

James River improves performance, saves money with its corporate process control system maintenance program

Jim Young
Feature Editor

The Cascade Mill will potentially save over \$1 million/year on one recent project alone where proprietary control algorithms were developed.

The Cascade Mill in Gorham, N.H., is the latest James River facility to subscribe to the corporation's process control system (PCS) in-house support program. Mills in Livermore Falls, Me., and Groveton, N.H., transferred maintenance responsibility from vendors to the newly formed James River Digital Field Service (DFS) organization in early 1986, and the Cascade Mill did so this past January.

The James River Digital Field Service organization is responsible for hiring, training, and providing technical direction to systems technicians assigned to the three mills. Although administratively personnel report to the DFS organization, pragmatically they are part of mill technical and production teams. This relationship is viewed as essential in establishing a successful in-house program. Each mill also assigns a coordinator from its staff to work closely with DFS technicians on work assignments and communication with various mill departments involved in the maintenance effort.

Maximum control performance is the payback

Although in-house digital maintenance can be less expensive than vendor service contracts, Larry L. Woolums, James River's director of control systems engineering, says cost considerations are not reason enough to change from vendor service contracts. Vendors have historically provided mills with contract maintenance on their installed systems, and, in terms of system availability this approach has generally worked well. Also, the risks involved in setting up, funding, managing, and staffing an in-house service organization cannot be justified on anticipated lower digital maintenance costs.

"The real motivation and payback," Woolums explains, "is in the hundreds of thousands of dollars and improved product performances we are able to get from making these systems operate better and in getting the fullest utilization of existing and new advanced controls as they become available."

Eugene T. Dennebaum, DFS senior technical specialist in the Northeast, cites a couple of examples. "If we can consistently increase the moisture content in our sheets by one percent, we can take out one percent fiber and create a more uniform product. That's worth a lot of money," he says. "If we can measure ash content more accurately and shift the target on the ash gauge, we get better uniformity and another one percent fiber reduction. So the dollars are in maximizing system control performance. Our ability to do this involves maintaining sensor calibration accuracy, optimizing control tuning, and training paper machine operators to make maximum use of all available controls." That frequently goes beyond sensor-based systems.

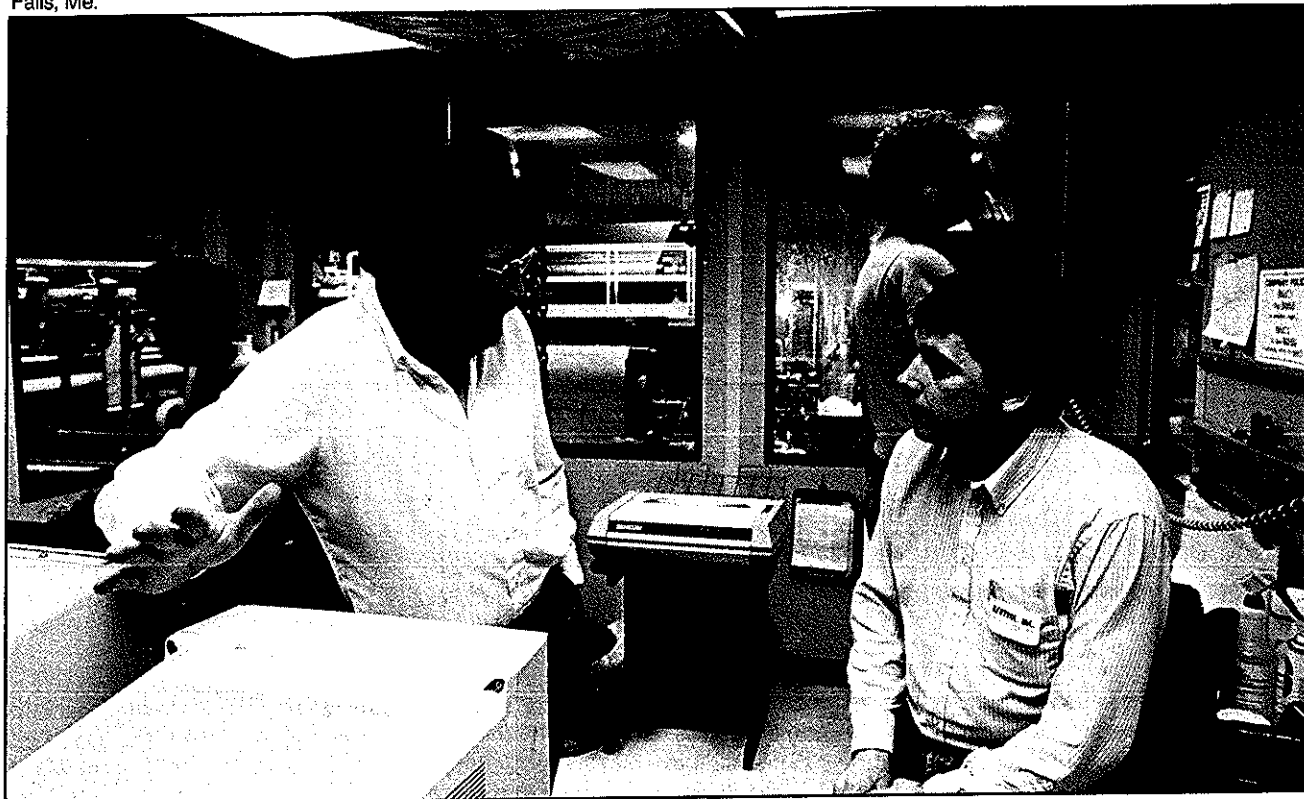
Total PCS control performance will usually improve to a point where process constraints such as formation, tensile, and drying problems inhibit further control performance improvements. Woolums stresses the importance of knowing where this point falls so a trade-off can be weighed between further savings from PCS performance and the cost to upgrade the process in such areas as the headbox, press section, and coater.

