


rotork

INDUSTRY LEADING VALVE ACTUATION NEWS FROM THE WORLD OF ROTORK



Focus on Rotork Site Services

Feature begins on page 10

Also inside:

Group News

New Rotork plant in India expands local and worldwide manufacturing capacity

Contract News

Fluid power actuator project provides energy independence for Chile

PLUS

rotork.com - Rotork's 'encyclopaedia' of valve actuation!



Valve actuation at *the world's largest flow metering calibration facility*

Story continues opposite

rotalk³³

INDUSTRY LEADING VALVE ACTUATION
NEWS FROM THE WORLD OF ROTORK

CONTRACT NEWS:

Rotork Group contract stories from around the world.....3, 4, 5, 6, 7, 14, 15 & 20

GROUP NEWS:

Rotork Group news stories from around the world.....8 & 9

COMPANY FEATURE:

Feature on Site Services.....10, 11, 12 & 13

BACK TO BASICS:

Aspects of successful valve actuation....16 & 17

MEDIA NEWS:

rotork.com - Rotork's 'encyclopaedia' of valve actuation!.....18 & 19

Situated by the New Meuse River in Rotterdam, EuroLoop will be the world's largest research and test site for the calibration, verification and type testing of industrial flow meters in the oil and gas industries and for the performance of industrial experiments involving process technologies and flow.

The plant comprises two separate, industrial scale closed-loop test circuits – one for liquid meters and one for gas meters – on a brand new, self-contained 200 x 100 metre site that also houses the control room, meeting rooms and an educational centre. Being entirely self-contained, EuroLoop will operate independently of external factors, maximising the availability of the calibration facilities. EuroLoop is owned by NMI, a world leading independent specialist for testing, certification, calibration and training in the field of metrology.

Electric and fluid power valve actuation

The two closed-loop calibration circuits at EuroLoop have been constructed as separate projects. Each has adopted different valve actuation technologies, both supplied by Rotork. The circuit for gas meters, including compressors, a heat exchanger, gas holders and a lubrication system in addition to the master meter circulation system comprising turbine and ultrasonic flow meters, utilises Rotork IQ and IQT intelligent electric actuators with Rotork Pakscan two-wire digital control. The IQ actuators are fitted with Rotork Gears IW worm gearboxes for the operation of the larger ball valves. The IQTs are direct drive quarter-turn actuators. The service parameters of the ATEX Zone 1 explosionproof plant are very demanding, involving flow rates up to 30,000m³/hr in pipe sizes up to 30inches at pressures up to 60bar. Safety is therefore of primary importance and for this reason virtually all the ball valve installations are of double block and bleed design, the largest weighing in at eight tonnes. Security against leakage is vital for the accuracy of the metrology as well as safety. The other plant at EuroLoop, for liquid meter calibration, consists of three circulation systems, each comprising large and small circuits and each equipped with master meters of various sizes, together with pumps and coolers. The circuits can be connected to one of two piston provers, either for master meter calibration or for testing directly against the provers. Service parameters involve flow rates up to 5000m³/hr at pressures up to 10bar. Virtually all the valves on the circuits are butterfly valves, operated by Rotork RC200 range pneumatic actuators, equipped with Series 1990 switchboxes and PMV positioners, supplied by Rotork's agent in Belgium, Prodim SA.

Both plants are fully automated, the gas plant requiring 85 electric actuators and the liquid plant requiring 43 pneumatic actuators. The annual testing capacities will be up to 1500 gas meters and 600 liquid meters when the plant is fully operational later this year. The single sourcing of valve actuation and control equipment from Rotork



Some of the Rotork RC200 Series pneumatic valve actuator installations on the liquid meter calibration loop at EuroLoop.

has provided a number of additional benefits for the EuroLoop project. EuroLoop Project Engineer Wim Volmer explains: "We looked at various suppliers before selecting Rotork on the merits of the equipment offered and, of course, value for money. For example, on the electric side, the Rotork IQ actuator delivers valve diagnostic capabilities which, although not an essential requirement for this plant, are still very useful for the plant operator by eliminating the requirement for over-cautious routine valve maintenance. In addition, the Pakscan two-wire digital control system is economical to install, assists swift commissioning and provides a dedicated, reliable link for communication between the actuators and the plant's SCADA system. The close proximity of a Rotork office and workshop in Rotterdam is of great assistance on a practical, logistical level. Rotork has been able to fit virtually all the IQ actuators to the valves in the workshop and supply them to site as complete, factory tested units. Also, although the different actuator products are manufactured in Rotork factories in the UK and Sweden, the Rotork company in Holland provides us with fully qualified service technicians for on-site support, literally on our doorstep."

Sophisticated control

On the control side, each calibration circuit has adopted different architectures although the two systems are linked together for safety reasons.

Whilst the forty-three pneumatic actuators on the liquid circuit are conventionally hard wired, the greater number of electric actuators on the gas circuit can take advantage of the economies of scale provided by a single Pakscan two-wire bus highway, connected to the latest Rotork Pakscan P3 master station. The master station links to the next level of control, the safety PLC controlling the pressure and temperature parameters of the plant's operation. This encompasses a complex package of tasks involving approximately 800 input/outputs, which, besides preventing over pressure and other safety-related duties, also carries out the measuring operations required for calibration. Any fault would be detected at this level, triggering an immediate shut down of the circuit. At the same time, the PLC would communicate with the safety PLC on the liquid circuit to close that down as well, ensuring total plant integrity in the event of an emergency. The PLC design and the design of the flow computers and PC based SCADA and calibration management system that supervises the operation of the EuroLoop plant has been provided by two Dutch companies – Spirit IT for the gas facilities and Krohne Oil & Gas for the liquid facilities. The day-to-day operation of the valve actuators is fully automated with local operation from HMI stations also available. Operation of the individually addressed IQ valve actuators is additionally available at the Pakscan master station.

