

Press Release

BR 7393
October 2008

Moving controls to safety

Rexroth's newest high-pressure project



IndraControl L20

Process controller, series ED05-
DDL, digital control, with M12 plugValve Terminal
System, Series LP04

When Aberdeen Control Limited was asked to create a new design for a control cabinet, to remotely control a diesel engine driven pump on an oil rig, they proposed using a Bosch Rexroth PLC-based control.

Life on an oil rig, whether it's in the treacherous waters of the North Sea or in the tropical climes of the Indian Ocean, is full of risks at the best of times. For oil riggers, working on and around the well are some of the most dangerous of jobs.

While drilling into the sea bed, the bore hole may pass through several different strata, each layer having its own particular characteristics. If the well is not cemented correctly, then the contents of the various layers can mix and cause problems with the well and result in expensive downtime.

Two diesel engine driven pumps are used to push the cement down the well; these sit in the Cement Room usually placed in the bowels of the rig. After the cement has hardened properly, it is drilled through and deeper drilling of the well recommences. Because of the low pressures involved, the operator can control the pumps manually in relative safety.

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These two pumps lend themselves to a variety of other pumping operations, such as pushing chemicals into the bore hole to permeate the formation and thereby enhance recovery. Again, since the pressures are relatively low, the operator can control the diesel engine driven pumps from the local position at the engines.

For high pressure testing operations, these same two pumps are used to force water into the bore hole to test the well. These operations are more hazardous and require the pump operator to stand in a place of safety, away from the Cement room. Under these circumstances, a remote control system is necessary.

Aberdeen Control Limited is one such company that specialises in the manufacture and provisions of hazardous area equipment for the offshore oil, gas and petrochemical industries. The company is a highly successful manufacturer of control equipment, supplying specialist materials and providing expert installation and back-up services around the world.

One particular piece of equipment that Aberdeen Control manufactures is a control cabinet designed to allow remote control of these diesel engine driven pumps. When Aberdeen Control received an enquiry to build nine control systems for use on offshore oil rigs, it was with Schlumberger's request that an alternative design was explored. Previously, Schlumberger used an electro-pneumatic fully-remote control system which while being adequate, did not provide a fine enough control for some functions.

When asked to assess if this type of remote control system could be achieved, Aberdeen Control Managing Director Graeme Craig called upon the expertise and technical assistance of Bosch Rexroth. Rexroth offers software tools that make it easy to integrate mechanical, electrical and pneumatic components in a design.

At the initial project consultation with Aberdeen Control and Schlumberger, Bosch Rexroth proposed using a PLC to control the DDL field bus LP04

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manifold to ensure that the hazardous zone certification requirements were met. In addition to providing a cost-effective solution, the expectation of using a PLC-based solution was to achieve finer control of the system.

On the recommendation of Aberdeen Control, Schlumberger agreed that Bosch Rexroth's components and technical assistance would produce a practical solution. The technical aspects of implementing a PLC-based control system into the design were examined with the Aberdeen Control project team at a subsequent onsite meeting.

"Rexroth responded well to the oil field lead times," said Graeme. The project deadline was very short, with the first cabinet being required only four weeks after the initial meeting. Parts had to be supplied quickly, with software written and tested in approximately 10 days. "This, in my opinion, was a critical factor for the rapid and successful completion of the project," he added.

The resulting design solution included Rexroth's LP04 double 3/2 version valve manifold with integrated DLL field bus and RA14 3/2 valves. For the safe area version, Rexroth's ED05 pressure regulator and DDL and ED05 sub-base were specified, along with filter assemblies, mounting kit and DDL units and ancillary components. The ED05 products were swapped for ED07 products for the ex-rated system.

On the control side, Rexroth's mini-PLC, the IndraControl L20, was used with IndraLogic firmware. The customised program was developed by Rexroth's application engineers using the system tool IndraWorks with WinStudio lite runtime and editor.

"Prior to shipment to the oilrigs, the modified control systems were bench tested and then connected to a diesel engine driven pump for full cycling tests," explained Graeme. The modified control system ensures that these control cabinets can now be supplied by Schlumberger throughout the world for similar

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applications, and are already installed and operational on two oil rigs – Rowan Gorilla VI and Leiv Eriksson.

As a large supplier, Bosch Rexroth has the breadth of product range needed to act as a true single-source, and can provide support throughout the life of the equipment, whether it be five, ten or even twenty years. Also, since it's a global company, Rexroth can support the control system even when its moved to an overseas location.

“Overall this project was very challenging,” said Graeme. “In the end it worked out rather well and both Schlumberger and Aberdeen Control have been pleased with the technical design.” Following the successful completion of the first two installations, more of these control systems are planned throughout 2008. In addition, future project work with Aberdeen Control and Schlumberger is anticipated.

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Bosch Rexroth AG, a wholly owned subsidiary of Robert Bosch GmbH, achieved sales of more than 4.9 billion euros in 2006 with over 29,800 employees. Under the brand name of Rexroth the company offers all relevant drive, control and motion technologies: from mechanics, hydraulics and pneumatics through to electronics and the associated services. The global player is a competent partner to around 500,000 customers in over 80 countries and an extensive supplier of components and systems for industrial and factory automation and mobile applications.

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