The digital maintenance function

Maintenance of process control systems involves both hardware and software. Mechanical and digital skills are required to service such major components as the scanner frame, sensor package, computer electronics, operator stations, and various cross-machine (CD) actuators. In addition, technicians must also be able to identify problems with process variable transmitters and final control elements (valves) which are connected to the PCS. These latter items are customarily serviced by regular mill maintenance departments.

Normally, one technician can handle preventative maintenance and service on two PCSs. However, as systems become more complex, as with the addition of cross machine controls or integrated distributed controls, one technician may be required per system. At the Cascade

Eugene Dennebaum (left) discusses cross-direction basis weight control on PM No. 9 with Paul Frantz at the James River-Otis mill in Livermore Falls, Me.



Mill, for example, where several machines have a full complement of CD controls, four technicians will service six PCSs.

Custom software yields further rewards

Vendor software control algorithms are usually left alone, but in some applications they have been customized to improve specific control performance. Of greater importance, some new James River software has been developed which enhances existing performance or adds new dimensions to the control capabilities of the system. James H. Black, technical director at Cascade Paper Division, states that the Cascade Mill will potentially save over \$1 million/year on one recent project alone where proprietary control algorithms were developed by a DFS technical specialist. DFS, he says, will be the conduit for sharing these breakthrough applications with other James River mills.

Parts management another plus

Wallace A. Hamm, James River's recently hired DFS manager, states that parts management is another significant benefit of the program. Good diagnostic and troubleshooting procedures along with careful inventory tracking, he says, have reduced annual parts inventory turnover costs an estimated 30-50% over past experience.

Ralph Clark, DFS technical specialist at the Cascade Mill in Gorham, claims that shopping the open market for parts has also made a major contribution to this reduction. "We repair the circuit boards that we can on site and buy the components we can in the local market. If we buy something from a second source, it will have

its own warranty. And if we see a way we can make it work better, we can optimize or modify to suit our needs. DFS assumes responsibility for it, but that is going to serve us well in the long run." One estimate places the anticipated savings for the mill in the \$100,000/year range.

Clark points out that the mill in Groveton has developed superior systems by mixing and matching vendor equipment — "a PCS from one vendor, an actuator from another, and coming up with our own interface in between."

