

Safety Initiatives

Safety PLC Implementation for AS/RS Equipment Control

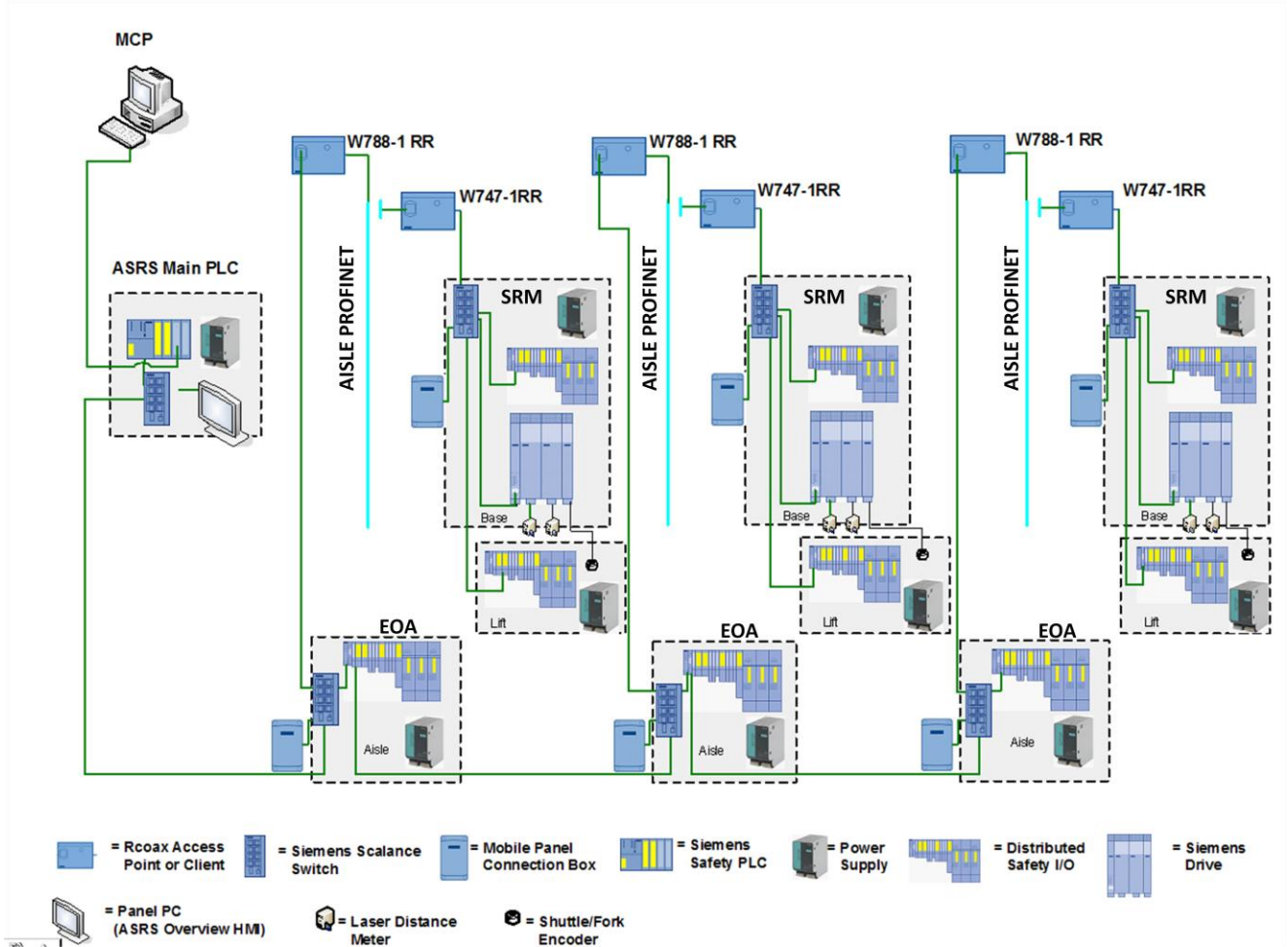
Problem: In an automated environment, keeping the human asset safe is paramount. Plant engineers at Chrysler were faced with the need to add three new AS/RS aisles that are compliant with new corporate safety standards and initiatives.

