

SIEMENS CONTROLS HELP TIRE CORD MANUFACTURER IMPROVE PERFORMANCE OF WIRE DRAW SYSTEM

*Global distributor Wesco and Siemens team up with local integrator
to enable major Tennessee tire manufacturer
achieve consistent tension, save money*

As Chad Garner, a Nashville-based application engineer with distributor Wesco, relates, “We were presented with a significant challenge by one of our great customers, a tire manufacturer in the area. They needed to upgrade their multiple wire drawing machines for tire cord production in the plant.”

Garner goes on to explain in detail. “They were faced with very specific challenges. The machines needed to hold a very tight and consistent tension to meet the wire specifications. The company was using a ‘black box’ solution that had been custom-developed for them by a small local company that was no longer in business. The black box, in this case, originally allowed the user to dial in the tension on the wire without making any adjustments to the drive parameters. However, the system was now only able to hold +/- 500 grams of tension on the line, even after the customer had tested nine different control schemes to find a solution. Ideally, their goal was to replace the black boxes with off-the-shelf products, but their current drive and control supplier was not able to help satisfactorily. Wesco, in tandem with a local integrator and Siemens, was able to devise a solution, using standard Siemens components for the first line.”

This wire line was running at a maximum speed of 1000 meters per minute. The target wire tension requirements were 600-2000 grams, +/- 50 grams. Typical wire diameters on the line were 0.15-0.3 mm. The tire manufacturer and integrator first tried using their default drives and PLC platforms, supplied by another manufacturer, to solve the problem. However, it was determined that the manufacturer could not meet the tension specifications needed for the job. As a result, Wesco and Siemens were jointly asked if they might have a better solution. Wesco specified the drives and motors required, then provided a combination package of Siemens products to the integrator for onsite testing. During the initial testing period, the legacy PLC was used with the Siemens drives and motors and the solution was proven acceptable. Upon meeting and exceeding the desired specification, it was finally determined that a full Siemens solution was the most efficient and cost-effective answer for this tire manufacturer on the first wire draw line.

The full solution to this challenge comprised a SIMATIC S7-1500 PLC plus remote I/O racks, SCALANCE wireless switches, SIMATIC HMI panels and, the heart of the solution, the SINAMICS S120 drive system, running 30 axes of motion control, plus various servo motors and other control products. All these components were supplied as a total solution to the integrator and the tire cord manufacturer by Wesco.

Thanks to the success on the first machine, three more wire drawing lines at the facility were upgraded with the Siemens solution, with more planned for future installation. A total of 120 axes of motion run by the SINAMICS S120 drives are currently in operation. The key to success here was the tight tension control programmed into the S120 drive control unit.

Chad Garner of Wesco further observes, “A major financial aspect of this project was the amount of money invested in the controls cabinet on each machine. The legacy PLC and Ethernet cards, if purchased from the previous supplier, would have cost approximately \$30,000 and we were able to supply our better solution for about one-third that amount. This was not only a significant reduction in cost from the previous solution, but it also resulted in component reduction, as we were able to combine functions in fewer parts. The Siemens solution offered the customer integrated Ethernet on the PLC, so there was a reduction in expensive hardware, also achieving a smaller footprint in the plant.”

Matt Wagner, a Drives and Motion Consultant on the Siemens team, comments, “By replacing the old black box solution for tension control on these wire drawing machines at the tire manufacturer, our team, working in tandem with Wesco and the local integrator, was able to achieve all the required wire draw specs and do it with off-the-shelf solutions from the Siemens product lines. It’s exciting when we can exceed the goals of the customer, retrofit a substantial part of the manufacturing operation and save them a lot of money in the process. Can’t do much better,” he mused.



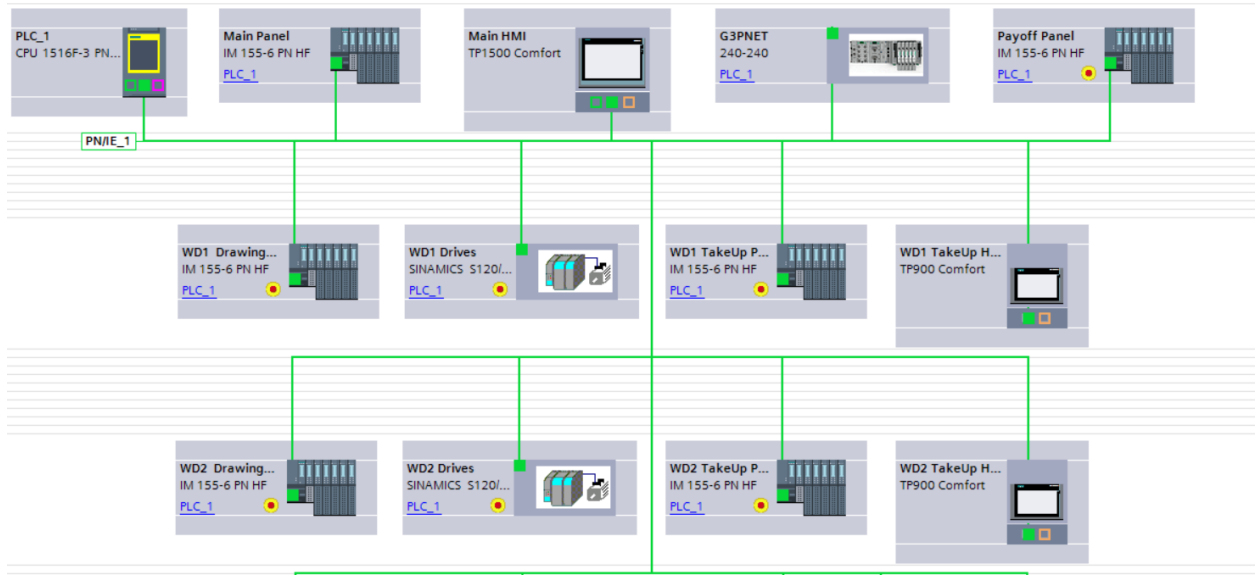
SINAMICS S120 drives now run 120 axes of motion on four wire drawing lines at a major tire manufacturer in Tennessee.



