rotalk 24

Industry Leading Valve Actuation News from the World of Rotork

Application, contract and product reports from the worldwide Rotork valve actuator family

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Petrobras prefers EH actuators for the Osbra Pipeline

Thirty-nine Rotork EH range electro-hydraulic modulating actuators have been installed on the Osbra Pipeline in Brazil, replacing a competitor's hydraulic actuators installed in the 1990's when the pipeline was new. Petrobras, the pipeline operator, was dissatisfied with the performance of the hydraulic actuators, which suffered from frequent problems involving corrosion, hydraulic leaks and a lack of technical support from the manufacturer.

The Rotork EH self-contained design offers a tested and approved alternative solution for linear and quarter-turn valve automation, for both double-acting and spring return duties. In particular, the EH simplifies installation and commissioning by eliminating the requirement for separate hydraulic power units and associated pipework, which are incorporated in a fully enclosed integral power unit containing an electric motor, hydraulic pump and reservoir. In addition the EH actuator provides simplified remote control and indication together with local pushbutton control. Operating costs are further reduced by removing the expense of regular maintenance on hydraulic power plants, especially in environmentally exposed or remote areas.

With a total length of 955km, the Osbra pipeline is an important part of the petrochemical distribution network in Brazil, carrying multiple products (LNG, petrol, aviation fuel, kerosene and diesel) from refineries to major consumer areas. The thirty-nine linear and quarter-turn EH actuators have been retrofitted on the pipeline from the Replan refinery in Campinas SP. The linear actuators control flow from the pipeline to tanks at the terminals whilst the quarter-turn units are installed after the pumping stations.

The EH actuator is a compact, self-contained solution for critical applications with the option of stay-put or failsafe ESD (emergency shut down) operation. The actuator offers high operating torque performance with the speed and accuracy of hydraulic operation, combined with low energy consumption.

Contract News

Sohar Refinery, Oman

Over two hundred IQ actuators, mostly with Pakscan control systems, together with nearly one hundred GP and CP range pneumatic actuators have been ordered for a new petrochemical refinery at Sohar in Oman. The $880 million project, constructed by JGC Corporation, will produce petrol, propylene, LPG, naphtha, kerosene, gas oil and fuel oil when production starts in 2006.

Africa: Onshore

Rotork IQ actuators are replacing more than 100 electric actuators of USA origin on the Veba Oil Operations oil terminal on the coast of Libya.

Africa: Offshore

Quarter-turn and linear pneumatic actuators have been ordered from Rotork Fluid System in the UK and Italy for the new Plutonio Prospect offshore oil production platform that will operate in Angola's Block 18 field. Operated by BP and Shell Exploration, the platform has been engineered in the UK by MW Kellogg Ltd. Two hundred and fifty pneumatic actuators will operate ball valves from Valve Engineering Services Ltd and a smaller quantity of linear pneumatic actuators will operate Breda gate valves. All the actuators are being packaged with control systems and an additional quantity of IQ electric actuators have also been ordered for the same project.

Nanhai Chemical Complex, China

"Even for China, the $4.3 billion petrochemicals complex under construction in Guangdong Province is enormous."

Bechtel in the USA, Sinopec in China and Foster Wheeler in the UK are managing the construction of this major petrochemical complex at Nanhai in southern China, primarily to service the domestic market. Rotork's orders currently encompass approximately two thousand pneumatic actuators and nearly two hundred IQ electric actuators, the electric units equipped with Foundation Fieldbus connectivity. The Nanhai plant will be an integrated chemical complex including steam and electricity generation and other utility provisions, storage, handling and shipping facilities together with effluent treatment and environmental protection plant. At the heart of the complex a "world-scale" condensate or naphtha cracker will produce 800,000 tpa ethylene and 430,000 tpa propylene for further onsite production of petrochemicals.

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Filter upgrade is first for Pakscan and modulating pneumatic actuators

Mike Heuseveldt from Rotork Fluid System in Rochester USA reports on the innovative use of the Pakscan two-wire control system to operate modulating pneumatic actuators.

The Clinton Water Treatment Plant in Illinois has been recently modernised and expanded, improving filtration quality and increasing output.

As part of the filter plant upgrade Rotork Fluid System supplied P and SP range pneumatic actuators, in various combinations of double-acting and spring-return for isolating and modulating duties with stay-put or failsafe closed operation on loss of power. The twenty-nine actuators, which are operating butterfly valves on filter clarified and wash water circuits and plug valves on filter sludge circuits, are all controlled by a Pakscan two-wire digital control system.

The on/off pneumatic actuators were fitted with Rotork's standard remote control and indication package, including the Pakscan interface card, to energise open and close solenoid valves. However, the modulating actuators demanded an innovative, customised package to facilitate Pakscan connectivity. This was achieved by equipping a Pakscan general purpose field control unit (GPFCU) with an electro-pneumatic transducer to send a 3-15 psi signal to the actuator's pneumatic positioner in response to commands from the Pakscan loop.

This is the first time that Pakscan has been used for modulating pneumatic actuation, providing further evidence of how the benefits of Rotork's predominance in electric actuation control systems can be translated into the operation of Fluid System equipment to meet the increasingly sophisticated expectations of plant operators.

Right: The Pakscan IIS master station neatly installed on the side of the Clinton control cabinet. Below: Modulating actuator on backwash supply valve and isolating actuators on filter-to-waste drain valves.

Safety shutdown with earthquake protection

Rotork Fluid System GP and P range pneumatic actuators have been installed during a safety shutdown improvement upgrade project at the Southern California Gas Company (SEMPRA) owned Playa del Ray gas storage facility near Los Angeles airport.

The actuators were fitted on Rockwell plug valves in 12 and 16 inch sizes, pressure rated at ANSI Class 900 and 300 respectively. Due to the potential earthquake threat in the area the actuators were equipped with cradles to provide additional support and protection from seismic damage.

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IQ actuators installed at innovative new water treatment plant

Residents in picturesque north Wales will soon benefit from an improved water supply from the Dee Valley Water Plc. A new 4Mld (million litres a day) water treatment plant is being built at Pendinas to simultaneously treat the water from three reservoir sources and meet the latest EU requirements for manganese removal.

The new plant will run automatically under PLC control - combined with an innovative intelligent MCC - using a touch screen SCADA programme. Rotork electric actuators have been installed for the operation of the valves throughout the plant, the majority being butterfly valves fitted with the latest Rotork IQT intelligent quarter-turn actuators.

