Case History Report
Presented by Panther Systems, Inc.

Fast Conversion of Roll Tracking System Pays Dividend For SSCC Stevenson

The Stevenson mill of Smurfit-Stone Container Corporation (SSCC) recently completed a quick turnaround of its IT systems to agree with the Corporate Enterprise Standard. The total effort, including financials, HR, plant historian, maintenance, interfaces, roll tracking, lab and order/invoice integration took one month to complete from kickoff to completion, without a mill shutdown. A dedicated team of mill, corporate and vendor personnel, assembled to complete the many concurrent tasks and activities, are to be congratulated for their dedication, effort and commitment. This paper discusses the background, systems, and results of one aspect of the turnaround, namely the roll tracking Manufacturing Execution System (MES) and dry lab systems.

SSCC Stevenson, AL

Introduction

The Stevenson Alabama mill is a large integrated paper, power and pulp mill specializing in the production of corrugating medium. The mill has 2 paper machines that produce 2200 to 2400 TPD of 18#/MSF to 45#/MSF corrugating medium. Each machine has its own winder. A common scale, warehouse, 10-bay truck dock and railcar loading facility complete the finished goods end. Built originally in 1975, the mill changed ownership when SSCC acquired the facility on October 1, 2002. SSCC made the decision to quickly integrate Stevenson into its production facilities to take advantage of the increased production capacity and market share the acquisition brought to its core business of container and box manufacturing. The existing systems at Stevenson for roll tracking and lab operation did not fit into the SSCC Corporate Enterprise Standard. To continue to use the systems would have required SSCC to develop special interfaces and business processes, thus burdening the company with unique and unnecessary support at greater cost. During the evaluation and site study phase, it became evident there were unusual and restrictive operating practices and support costs based on the existing systems that were more easily solved by applying the SSCC Corporate Standard, rather than attempting to enhance the existing systems. Instead of a phased approach over a long period, it also was decided to make a quick turnaround on these particular systems. For the mill, the existing system had only been deployed for a short period and internal support for change was easier to accept and implement with resources experienced in system change-outs.

Existing Roll Tracking System

The existing system at the time of the change in ownership was actually a hybrid implementation of a commercial roll tracking system and parts of an ERP (Enterprise Resource Planning) system. This hybrid solution was based on a UNIX operating system, which added its own complexity in support and maintenance. The client/server system architecture used redundant UNIX servers and emulator/translator software on conventional PC workstation clients. The mill supported the systems with a UNIX trained staff, plus maintenance contracts for the hardware and software as provided by three different suppliers. Figure 1 depicts the system. The roll tracking system was used at the backtender, winder, and scale. The ERP system was integrated to the corporate level for order processing and financials. For this installation, it was decided to use the ERP system at the mill inventory and shipping level as well. This required a special interface between the roll tracking and ERP system to pass data that represented routine, but comprehensive, floor movement of roll production to inventory and shipping as a continuous thread. The lab system was connected to the ERP system. Data communication between systems was both complex and difficult, resulting in ongoing operating inefficiencies on a daily basis.

A set of floor level interfaces, including those for paper machine control systems, PLC’s at the winders, scale, auto labeler, and RF tracking in the warehouse and shipping areas, rounded out the system.

