicong, Juhua's project engineering chief, says, "An important system benefit is that it uses both FOUNDATION fieldbus and OLE for Process Control (OPC). FOUNDATION fieldbus and OPC are a match made in heaven. Besides the freedom and ease of use FOUNDATION fieldbus offers in the field, we wanted the ability to select control room software that meets our specific needs. Only OPC gives us the freedom to select the process visualization software."

Juhua's ammonia plant uses the FOUNDATION fieldbus system configured with two redundant Microsoft Windows NT workstations and 17 foundation-registered devices located on two fieldbus segments connected directly to both stations. One segment has four pressure transmitters and four fieldbus-to-current converters. The other segment has the same pressure transmitters and converters, but is also equipped with a temperature transmitter. These devices create nine control loops distributed via fieldbus on the plant's compressor, ammonia evaporator, water cooling tower, air expander and molecular sieve containers. The loops perform all control functions in the field, including evaporator exhaust air temperature (cascade), compressor anti-surge, air cooling tower water level, liquid air level, exhaust nitrogen pressure and system pressure.

"We were able to reduce our wiring by more than 70 percent and greatly simplify our system architecture, which enabled us to shorten our engineering, installation, commissioning and startup time by an estimated 60 percent. This translates into tremendous savings for us on labor and resources," says Mr. Zhu. "Smar's engineering team supported us from training on new aspects of FOUNDATION fieldbus through engineering, commissioning and startup, which made integrating the whole system almost painless.

“Engineering is also simplified compared to our old system,” Mr. Zhu continues. “Cable schedules and drawings are simpler because we now have less wiring and I/O subsystems. Cross-reference lists were eliminated because data mapping is no longer required. And commissioning is really plug-and-play, because the devices are automatically detected when they’re connected.”

Juhua’s new system even helps ease the move to FOUNDATION fieldbus. For example, conventional I/O subsystems integrate conventional 4-20 mA and discrete signals into the system. This allows a smooth migration to the new system by existing equipment and instruments, including those not yet available in FOUNDATION fieldbus versions.

Besides simplifying plant operations, Juhua’s new system includes a suite of OPC client applications that allow users to carry out operations, engineering and maintenance from the workstations. Configuration, diagnostics and calibration are performed with a Smar engineering tool. The main workstation has a PCI fieldbus interface card, with an OPC server acting as the Link Active Scheduler (LAS). Meanwhile, the redundant workstation’s PCI interface and several fieldbus devices are configured as a backup LAS for added safety and availability.

“The fieldbus system’s powerful—yet friendly and convenient—engineering tool lets us browse through the plant’s instruments and devices to see if there are any faults, or check when the equipment was last calibrated, all without having to leave the workstation. Eliminating several layers of hardware associated with the DCSs also helps make the overall system less complex and easier to maintain,” says Yang Genmu, Juhua’s instrument engineer. “We can also access a huge amount of information, diagnostics and device information from the field, which makes this part of the plant almost transparent to our engineers and operators. We feel the plant is much safer knowing that, even in the case of a computer crash, control will still be carried out reliably by the field devices. Redundant workstations and an additional backup communications master in the field devices is very comforting. We feel confident and at ease with the system.”

Xu Xinzong, Juhua’s associate plant director, explains, “Installing a FOUNDATION fieldbus system shows customers that we use the latest technology to make better products at competitive prices. This is because

the new system radically improves our productivity and decreases manpower, energy and raw material costs. This means a lot more to us, given China's current economic circumstances. We can no longer afford the complex, proprietary, expensive DCSs that we used a few years ago.

"We believe more savings will occur as we expand the fieldbus system to other parts of our plant," Mr. Xu continues. "In fact, we're so satisfied with our current system that we've already purchased more fieldbus devices so we can upgrade our argon unit with another 10 control loops. The system's scalability should make this expansion equally effortless to implement."