NUMMI enhances competitive position by modernizing presses

Automotive:
NUMMI

UNITED STATES

Introduction

New United Motor Manufacturing Inc.(NUMMI), a joint venture between Toyota and General Motors, is an independent California corporation that manufactures the Toyota Corolla, Chevrolet Geo Prizm, and Toyota Takoma pickup truck. Their facility is in Fremont, California.

The objective

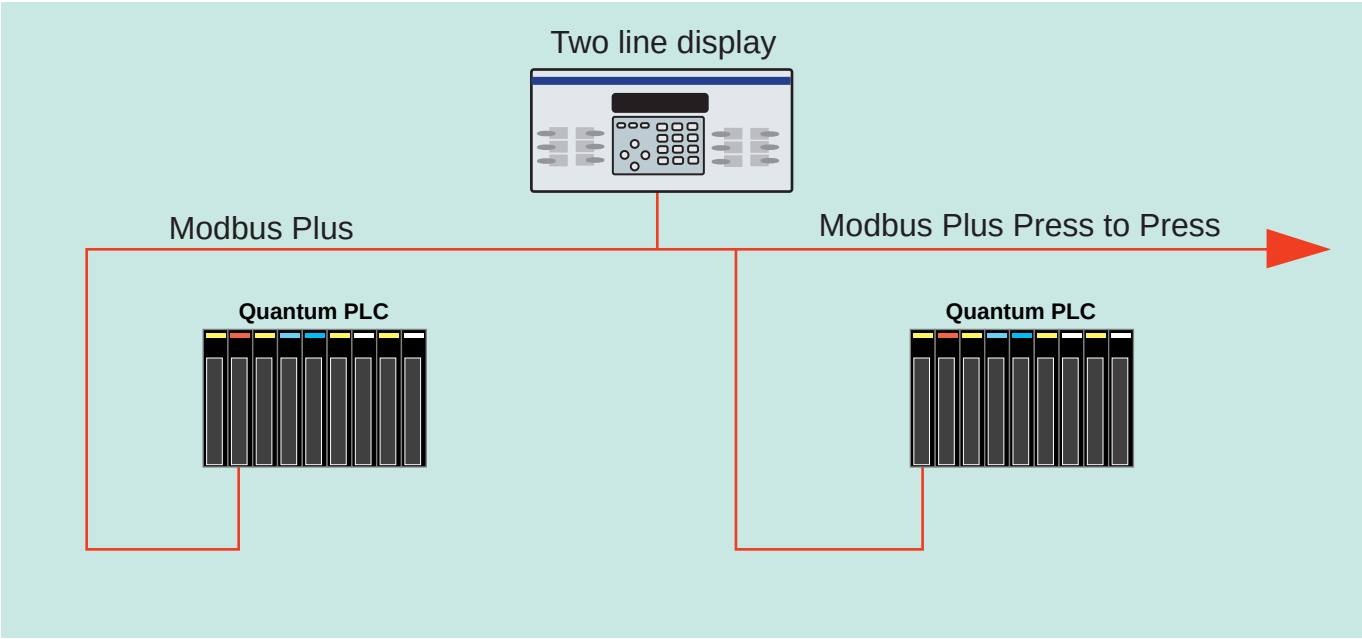
When NUMMI Stamping considered updating the controls on the Fremont, California press lines, they had in mind a Groupe Schneider solution that they had seen at the GM Metal Fabrication Division plant in Flint, Michigan. The control approach NUMMI required was:

- One that would increase productivity by providing state of the art control
- Flexible, expandable, powerful and easy to use
- Readily available, and tied together on a high-speed network.
- Installed in quick fashion.

The continuing operation of the press lines were key to achieving daily production objectives.

The application

The automation equipment in the NUMMI facility was outdated and installed in the late 70's and early 80's. Additional equipment of this vintage was difficult to find and troubleshoot, expensive to replace, and



The solution installed at the NUMMI facility consisted of the MODICON TSX Quantum utilized for press operation and all ancillary control, the control was tied to an existing HMI device, pre existing on the press and All of these utilizing the Modbus Plus communication protocol and media. Modbus Plus was an ideal solution due to its speed and band width. And because all of the control devices had this common communication protocol imbedded, no additional control networking was required. The most significant part of the solution was the installation being accomplished with a pre-terminated control panel to facilitate quick installation.

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The application (cont.)

had limited memory for program expansion. The system also lacked a high speed network interface. The NUMMI facility needed to increase press uptime to improve efficiency for formed sheet metal parts. As aggressive production schedules needed to be maintained, a quick installation and commissioning was vital to this project.

The solution

The Groupe Schneider solution included the following application functions:

- Die Set
- Tonnage Monitoring
- Interpress Coordination
- Automation Valve Control
- Press Operation Control
- Main Operator Station, (tied into Uticor display)
- Diagnostics

The solution consisted of the following hardware:

- TSX MODICON Quantum PLC's
- Modbus Plus Networking Components
- Custom constructed enclosures with terminations for quick swap out with existing enclosures.
- Assorted Square D control components

Quantum's power, networking flexibility, state of the art operational effectiveness and programming made it the right choice for NUMMI. There were four tandem press lines, two blanker presses and a transfer press included in the project. With up to six presses in line that required common controls. The installation of the new press controls equipment was unique in that fully fabricated and programmed equipment installed in enclosures with terminations was required. A standard installation of this type is regularly a 72 hour (9 shifts) effort. This Groupe Schneider installation took only twelve hours and disrupted only 1$^1/_2$ production shifts .

The upgrade and re-installation of the existing control panels was handled in the following sequence.

1. The original enclosure was stripped of the old PLC hardware and prepared for shipment to the panel shop.





2. The panel is updated with new PLC equipment, fully terminated and made ready for the next press.
3. Once all presses on a line are retrofitted with the new control systems, the press to press discreet I/O are updated and the presses are networked on Modbus Plus.
4. Repeat sequence for next press line.

Typical Conversion Sequence

- Saturday 12am - Run out press line of all parts, stop press and disconnect power to PLC enclosure.
- Saturday 12:15am - Begin disconnecting all filed terminations in enclosure.
- Saturday 1:30am - All wiring to enclosure is disconnected, remove existing enclosure and replace with new enclosure
- Saturday 2am - Terminate all power and field wires to new enclosure.
- Saturday 8am - Inspect new enclosure for proper terminations.
- Saturday 9am - Apply power to new enclosure and check all voltages. Apply power to processor and check for correct operation. Apply power to all input devices and verify correct I/O. Apply power to all output devices.
- Saturday 10am - Begin manual check out of press and automation. Utilize sequential check list.
- Saturday 11am - Start press in Auto at slow rate and gradually increase. Compensate for timing issues brought on by faster processor.
- Saturday 12pm – release press to production.

The Groupe Schneider solution for the NUMMI facility was more than just hardware and software.
The following services were provided:

- On-Site Program Management throughout the process
- Pre-Inspection of the press line
- Control System Design
- Control System Programming, (conversion)
- Control System Fabrication
- Control System Documentation
- Supervision of the Control System Installation
- Control System Commissioning
- Press System Launch Support

Benefits

A press control system solution that is state of the art, powerful, flexible, expandable, reliable, easy to use, readily available, and tied together on a high speed network were all requirements of the New Unified Motor Manufacturing Inc. Corporation. The Industrial Applications Group's Forming Application Business delivered that and installed it in record time. The

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