Rotork fluid power valve actuators have been installed throughout a major new LNG (Liquefied Natural Gas) importing and distribution project that is expected to meet 40% of the demand for gas in Chile and secure energy independence for the country.

The LNG complex at Quintero Bay encompasses the installation of a sea terminal to receive LNG from tankers and a plant for regassifying and distribution by pipelines into central Chile.

Rotork Fluid Systems has received orders for heavy duty, scotch-yoke pneumatic, gas-over-oil and high pressure gas actuators which have been supplied to valvemakers in France, Italy and Spain. The majority of the eighty-seven CP and GP range pneumatic actuators supplied are operating cryogenic service ball and butterfly valves at the Quintero Bay marine terminal and the adjacent storage and regassification plant.

The GO range gas-over-oil and HPG range high pressure gas actuators have been supplied for a new 28 kilometre pipeline which links the Quintero LNG complex to the Electrogas terminal at Quillota for integration with the existing gas network and fuelling combined cycle power plants operated by Endesa Chile.

The GO unit is installed on a Class 600 24 inch ball valve at the City Gate in the Quintero LNG terminal, whilst the HPGs are installed on Class 600 8 inch and Class 300 12 inch ball valves at the Electrogas Plant Gate in Quillota.

Fluid power actuator project *provides energy independence for Chile*



One of the Rotork HPG actuator installations at the Electrogas gas terminal in Quillota.



Rotork GP range, spring-return, scotch-yoke pneumatic actuator installations on the sea terminal at Quintero Bay.

Designed for safety and shutdown duties, GO and HPG actuators use the pipeline gas as the motive power source. Valve operating speed is adjustable in both directions and manual hydraulic override is provided as standard. All the Rotork actuators supplied are certified to ATEX 94/9/EC and IP66M/67M in accordance with PED 93/27/EC.

The sales and engineering participation of Rotork's local representative in Chile, Ineco, S.p.A, has been a key factor in the company's success with this important project. Rotork's activity was co-ordinated at Rotork's USA head office in Rochester and involved Rotork offices in France, Italy, Spain and the UK, where the engineering, procurement and construction contractor CB & I is headquartered.

The Quintero Bay terminal will have an annual supply capacity of 2.5 million tons of LNG. The \$1.2 billion project is owned by GNL Quintero SA, a joint venture between electricity generator EndesaChile (20%), the state oil company ENAP (20%), gas distributor Metrogas (20%) and the British Gas Group plc (40%).



The Green Diesel Project is a major component in the expansion of the giant Abu Dhabi Oil Refining Company (TAKREER) Ruwais Industrial Complex in the United Arab Emirates. The project involves the modernisation of existing units and the addition of new units to meet the future demands for Green Diesel, or sulphur-free gas-oil (SFGO).

Much of the work has been awarded to engineering companies in South Korea, where Rotork Controls (Korea) Co. Ltd. has won substantial orders for IQ intelligent electric valve actuators and Pakscan two-wire digital control systems.

Rotork intelligent valve actuation *with Pakscan digital control in the UAE Green Diesel Project*

At the Green Diesel site Pakscan P3 master stations control 35 IQ and 105 IQT actuators in four plant areas on highways up to 15 kilometres in length. The fully redundant 'hot standby' Pakscan field networks are linked to the supervisory ABB DCS (distributed control system) and intelligent motor control centres (iMCCs) throughout the site.

The Pakscan P3 master station provides the vital link between the valve actuator and supervisory controller. Designed specifically for the valve actuation operating environment, it is an intelligent, reliable, high integrity, fast and easy to install communication highway between the field equipment and the control room.

Remote parameterisation of all actuator setting variables is achieved at the master station HMI or on a web browser in a local or remote PC. Parameters can be changed on-line with no system interruption and without the need to visit the actuator.

The Ruwais Green Diesel plant is one of the latest of many oil and gas industry projects to utilise the Rotork IQ actuator and Pakscan two-wire digital control option for intelligent valve control.

Widespread use of the system has given it virtual 'industry-standard' status in refineries, tank farms, pipelines and associated facilities.

Rotork lands more *airport contracts in the Middle East*

By reducing aircraft 'turnaround time' these systems assist the proper regulation of airport traffic, as planes are not kept waiting for refuelling on the tarmac. Rotork's actuation technology helps to increase the integrity of the refuelling process.

At Muscat the IQ actuators will control fifty double block and bleed valves to facilitate swift refuelling of aircraft on the airport's apron pad. By eliminating

the need for fuel tankers the system makes a significant contribution to strict airport security. Rotork's Pakscan digital control network will enable the actuators to be comprehensively monitored and controlled from centralised control areas.

Pakscan is specifically designed to cope with the long distances between the control room and field units that characterise typical valve actuation

The Muscat International Airport will be the latest Middle Eastern airport to have an aircraft hydrant refuelling plant utilising Rotork IQ electric valve actuators with Pakscan two-wire digital control.

installations, with no loss of communication performance and without the need for repeaters on the network. The contract at Muscat is the latest of its type for Rotork, following similar installations at King Abdul Aziz International Airport in Jeddah, Shaikh Maktoum International Airport in Jebel Ali, Dubai, New Doha International Airport in Qatar and Abu Dhabi International Airport.

Rotork valve actuation service *demonstrates world class performance at the Winter Olympics*

Operating quarter-turn isolation valves, the IQT actuators were installed on the refrigerant circuit responsible for maintaining the ice surface in the Olympic Sliding Center. Situated at Whistler in British Columbia, the Sliding Center hosted the two and four person Bobsled, Luge and Skeleton events during the Winter Olympics in February 2010.

