

The Framework Agreement formula for a successful partnership

Framework agreements between equipment manufacturers and end users are a well established way of doing business in the fluids handling industries. Rotork is one of the companies that have built up successful framework agreements with a significant number of their customers, so that today agreements for the company's valve actuation products and services exist in most end user sectors, including oil, gas, power generation, water and waste treatment.

A significant framework customer is Royal Vopak, the world's largest independent provider of tank terminal capacity for the oil and chemical industries. A recent expansion project at the Vopak Oil Europoort Terminal serves to illustrate how the range of products and services included in the framework formula has assisted and simplified the progress of an elaborate contract.

Project description

The expansion project at the terminal has increased the total storage capacity by 160,000 cbm to approximately 3.5 million cubic metres, strengthening Vopak's position as an independent bunker station in the Port of Rotterdam. Phase 8 of the project involved the construction of four new 40,000 cubic metre capacity fuel oil tanks, a pump pit with manifolds, which connect the tanks to each other and to the rest of the terminal, and an OCU (Odour Control Unit) which is the fourth to be installed on the site for environmental



Fig 1: General view of the Vopak Phase 8 plant.

improvement. The company's activities have encompassed the supply of intelligent electric actuators for isolating, modulating and failsafe valves, digital control systems, valve gearboxes, valve adaptation, workshop motorisation, on-site retrofitting and commissioning.

Scope of supply

Through its framework agreement, Rotork has previously supplied more than 1500 actuators, the majority with Pakscan two-wire digital control systems, on the existing Vopak site. In Phase 8 of the expansion project Rotork has delivered a comprehensive range of products and services that illustrate many aspects of its group capabilities. The scope of supply has been tailored to closely match the technical and logistical demands of the project. Technically, their IQPro intelligent electric valve actuation with Pakscan two-wire digital control has been adopted for the majority of valve duties throughout the existing facility. Therefore, the bulk of the new valves in Phase 8, totalling 111 on-off installations, have also been motorised

with IQPro actuators. These include gate valves in sizes up to 24 inches on the manifolds and butterfly valves on the OCU lines.

Vopak Project Manager Cees Brijs comments: "We have been using their actuators for a long time throughout the terminal and find them to be of good quality. In addition, if there is a problem, the response time is very swift." IQPro actuators are designed for maximum reliability with enhanced functionality, featuring non-intrusive, intrinsically safe commissioning, data logging and predictive maintenance capabilities. A large and comprehensive user display on the actuator's double-sealed IP68 watertight and explosion proof enclosure is the interface for actuator setting, commissioning and interrogation by means of a hand-held setting tool. The illuminated window displays point-and-shoot setting menus, prompts and confirmation of setting data, local and remote control status and additional data including valve torque/position profiles. The hand-held setting tool, featuring bi-directional infra red communication, facilitates on-site

actuator configuration with or without mains power connected.

Bidirectional communication enables data to be retrieved and retransmitted to other actuators, offering the ability to save time and cost when many valves require near-identical commissioning. In addition, actuator data logger files can be downloaded and transported from plant to office for storage and analysis on a PC running IQ-Insight software. The Pakscan digital network can also be used for this function, enabling data retrieval to be performed in the comfort of the control room. Effective asset management programmes can then be planned and implemented, maximising plant utilisation and minimising the risk of unexpected process interruptions.

Swift response is assisted by the nearby presence of the company's Holland offices and recently enlarged workshops. These facilities have also assisted with the supply of motorised valves for the Phase 8 project by enabling some of the valves to be free-issued, fitted with actuators and tested in the workshop before delivery to site as completed packages. In addition, engineers from Site Services have been available to fit actuators to valves on the site when this



Fig 2: IQPro actuated gate valves on the pump pit manifolds.

has been seen to be the best solution, providing additional flexibility to suit the logistics of the contract.