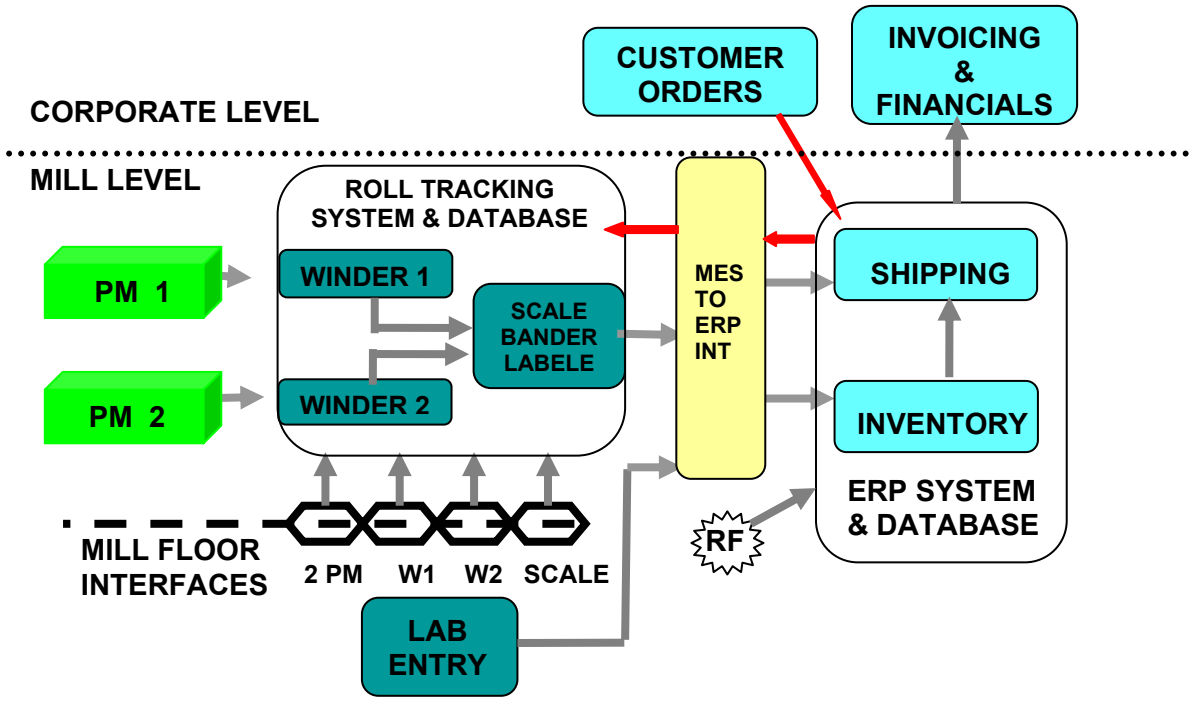

Fig. 1 Old System Architecture

New Roll Tracking Project

With the changeover in ownership, the decision was made to replace the hybrid roll tracking system with the SSCC Corporate Standard. The replacement standard includes the *Panther* MillTools™ Production Management Information system for roll tracking and the integrated Panther TestCentral™ Internet Quality Information System for the dry lab. These systems already are deployed at multiple SSCC containerboard mill sites, so there was a high degree of corporate knowledge and confidence the two systems would fit into the mill operations. A team of corporate, mill and vendor experts were assembled to plan and execute the project. In all, some 40 people were used at one time or another, with 16 resources supplied by the software vendor and the rest split between SSCC corporate and mill staffs.

A site survey and gap analysis occurred prior to project kickoff to develop and detail the project plan to meet the business processes and operational requirements. The actual project commenced October 1, 2002 and was completed on schedule with a “Go Live” event November 1, 2002. During the project, the systems were configured, the database populated, and testing performed on site. A core team of mill resources was trained by the vendor to use the system applications. Go Live was supported by the vendor around the clock for 3 additional weeks to ensure project success and provide more on-the-job-training. The entire change-out, including hardware, software, interfaces and user training, was accomplished without a mill shutdown. All the existing floor level PM control systems and PLC devices were retained and attached to the new system. The RF equipment was updated.