Norpac Controls Ltd, Rotork's local representative, was first approached by the refrigerant contractor Cimco Refrigeration in 2006 and asked to submit prices for motorised isolation valves in pipe sizes between 2 and 12 inches.

Norpac's sales team successfully demonstrated that a high profile project such as this demanded the highest quality and most reliable actuators, backed up by local support. As a result, Cimco decided to

reject cheaper actuator options and selected the Rotork IQT package, together with start-up and commissioning support. Cimco's project manager confirmed that the decision to select Norpac and Rotork was an easy one. The combination of quality and reliability inherent in the actuators, together with Norpac's proven record of providing local customer support alleviated any concerns regarding the performance of the actuated valves. Fifteen IQT actuators were installed in September 2007 and commissioned by Norpac's Rotork trained service technician in the following month, in good time to permit training runs to begin during the winter season.

Service technician Jim Gardner (pictured right) commissioning one of the IQT actuators installed at Whistler.

Rotork IQT intelligent electric valve actuators with external failsafe back-up have played a crucial role in ensuring that the 2010 Vancouver Winter Olympics met the demanding requirements of elite sliding athletes.

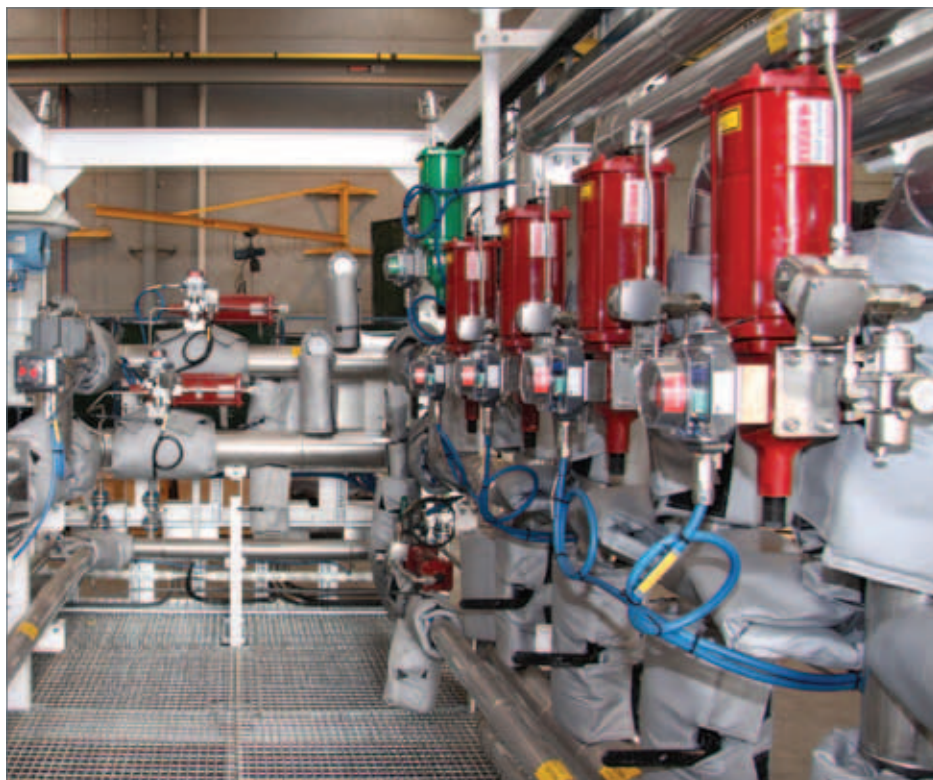


In one of the latest contract successes with Australian based Gasco Pty Ltd, Rotork Fluid Systems (Australia) has completed a valve actuation project involving fuel gas valve trains and control skids for three API 560 gas fired direct heaters.

Designed for gas plant and refinery processes, Gasco API 560 heaters generate hot combustion gases that transfer their heat to a process liquid or gas flowing through internal coils. A typical heater consists of a radiant section, convective section, stack, burners, fuel skid and control system. Rotork Fluid Systems' contract has encompassed the supply of CP and GP Series pneumatic actuators for valve automation, together with the design and manufacture of valve mounting hardware, assembly, testing and local support.

These services are assisted by Rotork Fluid Systems' comprehensive workshop facilities in Bayswater, where Gasco has recently established a new manufacturing plant. Gasco heaters, skids and other process equipment items are designed entirely in-house at the company's Bayswater office. The location of this project is a gas plant in a central Asian republic, to where the three skids have been exported for connection under Gasco field supervision to three 19MW thermal heaters manufactured for Gasco in Malaysia. The contract continues Gasco's success in export markets including the Middle East and Asia. During 2009 Rotork Fluid Systems' support for this success included the Pluto (Woodside Energy) and Mortlake (Origin) projects in Australia and the Dolphin Energy (Total) project in Abu Dhabi.

Asian gas plant contract continues Rotork's success with Gasco



Rotork CP Series pneumatic valve actuators installed on one of the Gasco API 560 heater skids.

LNG pipeline contract extends Rotork's activity in Angola



In the latest of a series of contracts for projects in the area, Rotork Fluid Systems is supplying pneumatic and electro-hydraulic valve actuators with a value in excess of one million Euros for the onshore liquefied natural gas pipework network in Angola (AnLNG).

The pipeline network consists of gas gathering and transportation systems designed to deliver gas from several offshore oilfield developments to an onshore LNG processing plant at Soyo. Three pipelines are under construction, each consisting of an offshore, near-shore and onshore segment. The Rotork actuators for the latest contract will operate high pressure ANSI Class 2500 ball valves in 12,

18 and 24 inch sizes and 22 inch ANSI Class 1500 ball valves for the onshore sections of the pipelines. Applications include pipeline ball valves, emergency shutdown (ESD) service valves and shutoff valves.