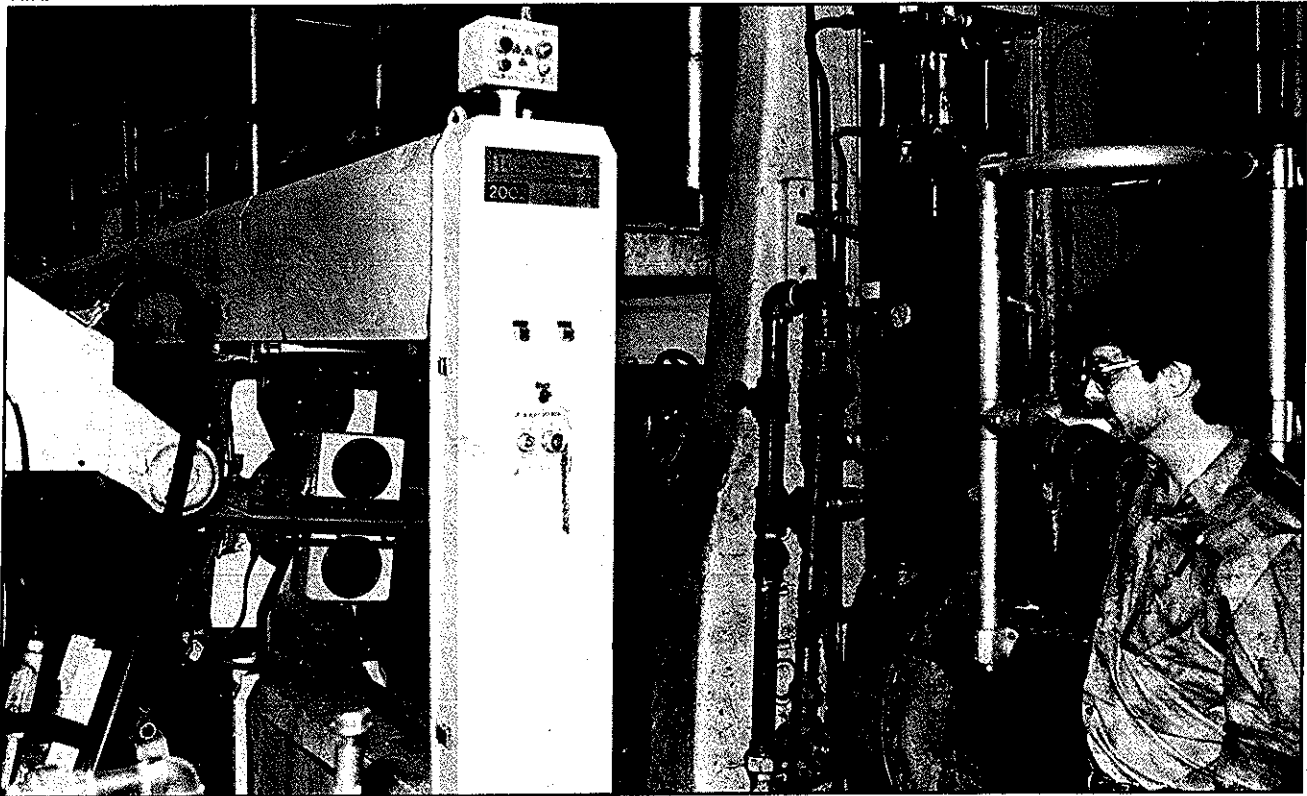
Making the maintenance transition

The move from vendor contract service to in-house service requires careful planning and good communication and cooperation between the mill, the PCS vendor, and DFS, Woolums states. Sensitivities exist and roles, responsibilities, and timetables need to be clearly defined. DFS executes its own written service contracts with each mill to insure full agreement on all issues.

Initially, James River hired experienced vendor technicians to get the DFS program started. This is a sensitive issue with some PCS vendors, and Woolums is looking to technical school graduates and armed services veterans to staff future growth in DFS. Extensive training, including cross training on multiple vendor PCSs, is planned to make DFS self-sufficient in PCS service technology. Shared resources among mill clusters and career path planning are also important elements in James River's DFS program.