The new plant, which replaces an existing single stage filtration works on the site, is being designed, constructed and commissioned by Biwater Treatment Ltd, who are responsible for all civil works and M & E installations. The treatment process consists of blending from the three sources, flash mixing and flocculation, pH control with lime, coagulation with aluminium sulphate, dissolved air flotation, first stage rapid gravity filtration, second stage pressure filtration for manganese removal and gas chlorination. Filter backwash water is processed through a washwater recovery plant and the supernatant is returned to the head of works, whilst the sludge is stored for periodic off-site tankering.

Rotork actuators control the flow of water throughout the plant. Initially, two IQM modulating actuators regulate the inlet supply to the dissolved air flotation. Each of the four first stage filters is equipped with five IQT actuators to control inlet, outlet and daily backwash and air scour operations. A similar IQT actuated valve configuration operates the three secondary pressure filters.

Keith Jones, Dee Valley Water's project manager, comments:

"Rotork is the preferred supplier for valve actuators at Dee Valley Water sites. At Pendinas they are being controlled for the first time by a new, compact and intelligent MCC panel that has been designed and built to our own specification.

"The MCC starters communicate with the PLC to give, as examples, early warning of failure and to download operating parameters automatically should overloads be replaced. Biwater's SCADA software programme also stores data on operating trends to further assist with plant utilisation and maintenance planning."

Biwater Project Manager Richard Thomson and Rotork Sales Engineer Jon Cox commissioning IQT actuators on the Pendinas filters and confirming plant status on the MCC touch screen.

Alarms from the normally unmanned site will be signalled by telemetry to the Dee Valley Water operations centre at Packsaddle. The plant itself is equipped with an emergency generator to keep it running during a power failure, supported by a battery back-up to ensure the failsafe operation of key valve actuators.

When completed, the £3.8million project will maximise the available water resources to provide a reliable, quality water supply to consumers.

The Clarion-Ledger MISSISSIPPI NEWS

"With the flick of a switch…..millions of gallons quietly began feeding Nissan and its many suppliers."

It's not often that Rotork actuators feature in newspaper stories, but, as Rotork Area Manager for South Central USA Skip Kuehn noted, an IQ25 achieved centre stage in a recent report from the Mississippi News.

The story announced the opening of a new $12.5 million pipeline supplying a Nissan engineering plant and associated businesses close to Jackson with 5 million gallons per day of treated water from a new reservoir source.

The pipeline provides a reliable, single source of water to an area that previously had to rely on multiple smaller sources.

A flick of the switch opens the valves as the new water supply goes online.

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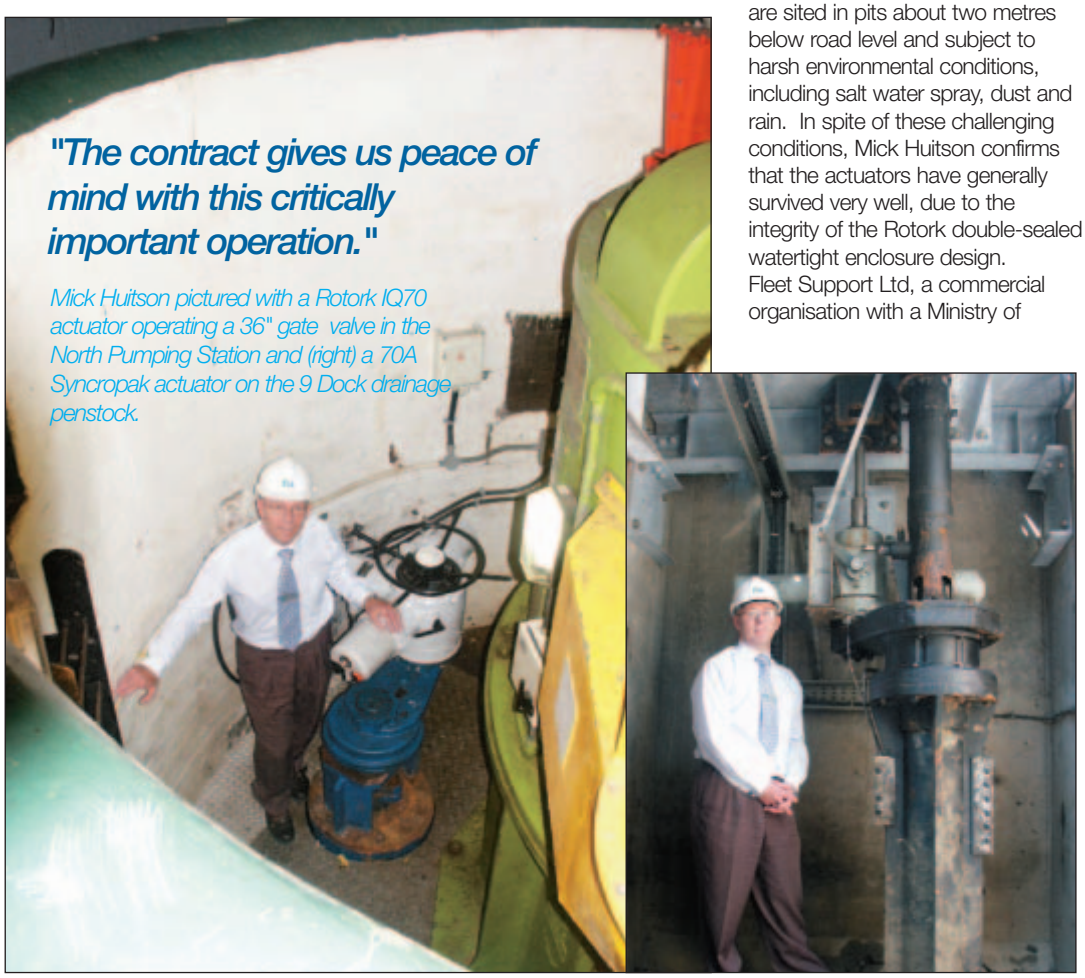
Site Services in Focus

Landmark maintenance contract secures uninterrupted operation of UK's premiere naval dockyard

Rotork has won a landmark contract with Fleet Support Ltd for the maintenance of seventy-three electric valve actuators that control the safe movement of millions of tonnes of water during the flooding and emptying of giant dry docks and locks at the HM Naval Base in Portsmouth. The contract, described as a "win-win" solution for both involved parties by Fleet Support Facilities Plant Maintenance Manager Mick Huitson, will rely on Rotork's Site Services department to keep the actuators in first class operating condition and minimise the risk of unexpected interruptions to this vital dockyard function.