This latest contract follows several others recently awarded to Rotork Fluid Systems for the Angolan offshore oil and gas industry. At the beginning of 2009, more than 500 pneumatic actuators were ordered for the Pazflor FPSO, a mega floating production, storage and off loading vessel that will operate in Block 17 of the offshore Angola field. Previously, orders for Rotork pneumatic actuators have included the Kizomba A and B FPSOs, which operate in the Block 15 offshore field.

One of the Rotork electro-hydraulic actuators supplied to Angola.

Fast track performance achieves *ten week delivery for sub-sea valve actuators*

Ordered for the Turkmenistan Block 1 Gas Development Project in the South Caspian Sea, the actuators will operate ANSI Class 150 ball valves in sizes 6 inches and larger. The quarter-turn actuators utilise the rugged Rotork RH rack and pinion centre body design in sizes 120 and 240.

All the actuators are equipped with pressure compensation systems and ROV (remotely operated underwater vehicle) receptacles for the rotary tool operation of mechanical override systems. The fast-track order is the latest in Rotork's extensive reference list of sub-sea valve actuation projects,

stretching back to 1992. The company has successfully completed hyperbaric testing of its sub-sea products at simulated depths of 2500 metres.

The Turkmenistan Block 1 Gas Development Project is being undertaken by a subsidiary of the Malaysian oil and gas company Petronas and will comprise two delivery platforms, one riser platform, an onshore gas terminal and associated pipelines.

Rotork subsea valve actuators for Turkmenistan Block 1, ready for despatch from the Rotork Fluid Systems factory in Lucca.

Rotork Fluid Systems has successfully completed the delivery of forty-four specially customised hydraulic valve actuators for sub-sea installations in only ten weeks from receipt of order.



Underground gas storage has provided one of the latest success stories for Rotork valve actuators in the Baltic country of Latvia.

The unique geological conditions in the country are ideal for the underground storage of natural gas, for both the country's domestic use and for gas en-route from Russia to other Baltic countries.

These facilities are being developed to secure the supply of natural gas to Baltic countries by the upgrading of existing facilities. Capacity of the storage site at Incukalns is 4.4 BCM (Billion Cubic Metres) after reconstruction. This project has involved the installation of 330 IQ and IQT ATEX certified explosionproof intelligent electric valve actuators, in contracts awarded to Rotork's Latvian agency Rino TK. The majority of the actuators operate ball valves controlling the receiving of the gas and its injection into

Storage project *secures gas supplies in Latvia*

the storage wells. Additional IQM modulating actuators are installed on ball valves in the site's metering plant. All actuators are connected to PLCs and controlled by a centralised SCADA system designed and manufactured by Olimps.

The larger, gas receiving ball valves, in sizes up to 1000mm, are operated by IQ actuators in combination with IW quarter-turn gearboxes manufactured by Rotork Gears. Smaller ball valves are operated by IQT direct drive quarter-turn actuators. Experience with Rotork actuators in Latvia, combined with a reputation for

quality, ease of installation and value for money, contributed to the decision to specify the IQ and IQT actuators at Incukalns. Equally important, the presence of dedicated and expert local support provided by Rino TK offered additional assurance to the customer and end-user.

The plant upgrade at Incukalns has been carried out by OAO Giprospepgaz, a specialist subsidiary of OAO Gazprom, Russia's largest extractor of natural gas. The four part project commenced in 2004 and was completed in 2008.



Rotork IQ intelligent electric valve actuators installed on the gas injection plant at Incukalns.

New Rotork plant in India *expands local and worldwide manufacturing capacity*

The recent Open Day at the brand new Jigani factory in India heralded the commencement of operations at Rotork's eighteenth worldwide manufacturing facility.

The extensive, state-of-the-art Jigani plant, situated in Bangalore, is in a new factory development area that is attracting an increasing number of leading multinational companies. The Rotork plant is providing additional manufacturing capacity for the burgeoning Indian valve actuation markets, complementing the existing Rotork factory at Chennai, which is also receiving substantial investment for expansion. The Jigani plant is designed to manufacture product ranges from Rotork Controls, Rotork Fluid Systems and Rotork Gears, including two assembly lines for the local manufacture of the world-beating IQPro intelligent electric actuator range.



Rotork's Jigani Factory.



Work in progress on one of the IQPro production lines.

