



Application Story: Batavia Transmissions, LLC

TRANSLINE System Solution BRINGS "COMMONALITY" TO CVT PRODUCTION

By use of Siemens TRANSLINE System Solution architecture and control equipment on over 150 new machine tools, Batavia Transmissions, LLC has brought a "commonality of control" to the production of its CVT (continuously variable transmission) line.

In an initial 300,000 sq. ft. area of this 1.8 million sq. ft. Ohio-based transmission plant, which was a joint venture of ZF Friedrichshafen AG and Ford Motor Company, a series of CVTs is in production on a line with over 145 pieces of machinery and equipment. The facility is now owned and operated by Ford Motor Company exclusively.

For the production floor on the CVT, according to the facility's business unit manager, "We worked with our machine tool and equipment builders plus our system integrators, seeking a partnership, which would expand our mutual businesses, while we grew together and learned from each other. As an example, our controls supplier (Siemens) was willing to invest in on-site personnel to assist us with the design, implementation, set-up, training and historical validation of their system. Impressive sign of the Siemens commitment to support their specific commodity."

The majority of the machine tools, as well as the induction heating, materials handling, robotic articulation, transfer line and even test equipment have Siemens controls onboard. Most incorporate the SINUMERIK 840D CNC, while many also carry Siemens motor drive and linear motion control packages.

The machine tools in this production system are as varied and application-specific as the end product is unique. Herein was the heart of the challenge for the control scheme solution provider.

With so many machine builders, plus a variety of operators migrating between tasks (milling,

drilling, facing, finishing) and a wide array of processing parameters and options, the machine controls needed a common look and HMI (Human Machine Interface) aspect, from the outset.

As one engineering manager explained, "We drafted the full specification for each machine in the system, then provided these to Siemens. After several iterations, the decision was made to standardize all the controls with the TRANSLINE 2000 HMI PRO system." The control menu screens, both standard and optional, were designed to give operators a common HMI, as well as functionality in the transfer of data to the host FIS (Factory Information Software). This was critical, because the plant requires a fully documented and accessible "birth history" for every CVT produced, as part of their process control protocol. By use of the onboard multi-point interface, PROFIBUS and Industrial Ethernet communications architecture, every Siemens PLC and CNC in this TRANSLINE system can send comparable and easily integrated data to the host server. The Batavia Transmissions

Above left: Different machines shown with TRANSLINE HMI (Human Machine Interface) at the Batavia Transmissions Plant

Above center: Gear checking equipment with common controls to those on the machine tools

Above right: An operator can make quick transitions on different machine tools, owing to commonality of control

Machine tools and assembly robots are all equipped with common control





High-speed cutting machinery all feature easy operator interface, data screen call-up and programming capability

Controls Group worked in tandem with Siemens application engineers to modify the TRANSLINE system for this application.

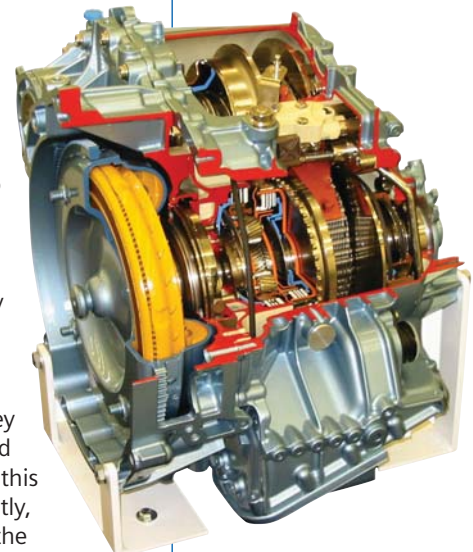
The following is a partial list of the machines used in the CVT production process:

- Gear checkers
- EB welders
- High-speed machining centers, vertical and horizontal
- Turret lathes
- Horizontal shaping centers
- Surface grinders
- Acid washers
- Thermal deburring machines
- High-speed drills
- Robotic parts handlers
- Robotic gantries
- Spline rollers
- Pressure and leak testers

The PLC and/or CNC on each was standardized for the various parameters of configuration, programming, start-up, diagnostics, in-process conditions and required maintenance. All data from simple hydraulic motion to complex multi-axis machining is captured, transmitted and managed by the hierarchy of controls within the TRANSLINE system. From top-down, that hierarchy comprises Ethernet TCP/IP for connecting all machine controls, PROFIBUS-DP for machine intelligence and distributed I/O, Beros and control devices with AS-interface

for actuators/sensors and MPI (multi-point interface) for programming devices and operator panels.

As the Batavia transmissions maintenance manager comments, "Having the identical screens on nearly all the machine tools means each production and maintenance worker handles a common configuration, making the learning curve simpler. Although the skilled electrical tradesmen here were initially apprehensive about the amount of material being presented by Will Bryan and Chris Murphy (the in-residence Siemens Project Engineers), they quickly realized the upsides of the TRANSLINE system. As they progressed through the 8-week training course, from Basic to Intermediate to Advanced Levels and finally graduation, they saw the benefits of this system, which will substantially speed up our time to production and our hitting of budget targets." He also made note of the cooperation received from UAW Local 863 in time and effort to bring this massive project forward. He especially cited the hourly coordinators who drove the project from the beginning. "They participated in this project, starting Day One. They have a real pride of ownership and everyone's working hard to make this plant the talk of the industry." Lastly, he expressed appreciation for all the



assistance given by the machine builder personnel, "who worked side-by-side with our people to make this project happen on-time, on-budget and as a real team effort between people from all around the world. From an empty shell, this CVT production facility was readied for its first unit run in slightly over one year, a remarkable achievement by any standard."

The TRANSLINE system was first implemented in 1993 at the Mercedes Benz NVM engine plant in Bad Constatt, Germany and now has hundreds of successful customer installations worldwide. At Batavia transmissions, the need also existed for flexible manufacturing systems to allow production of several variations of the CVT, based on the different torque styles targeted.

Jim Remski, Siemens Powertrain Industry Manager, observed this particular TRANSLINE application, "...was very challenging. This automotive end user was seeking a common control solution for various manufacturing processes used in their plant, including the flexible machining cells, transfer machines, materials handling equipment, assembly and test equipment. Plus, they planned to run different units on the same line, as well as build a separate line for another CVT model. We (Siemens) presented a comprehensive solution and, coupled with our worldwide machine tool business base, it was accepted by the customer."

CVTs produced at Batavia Transmissions were introduced in Ford of Europe's 2004 Focus C-Max and are currently on the 2005 Ford Five Hundred and Ford Freestyle, as well as the 2005 Mercury Montego. ■



Top: Ford Five Hundred
Center: Ford Freestyle
Bottom: Mercury Montego

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