"The contract gives us peace of mind with this critically important operation."

Mick Huitson pictured with a Rotork IQ70 actuator operating a 36" gate valve in the North Pumping Station and (right) a 70A Syncropak actuator on the 9 Dock drainage penstock.

Capable of handling warships and commercial vessels of virtually every size and description, the 350 acre Portsmouth Naval Base has four locks and twelve dry docks, mainly dating from the early twentieth century. These are served by a network of several miles of subterranean two-metre diameter culverts, connecting three main pumping stations to the locks and docks.

Cast iron penstocks and gate valves on the network were retrofitted with Rotork electric actuators in five phases between 1983 and 1996, replacing pneumatic equipment as part of a major refurbishment programme. Most of the actuators are sited in pits about two metres below road level and subject to harsh environmental conditions, including salt water spray, dust and rain. In spite of these challenging conditions, Mick Huitson confirms that the actuators have generally survived very well, due to the integrity of the Rotork double-sealed watertight enclosure design.

Fleet Support Ltd, a commercial organisation with a Ministry of Defence pedigree, has been operating in Portsmouth Naval Base since 1998 and, in partnership with the Naval Base Commander, provides ship repair, facilities management and logistics.

Mick Huitson, who looks after everything from bikes to cranes and pumping stations, explains the significance of the actuator maintenance contract: "For operational and safety reasons, the movement of millions of tonnes of seawater in and out of locks and docks must be strictly controlled by a safe system of work. Each actuator has a unique key and can only be operated by a competent person when its key is drawn as part of a secure, planned sequence prepared by Salt Water Planner Bob Powell, in accordance with operational demands and the state of the tide. Actuator failures would cause severe disruption whilst back-up measures were instigated.

"The contract gives us peace of mind with this critically important operation. Rotork engineers have surveyed and serviced all the actuators and maintenance has been carried out in accordance with their recommendations, either in-situ or at the Rotork factory. Repaired actuators are re-commissioned with a new 12 month warranty – by handing over care to the manufacturer it's a win-win situation for both companies. We have developed a good working relationship with Rotork, who are very helpful and provide excellent technical support."

Fleet Support's work at Portsmouth encompasses contracts with the Royal Navy, overseas navies and commercial shipping, as well as facilities management contracts beyond the perimeters of the Naval Base. Recently completed dockyard orders include repairs to the badly damaged destroyer HMS Nottingham and the American guided missile destroyer USS Winston S. Churchill.

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Upgrade gives actuators a new lease of life

Rotork's Site Services department has completed an economical upgrade contract to give a new lease of life to twenty-four actuators installed on the BP Kingsbury oil logistics distribution terminal in Warwickshire.

The terminal serves petrol stations, commercial customers and airports throughout the Midlands. The upgraded actuators are Rotork 'A' range units, installed in the early 1980's on the tankside isolating valves to control storage tank filling and emptying. At the time of installation the actuators were amongst the first to be linked by a Rotork Pakscan two-wire digital control system to a centralised control room and mimic panel.

With the passing of twenty years, advancements in technology resulted in some of the control system components becoming non-supportable, creating a risk of interruptions to the terminal's operations should the system develop a fault. Also, the actuators, which were still in good condition and operating reliably, were too old to be compatible with the new Pakscan equipment that would be required. However, BP wanted to avoid the expense of replacing them and asked Rotork's Site Services engineers to find the most cost effective solution.

Rotork's successful proposal was facilitated by the modular design of the actuators. The original 'Syncropak Mark 2' integral starter and control modules could be simply removed and replaced with newer 'Syncropak 1600 Series Mark 5' units containing Pakscan field units that provide connectivity with the latest Pakscan systems. In this way all the actuators could be modified without removing them from the valves and the existing site wiring could be used to connect them to the new panel in the central control room. These operations have been performed in the minimum of time, with virtually no disruption to the day-to-day operation of the terminal.

At the mimic panel itself, further savings have been made by replacing the original 240-channel Pakscan master station with the 32-channel Pakscan IIS derivative that is specifically designed for installations with relatively small numbers of valves. Therefore, as a result of this carefully planned contract, all the actuators have been given a new lease of life and equipped with the latest two-wire digital control supervision.

Rotork Site Services Engineers Stuart Andrews and Peter Smith complete the work on the upgraded actuators and commission the new Pakscan IIS master station at BP Kingsbury.

From sea bed to test bed – Refurbishment contract confirms Rotork's double-sealed enclosure

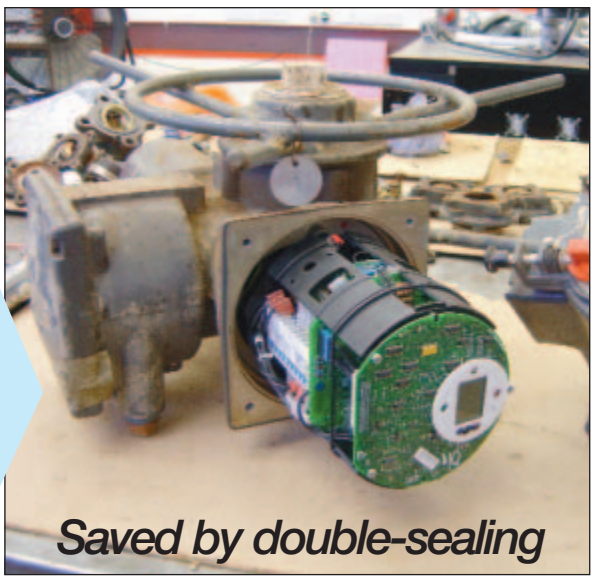
Rotork Service Department at Bath is currently refurbishing over 350 actuators that have endured nearly four weeks of submersion in up to 8 metres of sea water.

Initial inspection of the actuators confirmed that the IP68 watertight enclosure had done its job and double-sealing had restricted the bulk of anticipated sea water damage to the actuators' terminal compartments.

Separate environmental sealing of the actuator terminal compartment, known as double-sealing, is a benchmark design principal that Rotork first introduced in the 1960's and has incorporated in every new actuator design ever since.

In this case, double-sealing gave Rotork the confidence to propose that the actuators could be successfully refurbished as a cost effective alternative to replacing them with new units. Every refurbished actuator is fully bench-tested and provided with a new test certificate and warranty.

Site Services Manager Mike Dale comments "This contract illustrates not only the inherent robustness of the Rotork actuator design – enabling it to survive exceptionally harsh environments – but also the ability of our service and support teams to cope with unexpected challenges.



