



A Rockwell Automation Company

## BXL Bulk Explosives Limited Mixing Truck Control and SCADA System

### The Client:

BXL Bulk Explosives Limited (BXL) is a Joint Venture Company (50% – Explosives Limited and 50% – Orica Canada Inc.) that was established in 1976 to supply and service the growing need for bulk explosives in open pit mining, in Western Canada. BXL is a world class bulk explosives Company headquartered in Calgary, Alberta, Canada and is the leading supplier of bulk explosives in Western Canada.

To maintain its leadership, BXL draws upon the combined global research and technical expertise of Orica and the management, administration and operational capabilities of Explosives Limited to meet the challenges of today and develop the systems and products of tomorrow.

### The Requirement:

BXL's largest client, Fording Coal Limited, requested that all of the explosive charge requirements for a given day be electronically transferred to the truck fleet for implementation and all records of the charge loads be electronically returned at the end of the day. These loads are calculated by the mine engineer and plotted for maximum effect, a miss application can ruin a portion of the seam and make the coal difficult to use. At the present time each of the 5000 borehole records required each day are provided on paper to each of the trucks and the completed documents are sent in and compiled for invoicing at the end of the day. This involves several thousand documents which reside in trucks

in a coal mine for the day and are in less than pristine condition. BXL's motivation was based on the need for more accurate measurement for the purposes of invoicing. The charge requirements are based on a specified depth for each hole however the differential between the 12.75 inch diameter expected and the actual requires a larger volume of explosives to fill to the specified depth. Each hole can have up to four layers of different material.

A further complication was the matter of multiple trucks performing the different loads for an individual hole.

### The Design Solution:

This solution has three parts. Number one is an interface to the customer Oracle database which was accomplished by installation of a SQL Server 2000 Database and import routine. Number two was the on-board PC which maintained the Disconnected Datasets. The third part was the Rockwell SLC 5/03 PLC which was the interface between the Input/Output devices of the truck and the on-board PC. The interface between the Server and the truck needed to be wireless and was used only for brief periods to enable the truck to get its load pattern requirements at the start of the shift and send back the actual at days end.

A Dell Windows2000 Server was purchased to run SQL Server 2000 as an interface between the Fording ORACLE Database and the truck based PC. Technologies used to perform these tasks were Visual Studio .NET, ADO.Net, Disconnected DataSets, XML and SQL Server 2000.

The on-board PC selection was made based on functionality, size, portability (could be moved from truck to truck), shock/vibration specifications and cost. This component combined with PLC make up the bulk of the cost of each system as

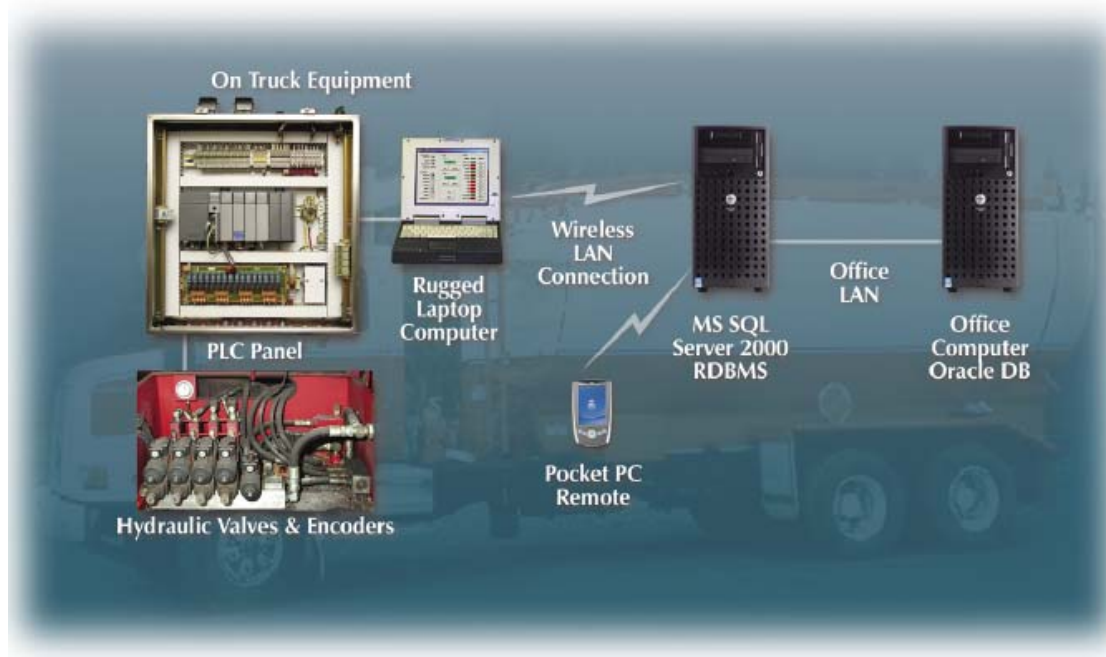
there is one of each on every truck. Upon investigation, the Panasonic CFM34 Laptop PC was chosen. Rockwell's RSLinx was used as an OPC Server to allow communication between the SLC and the ADO.NET Dataset.

The SLC 5/03 was chosen based on the following: The flexible I/O configuration. A large number of High Speed counters were needed to interface the augers and pumps. Native 12 VDC power supply was required. The familiarity of our engineers with this platform was also a factor. Familiarity was needed as the prototype had to be ready for testing in six weeks. In addition to the short fuse on this project we needed to prepare a system to work on two different types of trucks each having a different I/O component. The long term plan is to integrate both a depth gauge and GPS on the boom of the truck to ensure the location and depth are correct. The blast patterns are quite dense making each hole close to its neighbor and of course requiring a different load composition.



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### System Specifications:

#### Technologies Used:

- SQL Server 2000 Database
- Microsoft .Net Enterprise Architect Edition
- ADO.Net Datasets
- XML Data Files
- OPC Communications to PLC
- Wireless 802.11b connection from Trucks to SQL Server 2000
- Touch Screen Optimized Windows .Net forms

#### Dell PC

- Windows 2000 Server
- SQL Server

#### Wireless Ethernet Interface

- Proxim PCMCIA card
- Lynksys base station

#### Panasonic Toughbook CFM 34 Laptop PC

- Rockwell Software RSLinx OPC Server
- .NET Application

#### Rockwell SLC 5/03

- 1746-L531 (Processor)
- 1746-P7 (12VDC Power supply)
- 1746-IB16 (16pt discrete Input module)
- 1746-OB16 (16pt discrete Output module)
- 1746-NI4 (4pt Analog Input module)
- 1746-scCTR8 (8pt high speed counter input module)

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

[www.hinz.com](http://www.hinz.com)