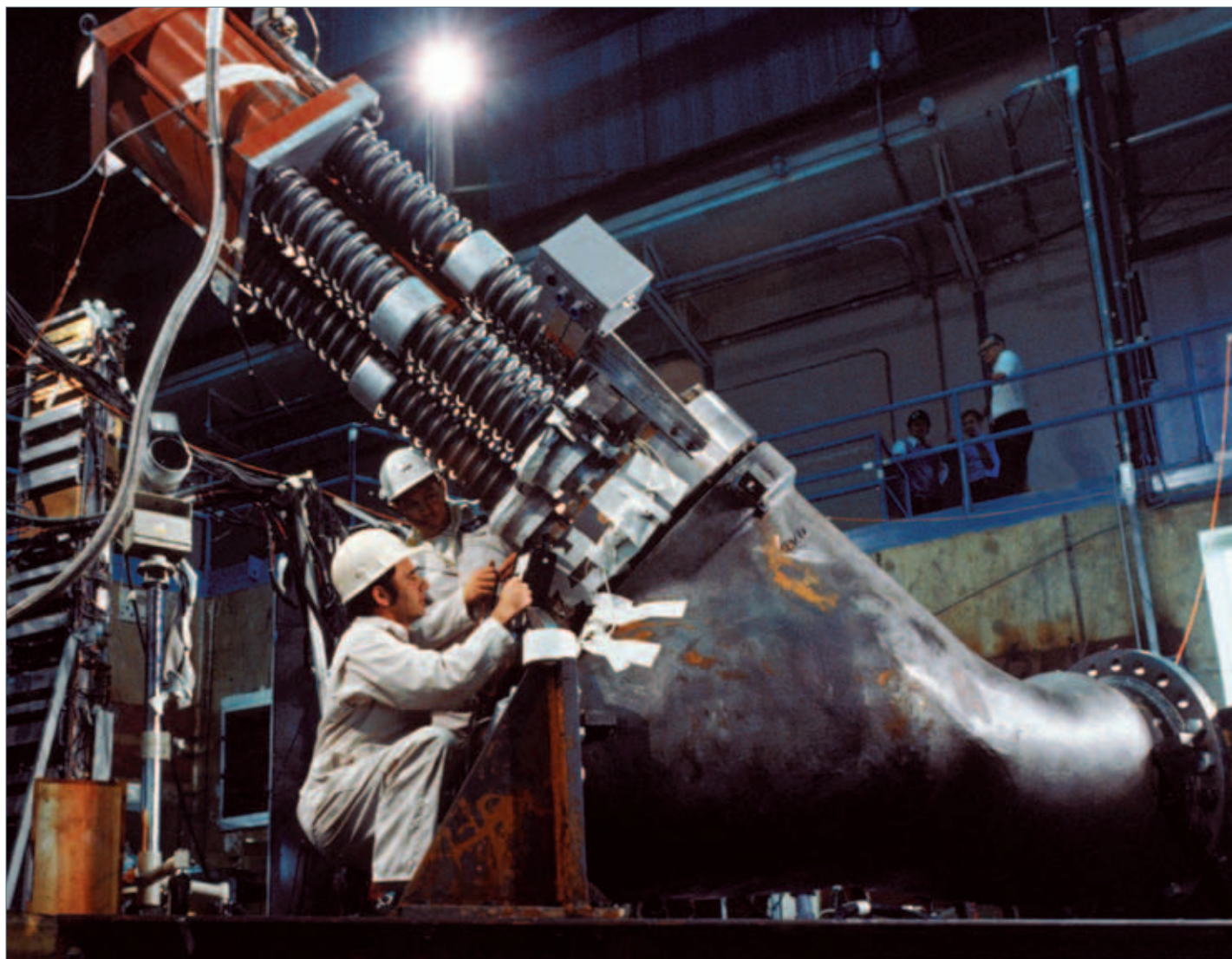
In addition to the manufacturing plant, new sales and service facilities at Jigani will provide increased support for Rotork's customers in India. Many of these customers from the oil, gas, power generation and water industries were able to attend the Open Day and view first-hand the latest evidence of the comprehensive and extensive investment in the future of the Indian economy that Rotork is making.



Carlos Elvira, Rotork Sales Director (above left), in discussion with important customers at the Open Day.



Nuclear qualified fluid power valve actuators *complete Rotork's power industry product range*



The acquisition of Ralph A. Hiller Company Inc. (Hiller) enables Rotork to add an established range of nuclear qualified fluid power valve actuators to its existing comprehensive electric actuation capabilities in the nuclear power industry.

First established at Pittsburgh, Pennsylvania in 1950, Hiller began the production of actuators for the nuclear industry in 1968. The company can now claim a large installed product base within the USA and throughout the world. Hiller's nuclear product range encompasses rotary and linear

pneumatic and hydraulic actuators, in double-acting and spring-return configurations, together with specialised linear hydro-pneumatic actuators designed to deliver very precise speed control.

Applications include main steam isolation valves, feed water isolation valves, HVAC system dampers and balance of plant auxiliary systems. Quality assurance for these products conforms to 10 CFR 50 APP B, 10 CFR 21, ANSI N45.2 and has been audited by both NUPIC and NIAC. Environmental and seismic qualifications comprise IEEE 323, 344 and 382. Hiller supports its

Testing being carried out on a main steam isolation valve (MSIV) fitted with a Hiller hydro-pneumatic actuator for installation on a boiling water reactor (BWR).

actuation products with a stock of factory original parts to ensure a swift response to the demands of safety related applications. Maintenance, field service and training are also provided, together with a comprehensive refurbishment service for complete hydraulic and pneumatic systems. Hiller products will sit within the Rotork Fluid Systems Division and be sold through existing sales channels as well as Rotork's worldwide network of offices and agencies.

Alex Busby, Rotork Fluid Systems Managing Director, explains: "The acquisition of Hiller will enable Rotork to establish a Centre of Excellence for nuclear industry products. As well as being a significant addition to Rotork Fluid Systems, Hiller is also a key element in the completion of our portfolio of Rotork Group products."

For more information on Ralph A. Hiller contact:
alex.busby@rotork.com

Rotork Site Services' comprehensive extended scope abilities have enabled new valves with the latest IQ intelligent electric valve actuators and Pakscan 2-wire digital control to be installed in a vital upgrade project at a BP tank farm.

The BP storage tank farm at Lyon in France consists of nine storage tanks with a total capacity in excess of 60,000 cubic metres. The plant's inlet and outlet valves utilise Rotork electric actuators, whilst the fire fighting water main was, until recently, equipped with Profibus-enabled valve actuators from a French manufacturer. BP contacted Rotork with a view to improving the level of reliability and the maintenance service for all the actuators on the site.

Rotork's engineers convinced BP that the installation of Rotork IQ intelligent electric actuation technology with Pakscan 2-wire digital control on the fire fighting water main would provide the security and reliability demanded by the application, as well as meeting BP HSSE standards. Rotork actuators with Pakscan control have been widely adopted in BP tank farm installations in Europe and elsewhere since the first Pakscan system was launched in the 1980s.

Many of these installations have been subsequently upgraded with IQ actuators and the latest Pakscan P3 network. In addition, the comprehensive scope of supply available from Rotork France would enable the new actuated valves and control system to be supplied as a complete, factory-fitted and tested package, simplifying the whole contractual process.

