



A Rockwell Automation Company

INCO Ltd. 3600 Level Haulage Automation

The Client:

INCO Ltd. is the worlds leading producer of nickel, supplying 1/3 of the world demand. INCO operates a large nickel-copper mining complex in Thompson Manitoba. The site includes several producing mines (Thompson mine, the

open pit South mine and Birchtree mine), an on-site concentrator, smelter and refinery. The combined remaining mine life is over 20 years. The mill presently has a capacity of 15,000 tons per day.

The Requirement:

INCO uses the 3600 level haulage system to transfer ore and rock from the 1C ore body (under T-3 mine) to the T-1 shaft for crushing and hoisting to surface. The haulage system encompasses three major sub-systems; loading systems, dumping systems and trammng systems.

Loading is performed at the north end of the haulage system. Currently three loading chutes are installed . Eventually as many as 14 chutes may be installed under the control of up to 7 PLCs.

Dumping is performed at two sites located at the south end of the haulage system near the T-1 shaft. No further dump sites are planned.

Trammng of the two locomotives is performed throughout the haulage system, moving the trains from the loading area to the dump sites.

The haulage automation project will add PLC control on the loading chutes, dumping sites, track switches, control gates and security systems. As well, the Frag. Rectifiers that supply 600 VDC to the locomotives and the locomotives themselves will be automated. Each PLC will be capable of communicating with the Master Control (MC) room. The Master Control room will have a PC based Graphical Operator Interface. Communication will be via Broadband and Leaky feeder communication links.

The Design Solution:

Hinz assisted INCO in the development of the PLC programs as well as developing all the Monitor 77 screens and logic. Hinz personnel also commissioned the entire system on site.

The train can be continuously loaded at the selected chute. Loading may be performed by one or two operators. When two operators are available, one operates the locomotive while the other operates the chute controls to load the train. When only one operator is available, that operator controls the locomotive from the chute control panel while loading the train. Locomotive commands are passed from the chute control PLC to the MC PLC and then onto the locomotive.

The loaded train is then driven (trammed) to the dump area. The automation system operates the appropriate track switches and crossing gates to allow the train un-inhibited travel to the dumps. Trammng normally occurs with an operator on board.

The loaded train is then continuously dumped. If two operators are available one may optionally dismount and operate the dump controls. The train operator controls his train into the mouth of the dump where the automation system then completes the dump. The operator then drives the train into the tail drift to prepare for return to the chute area.

In the tail drift the operator dismounts the train at the boarding station and selects a new destination chute. This selection pre-determines the train's route both to the chute and back to a dump. The automation system controls the track switches and control gates to allow the train to travel non-stop to its destination.

A Telemecanique Monitor-77 Operator Interface system annunciates total system status to personnel in the MC room. Operational status as well as alarms and troubleshooting is performed.

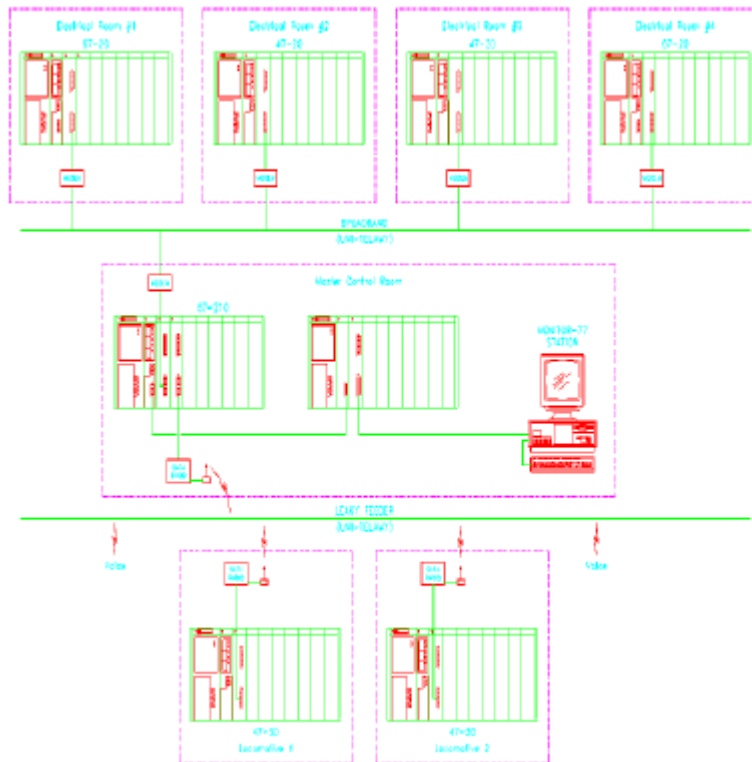
The Telemecanique PLC system installed on 3600 consists of one 47-30 PLC installed on each of two 25 ton locomotives, one 67-20 PLC controlling the dumping systems and surrounding track switches, one 47-20 PLC monitoring each of the two 600 VDC rectifiers, one 67-20 PLC controlling three chutes and surrounding track switches and a 67-210 PLC acting as network master and master control.

Future plans for the haulage system include remote control loading and automated trammng and dumping. The ability to operate two trains simultaneously is also planned.



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System Specifications:

- 1 Telemecanique Monitor-77 Operator Interface (FactoryLink).
- 2 Telemecanique 47-30 PLCs.
- 2 Telemecanique 47-20 PLCs.
- 2 Telemecanique 67-20 PLCs
- 1 Telemecanique 67-210 PLC.
- Broadband and Leaky Feeder communication networks

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

www.hinz.com