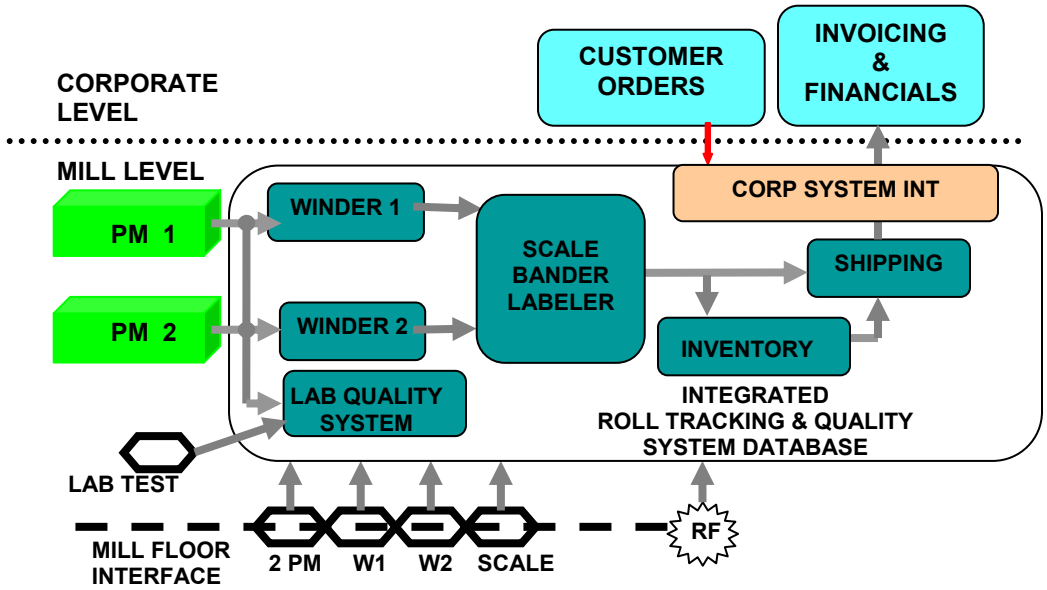

Fig. 2 New System Architecture

New Roll Tracking & Lab System

The new roll tracking and dry lab systems are completely PC based, thereby eliminating the need for the UNIX hardware and support contracts. In addition, the new system assumed the functions of the replaced ERP inventory and shipping functions, thus eliminating the need for any maintenance support of the ERP system. The new system consists of a PC clustered server running MS Windows 2000 and some 100 client users. There are 5 specific mill floor clients used full time, including 2 winders, 1 scale/bander/autolabeler and 2 inventory/shipping stations. Plans for the future include the addition of approximately 30 more users. In addition, since the systems are Internet compliant, both systems and reports can be viewed over the web, a feature not available on the old roll tracking system.

Figure 2 depicts the new system. The single roll tracking system replaces both the roll tracking and ERP systems, thereby assuring tight and complete data integration for smooth mill floor operations. Orders are received from the corporate order processing system as in the previous installation, albeit from a different corporate source. Shipment information is automatically routed back to the corporation for invoicing and other necessary financial transactions. The addition of the dry lab system, along with automation of lab device entry from one vendor, adds a new dimension of integration not previously available. This has shown benefits in several areas of mill floor level decisions to save paper and smooth production. It also provides roll genealogy of integrated production, quality and order data over the Internet for customer communications, and in-mill or corporate performance analysis.

Immediate Benefits

Expected benefits from the system were quickly realized. The elimination of the hybrid systems and their underlying proprietary technology presented obvious areas for improvement. Gains based on better intra-system data integration using a common open database technology, and the use of MS Windows as an operator interface became evident. Some of the realized benefits include:

Reduced Support
The Windows based system for roll tracking and dry lab eliminated on-going maintenance support for UNIX servers, roll tracking UNIX applications, and the local ERP system. It also allowed the mill to remove UNIX administration and expertise from its IT staff. The mill already had PC support in place, due to its other PC based systems, so there were no additions required for supporting the new system. Single vendor support for the combined roll tracking and dry lab systems enhances support efficiency.

Better Data Integration
The integrated solution produced benefits in the availability and consistency of data. Since all the applications share a common database structure, the integrity and immediacy of data allows operators to make informed decisions without consulting a supervisor to analyze an unusual occurrence. Increased data confidence also allows the mill to seek real causes of problems rather than assume a system data oddity. Two such instances were recorded that improved mill operations and reduced manufacturing cost.

