

## CASE STUDY

### CAN-based HMI in mining machine

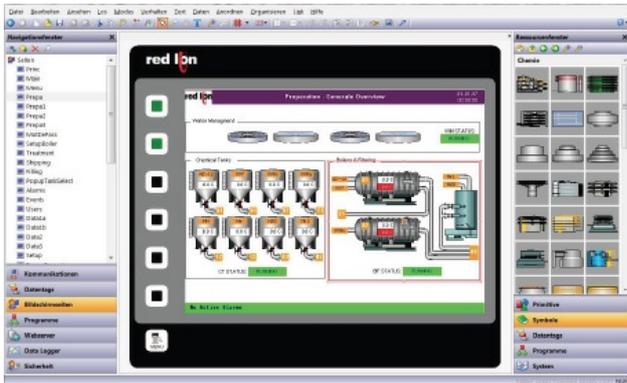
Thyssenkrupp use the G3 HMI operator panels from Red Lion for their transport crawlers. The engine of the crawler uses J1939.



(Source: Red Lion)

Activities such as the extraction of raw materials or the construction of large conveyor systems often require moving heavy loads and equipment in rough terrain, and transport crawlers are vehicles which suite these tasks. Deployed globally to all manner of extreme environments - from frigid arctic tundra and sweltering deserts to humid jungles and the salt-laden air of mangrove swamps - these crawlers require a particularly robust design for all components. To facilitate the control, monitoring, and if necessary, remote maintenance of the transport crawlers in these types of conditions, Thyssenkrupp employs human machine interface (HMI) operator panels.

Graphical representations of the programmable logic controller (PLC), drive technology, engine, and other components are essential for use of the operator panel to control the crawler as well as safely ascertain its status or if applicable, to send alerts. As the equipment is often operated by workers on location, it is advantageous if the software and display use the local language. In order to handle maintenance scheduling and deploy the crawlers most effectively, an integrated automatic data-logger for the primary operating parameters is also important. Exchangeable storage media are indispensable and improve the usefulness of the crawler control since they save the recorded data and enable the safe transfer of application software updates.



Crimson 3.0 software (Source: Red Lion)

The web-serving graphic operator panel of the G3 HMI suits these tasks . Providing an HMI with a 10,4-inch LCD touchscreen, the product offers a built-in web server and the ability to transfer information via FTP. These capabilities in turn enable configuration and management of remote maintenance and control parameters. A flash slot allows on-board data-logging and uploading of application software updates. Databases and log files can be synchronized via USB interface. Numerous interfaces and optional plugin cards for fieldbuses such as CAN or wireless modems expand the areas of application.

The HMIs are able to communicate using any of over 300 different industrial protocols, including the J1939 CAN protocol used by the engine of the crawler. This allows a single G3 to provide control, monitoring, and data-logging for both the PLC and the engine, each of which had previously required their own

dedicated operator panel. The programming features of Crimson software allowed Thyssenkrupp to continue to use the existing display for PLC control and to add additional functions, such as data-logging and an engine data display screen.

Since according to the company, reliability and availability were the primary criteria in the selection of the control components for the transport crawler, Thyssenkrupp Fördertechnik Industrial Solutions conducted in-house tests, to assess the capabilities of devices, including the use of a climatic chamber to simulate various environmental conditions. Results of these tests led to a decision in favor of a Red Lion Controls G3 HMI.

Another reason for using the HMI was the programming of the equipment. By using Crimson 3.0 software (shown above), the configuration and control of the user interface can be tailored for each location. Multilingual builds are possible thanks to software support for Unicode characters including such alphabets as Cyrillic and Chinese, simplifying global deployments. This enables the shared use of one database for all applications. Due to an interface, user guidance, and a library with more than 5 000 industrial graphics in roughly 60 categories, the application was implemented.



*The web-serving graphic operator panel of the G3 HMI (Source: Red Lion)*