Distributed control takes new shapes under PC pressure

Elizabeth C Scheyder
Recorders Play an Essential Role in Emissions Monitoring

PC-BASED RECORDING DEVICES PERFORM MANY OF THE DATA ACQUISITION TASKS REQUIRED BY REGULATORY AGENCIES TODAY, BUT END USERS CONTINUE TO RELY ON TRADITIONAL PAPER-BASED RECORDERS FOR EXTRA COMFORT

That warm, fuzzy feeling. No matter how far technology allows us to go in digitizing, automating, and computerizing process control, there will always be something to be said for having data recorded in black and white. For many engineers, traditional paper-based chart recorders provide an extra level of confidence. That’s particularly true when you talk to engineers whose responsibilities include continuous emissions monitoring systems (CEMS).

"People like the ability to go up to an instrument and see the reading and see the trend right there, rather than pull it up on a computer some place," says Dean DeGhetto, a senior associate at Environmental Risk Ltd., Clifton, N.J. "We all still have that need to have a record we can see on paper."

DeGhetto, an environmental consultant, says his clients generally buy their chart recorders as part of a complete package, bundled with emissions sensing equipment. According to DeGhetto, many engineers continue to use chart recorders in CEMS applications where computer-based monitoring systems are available. It is "more of a [client] preference, although some state regulatory agencies may require it," says DeGhetto.

Mark Bahner, a research environmental engineer with the Research Triangle Institute, Research Triangle Park, N.C., agrees that chart recorders do have a place in today’s high-tech world. Although Bahner primarily relies on computer-based data loggers for CEMS data crunching in his research, he concedes that "we have had some problems downloading data from data loggers, so I can see users having chart recorders just to get a warm and fuzzy feeling that there would be something to fall back on."

But Bahner has some reservations about the limitations of chart recorders. "In some of the research testing that I did several years ago, I used chart recorders and had to hand-integrate them," says Bahner.

Product Developments

Chart recorders have come a long way in recent years, and manufacturers offer more and more sophisticated features in their paper-based chart recorders. Tony Porrazza, senior product manager in the product definition group at Honeywell Industrial Automation and Control, Fort Washington, Pa., claims his company’s chart recorders have had basic control capability "from the beginning, in the form of proportional, integral, and derivative (PID) control and alarming."

Porrazza says the company’s latest focus has been on communication. "We now offer RS-485, RS-232, and modem interfaces, so a recorder can dial up by itself and send its data and summary reports, too." Honeywell also continues to add advanced mathematical packages to its chart recorders. "Customers want even more capability," says Porrazza, "and (continued on p38)"
we will soon be offering the capability to do C-language programming" for a chart recorder.

Portenza adds that chart recorders have evolved from being a primary form of information gathering. Now they serve a redundant function. This is true in all of the markets that we serve. But that hasn't diminished demand for recorders.

"There is still a stable market for paper-based recorders," says Portenza. "We are selling more and more each year. A chart recorder is a black box like a flight recorder. Users know they are being watched." He also points out that chart recorders can be used under lock and key, while printouts of stored data are intrinsically less tamper-proof. "There always seems to be the desire to have the information being printed in real time on paper," says Portenza.

"Under Part I of the Environmental Protection Act, continuous records must be kept of emission levels of NOx, nitrogen oxides, SOx, [sulfur diox- ide], particulate matter and various other prescribed substances," says Greg Kleintert, product manager at Randolph Chessell, Newtow, Pa. "You may be allowed to be above certain limits, but you have to continuously monitor. This means that anyone who has a boiler, and anyone who has any kind of stackstack, has to have a monitoring system."

