In the Chips

InTouch HMI replaces aging operator consoles at Smurfit-Stone to upgrade operations and helps turn wood chips into high-quality paper products.

Paper is one of those commodity products that most people take for granted. They use it every day in countless ways — everything from printing computer documents to packing items in corrugated boxes — but few people know how or where these paper products are made.

Many of them are produced by Smurfit-Stone, one of the world's leading paper companies and the world's top producer of corrugated containers, at the company's sprawling paper mill in Panama City, in the Florida panhandle along the Gulf Coast. Every day the 600 Smurfit-Stone employees at the Panama City facility make more than 900 tons of linerboard, which is used for making corrugated containers, and more than 1,000 tons of Panacell bleached hardwood pulp, the basic raw material for making high-quality printing, computer and writing papers.

Founded in 1931, the Panama City Mill was the first pulp-and-paper mill in the state of Florida and has grown to be one of the most important production facilities in the company's roster of 21 mills located throughout North America. It is also one of Smurfit-Stone's most sophisticated plants, now that its production systems have been modernized using FactorySuite automation software from Wonderware Corporation, a business unit of the Invensys plc.

The InTouch® human-machine...
interface (HMI) has enhanced Smurfit-Stone’s aging Bailey 90 distributed control system (DCS), allowing management to fine-tune pulp and paper making to produce even greater volumes of product — all while maintaining the high quality for which Smurfit-Stone is renowned. The InTouch HMI helps plant operators closely control their DCS and programmable logic control (PLC) operations at every step of paper production by replacing the DCS operator consoles with PC-based process visualization systems that interface smoothly to all the Bailey and G.E. control systems throughout the plant.

“We made this change because Bailey recently announced an end-of-life program for the operator software that was originally delivered with their distributed control systems,” says Greg Cypher, mill systems supervisor. “Using the InTouch HMI as a DCS console replacement package lets us retain our existing hardware investment. With help from our system integrator, Industrial Electrical Services, in Montgomery, Ala., we were able to accomplish a reasonably painless conversion process for moving graphics files, tag databases and animation links to the new software. It’s even added new capabilities for archiving historical information so we know better what our production trends are.”

Complex Production Process

THE MAKING OF PAPER PRODUCTS IS A COMPLEX PROCESS THAT COMBINES BOTH CONTINUOUS PROCESS AND DISCRETE MANUFACTURING TASKS, ALL OF WHICH MUST BE CLOSELY COORDINATED TO CREATE FINE QUALITY OUTPUT.

It all starts with the wood, which arrives at the plant as tree-length logs or as trucks or railcars filled with wood chips. The Panama City Mill uses about 925,000 cords of pine and hardwood pulpwood and wood chips annually. About half of it arrives as logs and half as chips. Operators dump bulk wood chips, either by tilting entire railcars on their sides or by hoisting tractor-trailer trucks high into the air to unload tons of chips in a matter of minutes. The chips are carried along conveyors to stackers that place them in huge piles, ready for transfer into the mill.

At the same time, a massive crane unloads tree-sized logs from trucks and puts them in a debarking drum, where the bark is automatically removed before huge revolving knives cut the logs into chips that are conveyed to the same storage piles.

Operators in the wood yard control room, high above the ground, have a bird’s eye view of all these operations — both in real time — by looking out the window — and on the InTouch screens, where they can monitor and control tasks. They can smooth the flow of incoming chips from storage into the papermaking process so that it runs continuously to feed the pulp-making process.

Reclaiming machines convey chips from the storage piles into the mill. Each of the spider-like reclaimers is controlled using an InTouch workstation right on the machine, so operators in the control room can efficiently coordinate the movement of the machines among the storage piles. Once they’re conveyed into the mill, the chips are cooked in giant pressure cookers called digesters, which dissolve the lignin that holds the chips together and creates the wood pulp. The pulp is washed to remove spent chemicals and other impurities, and then it’s either bleached for making the white Panacell pulp product or left in its natural brown color, much like a grocery shopping bag, for making the corrugated liner. The pulp, whether bleached or unbleached, is then sent to the paper machines.

