APPLETON, WI – Thermal paper is one of those products we all use but never think about. It is something most people take for granted. But, every day, 365 days a year, miles and miles of thermal paper is used in millions of fax machines and printers worldwide.

Appleton Papers Inc., headquartered in Appleton, Wisconsin, is North America’s leading producer of thermal paper. It is ISO 9002 certified and is the only fully integrated U.S. thermal paper manufacturer to control both the production of the base paper and the application of the thermal coatings.

Appleton employs Wonderware® InTouch™ human-machine interface (HMI) software to control the machine functions of their new No. 17 Coater, which produces OPTIMA brand thermal fax paper.

Because of InTouch, fewer operators are required to run this behemoth. Prior to the installation of the InTouch software, one operator could make a couple of fine adjustments at his station, and not know how it affected the operators at the other stations. If one of the other operators saw something and made a couple of adjust...
ments, the two operators almost fought each other for control. “The InTouch software allows all of our operators to see what’s happening over the whole machine,” said Carl Hanson, Appleton project engineer. “It’s like having one central interface into the entire machine allowing the operators to do things they could never do with the machine layouts they had previously.”

The first thing we did following the InTouch installation was to design a simple bar chart of all the different tension sections of the machine,” said Hanson. “It allows any operator to see how the tension is running throughout the entire machine. Now, if one operator sees a baggy web (it should correlate with one of the bars on the tension screen), he can take that information and decide how he’s going to work with it. If he makes an adjustment, he can see how it affects the rest of the machine. And, the other operators can see that someone is making an adjustment and will know what’s going on.”

InTouch handles recipes for tension settings on the load cell rolls, grade change settings, and dryer temperature settings. It logs key activities such as web breaks, machine status, alarms, etc. Voice alarms warn operators of upcoming actions or alarm conditions. The HMI also instructs the machine to insert a visible label onto the paper roll to flag quality defects for removal at the winder. The system can display the status for all MCCs, PLCs, and drives at the click of a mouse, and provides troubleshooting with PLC ladder logic, as well as PID loop tuning without special programming equipment.

There are 12 PLC 5/40E’s all talking on Ethernet to InTouch. Some of the 5/40E’s on the No. 17 Coater, control the drive system, the alarm handling, data collection, and the label printer. “Electronically, we know when things are wrong with the paper,” continued Hanson. “We know when any component isn’t in the right position. We know when there's bad product going. We can detect that electrically. So we automatically send a message to a thermal printer which applies a defect flag to the roll on the fly. It identifies the problem right on the roll even though it may be traveling at high speeds. When the rewind operators, who are winding the paper onto a customer roll, see that little orange tag, they can remove the defect right there. They can even accommodate a splice right there. They can slow down, cut the bad parts out, splice it, and start it back up again.

And for things that are not visible electrically, but can be seen with the naked eye - like cracks, wrinkles, or skip coating, the InTouch screen will identify the problem, a label will be printed, and then applied in order to indicate where the problem is. “We used to have different color coded labels that had to be applied by hand. It wasn’t a safe way and it didn’t necessarily get the label near where the problem is. The new procedure will get the tag within six inches of a splice. If you find that tag, you’ll find the splice right away,” commented Hanson.

Appleton uses a recipe system to adjust the machine for varying operating conditions. Recipes are used for different thickness and density of paper, or coat weight. The machine must run differently for each paper thickness, tension, and temperature.

One benefit of InTouch is the ease with which its recipe system can be altered and used in different applications. “We just completed a new InTouch system installation on an existing thermal Coater that does tag and label and thermal fax runs and it'll probably have 50-60 recipes on it,” said Duane Bruns, an Appleton electric technician. “We utilized the recipe system from the No. 17 Coater and modified it. It’s an older machine and doesn’t have all the inputs and control points. And it’s not as digital. Once you’ve built a product like No.17, and you have hundreds of screens and data
points, it’s so easy to put them in a separate database and just bring them in to the new application. You simply strip away what you don’t want. I took the recipe control scripts and imported them along with the screens and then just changed the recipe database. I did the same with the tension adjustments and drive controls. All the sliders that pop up are the same sliders. So are the buttons.”

Another advantage of using an InTouch-based system is that once the operators are trained, you can put them on another InTouch equipped machine and they’ll know how to run it, too. For example, Appleton was able to take operators from the older machine, show them the No. 17 screens, sliders, and switches. Although the machine are physically different, they work the same way. It was easy to bring up the older machine very quickly.

Appleton takes advantage of InTouch’s ability to play audio wave files and uses them as an operator advisory. “We have voice files or codes that are not loud, but they confirm actions,” stated Hanson. “Instead of having a red light siren, bell or a whistle and have the operators try to remember what they mean, we tell them in plain English - ‘The Coater roll is not turning.’ The operator knows that if it doesn’t start turning it in the next 15 seconds or so, there are some problems with it. A lot of this information is available as data in the PLC, but we convert it in InTouch and play the appropriate message. We do all the timing in the PLC but the wave file lets the operator know what’s happening. If it’s an alarm, it’s obvious, it says ‘a roll isn’t rotating’. Or ‘oven temperatures are too high.’ Or ‘A filter is plugged.’ ”

We know that when there is a differential pressure that’s high enough, or high back pressure, that they’re going to start running into trouble. So we’ll tell them ‘The differential filter is getting plugged.’ We could pop them up on a screen, but when this machine’s running, the operators aren’t always right in front of the screens. They might be getting another roll ready to go or they’re taking one of the reels off, because this machine runs continuously. They might only have five minutes to get that filter switched over to an alternate filter so they can clean it out. So having an audible message is very important.

“We also give operators information about things that are happening on the machine, more from a safety/status basis,” stated Bruns. “If the turret starts to index, we tell him the turret is indexing. ‘Unwind turret index.’ ‘Two minutes to splice.’ Sometimes operators can be right in front of the screen and not know the splice is coming up, but they know when they get the audible message that this reel is starting to index. They know if they’re standing in that area they better back off because it’s going to start turning around on them automatically. Also, it’ll tell the operator something is coming up and they should go out by the machine and make sure everything is OK.”

According to Appleton, their productivity is much higher and more efficient now that InTouch has been
installed. The InTouch recipe system takes a snapshot of a couple hundred operator adjustments, and in about two seconds, it reloads and is ready to go. It might not work perfectly from these initial settings, but it is easily fine tuned from there.

Another example of increased productivity due to InTouch is the decrease in manual controlling of the machine. “We can also access our hydraulic system, filters, cooling, etc. The operator can start and stop all the hydraulics with one button. And, if you need to add a button on a machine, you can do it in software. You don’t have to buy a button and pull wire, you just put it in InTouch and you’ve got it done in 20 minutes or less,” stated Hanson.

To keep pace with the increased production from the No. 17 Coater, Appleton has installed a high-speed Rewinder that is also controlled by InTouch. The system’s master screen tells the operators what’s happening on the reel and on the unwind. Before rewinding the paper, the basis weight of the paper must be known so that the weight of the roll can be accurately calculated. Operators can now read those numbers on a screen that gives them a list of the basis weights. They then select their product number and automatically fill in the basis weight to get the roll weight. No more extensive calculations.