However, just keeping the data is not enough. "To satisfy the conditions laid down in the relevant process guide notes," says Kleintert, "raw measurements of pollution levels must be converted to a specific format." According to Kleintert, his company's chart recorders with continuous emissions monitoring software provide "the economical solution to compliance monitoring and recording of stack emissions" by packaging "data handling, normalization, and reporting in one instrument." Although Kleintert notes that different agencies have different requirements for averages, "in general, they fall into three categories: daily average, calendar average, and percent within limits." Kleintert also points out that CEMS are not just a concern for companies located in the U.S. "In many countries, the primary responsibility for monitoring the emissions now falls on the pollution raters rather than the regulator," says Kleintert.

"All this adds up to a rapidly growing market for pollution monitoring equipment."

But how do the officials at the regulatory agencies who see CEMS standards feel about the role of paper-based chart recorders? Some individuals are very specific about their preferences, and predict that computers will completely dominate CEMS some day.

Regulators Speak Out

It is a foregone conclusion that computer-driven monitoring systems are taking over," says Jerry Martin, a spokesman for the California Air Resources Board (CARB), Sacramento, Calif. According to Martin, CARB prefers computer-based systems, "because of the better accuracy and ability to look back over time, and their greater ease of use for tracking systems' emissions and improving them."

In the Los Angeles area—one of the most stringently monitored areas of the country—the South Coast Air Quality Management District's "goal is to have the information transmitted to us over a dedicated phone line into our computer," says Bill Kelly, a spokesman for the Diamond Bar, Calif.-based agency. "Then we would be able to graphically view it and record it on our end." The agency currently has this type of dedicated-line set up with some facilities, but not all. "And our issues of data security and devices that still have to be resolved," says Kelly. "But the system goal is supposed to be fairly high-tech." Looking further into the future, Kelly says the South Coast Air Quality Management District "has interest in using predictive emissions monitoring. However, "the issue is still not fully settled." In Pennsylvania, "the only requirement of chart recorders with respect to certified CEM is to record the data on at least the minimum time cycle basis for parameters with short cycle times (e.g., opacity, temperature, etc.)," says Joseph Nuzzo, section chief for CEM at the DEP's Source Testing and Monitoring in the Bureau of Air Quality, Harrisburg, Pa. "Average for all parameters and minimum cycle time readings for these parameters are all stored electronically."

In many other regions of the U.S., controls on monitoring methods are not as strict. Jerry Bledsoe, an engineering specialist at the Texas Natural Resource Conservation Commission, Austin, Texas, says "we don't really care how a company goes about collecting data. We just require that they collect the data, and keep it for at least two years. Each company tells the agency "goes through a lot of data reduction (Continued on page 38)
blodgett, who recalls his previous work in industry, appreciates the immediacy of paper-based chart recorders. "In a strip chart, you can see the data coming off and you know you have it," he says. "With a data logger, you can be taking data all day, and not realize until the end of the day that you have a problem."

**Conservative Approach**

Many environmental consultants agree with blodgett's conservative approach. For instance, Frank Tringale, senior project manager at HNSR Consulting, Acton, Mass., recommends chart recorders in CEMS systems "where [clients] need to have a validation process to back up their data acquisition systems.

Chart recorders also are useful for providing visual assistance in troubleshooting, Tringale says, and "while they may not be required by an agency, chart recorders are often a customer requirement." Tringale and his associates strongly recommend their use.

Tim Russell, stack sampling manager at Barr Engineering Co., Minneapolls, agrees that the role of paper-based chart recorders has evolved over the years, but they remain an important part of the CEMS system. "Strip chart recorders are no longer serving us in the role of primary data acquisition and recording device," says Russell.

"We are utilizing strip chart recorders as a backup to our PC-based data acquisition system. Strip charts also act as a handy place to document events with field notes. We are currently including both the data logger records and copies of strip chart recordings in our stack sampling reports to regulatory agencies."

The ability to have a piece of paper as an output not only provides immediate confirmation of results, but also provides a way (and a place) to note the timing of significant events which may impact emissions. This way, the timing of the event and the notes are kept right with the data.

"More sophisticated clients are demanding data logging capabilities for instrument-based test methods," says Russell. "I believe that strip chart recorders will continue to serve as backup devices to guard against data loss."

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