The mass is about 99.5 parts water and .5 parts pulp as it’s fed onto a high-speed, wire-mesh screen on each papermaking machine. Rollers squeeze out the water, and the wood fibers interlock to form a continuous sheet of paper. At the end of the block-long paper machines, the dry rolls of paper are processed for shipping.

The massive rolls of linerboard are cut into more manageable roll sizes to be shipped by rail or truck. The bleached white pulp is cut into sheets, which are packaged in bales for shipment to about 30 countries overseas, where it will be used as an ingredient in making high-quality papers for writing, printing and computer output.

“One characteristic both of these mill products have in common is meticulous attention to quality,” says Greg Cypher, mill
Every day we perform more than 1,600 hands-on quality tests and 3,700 process tests to insure that our output matches the customer’s specifications.

Good Control of the Process

At multiple steps throughout these production processes, the InTouch HMI provides operators with all the data they need to monitor operations and verify that products are being made within quality parameters. There are 10 InTouch workstations (six with double-stacked screens) in the paper mill, seven in the washer/pulp mill area, five in the wood yard, 10 in the power plant and one in the system shop.

The HMI workstations on the lines or in the control rooms give Smurfit-Stone supervisors the ability to interact with the Bailey 90 DCS and G.E. PLC systems that run all the production equipment. All production data is archived so that mill management has a complete product genealogy on every roll or bale of paper produced and can track any product to ensure customer specifications are being met.

“We made the move to InTouch software mainly to eliminate the multiplicity of operating systems and proprietary operator interfaces that were cumbersome to work with and maintain,” Cypher explains. “We were looking at replacing all of our HMIs with user-friendly, Windows NT-based platforms that any technician with any PC or networking experience could maintain and troubleshoot. Our paper mill control room is the nerve center of our operations, and we can now easily bring up views of both paper machines at one place, which makes it very handy for running these machines, as well as all the other equipment.”

“These PC-based workstations with graphical representations of the old J2 refiner controllers have replaced the panel-mounted stand-alone J2 controllers with control schemes integrated into the Bailey Net90 control system. This has simplified our refining operations and made them much more reliable,” he adds. “We have many graphics for the primary, secondary and recirculation stock systems. These are all dynamic so that anyone can pull up any motor and start or stop it, or they can bring up any controller and manipulate it from the workstation.”

“We have approximately 300 points of information in a typical InTouch page, which is far better than the old operator screens that typically could only handle four controllers. The InTouch system provides much more information in a smaller footprint. Our ultimate goal is to interface all PLC and Bailey DCS HMIs using FactorySuite workstations mill-wide.”

In addition to its role in making paper, InTouch software is deployed extensively in operating the mill’s electrical power plant, boiler operations and environmental systems. Smurfit-Stone has its own power plant with three steam-driven turbine generators capable of producing 34 MWh hours of electricity at peak capacity. The plant also has two power boilers that are fueled by the bark and other waste wood products created in the chip processing, and two recovery boilers that burn the residue from the pulp-making process to recover and recycle pulping chemicals.

“About 75 percent of our electrical needs are met internally by production from our steam turbines, with the remainder purchased from Gulf Power Company,” Cypher says.

The Panama City mill conducts comprehensive programs for the treatment of both its air emissions and water discharges to make sure the company meets all state and federal environmental requirements and to be a good corporate citizen.

“We’ve made significant advancements in our continuing program to reduce air and water emissions,” Cypher notes. “In early 2001, the mill completed a massive $60 million environmental project to meet new EPA air and water regulations that became effective in April. The project involved a major rebuild of the mill’s bleaching system, eliminating the use of elemental chlorine. In addition, odors were reduced and an array of other air and water emissions were reduced or eliminated.”

The result of using InTouch software to monitor and control this complex but finely tuned production process is the large volume of high-quality, economically priced papers and packaging for users throughout North America and the world.