New butterfly valves were therefore free-issued to Rotork's Site Services workshop

France: *Site Services package secures vital actuation and control upgrade for BP*



for motorisation with IQT actuators in two contract phases, each involving 30 valves. The Rotork Pakscan P3 digital control system was also supplied in the first phase of the contract and has been commissioned by Rotork service

engineers. Following the success of the Rotork Site Services package, Rotork is now negotiating a two-year maintenance contract for the BP site, including the Rotork actuators on the inlet and outlet valves.

Norway: *Service engineering synergy on the North Sea*



The successful supply and support of Twin Power and RH range actuators installed on the Norwegian Gjoä Platform in the North Sea has been assured by Site Services synergy between three Rotork companies.

This has enabled one field service engineer from Rotork Sweden to service his own company's Twin Power actuators and the RH units supplied by Rotork Fluid Systems in Italy, for which he received training en-route to the platform from the Exeeco facilities in Leeds.

The result has been a swift, economical and efficient service for the customer, enhanced and delivered by the organisational abilities, experience and capabilities of Rotork Site Services staff at three separate locations.

The Norwegian Gjoä Platform in the North Sea.

COVER STORY



Qatar: *Local expertise for servicing and site commissioning at Qatargas LNG*

Rotork's agent in Qatar, Petrotec, has signed a service agreement with the Chiyoda-Technip joint venture main contractor to provide Rotork trained service engineers for site commissioning and servicing of Rotork actuators at the giant Qatargas LNG project at Ras Laffan.

During the past three years alone, Rotork companies in France, Iberia

and Italy have supplied over 700 IQ and IQT intelligent electric actuators on numerous Qatargas projects. Rotork Fluid Systems is also a major supplier of actuators for the Qatargas programme.

In the photograph, a service engineer from the Petrotec Service and Technology Centre is seen commissioning IQ actuators on Train 6 in the Qatargas 3 project.

Thailand: *CVA upgrade at ESSO Lumlukka*

The new Rotork CVA control valve actuator, combined with Rotork's local site service capabilities, has impressed staff at the ESSO plant in Lumlukka, Thailand.

ESSO was having problems with a competitor's electric actuator of USA origin which was proving to be unreliable. To add to their problems there was no local support for either the supply of spare parts or on-site servicing. The decision was therefore taken to replace it, giving Rotork Thailand the opportunity to demonstrate the advantages of the new CVA actuator range.

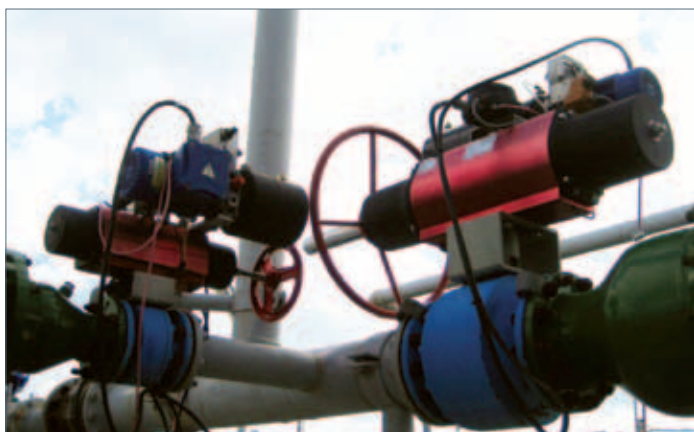
ESSO's confidence in the Rotork brand contributed to the decision to adopt the innovative CVA technology for this upgrade, which was fulfilled by the supply of a CVQ 1200 quarter-turn actuator.

ESSO was then further impressed by the Rotork Thailand Site Service team's ability to retrofit the new actuator and commission it non-intrusively using a PDA within a total time of less than two hours. The success of this retrofit project, has, it is hoped, opened the door to similar upgrades for ESSO and other companies in Thailand in the future.



Before and after retrofit and non-intrusive commissioning of the CVQ1200.

Romania: *Tank farm safety and environmental upgrades*



On-going upgrade programmes for increased safety, reliability and cost effectiveness for Petrom OMV tank farms in Romania have involved the supply of RCE-SR failsafe Ex electro-hydraulic actuators with integrated manual override, manufactured by Rotork Sweden.

The RCE unit consists of a hydraulic spring return actuator with manual override, electric motor, hydraulic pump and tank. In the event of an emergency, the valve fails closed

or open automatically with the aid of a return spring in the actuator. Another purpose of the upgrades is to ensure compliance with today's strict environmental regulations.

The valve actuation equipment has been successfully installed by Syscom, one of Rotork's Romanian partners. In some areas the RC equipment has now been running for over two years and has been praised by the end-users and maintenance staff for its robust design and trouble-free operation.

Rotork CVA provides *electrically actuated solution for automated sewage treatment control valves*

Rotork's CVA control valve actuator has provided a successful all-electric solution for the automation of the biological treatment process at a municipal sewage works in Sweden. The CVA was selected by Mälarenergi, the city-owned electric power and district heating provider for Vasterås, who also operate the sewage treatment plant.

The application involves the biological aeration process at the plant. Previously, two valves were installed in series on each air line, one electrically actuated and one manually operated. The electric actuator's duty was to fully open or close the air line whilst the other valve was manually operated to regulate the flow of air into the aeration channel when the air line was open.

The CVA upgrade, replacing the existing actuator, now provides fully automated control with only one valve by regulating its position from a 4 – 20mA control signal. This enables the aeration process to run with increased efficiency, with reduced air wastage



and reduced manpower – the last factor being particularly welcome during the depths of the Scandinavian winter.