With the cover removed, the internal electronics of this IQ actuator can be seen to be entirely unaffected by eight weeks of submersion in corrosive sea water.

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Rotork is a key player at Wessex Water's first Profibus valve actuation site

Rotork IQ valve actuators with Profibus DP open control system connectivity are helping Wessex Water to improve the sewage treatment regime and protect the popular tourist beaches on the Somerset coast at Highbridge.

A new storm overflow tank installation at Highbridge is Wessex Water's first use of the Profibus DP protocol for the monitoring and control of valve actuators, which, says Wessex Water's commissioning engineer Iain Harris: "should provide us with the prototype for similar installations in the future. Wessex Water is always keen to look into using the latest developments in technology in order to continue to be recognised by Ofwat as being the most efficient water and sewerage operator."

At Highbridge two new storm tanks have been built to double the storage capacity of the existing installation, which receives the flow from eight pumping stations in the surrounding area. The plant expansion is being designed, installed and commissioned by the principal contractor, M. J. Gleeson, in order to meet strict new consent targets introduced by the UK Environment Agency to minimise the risk of untreated discharges to sea. At the same time new screens, filters, aeration tanks, settlement tanks and ultra-violet treatment plant have been installed at the West Huntspill STW, which receives the outflow from the Highbridge site, at a controlled rate of no more than 300 litres/second.

Rotork IQ actuators control the flow rate through the Highbridge plant as well as the sequence of filling and emptying the storm tanks when the full flow to site rate is exceeded. At this point the additional volume is automatically diverted into the storage tanks until the flow rate returns to normal.

All the processes at Highbridge are controlled on Profibus two-wire networks, linked to a new Mitsubishi Q2AS-S1 PLC utilising a software programme written by Wessex Water automation. Wessex Water senior automation engineer David Evans explains: "A total of four independent Profibus networks are installed at Highbridge, each network linking flow meters, high and low level sensors and valve operating equipment from different manufacturers. This type of flexibility is a particularly useful benefit of using an open system such as Profibus when designing and operating plant processes."

The software programme fills tanks 1 to 4 one after the other but empties them in an especially configured eight-part sequence to enable the process to react immediately to fluctuating ambient conditions. For the offsite monitoring and reporting of alarms from the fully automated site, the PLC is linked by a Seprol S500 telemetry output to Wessex Water's Regional Operations Centre at Bath and can be accessed from other communication centres.

Commenting on the decision to use Rotork IQ valve actuators on this significant Profibus application, Iain Harris says: "Rotork has a good track record of reliability at other Wessex Water sites. As well as integrating successfully with the other Profibus controlled equipment on site, the IQ actuator gives us greater flexibility with control and instrumentation, particularly with the maintenance and diagnostic abilities provided by inbuilt data loggers."

the virtues of

Refurbished actuators in as-new condition awaiting despatch

Site Services in Focus

Using the non-intrusive infra red link, Rotork Sales Engineer Mike Joslin downloads operating data from an IQ actuator at Highbridge and reviews the information with Wessex Water Commissioning Engineer Iain Harris.

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Networks explained Part 1

An Introduction to Networks

This is the first in a series of articles that will look at the full range of networks supported by Rotork.

Modbus® DeviceNet® Pakscan® PROFIBUS PROCESS FIELD BUS FOUNDATION™

Fieldbus control systems for valve actuators

Since the 1980's Rotork has pioneered the use of field networks for the control of actuators used in valve automation. There are over 100,000 Rotork actuators installed with a fieldbus connection of one sort or another, being used in over 2000 systems around the world. Many of these use popular industry standard open protocols such as Profibus, Modbus or Foundation Fieldbus, but the majority use Rotork's own Pakscan system. Pakscan has been continually developed to meet the growing demands of valve automation over the last 20 years and still remains the system of choice with many users.

Why use a network?

Traditional control systems use individual cables for each signal to be gathered or supplied to the field equipment. These cables are taken to interface panels and thence back to the control computer or PLC. As the actuators have become more important this has led to more and more cables being required for the collection of the actuator data. Today this can result in more than 20 individual terminations being required at each actuator. The proliferation of cables, cable trays and interface racks etc, with the associated installation costs, increased in proportion to the size of the plant.

Imagine the impact of digital network technology! Suddenly, large numbers of parallel wires can be replaced by single two, three or four core cables interconnecting scores of individually addressable actuators and carrying all – if not more – information between the plant and the control room.

Installation costs are dramatically reduced, plant efficiency is enhanced and reliability is improved. Furthermore, digital communications can fully exploit the information gathering potential inherent in intelligent actuators to facilitate improved diagnostics and predictive maintenance.

These new systems allow for rapid plant upgrades and simplify the work involved in altering plant functionality. This allows the owner to more readily adapt their plant to changing market requirements. Engineering work is greatly simplified and commissioning times reduced. Finally the cost of ownership will come down despite a higher initial cost for some of the hardware elements.

Proprietary and Open systems

Rotork was one of the first manufacturers to introduce a network capability to the world of actuators and valve control. The Pakscan product is unique to Rotork and uses a proprietary (or closed) protocol for the network communication. The advantage of a Proprietary system is that the network can be optimised to exactly match the needs of the elements connected to it.

For example Pakscan can cope with extremely long data highways (up to 20 km) without the need for any repeating devices, it is able to cope with the removal of power from any actuators on the system at any time and also protects against cable failures by providing dual communication paths at all times. There are no Open systems that can do this unless they are extensively modified from their original design. Almost all cable systems, other than Pakscan, will be compromised by the need to cover such long distances. Pakscan has been continually developed over the last 20 years to meet the needs of its intended market.

The same period of time has also witnessed the development and introduction of Open systems from Modicon (Modbus), Siemens (Profibus), Allen Bradley (DeviceNet), Emerson (Foundation Fieldbus) and many more. These various standards have been passed into the public domain, documented and controlled by IEC and other authorities in the USA and Europe as well as other parts of the world. Once released for public use the new Open protocols have been adopted by many different types of instrumentation and control systems, though their own origins are often easy to see.

The advantage promoted by Open systems is the ability to mix and match equipment from several different manufacturers on the same bus highway. Thus a Profibus network can support actuators, flow sensors and motor drives on the same data highway. This can be a particular advantage where there are only a few devices of each type: in these cases the use of independent, proprietary buses for each manufacturer is uneconomic

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Choosing between a Proprietary and Open system

Making the choice between a Proprietary or an Open system is an important decision when selecting the network system for valve actuators.

