

A Common Thread for Improving Business Performance

Twister Control and Loom Monitoring at Firestone

This application article was submitted by:



The Bridgestone/Firestone Corp., Firestone Fibers and Textiles Division, recently moved weaving looms and twister equipment to a new production facility near Kings Mountain, NC. The new facility implemented a team-oriented approach to production management. Operators, team leaders, and process coordinators work together to improve the efficiency of the plant. All participate in the rewards of the improvements made by these efforts. In an effort to reduce costs and eliminate wastes, the Firestone staff wanted to implement a highly reliable and accurate yardage measurement and twister doffing system. The existing mechanical clocks had multiple problems such as difficulty in training operators, mechanical failures and lack of ability to monitor their status remotely. The Firestone team required an improved system reducing costs for their new world-class operation.

Twister Yardage Control Solution

Salem Automation, a supplier of data acquisition and control systems, was invited to propose a solution. Salem Automation consultants Chuck Graham, Todd Nichols and Tim Cochrane designed a solution for Firestone using InTouch by Wonderware for supervisor interaction, Microsoft ACCESS with Visual BASIC for reporting, local panels for operator interaction and redundant programmable controllers for high availability control functions. This solution, using off-the-shelf products, provided Firestone with a complete system for accurate yardage measurement, twister control

and production monitoring. The first step for Firestone was to contract with Salem Automation to install a pilot project of the proposed control system on 5 of the twisters at the facility. With little training, the operators were able to reset the twisters, accept or change the preset and view information about the twisters. The operators and supervisors could now see the following information from the operator panel next to the twister:

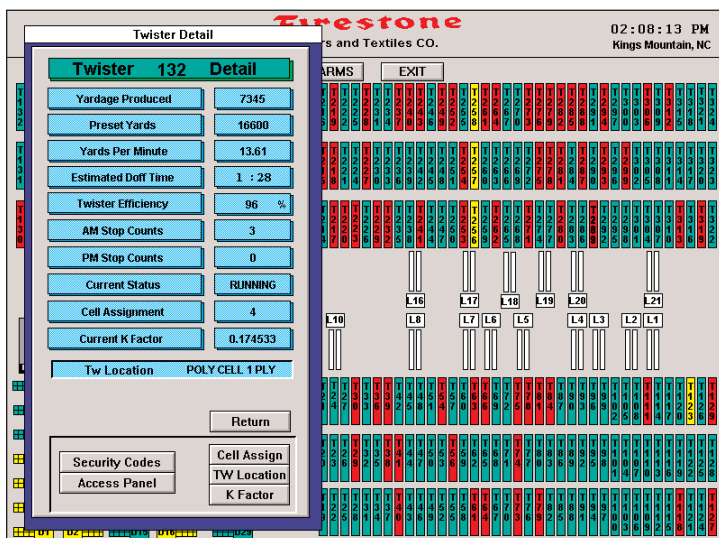
- Estimated Doff Time
- Twister Efficiency
- Cell Efficiency
- Number of Stops in AM Hours
- Number of Stops in PM Hours
- RPM of Feed Roll
- Yards per Minute on Twistors
- Current Yards Twisted
- Preset Yards to Twist

This system also provides end-of-shift reporting, end-of-month reporting, exception reporting and allows the facility to be managed by cells or teams. Reports can be generated by shift, day, week, month or year.



"Salem Automation's willingness to customize a program especially for Firestone has allowed us to pay back this installation in less than one year".

Terry Swanner
Firestone
Fibers and Textiles Division



This cell management concept has allowed top management to objectively judge people, yarn suppliers, equipment and floor supervisors.

The pilot project worked successfully, giving Firestone reduced waste and reliable yardage control.

Salem Automation Engineer Mark Kaufman, implemented the expansion of the system out to the remaining twistors in the facility. Based upon the

tremendous success of this project, Firestone has subsequently contracted with Salem Automation to implement a chemical mixing automation of 13 mix tanks and implementation by Mark Kaufman of a Loom Monitoring System. The Loom Monitoring system monitors all loom faults and then records them into the Microsoft ACCESS database. This system also records total number of stops by type and loom downtime by stop type. An end-of-shift report shows the stops by machine by type, the downtime by machine by stop type, the total downtime by machine, the total stops by type and the total downtime for the weaving area.

How it Was Done

The system uses a programmable logic controller (PLC) for control of the twister yardage measurement and control function. While programmable controllers typically have mean time between failures measured in years, Salem Automation recommended implementation of a redundant controller as a hot backup with automatic switchover in case of primary controller failure. The system was also equipped with a

set of redundant power supplies, requiring failure of 4 power supplies before the PLC system would shut down due to power supply failure. No one component could completely disable the system. This is the same type of configuration Salem Automation has used to reliably control potentially explosive chemical processes. The backup system provided additional value in expediting changes made to the system.

Salem Automation could implement extensive changes to the control logic with zero downtime due to the redundant PLC system.