The CVA provides very precise electric control valve operation, with repeatability and resolution performance achieving less than 0.1% of full scale. The actuator also features a built-in super-capacitor, providing an advanced and programmable method of fail-to-position protection. Quick and easy commissioning and adjustment is achieved by wireless Bluetooth communication technology, whilst an integral data-logger stores an extensive record of operational and maintenance information, including valve torque profiles and dwell times.

Rotork's agent in Sweden, Alnab Armatur AB, originally demonstrated the benefits of the CVA to Mälarenergi and has now received an order for six model CVQ-1200 actuators for fast-track delivery to the plant.

Left: The first of the CVA control valve actuator installations at Mälarenergi.

SM-6000 secures *high speed damper control*

Enel is Italy's largest power company, and Europe's second listed utility by installed capacity. It is an integrated player which produces, distributes and sells electricity and gas.

The Enel Eugenio Montale Coal Power Station was updated in 2000. The original actuators from an Italian manufacturer were replaced with the

same company's latest design but these proved to be too slow for the required modulation of the dampers on the induced draft fan of the burner. SM-6000s have now been installed for exact positioning, critical for combustion chamber vacuum control to prevent the boiler and station from implosion. The Rotork SM-6000 Series is ideal for dampers,

vanes, valves and other process control applications requiring high speed, high torque and exact positioning control.

The Rotork SM-6000 high speed modulating electric actuator for valves and dampers.



CVQs at *El Paso Exploration and Production*

The El Paso Exploration & Production Company uses water flooding, a method of secondary recovery in which water is injected into the reservoir formation to displace residual oil at their Wyoming locations in the Rocky Mountains.

The company purchased CVQ-1200s mounted on small choke valves to control water flood flow

CVQ actuator mounted on a small choke valve to control water flood flow.

at five different oil field well sites. The reasons for selecting the CVQ included the configurable fail-safe capability, wireless Bluetooth setup, compact size and unlimited modulating ability.

As one of North America's largest independent natural gas providers, the El Paso Exploration & Production Company is involved in the entire exploration and production value chain.

Italy: Factory retrofit upgrade delivers *improved partial stroke test performance for refinery actuators*



Rotork Fluid Systems has successfully completed a project to retrofit improved partial stroke testing capabilities on heavy duty pneumatic valve actuators installed at a major European oil refinery.

The fourteen Rotork GP range quarter-turn valve actuators were originally supplied to the Raffineria Milazzo on the north coast of Sicily in 1995. Occupying an area of 212 hectares, the site is one of the most complex refinery facilities in Europe, producing high quality, low sulphur products. In 2008 the refinery contacted Rotork to request upgrading the performance of the

electrically operated partial stroke testing systems that had been fitted to the actuators when they were first supplied.

Partial stroke testing enables the performance and condition of infrequently operated valves to be monitored without fully closing them, in plant areas where such closings would disrupt routine plant operations.

The original partial stroke testing systems were in need of mechanical and electrical modifications to improve the precision of their performance in line with increased operational efficiencies in the

Rotork Fluid Systems Production Engineering Supervisor Anselmo Nicolini (left) and Service Manager Marco Ciardella on site at Raffineria Milazzo with some of the upgraded Rotork GP Range actuated valve installations.

refining processes. To achieve this, all fourteen actuators were disassembled and shipped to the Rotork Fluid Systems factory at Lucca, where they were modified and repainted, before being returned to site and refitted within a total timescale of approximately four weeks.

The modified partial stroke test systems are now initialised by selecting the test mode and operating a pushbutton on a new control box for each actuator.

The pushbutton activates a solenoid valve to release air from the actuator cylinder until it reaches a preset position of 15 degrees in the closing direction. At this point a newly fitted limit switch disengages the closing direction solenoid and activates the open direction solenoid to enable the valve to return to its fully open position. In this way, the valve is never allowed to travel beyond the 15 degree closing position, which would compromise the plant process and potentially shut down the refining reactors.

Rotork assists *Dwr Cymru Welsh Water's drinking water improvement programme*

Welsh Water is investing £200 million to upgrade its water treatment works across Wales by 2015. This includes the water treatment plant at Cwellyn, where Rotork intelligent electric valve actuators have been installed to control the flow through a new state-of-the-art extension to the works.

The new plant at Cwellyn has been designed and built by Black & Veatch Ltd, one of Welsh Water's Asset Management Alliance partners for water supply capital investment schemes.

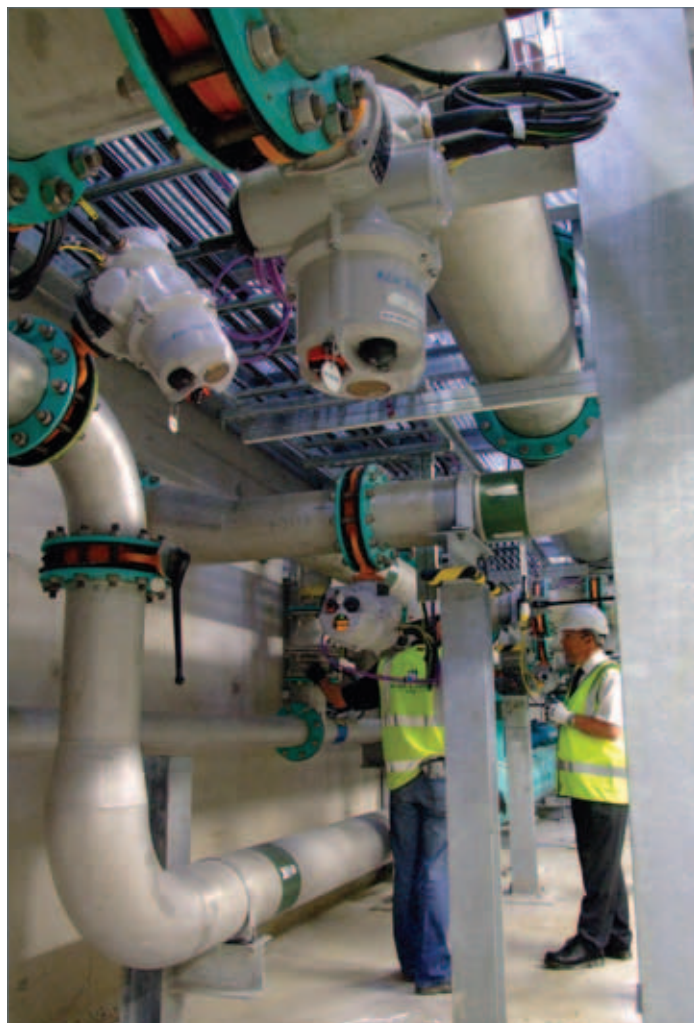
The new treatment regime is designed to clarify the water before it enters the existing works in order to deal with changing raw water conditions and consistently meet all water quality standards. Rotork IQT direct drive quarter-turn intelligent electric actuators have been installed to operate butterfly

