HINZ
A Rockwell Automation Company

IPSCO
Tube Mill Expansion

The Client:

IPSCO is an international company engaged in the production and sale of steel and secondary manufactured steel products. The Calgary operation is comprised of separate facilities: an ERW pipe mill and a pipe finishing plant. The mill with its heat treating facilities is capable of producing oil and gas well casings with diameters from 4½" to 10¾". Annual capacity is 205,000 metric tons.

The Requirement:

Due to increasing demand, the Calgary operation required the addition of a new tube/pipe testing mill. The new plant incorporated a washout system, a three-head hydro-test bed, sonic testing, EMI testing, manual inspection skids, a pipe salvaging system and four new individual conveyors. In addition, there were eight new operator stations, and a PanelView 1400 for control of the hydro-testing operations.

The new pipe mill would allow for the convenience of various operating configurations. Pipe could be brought into the plant via the Entry or Exit Conveyors.

- Pipe entering from the entry conveyor is indexed in batches onto the flat roll conveyor where it is fair-ended and kicked onto the washout skid. Once on the skid, the pipe are individually washed-out, aligned and indexed onto the hydro transfer Carriage.
- The hydro transfer carriage takes the pipe and moves them into the hydro-tester. The hydro-tester is a three-head tester, which allows the user to use any or all of the heads during testing. Upon completion of the Hydro-Test the pipe is indexed onto a drain skid, which ensures all water has drained from the pipe prior to being indexed onto the Sonic Conveyor.
- The Sonic Conveyor is a flat roll conveyor which can be used to transport several pipe at once or during Sonic Testing runs one pipe at a time. A single pipe is turned by turning rolls so the seam is up, held in place on the conveyor using pinch rolls and run through the Sonic Tester and EMI.
- Pipe is indexed off the Sonic Conveyor onto either the north or south inspection skids. Once the pipe is manually inspected, if it is indexed to the south it will be indexed into the existing pipe mill. If the pipe is indexed to the north, the pipe is also inspected, but can be thrown onto the Salvage Conveyor.
- The Salvage Conveyor allows the Operator control to position pipe in the saw for salvaging. Pipe can then be routed onto the exit conveyor.
- Once on the exit conveyor, the pipe can be run outside to the exit skids, or be rerouted back into the sonics skid for re-testing. The exit conveyor can also be used for pipe entry into the building. In the mode of operation pipe is brought in from the exit skids and transferred to the sonic skid for testing.

The Design Solution:

Hinz was contacted by IPSCO to provide engineering and integration services for the project. The electrical design and implementation consisted of a layout of the plant electrical including in-slab work and conveyor piping as well as supervision of the electrical contractor throughout the construction. The Automation design and implementation consisted of PLC architecture design, wiring diagram creation, PLC programming and commissioning.

The first phase of the project consisted of PLC architecture design in which the proper PLC equipment for the job was selected. An I/O count was also done in order to spec out the proper amount and location of the I/O cards. An Allen-Bradley 5/60C processor was selected with the Operator stations, including the PanelView, communicating via Control-net 1.5, and the VFDs controlling the Conveyor sections tied to the PLC via a Remote I/O link. From the initial I/O list, the PLC cabinet and Operator Stations were designed to meet the client's needs, and the proper wiring interconnection diagrams were generated.

The second phase consisted of construction. Through the wiring diagrams, the layout and sizing of the conduit for all in-slab and conveyor work was determined. Care was taken in order to ensure capacity remained for expansion and also inherent redundancy in case of unforeseen failure. The electrical contractor was supervised throughout the construction phase via site visits. The control strategy was outlined in a sequence of operations received from IPSCO. From this document the PLC control program was designed and coded. All program coding was broken into relevant systems for ease of troubleshooting and the minimization of downtime.

The third phase consisted of implementation. All end devices were rung back to the PLC cabinet during commissioning to ensure minimal implementation time. After this, each system's control strategy was confirmed through a series of tests. All documentation was consolidated and wiring diagrams as-built to reflect changes made in the field.

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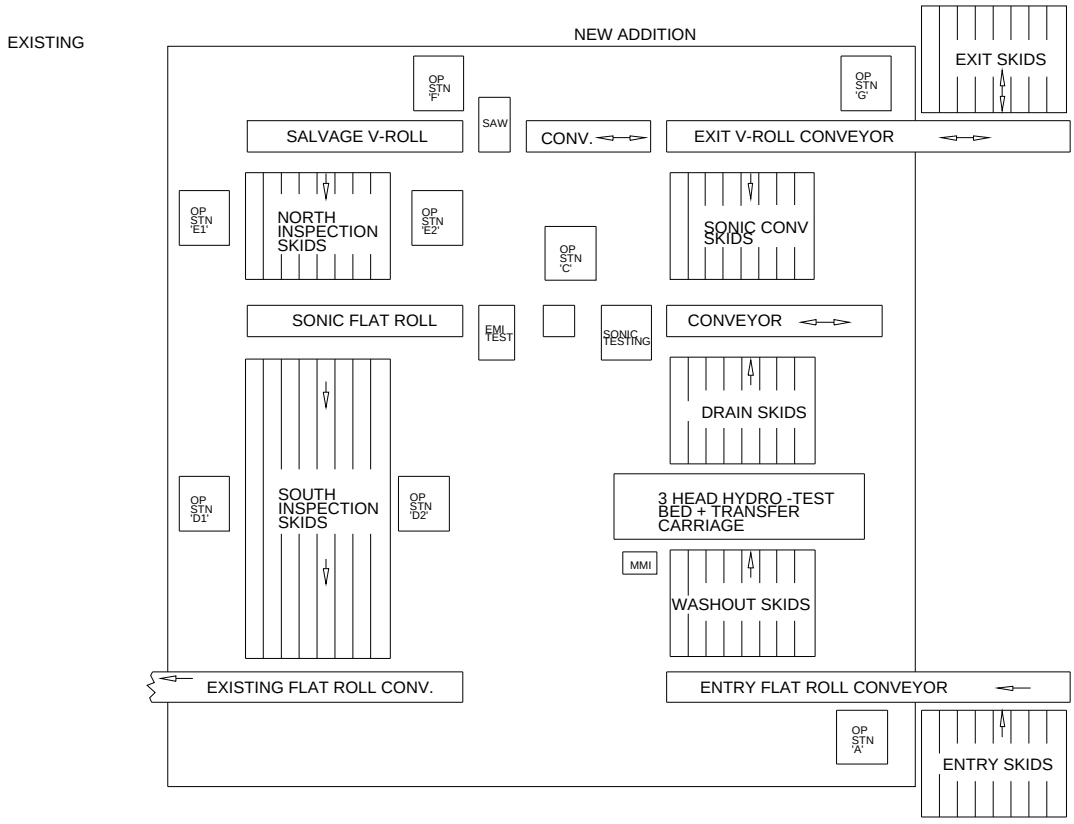

System Specifications:

- Allen-Bradley 5/60C Processor
- 8 Operator Stations each including:
  - 1794-ACN Flex I/O Control-net Adaptor
  - 1794-IB16 Flex I/O Discrete Input Module
  - 1794-OB16 Flex I/O Discrete Output Module
  - Allen-Bradley PanelView 1400
  - 4 Allen-Bradley 1336 Plus Variable Frequency Drives each with a Remote I/O Adapter
- Local I/O including:
  - 1771-IBD
  - 1771-IAD
  - 1771-OAD
  - 1771-IFE
  - 1771-OFE2
  - 1771-CAN

For further information or to contact a Hinz office near you, please check our website at:

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