- Implement Storage/Retrieval Machines (SRMs) that are compliant with “Category 3” safety standards for equipment control. Category 3 safety standards require a fully monitored dual channel system for all safety components. Though common to modern manufacturing equipment this standard is very uncommon to AS/RS providers.
- AS/RS aisles are required to be Pre-Health and Safety Review (PSR) certified for safety including ANSI Z244.1 (2003) compliance (Control of Hazardous Energy - Lockout/Tagout and Alternative Methods). Safe human access is required while not limiting to automated SRM load transfers between AGVS end-of-aisle P/D stands and pallet conveyor spurs exchanging loads with a RoboTrain system.
- Chrysler was concerned that U.S. standards requiring Risk Assessment would increase the number and complexity of interlocks required to perform SRM safety functions
 - ANSI B155.1 – 2006 – major update covering new formal requirements for the Risk Analysis, open harmonization with IEC and ISO standards.
 - ANSI B11 TR3 – Define methods for Risk Assessment
 - ANSI RIA 15.06 – Advocates Risk Assessments



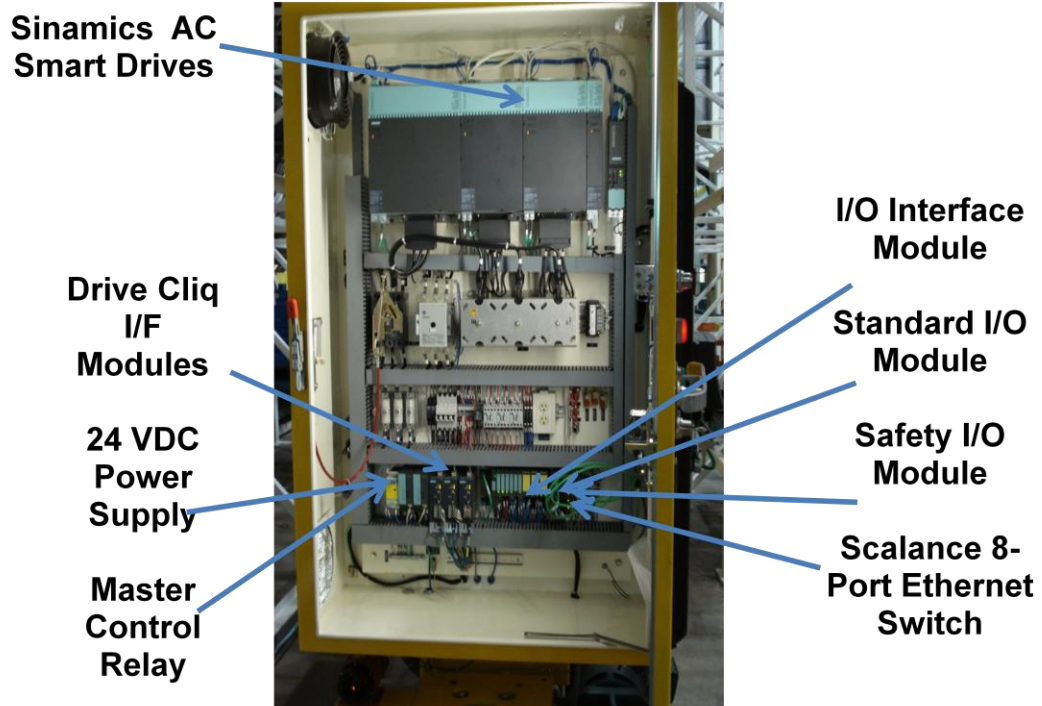
Chrysler AS/RS Aisle with Category 3 Dual Channel Safeties and ANSI Z244.1 Compliance

Solution: Implement a Siemens Safety PLC SRM Control System.



Siemens SRM Safety PLC Control System

- Category 3 Safe Control Hardware
 - SIMATIC S7-300F PLC
 - Approved up Category 4
 - ET200 I/O
 - Redundant I/O monitoring
 - Standard and Safety I/O
 - Dual Channel parallel wiring to all safety related devices
 - ProfiNet Safe Communication Network
 - SINAMICS AC Smart Drive Motion Controllers
 - Drive Cliq Interface



HK4000 Siemens SRM Base Control Enclosure

- Safety PLC Architecture Benefits:
 - Implemented project being compliant with ANSI Z244
 - “Category 3” Safety Initiatives (Chrysler’s standard)
 - Implement Safety PLC Technology
 - Control of multiple SRM aisles with single PLC
 - Implemented Ethernet Communications to Host Computer System
 - Implemented multi-system safety control from one zone safety controller
 - Implemented computer/control technology that may be readily supported
 - Implement expanded diagnostic capabilities across system to support up time
 - Easily implemented across existing systems as future architecture upgrades
 - Quick easy operator interfaces to reduce overall downtime in maintaining systems
 - Safe means of managing cranes to protect personnel in all modes of operation
 - Overall more efficient and safe machine for optimal production capabilities

Links: More Supporting Information

- [Siemens Simatic Controllers](#)
- [Profinet Industrial Ethernet Standard](#)
- [HK Systems, Inc. SRM Product Lines](#)