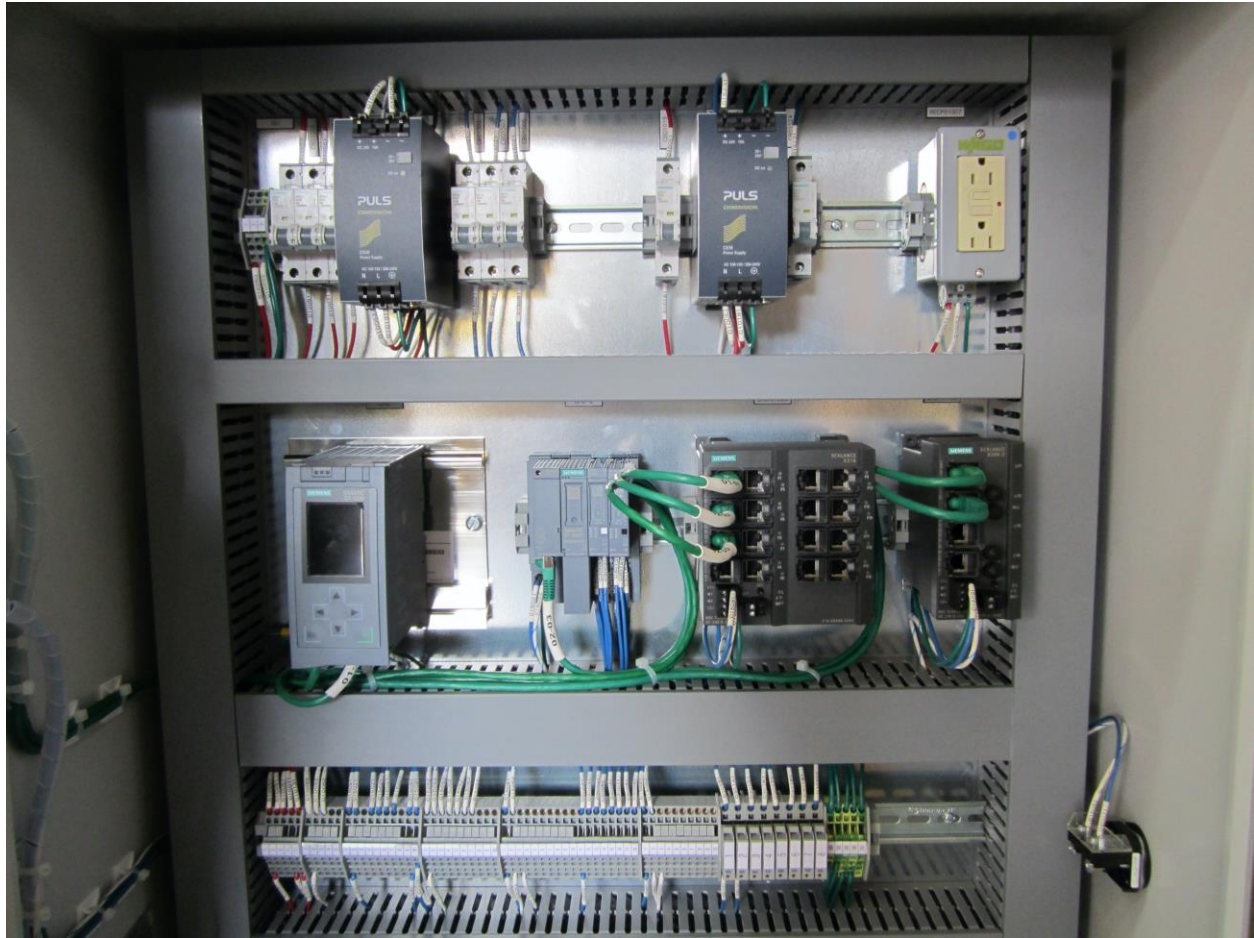
S7-1500 PLC from Siemens executes the user program and networks the controller with all other automation components.



Steel wire is wound to form tire cord at a tire manufacturing plant in Tennessee. The 30 axes of motion had been run by a legacy “black box” solution and Siemens products, provided by distributor Wesco and a local integrator, were able to achieve the necessary wire tension, reduce components and save the company considerable money. Four wire drawing lines at the plant have already been upgraded, with more planned in the future.



The wire drawing line schematic illustrates the reduced component count in the system solution for motion control, which held the desired tension requirements, saved money and made a considerably smaller footprint in the plant.



Main panel, showing the Siemens SIMATIC S7-1500 PLC, SIMATIC ET200 Distributed I/O and Scalance Wireless components (second level).



Wire drawing control panel shows the heart of this solution, the SINAMICS S120 Drive.