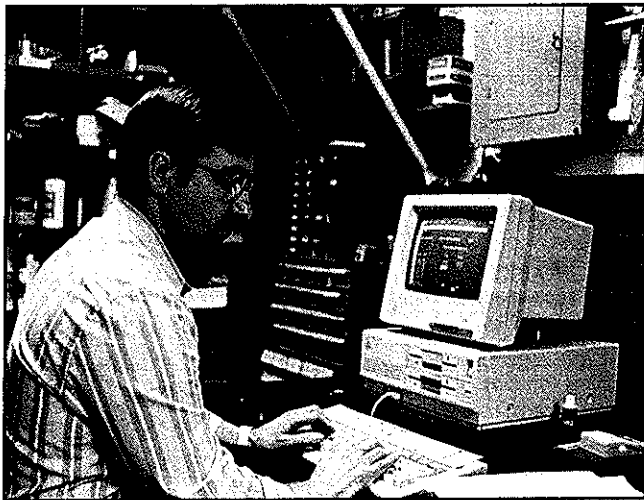
It is estimated that less than 20% of technician time is spent on actual hands-on maintenance of PCS hardware. Performance tracking and reporting, parts

Randy Hocking observes a reel scanner collect basis weight, moisture, caliper, and ash data on PM No. 1 at the Cascade Mill in Gorham, N.H.



Jim Young photos

Dwight Berube enters data on paper machine uptime for a management report at Groveton, N.H.



management, operator training and support, and PCS performance optimization tasks account for the bulk of the DFS effort in the individual mills. According to Dennebaum, sensor calibration and verification is "where it all starts." Consistently accurate sheet measurements are not only essential to maximum control performance, but are absolutely necessary to support mill "ship-by-the-gauges" and statistical process control programs.

Quarterly performance review meetings

"Because DFS is, in effect, a third party organization

providing contract services to mills across James River business groups, good communications are essential," says Hamm. In addition to daily contact with individual mill coordinators, quarterly review meetings are scheduled to meet the following objectives:

- To insure that mill upper level management is kept informed as to DFS focus and activities at the mill
- To briefly review control system performance and usage over the past three months
- To review the status of current PCS project activity
- To establish what, if any, changes to the DFS focus need to be made
- To keep the vendor updated on his product performance and joint project developments, i.e., beta trials and enhancements.

The vendor representative is encouraged to be an active participant in these meetings as system availability, sensor accuracy, control usage — items important to the vendor's product performance — are discussed.

A continuing evolution

Assuming vendor contract maintenance responsibility may just be a first step in providing highly specialized, shared technical resources to a number of James River mills. Woolums sees DFS opportunities in areas such as vibration analysis, thermal imaging, drive repair, custom micro control support, and in other skill areas which may be difficult for a small mill to resource on its own.

Each mill has its own culture and priorities. Dennebaum observes that, "What we are doing now is not what we are going to be doing in the future. For example, at the Cascade Mill, we were initially providing only project services and vendor maintenance program consultation.

Now, we have assumed PCS maintenance from the vendor. Our projected role in the near future will be to train mill hourly crews to handle routine and preventative PCS maintenance. Longer term, our role at Cascade will probably be in system technical management and providing engineering-level services in the millwide or CIM environment. Our own skills and expertise must grow accordingly."

James Black sees the eventual transfer of maintenance responsibilities of process control systems to Local 75 hourly personnel as a logical extension of the program. "We've had an ongoing, aggressive, employee involvement effort and I think with that effort comes a much higher level of trust between union and management," he says. "We have a maintenance cross-trades agreement that we didn't have a year ago making it even more amenable to move the PCS maintenance role to the Local 75 electrical/instrumentation group."

Program direction

In-house digital field service started as a pilot program in James River. Larry Woolums now feels that DFS has adequately demonstrated its ability to maintain PCSs equal to or better than vendor contract service. More important, significant improvement in control performance and utilization has been demonstrated. He is now comfortable in rolling out the program to other James

River mills. Woolums expects DFS will expand to James River mills in Upstate New York (now underway), northern Massachusetts, and eastern Pennsylvania and northwest New Jersey this year and next. "That would pretty well cover the Northeast," he concludes. "Then, if there is interest, we would begin looking at James River mill clusters in central Michigan, the Southeast, and Northwest."

The James River corporate motto is, "Finding a better way." Woolums and his associates believe they have found one in James River's DFS program.

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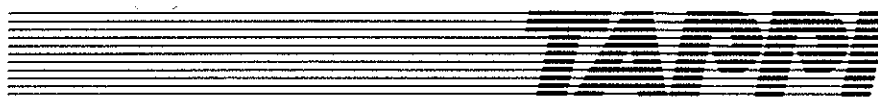
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