Unlike virtually every other piece of plant equipment, the valve actuator is generally inactive for over 90% of the time. However, when it is required to operate it is usually for an important reason. Therefore knowing that the valve and actuator are available for the task and that it is successfully completed is an essential requirement.

Any of the Open systems is capable of reporting the actuator status and carrying the command to move the valve. The choice between them will depend on a number of factors such as distance from the control room, number of devices required on the network, the availability of compatible equipment for other tasks, the integrity of the control required and so on. So the advantage of an Open system to enable multiple devices from several manufacturers to share a network may make choosing one of them the preferred selection. However, there is a penalty for this choice; all Open systems have a relatively high data overhead to allow for message transactions, configuration and other network maintenance functions. This overhead has the effect of slowing the data refresh so that they must run at high communication data rates to restore a suitable refresh time.

So why should a Proprietary system be considered? Well it must offer some advantages and Pakscan does have many. It is often the case that the valve actuator network only carries actuators from one supplier. If that is to be the case then the Pakscan system can be used and many other advantages will immediately become apparent.

Because Pakscan has been specifically designed for actuator control it is geared to use on sites where they are found. Pakscan can achieve much longer highway lengths than any open system, it can offer impressive data refresh times despite using apparently slow communication rates and, in addition, it offers increased safety by including a high degree of fault protection. Pakscan also lends itself ideally to the practice of isolating the valves by powering down the actuators, this action does not affect the communications highway at all.

Pakscan will often prove to be better than an Open system once the full operational parameters are examined. This coupled together with the latest developments in Ethernet technology make Pakscan the network of choice for Rotork actuators.

Proprietary/Open system comparison Pakscan and Profibus

	Proprietary System Pakscan	Open System Profibus
Distance (no repeaters)	20 km max, 6 km typical	1500 m max, 500 m typical
Number of devices	240 max, 60 typical	32 max without repeaters, typically 20
Highway redundancy	Included automatically at no extra cost	Needs second data highway and doubles the cost
Cable	2 core, twisted pair with overall screen	2 core twisted pair with overall screen
Update time (typical)	1 second for 60 actuators	0.2 second for 20 actuators

Comms Update

Pakscan® Ethernet

Pakscan master stations now have the option of an Ethernet connection.

The new addition to the range of Pakscan options allows connection of the Pakscan master station to the DCS or PLC over an Ethernet Local Area Network using Modbus-TCP protocol. The simple to use connection allows up to 10 coincident users to access data from the master station and operates on 10BaseT and 100BaseT networks. The Modbus-TCP protocol encapsulates ordinary Modbus RTU messages in a TCP data packet and is one of the easiest Ethernet protocols to use. The data format used with this device is identical to that already proven for use with all major DCS and PLC suppliers such as Yokogawa, Honeywell, Emerson, Siemens and Allen Bradley.

One of the strongest features in the new option is the inclusion of an embedded web server. Operators and managers can simply browse to the master station using Internet Explorer or similar software. Once correct password is entered the data available is impressive. There are screens showing the master station configuration, the order of the valves on the Pakscan loop and the condition of the loop communications. For each actuator there are pages showing the current status, any alarms present, torque profiles for IQ and IQT actuators and the tag data. In addition, with the right access the valves can be controlled from these web pages.

Should an alarm be generated on the system for any reason, from either an actuator or the master station itself, the system can send an email to a specified address indicating the nature of the fault and the time it occurred.

The Pakscan Ethernet integrates seamlessly with PLC and DCS equipment and can be combined with Rotork's In-Vision software for multiple user access with plant specific graphics. In-Vision also adds alarm and event logging to the system.

- Modbus TCP protocol
- LAN connectivity
- Embedded Web Server with
  - Full control and monitoring of all actuators
  - Full control and monitoring of the loop
  - Full control and monitoring of the master station
  - Configuration of master station settings, tags, etc.
  - Torque profiles
  - 'As wired' loop map
  - Password protection

Existing system upgrades

The Pakscan Ethernet option can be retrospectively added to an existing system to add Ethernet connectivity and the Web server. The combined hardware and software upgrades are available as upgrade kits for most Pakscan IIE and IIS systems previously installed.

Camden County (NJ) Municipal Utilities Authority realises significant cost savings with IQ actuators and Pakscan

from Bob Elliott, our correspondent in the USA

The Camden County (New Jersey) Municipal Utilities Authority (CCMUA) has installed a sophisticated system of Rotork valve actuators, two-wire communication loops and software in the primary sedimentation tank area of its main Delaware No. 1 Water Pollution Control Facility. According to Herman B. Engelbert, Executive Director of the CCMUA, the installation has resulted in major operational, maintenance, environmental, and cost-saving benefits.

Specifically, the automated sedimentation tank system that CCMUA installed has been able to significantly reduce operational and maintenance costs, improve plant efficiency, help the facility exceed EPA environmental permit parameters and greatly reduce odour problems in the residential areas near the plant.

The Problem

John Connelly, CCMUA's assistant director of operations and maintenance, said that automating the processes associated with the sludge and scum operation in the primary settling tank area became a very high priority for CCMUA. In 1999, the CCMUA focused on what, if any, improvements could be made to its ten primary sedimentation tanks.

Connelly said, "Every time we had heavy rain, an operator would have to manually open as many as 30 influent weir gates. In addition, we had to do a lot of maintenance on 30 existing scum gate actuators from another manufacturer. All in all, the system was outdated and labour intensive."

He said, "When we looked for a new method of control, we wanted a system that would provide a very high level of automation, and one that would require a minimum of maintenance. Also, it needed to interface seamlessly with our Bristol Babcock DCS."

The Solution

Robert Cornforth, director of operations and maintenance at CCMUA, said, "Because we are a public agency, we have a special commitment to our constituents to make sure that we have extremely reliable systems and software in place to meet our permits from the EPA and to exceed those parameters."

"Also," Cornforth said, "we have been diligent in keeping our rates down. We have a goal of looking for the most reliable and cost-effective operational solutions."

After a thorough search of available technology, CCMUA decided to install 30 Rotork IQ actuators on a Pakscan two-wire communication loop to operate the influent gates at the ten primary sedimentation tanks. In addition, they retrofitted 30 influent weir gates with IQ actuators.

The Edwin Elliot & Co., a Rotork sales representative located in Lafayette Hill, PA, worked with CCMUA to help make the project a success.