Pakscan

The 111 new IQPro actuators installed on Phase 8 are linked on two new Pakscan master station networks for communication with the Rockwell PLC that controls the operation of the plant. The new master stations dovetail into the twelve existing master station networks that are in service

throughout the existing plant. Once again, the local availability of specialised onsite service engineers has assisted the project through swift final commissioning of the new actuators and Pakscan networks. Pakscan is a digital control system designed specifically for valve actuators and has actuator focused features that are unavailable from other designs. For example, the capacity for up to 240 actuators on a fault tolerant field network, up to twenty kilometres long without repeaters, is an important reliability and economic consideration in the spacious

environments storage tank farms. Repeaters require separate power supplies, can slow the data transmission speed and introduce a single point of failure. The failure of a repeater will result in loss of communication with all downstream field units. Pakscan also provides dual host communication paths as standard and has the ability to isolate any field based fault without interrupting communication with other units on the loop. In fact Pakscan's configuration provides built-in redundancy in every area – from the valve to the control room – ensuring that vital information for the host controller on valve position, status and condition is as secure as possible.

Specialised actuator duties

In addition to the predominant area of supply involving IQPro actuators, some specialised areas of actuation duty have been fulfilled with equipment from other divisions within the organisation. For example, Rotork Gears has supplied IS range spur gearboxes with stem extensions to enable double block and bleed valves to be conveniently operated from a nearby mezzanine walkway.

Rotork Fluid Systems has supplied Skilmatic SI/EH range electro-hydraulic failsafe actuators for safety-related duties. These compact and robust actuators deliver a highly reliable means of valve management and positioning a valve to a safe condition, selectable



Fig 3: IS range spur gearbox/stem extension installation.

for failsafe to open, failsafe to close or lock in position on power failure or emergency shutdown (ESD) signal. Based on IQPro intelligent actuation technology, the Skilmatic SI/EH control module facilitates the same simple, safe and swift non-intrusive commissioning by means of a hand-held setting tool. Settings including internal hydraulic pressure, valve position, position limits, as well as control, alarm and indication functions can be accessed and adjusted using user-friendly point-and-shoot menus. Actuator status, control and alarm icons are provided on the illuminated LCD display, which also gives access to real-time information, help screens and diagnostics. Designed to SIL3 standards for use on safety critical applications, the actuators are also capable of partial stroke testing, something of particular importance on ESD applications.

Control valve retrofit

During the project a problem was identified with some installed control valves in the boiler house that provides heating for the storage tanks. The 6



Fig 4: Skilmatic actuator on safety related failsafe valve duty.

inch valves were equipped with linear electric actuators that had proved to be incapable of fully closing them at full differential pressure. Furthermore, the actuators operated from a 0-10V control signal that is non-standard for the industry and required an

engineer from the manufacturer to be flown in to commission them as the valve maker was unable to do this. Other problems included the mounting of limit switches on the exterior of the enclosure, where they were vulnerable to damage, a nitrogen gas filled enclosure design that made maintenance very difficult and junction boxes that were judged to be not robust enough. The situation gave Rotork Process Controls the opportunity to offer its CVA product, leading to the first substantial order from Vopak

for this innovative control valve actuator. The CVA electric actuator provides extremely precise control valve operation with repeatability and resolution performance at less than 0.1% of full scale.

In addition to the convenience of all electric control and operation, the CVA uses the company's non-intrusive communication technology for swift and user-friendly actuator set-up, auto calibration and adjustment. Further benefits include comprehensive performance data-logging, a double-sealed explosion proof and IP68 watertight enclosure for environmental protection and programmable fail-to-position options using integral super-capacitors. The CVA data logger stores operational data such as valve torque profiles, events and statistics that can be downloaded for detailed analysis using special software. By anticipating potential problems, preventative maintenance can be planned without interruption to the operation of the plant.

Four CVL1500 linear actuators have been ordered for retrofitting to the installed control valves by engineers. Their responsibilities included the design and fabrication of new adaptation between the CVAs and valves, which has been performed by Rotork Valvekits, the specialist valve accessory company in the Rotork Group.



Fig 5: One of the CVL control valve actuator installations at Vopak Phase 8.