

WATER & WASTES DIGEST

On-line Instrumentation

Don't Let Instrumentation Break Your Budget

By Marc Cartier

You can avoid budget overruns, schedule delays and painfully lingering problems with good instrument system architecture and vendor support.

There's more to successful process instrumentation than deciding what you want to measure. Factors you may think of as instrumentation details can turn a well-designed project into a series of nightmares that continue long after start-up.

Instrumentation costs come at you two ways: directly and indirectly. The direct costs of accurate, reliable sensors and displays are only the beginning. Start-up delays due to instrumentation problems impose heavy opportunity costs in fast-moving markets. After start-up, instrument maintenance and calibration costs over the lifetime of the system can hurt operating profit margins.

Asking the Indirect-cost Questions

If you're planning any instrumentation system, there are some questions about system architecture and vendor support you should consider. These questions may not have exact answers, but they can give you insight into indirect instrumentation costs.

- If your system specifications change at the last minute, do you have to get a new instrument from the vendor? How much will that delay your schedule? What will the delay cost?

- If an instrument is complicated to install and configure, the probability of mistakes goes up rapidly. How long will it take to get a replacement for a unit that's damaged by an incorrect jumper setting? How much time will you eat up trouble-shooting an incorrect installation?
- How much will you spend on maintenance over the life of the system? How much does it cost — in time and money — if the instrumentation is complicated to program or calibrate? How much will it cost to accommodate changes once you're up and running?

Good planning, good communications — plus good instrument system architecture and vendor support — can keep inevitable complications from being career-limiting events.

Carefully Defining Your Needs

Instrumentation success starts with understanding the result you want. Here are some more planning questions: What process variables are you looking at? Temperature, pressure, pH, flow rate, retention time based on flows in and out of a tank? Do you need a local indication, a remote display or both? What are the normal — and extreme — ranges of the variables? If you're controlling a process, how sophisticated does the control need to be?

Keep it as simple as you can. By doing so, you'll cut long-term costs.

- *Simple On/Off control.* If the pH rises above a threshold, dose in reagent.

- *Proportional control.* If the pH is close, add reagent slowly. If it's way off, add it rapidly for quick return to an acceptable value.
- *Complex proportional/integral/derivative (PID) control.* This is fancy stuff. How fast is the pH rising? Watch out for "control overkill" here. The costs may include complex programming and increased user training.
- *Chemical and materials compatibilities.* Have you discussed with your sensor vendor what compatibilities you must accommodate? There may be interactions that aren't obvious.

Stressing Good Team Communication

Everyone pays lip service to team communication. You may need to expand your thinking about who's on your project team. Purchasing staff, installers, and systems operators all need information.

Buyers need part numbers, quantities, and delivery deadlines. Installers need internal wiring diagrams, mechanical dimensions and specifications, set-up or configuration instructions. Maintenance people need calibration routines, trouble shooting guides and diagnostic tools. Operators need to know about training requirements and available materials. If these people don't have the information they need, expect indirect costs to surface quickly.

Get Your Vendor On the Team

The information needed by the people on your team should come from the vendor — or its representative. If you're dealing with a value-added distributor, are the sales people knowledgeable? They're your first line of contact. If you're deploying multiple installations, look for worldwide distributor support.

Expect the vendor to supply detailed information, including materials and compatibilities, installation and maintenance,

operator training requirements, distribution support, and delivery. Then there's the cost of technical support. A low-cost catalog dealer may lead you to billable service calls. A vendor who's on your team can cut your indirect instrumentation costs significantly.

Instrument System Architecture

Every year, thousands of hours and millions of dollars go into instrumentation problems that show up at system start-up. Here are some instrument system architectural features that can reduce schedule delays and cost overruns due to instrumentation problems:

- Simplified installation,
- Easy range changes,
- Standardized programming,
- Easy unit recognition, and
- Part number systems that reduce ordering errors.

Nobody's Perfect

Murphy's law has not been repealed. No project complex enough to be worth doing has yet been completed without a hitch.

Yours will not be the first.

That's why instrument system ancillaries must help reduce human error and support inevitable change. Features such as an instrumentation architecture that is easy to use and facilitates change — plus good vendor support — are more than niceties. They can help bring your project in on time and on budget ... and keep it operating that way.

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