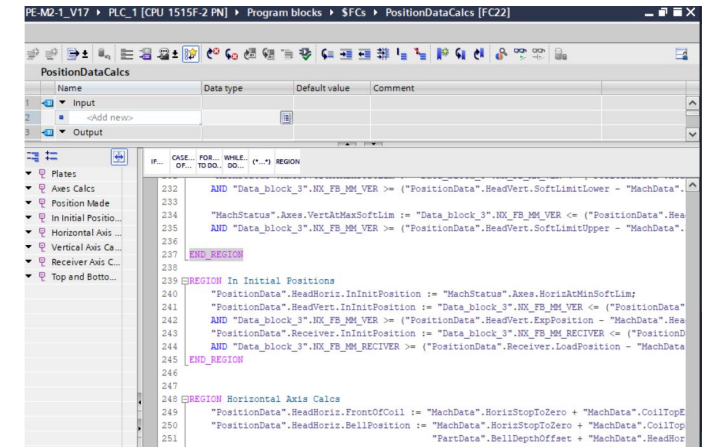# Controls & Embedded

# PLC program support – Case Study



- A leading manufacturer of machines producing Heat exchanger coils for the HVAC industry in the US approached MNES to test and validate PLC program for their new machines.

- MNES converted the outdated program to the latest TIA portal version.
- We upgraded and optimized the program with functional blocks, tested and validated for seamless operation of virtual & physical machine.
- MNES tested the program in virtual PLC after which functional validation was performed in the physical PLC for efficient working of the machine.

- With our PLC support, the customer was able to identify & rectify errors during the program development stage before the commissioning of the machine.
- The customer saved 30% of their program development time.

# Shaft & Tube Assembly Machine

## Business Drivers

- To design a machine to help the operator assemble the product without error in assembly using the Poka-Yoke error proofing technique.

## Solution

message to alert the operator, suggestive messages on HMI to help operator prepare for the next action.

**PLC and HMI Details**: Mitsubishi PLC: FX5U-16EX/EU, Mitsubishi HMI: WTBD GS2107

**Major Devices and Operator Controls**: HMI Operator Pendant, Cycle Start Operator Pendant, Barcode Printer, Scanner PC.

**Modes of Control**: Manual Operation, Assembly Sequence, Greasing Sequence

**List of Safety Devices**: Emergency Push Button, Safety Curtain.

- Any new operator can get familiar with the machine with the assistive messaging on HMI, so that he/she can get familiar with the system after couple of operations and get trained quickly.

## Results
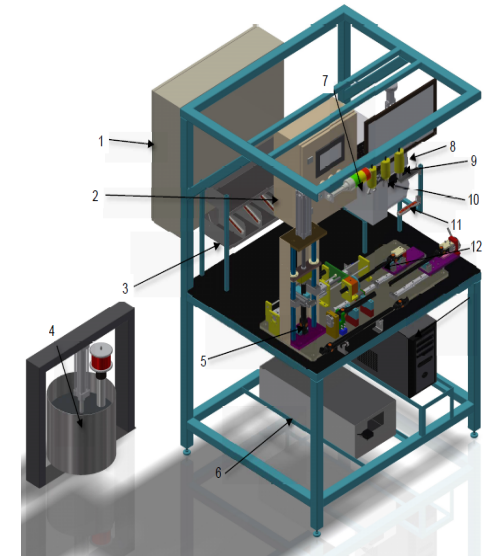
| No. | Description |
|-----|-------------|
| 1 | PLC Panel |
| 2 | HMI Panel |
| 3 | Bin Pickup Sensor |
| 4 | Grease Tank |
| 5 | Tube Assembly |
| 6 | Rejection Bin |

# Controls & Automation: Process Control System



- Designed and developed an automatic batch system for 40 Cu.meter plant using Siemens S7 controller

- 6 aggregates and 2 additives were considered

- Independent control processors were employed for cycle and batching controls

- Digital filters were employed at each of the aggregate weigh scale to minimize errors due to mechanical vibrations and to control fine batching at the end

- Batch automated print reports and history

- Provided interface options for higher end systems.

- Visualization was developed with VisiWin and custom VB6 controls.

# Chain Industry - Smartlink Variants



## Software Development

• Function: Wear Monitoring System function on LIVIUS, WinCE Platform

• Managed (.NET/C#) and Native (C, C++) based development

• Real Time data acquisition

• Installation and Auto Upgrade

## SW Windows OS

• Storage: NAND, SD/MMC

• Connectivity: RS 232/485, Ethernet, USB, GPRS/GSM /3G, CAN.

• Sensor & actuator Interfaces: GPIO, ADC, DAC, UART

• User Interface: Telnet - command line interface.