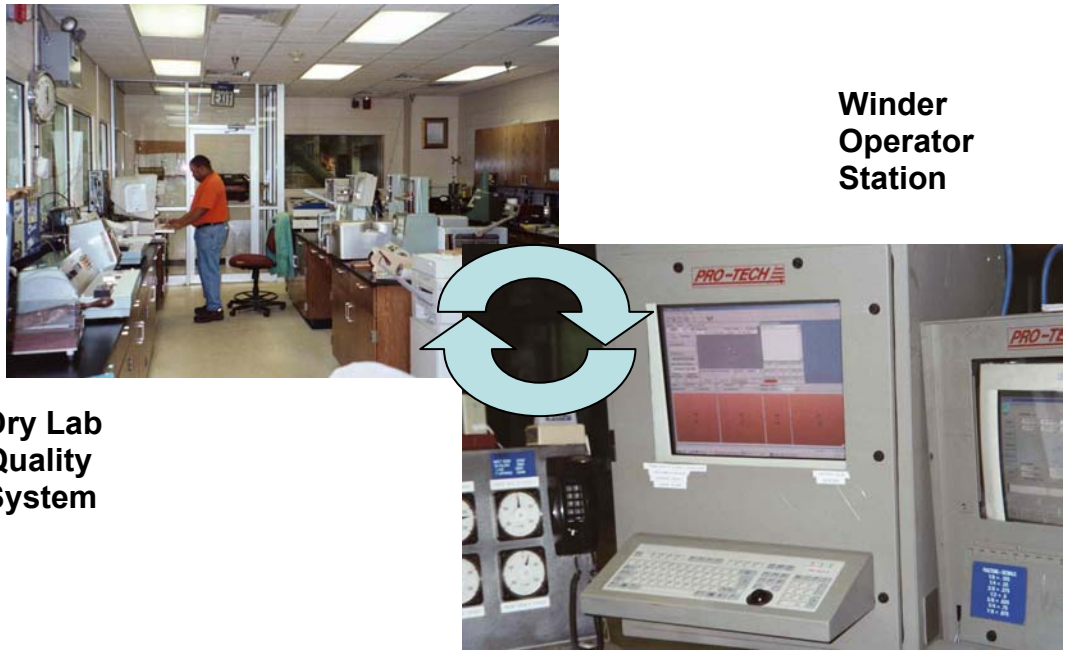

Fig. 3 Integrated Lab/Winder Operation

Data quality information is now integrated and available to the winder operator before the winder operation is performed (Figure 3). In the previous system, the operator used two screens from two systems (roll tracking and ERP) to perform his tasks, making for an error prone situation. A suspected paper quality issue required intervention of a supervisor if it was not obvious to the operator by observation. This took time and reduced production while making a decision. Now, the operator readily sees the quality information and can make a decision to cull or downgrade a roll without other intervention. Lab tests can be re-run quickly on a suspect quality problem and roll/set quality tracking has been vastly improved. The immediacy of the data and floor level communication results in paper savings while maximizing operations.

The scale operation is a multi-purpose station that weighs, measures, bands and labels rolls of paper in preparation for order fulfillment in shipping. Measured weight, length and diameter are used to compare against calculated weight produced by the paper machine basis weight sensor and order roll size. An error between the actual weight and calculated weight automatically prints a default label, indicating an error condition. The system began to print default labels when placed on-line, something which did not occur before system changeover. A first reaction was a new system malfunction. Further investigation revealed an unknown sensor fault on the paper machine taking false basis weight readings. Data integrity in the new system led the mill to find the real cause of a key operational problem, which had gone undetected for quite some time. Previously, erroneous weight and size created at this stage caused downstream errors in shipping. The problem has been eliminated.

Inventory Reduction

Two business process conditions acted against each other to increase inventory and reduce shipment efficiency. The old ERP system modules required a roll to be assigned to an order immediately upon production after the scale and before warehousing and shipping. Per previous agreements with customers, the mill holds customer inventory on-site for quick shipment at a later date after production. Customer specific rolls became buried in the warehouse with other customer orders, and contributed to overcapacity to meet shipment demands. More sets were produced if the customer's paper could not be located in a reasonable time. Order fulfillment for shipment was delayed by sorting rolls and manipulating lift trucks in confined aisle spaces, sometimes resulting in partial load shipments. The operational situation created an atmosphere where errors could easily happen.

With the new system, like rolls can be soft allocated in warehouse bays. An order can be quickly assembled and shipped from the available inventory. This flexibility initially decreased inventory requirements by 33%, while improving shipping efficiency and accuracy. It also drastically reduced overtime costs, which were necessary to keep up to production requirements with the old system. Partial load shipments have been eliminated. Further inventory reductions are being pursued as the operational efficiency goes up. Flexibility of fulfilling orders quickly is a major benefit to the shipping department.

