

**Situation** Four independent Automatic Storage / Retrieval Systems are installed. Each AS / RS includes in load conveyor, loading elevators, forty-four (44) Storage belts, offload conveyors, transfer tables and unloading elevators

**Requirements** New conveyor and equipment will be installed to permit handling of larger product. Upgrade the control system.

- Control the new equipment
- Permit cross transfer from system to system
- Upgrade Operator Interface
- Improve system reliability
- All work must be completed during 10 shutdown days per year..
- All parts are identified and tracked using Bar Codes.

**Performance Features** Each AS / RS uses a separate PLC for control. PLC Processors are connected to the Operator Interface via Ethernet for speed, reliability, and flexibility of Operator Interface. Cross-transfer to / from other process lines at inlet and at outlet is accomplished by inter-PLC communication via Data Highway Plus. All PLC functions are completely written in GRAFCET. All products are tracked by the PLC according to product type

**Operator Interface** Operator Interface provides the following:

- Production Operator Interface
- Maintenance Interface
- Upload and download of data tables for archive and for fault recovery

Operator Interface screens display real-time process and fault information. Process and fault messages are logged to Excel spreadsheets. Screen text and screen navigation commands are stored in Excel spreadsheets. System status is communicated to other parts of the factory via Ethernet.

**Installation** Installation was done during scheduled plant shutdowns. Extensive prework was performed to minimize disruption and time required during shutdown. Installation of certain sections was done while the system was in operation. All phases of installation occurred on schedule.