Data management is one expertise of Salem Automation. In addition, to the critical function of yardage control, a Microsoft ACCESS database along with management shift reports were added to this system. These reports showed efficiency, yards twisted, yards/min, RPM, number of doffs, number of stops. A summary report then showed all twisters below a specified yardage. Salem Automation used the built in Wonderware InTouch SQL calls to write production data into the database. Visual BASIC was used along with Microsoft ACCESS acti-

vated by an InTouch script to create end-of-shift reports.

At the InTouch supervisor graphic the operator can monitor and interrogate the status of all of the twisters and looms. The color of the twister change based upon their status: OFF red, ON green, IDLE over 15 minutes red flashing, IDLE over 2 hours blue flashing and OUT OF SERVICE yellow. A separate screen was created to allow Firestone to determine at a glance which twisters would reach their yardage setpoint within a selectable number of minutes. The twisters that would soon be doffing can be printed on a report a supervisor could use to optimize the work force.

Summary of Benefits from the New System

With the installation of the Yardage Measurement System, Firestone received the following benefits:

- Reduced Waste
- Easier Training of Operators
- Eliminated Maintenance Cost of Mechanical Clocks
- Completely Consistent Yardage from Twister to Twister
- Accurate Shift Reports to Objectively Judge People, Raw Materials, Equipment and Managers
- Allowed Implementation of Team Oriented Management

Operators at the site are now conscious of the efficiency of their twisters and cell efficiency as a whole. The Firestone team reviews these numbers daily and uses them as a yardstick for meeting their performance goals. The system has been extremely reliable running continuously (excepting power outages) since installation. Salem Automation has provided maintenance support for the InTouch software and the control software via remote dial-up access since installation.

For more information contact:

Chuck Graham at Salem Automation, (336) 661-0890, ext. 106, cwgraham@sai-net.com. Salem Automation is located in Winston-Salem, NC.



SoftCell Training

Class Schedules

For all 5
SoftCell Training Locations



InTouch Development

May 4-6	Memphis
May 11-13	Charlotte
May 11-13	Birmingham
May 18-20	Charlotte
May 18-20	Mobile
May 25-27	Charlotte
June 1-3	Birmingham
June 8-10	Charlotte
June 8-10	Nashville
June 15-17	Charlotte
June 22-24	Mobile
June 29-July 1	Charlotte
July 6-8	Memphis
July 13-15	Charlotte
July 20-22	Charlotte
July 27-29	Birmingham
Aug 3-5	Mobile
Aug 10-12	Charlotte
Aug 10-12	Memphis
Aug 17-19	Charlotte
Aug 24-26	Birmingham
Sept 7-9	Memphis
Sept 14-16	Charlotte
Sept 14-16	Birmingham
Sept 28-30	Charlotte

InTouch Advanced Development NEW!

May 18-20	Memphis
June 8-10	Charlotte
July 20-22	Mobile
Aug 24-26	Charlotte
Sept 21-23	Charlotte

Database Reporting Tools

May 7	Charlotte
May 28	Charlotte
May 28	Memphis
June 4	Mobile
June 18	Charlotte
July 9	Charlotte
July 16	Mobile
July 30	Charlotte
July 30	Memphis
Aug 13	Charlotte
Aug 20	Nashville
Sep 6	Birmingham
Sep 10	Charlotte
Sep 24	Memphis
Oct 1	Nashville

IndustrialSQL Server

May 4-6	Charlotte
May 25-27	Charlotte
May 25-27	Memphis
June 1-3	Mobile
June 15-17	Charlotte
July 6-8	Charlotte
July 13-15	Mobile
July 27-29	Charlotte
July 27-29	Memphis
Aug 10-12	Charlotte
Aug 17-19	Nashville
Sept 3-5	Birmingham
Sept 7-9	Charlotte
Sept 21-23	Memphis
Sept 28-30	Nashville

InControl

May 19-20	Charlotte
June 15-16	Birmingham
July 20-21	Charlotte

InBatch

Aug 3-6	Charlotte
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InTrack

June 22-25	Charlotte
Aug 17-20	Charlotte
Sept 28-Oct 1	Birmingham

InTouch SQL Access

May 7	Memphis
May 14	Charlotte
May 21	Mobile
May 21	Charlotte
June 4	Birmingham
June 11	Nashville
June 11	Charlotte
June 18	Charlotte
July 2	Charlotte
July 9	Memphis
July 23	Charlotte
Aug 20	Charlotte
Sep 10	Memphis
Sep 17	Charlotte
Oct 1	Charlotte

Introductory Statistical Process Control

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NWA Quality Analyst Workshop

June 23-24	Charlotte
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July 28-29	Mobile
Aug 4-5	Charlotte
Sep 15-16	Nashville
Sep 1-2	Birmingham

SPC Pro

June 11	Charlotte
July 16	Charlotte
July 23	Mobile
July 30	Birmingham
Aug 6	Mobile
Aug 13	Charlotte
Aug 27	Charlotte
Aug 27	Birmingham
Sep 17	Birmingham
Sep 24	Charlotte

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