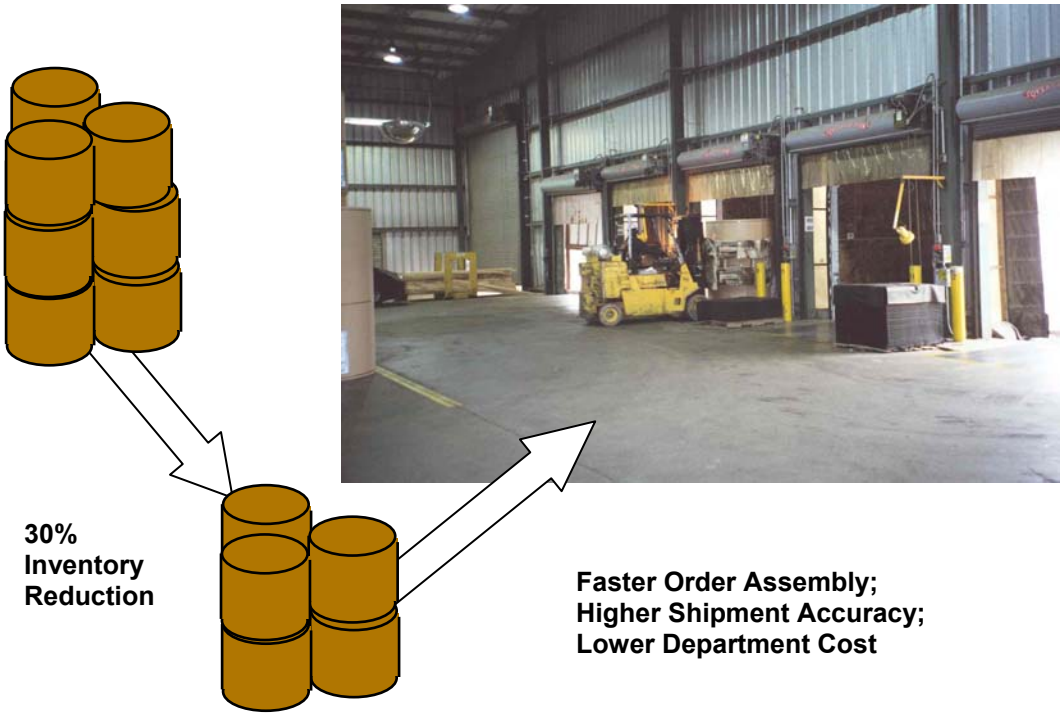

Fig. 4 Inventory Reduction with Shipping Efficiency

Report Generation
The system provides a set of standardized reports not available in the old system. New reports are easier to generate using standard report generation packages readily available for PC operation. The reports also can be made available over the web. It is expected that new report types will be added over time as the system and existing reports get used further. Focused reports allow the mill to analyze all aspects of production to reduce cost and increase revenue.

An interactive downtime report has proven quite useful. The report maintains a history of paper machine events and allows operator comments to be added. This permits the mill to perform operational analysis against time of occurrence, grade, customer order, and reason for downtime, or any other of many related parameters kept in the database.

Operator Acceptance
One common favorable response from operators is the ease of use of the roll tracking and dry lab systems. This acceptance comes from a group of users who are typically resistant to change, no matter what. The old general purpose paper mill MES system contained extra, unneeded detail and required more screens to be manipulated by the operator. The learning curve on the new system is significantly improved. For this mill, a cross-trained workforce is standard procedure. Thus, training cost and time has been reduced. Fewer screens, straightforward information and response to entries, and simplified navigation help the operators to concentrate on their jobs rather than becoming computer technology experts.

Web Access
Because of its modern Windows platform, the new system makes information access though the Internet easily available. The old systems could not provide this connection without significant investment. Web Access provides linkage for the Corporate Enterprise systems, allows mill personnel to examine operations via a web browser in local or remote scenarios, permits corporate resources to obtain data for analysis, and allows customer service representatives to obtain immediate status on orders, shipments and roll quality for customer satisfaction.

Conclusions

The changeover from the hybrid system of a roll tracking/ERP combination to a dedicated roll tracking and dry lab system proved to be successful and best suited to meet the requirements of this large volume corrugated medium paper mill. Complications induced by the hybrid interfaces and fundamental limitations of the ERP system as applied to paper making were eliminated by the new system. ERP systems, by their nature, are not suited for production tracking of paper. Given that an ERP system does have a place in the overall enterprise devised by a paper company, it perhaps is best to allocate these systems to the business/financial side of the business, while deploying a dedicated roll tracking system which has been designed from the ground up with paper mills as the model. It was further shown, from an operator standpoint, that a roll tracking system specifically designed to serve the containerboard paper industry is better suited for these type mills than a general purpose MES system.

A one month turnaround of the system change-out in a containerboard mill is possible if the system is essentially shrink wrap ready for such service and cadres of dedicated, quality resources are provided to make it happen.