There are ten primary sedimentation tanks at the Delaware No. 1 plant. Wastewater takes about 12 to 15 hours to flow through the tanks. During primary treatment, solids settle to the bottom of the tanks and form into sludge. The sludge is scraped off the bottom and held for further processing. Also, oil and grease scum is skimmed off the top and delivered to scum wells. A total of 60 Rotork IQ actuators on two Pakscan two-wire communication loops automatically operate the influent sluice gates as well as scum slide gates.

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Jordan provides all-electric damper actuation solutions at UK power stations

Rotork in Control

Littlebrook Power Station in the South East of London is the first power station in the UK to install a Jordan SM6000 electric actuator for fully modulating vane control on the boiler plant.

The Jordan unit replaces traditional hydraulic equipment and power packs that demand regular maintenance and require continuous electrical power to maintain hydraulic pressure. By comparison, Jordan actuators only use electricity when operating and have a low requirement for routine maintenance. Introduced in 2002, the SM6000 is widely used for continuously modulating duties in ambient temperatures up to 108ºC (225ºF) in the international steelmaking, papermaking, power generation and oil refining industries.
Littlebrook is an oil fired power station that was first commissioned in 1981. Now owned by RWE npower the station is currently called upon to 'top up' the National Grid with up to 1370 megawatts of power at times of peak demand. For this reason it is essential that the station's generating plant is able to respond to National Grid demands with speed and flexibility.
Dave Baylis, Littlebrook's Control & Instrumentation Engineer, was seeking a reliable and cost-effective replacement for the original hydraulic vane control equipment on the boiler gas recirculating plant when he was made aware of the Jordan SM6000 actuator by Exeeco Technical Sales Engineer Simon Finley. Exeeco is the European Service Centre for all Jordan products, within the Rotork valve actuation group. The SM6000 is a rugged self-contained lever arm actuator delivering positional accuracy within one-tenth of 1% throughout a standard stroke of up to 313 degrees, thereby offering all the essential characteristics for this important application at Littlebrook.
Exeeco's comprehensive experience of power station maintenance and modernisation projects enabled the company to propose an upgrade package encompassing the removal of existing plant, actuator installation including a new fabricated pedestal, electrical contracting and commissioning. For added convenience it was possible to use the existing site cabling to power the new actuator and connect to remote control continuous feedback circuits. Commissioning was achieved by means of the actuatorís innovative keypad and fluorescent display, enabling the installation to be brought on line with speed and accuracy.

Environmental upgrade at Drax

Exeeco Sales Director Ian Elliott reports on another successful Jordan actuator introduction, this time at Drax Power Ltd in Yorkshire.
Drax is the UK's largest, cleanest and most efficient coal-fired power station. Already equipped with a flue gas desulphurisation (FGD) plant that removes 90% of sulphur dioxide (SO_2)emissions from boiler gases to meet forthcoming legislation, the station is now actively seeking to reduce its oxides of nitrogen (NOx) emissions ahead of the EU Large Combustion Plant Directive (LCPD) that comes into force in 2008.
This is achieved by installing Boosted Over-Fire Air (BOFA) systems, involving specially designed fans, ducting and dampers, on the generating plant. Drax is currently installing the technology on the first of its six 660 MW units. The system is designed and installed by Mitsui Babcock, utilising specialised dampers manufactured by Damper Technology for fan isolation and modulation of the over-fire air draught. Damper Technology appointed Exeeco as the specialist supplier for actuators and associated services for the project.
Exeeco selected Jordan LA2000 range electric linear actuators for the automation of the dampers on this particularly harsh duty. The actuators are controlled by a 4-20mA signal, fed to the actuatorís digital amplifier, which can be remotely mounted to enable the actuator to operate in ambient temperatures up to 225ºF (108ºC). This, combined with a modulating duty rating of 2000 starts/hour and precise positioning, makes the LA2000 an ideal low maintenance solution for many power station applications.

Simon Finley with the new Jordan SM6000 electric actuator installation at Littlebrook Power Station and (left) the now redundant hydraulic power pack that the actuator has superseded.

Below: Exeeco Sales Director Ian Elliott demonstrates remote commissioning of the Jordan digital amplifier, a major feature of the Jordan LA2000 range.

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Rotork Gears wins sub-sea gearbox orders for Asian development project

The ability to meet critical deliveries with top quality product has enabled Rotork Gears to fend off fierce completion from European manufacturers and win sub-sea gearbox orders for a large and prestigious hydrocarbon development project in Asia.

Rotork in Control

Left: SSW5/B4 sub-sea gearboxes ready for despatch from the Rotork Gears factory

The ability to meet critical deliveries with top quality product has enabled Rotork Gears to fend off fierce completion from European manufacturers and win sub-sea gearbox orders for a large and prestigious hydrocarbon development project in Asia.
Rotork Gears has been selected by German valvemaker Werner Bohmer to supply gearbox operators for subsea ball valves.
The first order for twelve SSW5/B4 units has been supplied, with further contracts anticipated throughout next year.
The SSW5/B4 gearboxes were supplied with pressure compensation, high visibility indication, direct vertical mounted ROV inputs and stainless steel handwheels for emergency operation in the event of ROV failure. They are mounted on Werner Bohmer forged Duplex (ASTM A182 F51) fully welded ball valves (pictured right).

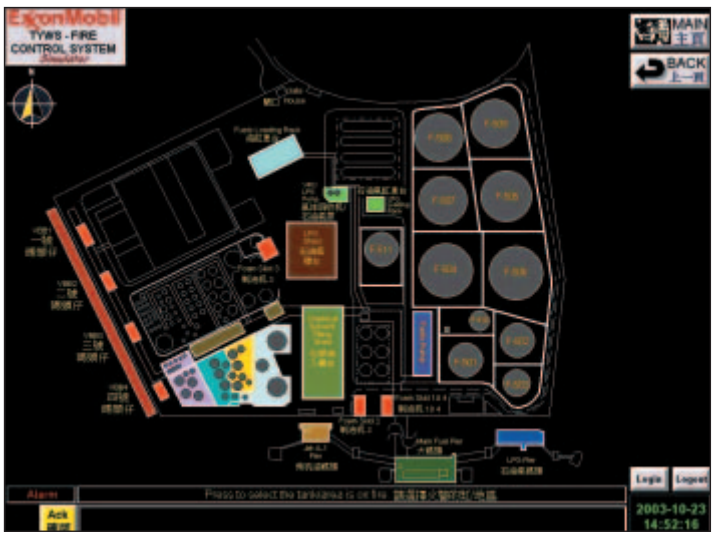
Rotork Gears manufactures a full range of gearboxes designed to withstand the harsh challenges of sub-sea operating environments, that can be customised with a wide range of optional features to meet the specific requirements of every application.
For further information contact Rotork Gears on 0113 205 7276
or email info@rotorkgears.co.uk

Automated fire-fighting system introduced at oil storage farm

Rotork IQ electric actuators with a Pakscan two-wire control system and In-Vision operating software have been used to automate valves, pumps and associated equipment on one of Hong Kong's largest oil storage tank farms.

