



Case Study

iTape Sticks to Its Plan to Rebuild as opposed to Purchase New

As we all know, tape can be pretty *sticky*. It's supposed to be! No one knows this better than, Intertape Polymer Group Inc (IPG). But when IPG, or iTape, needed someone to revamp an aging coater, they needed a smooth operation! They found New Jersey-based Circonix Technologies, the only systems integrator who was able to make it all happen, without *sticking* iTape!

The IPG manufacturing facility in Danville, Virginia was at a crossroads with one of its older manufacturing lines. The dated analog drive and control system was clearly showing its' age. Production levels were trending downward while downtime was trending upward and splicing reliability was a real concern.

IPG needed to determine whether it would be best to retrofit the existing line or purchase a new line. Many factors were taken into consideration including: cost, timeframes, downtime, production impacts, efficiency, output, and speed, just to name a few. After much deliberation, IPG made the decision to commit to the upgrade, as opposed to purchasing a new line. The primary reason for this decision was purely economics. A new acquisition would cost at least eight times more than an upgrade.

Economically, this was an easy choice for IPG; however, finding an integrator, and completing the job in a 3-month window, would not be so easy. They knew that it would take the "best of the best" to perform what some believed to be a miracle. As a result, they had very specific requirements for the systems integrator, and were not willing to compromise on the expertise they were looking for.

IPG sought an integrator who could provide a *turnkey* solution. This included designing and installing both the electrical and mechanical portions of the project, as well as the commissioning of the entire line. The integrator needed to be well versed in the subtle nuances of web conveyance and splicing. Many integrators would not consider the risk of such a stringent mission.

After an intensive search, IPG awarded the project to Circonix Technologies. Circonix met the criteria of having experience in the web converting industry, the ability to provide a turnkey solution, and the skill to commission the line. iTape squarely placed their confidence, and the success of this venture on the shoulders of the Circonix team. Circonix was viewed as the most capable integrator to get the job done. IPG would **NOT** be disappointed in their choice.

Time was tight. Circonix and IPG began negotiating the proposal in October, with a project completion date set for the end of December. The entire project from quote through installation had a three-month turnaround with only 9 days of downtime allotted to perform the physical upgrade. It was a challenge that Circonix prepared to meet.

It was early November when the proposal was accepted by IPG. Circonix had to complete engineering, manufacturing, testing, and procurement of all hardware, and be on site by early December. The upgrade included:

- a new 13 drive AC Vector drive system
- new drive trains complete with AC Vector Duty motors, gearboxes, pulleys, belts, and welded drive stands
- complete conversion of the unwind and winder turret indexing from single speed motor contactors to variable speed drives
- redesign and installation of new slip ring assemblies to accommodate the increase in electrical load as well as the number of signals for both the unwind and winder
- incorporation of new tension control
- new AC Motor Control Center
- new 480vac and 120vac power distribution for the machine
- integration of third party systems with the new drive and control system
- two new operator consoles complete with WonderWare based touch screens (replacing hardwired pushbuttons).

The Circonix team focused on key design elements, from both the electrical and mechanical standpoint, to insure optimization of the overall upgrade. AC Vector technology was chosen to replace the existing DC technology. DC motors with analog tachometers and cooling blowers were replaced with AC Vector Duty motors with encoder feedback and totally enclosed non-ventilated (TENV) frames. Speed regulation was greatly improved resulting in better tension control and winding quality. Also, motor maintenance was dramatically reduced. No more brushes to change or motor over temperature trips due to clogged air filters on the cooling blowers. Digital AC Vector drives ensure consistent repeatable performance regardless of fluctuations in ambient temperatures. No more potentiometers to tweak. Another benefit of AC drive technology is the improved power factor of the overall drive system. This saves IPG money everyday by helping them avoid power company surcharges.

Higher horsepower drives, motors, and gearboxes were needed to achieve the desired speed increase. Due to the inherent large size of DC motors (especially ones with cooling blowers mounted on them) some of the machine sections had multiple belt reductions to reach the rolls that they were to drive. Circonix redesigned the drivetrains to minimize and in some cases eliminate drivebelts. This along with precision gearboxes helped to dramatically reduce driveline backlash thus allowing Circonix to tune the drive system for maximum responsiveness.

Missed splices are a production nightmare. Every production manager's goal is to have his machine running at full speed. Every quality manager's goal is to have the process running at steady state. IPG was dealing with splicing reliability issues and uptime problems. Circonix was able to address this issue without hesitation.

Circonix has long been known in the converting industry for their splicing technology. Using a proprietary algorithm known as SPLICEPRO, the best in the industry, fitted unwinds perform a clean splice with a guaranteed 99.5 percent success rate, minimal waste left on the expiring roll, with consistent short tail lengths and no decrease in line speed. This is the same technology that Circonix has successfully implemented on machines running up to 5000fpm around the world.

In conjunction with SPLICEPRO, Circonix also implemented SPLICETRAK. SPLICETRAK automatically synchronizes the winder with the unwind ensuring that the newly made splice is either the last wrap on a freshly wound roll at the winder, or the first wrap on the core of a new roll at the winder. This is a very versatile option for the end user.

To complete the modernization of IPG's machine, new custom painted operator consoles with desktops were installed. Mounted to these consoles are warning horns and indicators lights, which alert anyone in the area of imminent, machine motion. Each console is fitted with a WonderWare based Operator Interface Terminal (OIT) with touch screen. Circonix and IPG worked together to design custom WonderWare screens for this particular machine. Not only do these stations provide state of the art ergonomics, they allow the operators to better track the machine's performance. Intuitive controls along with insightful alarms allow the operators to keep their hand on the pulse of the machine.

Once on site, the Circonix team was able to execute the job within the allotted 9-day machine downtime. The actual upgrade commenced on December 26th, with deliverable product coming off the line on January 8th. Most significant was the overall result. The Circonix project team was able to increase the coater's productivity by more than 50 percent by increasing the machine's speed and splicing performance.

Dave Inman, Process Engineer for IPG, commented "Circonix was able to put it all together for us, meet all of our electrical and mechanical requirements in a very stringent time frame, and actually get us up and running 1 day ahead of schedule. They were able to meet and exceed our expectations in many ways. Most importantly, we significantly increased our operational line speed, drastically reduced downtime and dramatically increased our Overall Equipment Effectiveness (OEE)."

IPG was extremely satisfied with Circonix. The benefits of using upgrade technology, along with the extremely skillful Circonix team saved IPG a tremendous amount of money, and at the same time, produced results that exceeded expectations. In this economy, manufacturers must be smart, efficient and productive to stay in the game. Both IPG and Circonix proved the power of teamwork, skill and experience as it translated into more product and more profit for IPG.