Left: View towards the jetty area of the Exxon Mobil TYWS site.

Below: The In-Vision operating software plant overview screen.



The Exxon Mobil TYWS, located on Tsing Yi Island on the west side of Hong Kong, was designed and built by Chiyoda Engineering and has been operating since 1993. The purpose of the automation contract, which was awarded to Rotork Hong Kong, was to actuate the existing manually operated fire fighting system and introduce computerised control. The automated system is designed to react to diverse operating scenarios and account for wind direction, the location of the fire and its severity.
A total of ninety-six IQ actuators have been installed on existing gate valves and foam pumps, whilst thirty-nine Rotork general purpose field control units (GPFCU) have been used to connect the non-actuator components of the system to the Pakcan control loop. The loop is operated by a Pakscan IIE master station, running In-Vision software.

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New Rotork actuators go beyond the limits of old to achieve reliable river gate operation

Rotork IQ intelligent electric valve actuators have been retrofitted at an important UK river gate and weir to improve river level control and secure more reliable automatic operation.

Bedford Sluice on the River Nene at Northampton is the main control structure before the Northampton Washlands, an environmentally sensitive amenity area supporting a wide range of outdoor sport and leisure activities. The four radial gates on Bedford Sluice regulate the river flow through the City of Northampton to prevent flooding and maintain water levels for nearby facilities including the River Nene Navigation, the Nene Whitewater canoe course and a rowing club.

Operation of the radial gates was literally beyond the limits for the actuators that have been replaced. Fitted with mechanical limit switches, they could not cope with the exceptionally long stroke required to fully operate the gates. External limit switches were therefore installed to operate directly on the gate stems, but these had proved to be less than 100% reliable and on occasions had caused damage to the installation by failing to stop the gates in time. IQ intelligent electric actuators have replaced mechanical limit switches with a Hall Effect magnetic pulse system that accurately measures and controls the stroke without the restrictions inherent in gears and switches. The system converts the actuator's output centre column rotation into an electronic signal which is compared to position limits programmed and stored within a secure, non-volatile memory, removing any chance of a mechanical failure.

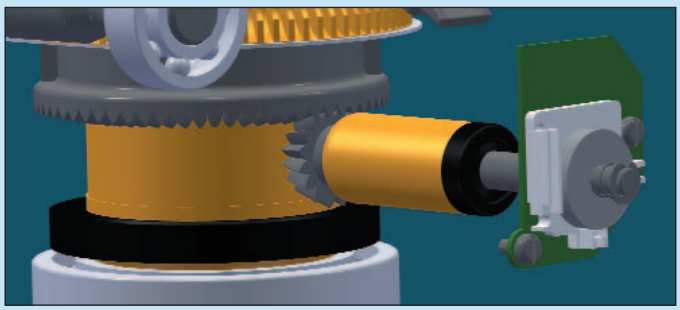
Working for the UK Environment Agency, Rotork has carried out all aspects of the actuator modernisation project. Rotork's specialist Site Services Department designed and fabricated new adaptation and installed IQ40 intelligent actuators. Rotork projects and services company Exeeco carried out the electrical installation including connection to a telemetry link and associated panel modifications. In this way, work on all four gates was completed in a period of only four weeks. As part of the customised installation, the actuators' handwheels have been removed and replaced with special adaptors for a hand-held hydraulic power pack. In the event of emergency operation during power failure this will enable the gates to be moved as quickly as possible.

The new actuators are controlled from a level sensor positioned a short distance upstream of the installation. Signals from the level sensor trigger sequential operation of the individual gates in order to achieve accurate river level control under all ambient conditions. The computerised programme is linked by telemetry into the Environment Agency ARTS supervisory system, based at the main monitoring and control room at Peterborough.

Under normal circumstances, operation of Bedford Sluice is fully automatic, but the actuators are programmed to transmit an alarm in the event of any malfunction, to facilitate immediate remedial action.

Russell Gillet, Operations Officer for the Environment Agency, inspects one of the new Rotork IQ40 actuator installations on Bedford Sluice.

IQ position measurement



The patented IQ non-contacting position measuring system is the most simple yet devised for actuator control.

With only one moving part, the resolver converts output centre column rotation into an electronic signal which is then compared to position limits stored within a safe, non-volatile memory.

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Actuation News

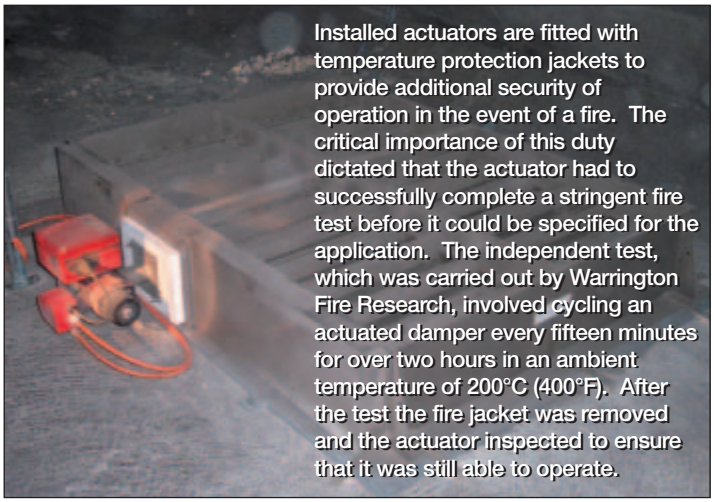
Skilmatic passes the Rotork intelligence test

Skilmatic electric modulating and failsafe actuators for quarter-turn and linear valves are now available with innovative non-intrusive infra red technology and intelligence that has been the cornerstone of the success of Rotork's market leading IQ range.

Known as the SI range, the new Skilmatic actuators utilise the Rotork intrinsically safe hand held setting tool to facilitate non-intrusive commissioning and the setting of control and indication functions in any environment, day or night.
The actuator's easy to read illuminated LCD display provides valve position, control and alarm icons as well as giving access to comprehensive diagnostic information and help screens. The double-sealed electrical control module also enables connectivity to the Rotork Pakscan two-wire control system or Open fieldbus protocols such as Profibus, Modbus, DeviceNet and Foundation Fieldbus.
These sophisticated control, indication and diagnostic benefits compliment Skilmatic's traditional design strengths. The actuators offer the simplicity and flexibility of electrical operation, combined with the precision of hydraulic control. Built to IP68/NEMA6 watertight specifications with the option of ATEX and FM explosionproof certification, SI actuators are suitable for single phase, three phase or 24Vdc power supplies.
For more information, visit rotork.com, view or download publication E711E.

Skilmatic actuators survive fire test for road tunnel contract

Skilmatic failsafe electric actuators have been ordered for ventilation dampers in the famous Saint Bernard road tunnel. Built in the 1950's, the 5854 metre long tunnel, which connects Italy and Switzerland, is being equipped with new Trox dampers during a ventilation and fire protection upgrade programme.



Installed actuators are fitted with temperature protection jackets to provide additional security of operation in the event of a fire. The critical importance of this duty dictated that the actuator had to successfully complete a stringent fire test before it could be specified for the application. The independent test, which was carried out by Warrington Fire Research, involved cycling an actuated damper every fifteen minutes for over two hours in an ambient temperature of 200°C (400°F). After the test the fire jacket was removed and the actuator inspected to ensure that it was still able to operate.

A total of 68 Skilmatic quarter-turn actuators have been supplied, providing two-position operation with failsafe closed emergency backup. The actuators operate from a 220V single phase electrical supply with a separate 24Vd.c. emergency shutdown switch circuit and remote position indication. On loss of power or signal the actuators must shut the dampers within 30 seconds. Using Skilmatic's self contained electro-hydraulic design for this purpose removes the requirement for additional failsafe battery packs for operation during power failure.

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Syncrude update

Syncrude operates the largest oil sands crude oil production facility in the world at Alberta, producing 13% of Canada's annual oil requirement. Rotork is closely involved in capital investment projects which will increase production by a further 100,000 barrels a day.
Illustrated here, a 72" Tricentric high performance butterfly valve (HPBV) equipped with Rotork EH Range electro-hydraulic actuator has been supplied for modulating duty on an acid gas service line. The valve/actuator adaptation accommodates a steam line coupling through the valve stem and body to keep the internals warm and inhibit the precipitation of sulphur from the acid gas. Similar packages are also being provided for 72" and 84" HPBVs, including the IQ electrically actuated version shown below.

Contract News

On another area of the contract, gearbox manufacturer MaxTorque pulled out all the stops to design and manufacture these large, heavy duty gearboxes for four key valves in record time. The quarter-turn gearboxes needed to handle 120,000 ft/lbs of torque and operate in less than 60 seconds at ambient temperatures of minus 50°C. In the event, all four gearboxes were ready for delivery after only sixteen weeks, including testing on MaxTorque's brand new 290,000 ft/lb test rig that confirmed the operating time at 44 seconds.

Valvekits

"Bomb proof" Switchboxes and mounting kits for the Royal Navy

ATEX certified switchboxes and high integrity valve mounting kits designed to withstand a direct missile strike are being supplied for the Royal Navy in a £50,000 contract with Actuation Valve Control Ltd. The switchboxes will be used on the vital fire fighting systems on the navy's new Type 45 destroyers, being built at the BAE shipyard in Scotstown.

As pictured, the switchboxes are mounted on Camtorq actuators that will operate Starline valves on pipelines carrying specialised Inergin fire fighting fluid at a pressure of 200 barg. To achieve the contract criteria, switchboxes had to survive MOD "bomb proof" testing with forces of 70G vertical and 30G horizontal, and still operate.

Previously Rotork Valvekits has supplied similar equipment to Actuation Valve Control for naval ships including HMS Albion, HMS Wave Knight and HMS Wave Rider, but this is the first time that the equipment is to be used on front line theatre attack and intercept warships.

Short lead times win Middle East orders

A complete product solution encompassing mounting kits, pedestals and gearboxes has earned Rotork Valvekits a second order with Shipham Valves for a major oil production project in the Middle East.
The ability to supply all the equipment for 137 valves on a short lead time won the business for Valvekits, together with the quality and contract performance achieved during the previous order.
Design work began in August and the first deliveries made in September this year. "Success with the first two stages of the project should enable Valvekits and Shiphams to achieve more orders for the same site next year," says Valvekits MD Martin Hunt.

New Valvekits sales engineer for Europe

Jos Bode has joined the Valvekits European sales team to cover Germany, Belgium and the Netherlands. Jos has twenty years successful sales experience with European valvemakers, including HP Valves and Wouter Witzel.

New actuators secure third century of operation for Australian water valve

Spencer Jenner from Rotork Melbourne reports:

The Happy Valley double door valve during its original installation

A valve that was installed in 1895 has been retrofitted with Rotork IQ actuators during an upgrade programme on a dam at Adelaide in South Australia. The 975mm diameter double door stop valve was installed on the pipeline from the Happy Valley dam, built in 1890's to provide the increasing population of Adelaide with a reliable water source.

In 2003, the South Australian Water Corporation – a long-standing customer of Rotork Australia – began a 20million dollar modernisation project on the dam to address safety issues related to flooding and earthquakes, since a large population now resides downstream of the dam. SA Water wished to use the old valve as a scour valve to draw down the reservoir level should flooding become imminent.

Before the work could start, the valve's internal condition was assessed by SA Water's diving team, who had to swim for over 30 metres down the 915mm diameter pipeline in order to carry out the inspection. Once the valve's condition was confirmed as good, SA Water's valve expert Michael Stasiuk designed new adaptation to enable two Rotork IQ actuators and gearboxes to be fitted to the valve, in-situ in the reservoir outlet tower, 20 metres below water level.

The completion of the retrofit work now enables the valve to be controlled remotely – securing its usefulness into the third century of operation.

Rotork IQ actuator installation in progress on the in-situ valve.

A helping hand for migrating salmon

The fish ladder at Hagestein on the River Lek, a tributary of the Rhine, is one of an increasing number that have been built to encourage the return of migrating fish to the main rivers of the Netherlands. The dramatic improvement in water cleanliness brought about by the country's successful environmental policies has enabled salmon to return to old spawning grounds, although their progress can be hampered by man-made barrages and sluices.

Rijkswaterstaat, the responsible authority, is therefore building specially designed fish passages, or ladders, around the obstructions, controlled by adjacent sluice gates that regulate the river flow under changing ambient conditions. The use of Rotork IQ electric actuators facilitates automatic operation of the sluice gates in response to signals from level sensors.

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