valves controlling the flow of water throughout the new treatment plant. Patrice Nadouce, mechanical engineer for Black & Veatch at Cwellyn, explained that Rotork was selected following a competitive bidding process.

The selection criteria included value for money, reliability, low cost of ownership and operator familiarity. All the Rotork IQT actuators are Profibus DP-enabled and linked to an existing distributed control system (DCS) on five two-wire bus networks.



Rotork IQTM modulating actuator controlling a steady flow of water into the DAF plant during the flushing operation, when the water level in the filter is raised to enable floating effluent to escape over a weir.



Rotork IQT actuated valves on the pipework controlling the operation and backwashing of the RGF plant.



The state-of-the-art, low pressure Ultra Violet disinfection plant installed at Cwellyn.

The operation of the plant is supervised by a SCADA system designed by Oasis Engineering Ltd.

Water from Llyn Cwellyn, some two kilometres distant, gravitates to the new treatment plant at a rate of up to 850 m³/hour. The flow initially passes through inlet static mixers where coagulant is dosed to maximise the performance of the DAF (dissolved air flotation) process. The flow is divided into three identical DAF streams, which consist of one Flocculator followed by one DAF cell where particles in suspension are floated to the surface to form a sludge blanket.

The clarified water is then filtered through first stage RGF

(rapid gravity filtration) before being pumped to the existing treatment works through Ultra-Violet disinfection to deactivate cryptosporidium.

The Rotork IQT actuators, including some modulating units, control all valve operations including the inlet works flow control, automatic desludging of the DAF cells, automatic backwashing of the RGF plant and the plant treating the effluent created by the clarification and filtration processes.

The successful completion of the upgrade project at Cwellyn will safeguard the drinking water quality for 70,000 Dwr Cymru Welsh Water customers in the Caernarfon area.

Rotork's innovative CVA electric control valve actuator has been introduced to solve a problem involving pump wear and resultant maintenance expense in the de-chlorination process at water treatment plants at Edmonton in Canada.

The E.L. Smith Water Treatment Plant is operated by EPCOR Utilities Inc. and produces up to 400 ML/D (million litres per day) of drinking water.

To meet provincial environmental regulations, the site has recently installed a de-chlorination process involving the injection of sodium bisulphite (NaHSO₃) into residual water that is returned to the river after the treatment process.

The de-chlorination process improves the environmental performance of the plant and EPCOR was keen to introduce the same process at its nearby Rossdale Plant, which has a drinking water treatment capacity of approximately 280 ML/D. However, the plant at E.L. Smith was utilising a series of pumps that were proving to require considerable

Rotork CVA actuator *introduced to solve dosing pump wear problem at water treatment plants*

maintenance due to excessive wear on the soft rubber internal parts.

Process specialists from water treatment experts Stantec proposed replacing the pumps with control valves using the Rotork CVA, a precision electric actuator with manual override and fail-to-position capability, for the de-chlorination chemical injection control. EPCOR has therefore proceeded with a pilot plant at E.L. Smith that will test the performance of CVA operated control valves and their response within the designed operating range.

Three Rotork model CVL-500 linear actuators have been mounted on Bauman 24000SB Series valves installed at E.L. Smith for the pilot project. One is replacing a pump sitting beside an existing unit and is operating in the main plant.



The other two (pictured above) are mounted in a test loop using a same split range configuration that will be used at Rossdale to handle flows ranging from 0.0138 litres/minute to 30.6523 litres/minute.

The valves will have a Cv of 0.1 and 2.5 respectively. The CVA actuators will be programmed to adjust valve position in response to flow meter data collected from the residual water flow line.

Rotork's distinctive bright red hot air balloon is a familiar sight in and around the company's home city of Bath, where employees and their guests are able to take advantage of pleasure flights.

Record breaking 'Long Jump' flight for Rotork's hot air balloon



Purchased as part of Rotork's 50 year birthday celebrations in 2007, the balloon serves charitable functions and travels to balloon fiestas in the UK and Europe. Recently Rotork's balloon team has won the 'Long Jump' award, an annual competition open to all comers to achieve the longest distance flight from anywhere to anywhere in the UK. The Rotork balloon beat twelve other teams to win the coveted 'Long Jump' trophy. The balloon is piloted by Rotork Systems Engineer Mark Dunstan-Sewell, who on this occasion was co-piloted by Rotork's Operations Director, Alastair Spurr. Taking off from Jacobstowe in Devon, the balloon was in the air for six hours, completing 230 miles at a maximum height of 6250 feet before landing at Sutton Bridge in Cambridgeshire.

The landing, at 40mph in a newly ploughed field, was the most potentially hazardous event in the adventure, the balloon basket ploughing its own 250 yard furrow before finally coming to a halt and enabling the two, by now slightly bruised, Rotork balloonists to be re-united with terra firma.

Nuts!...or...*what the helix!*

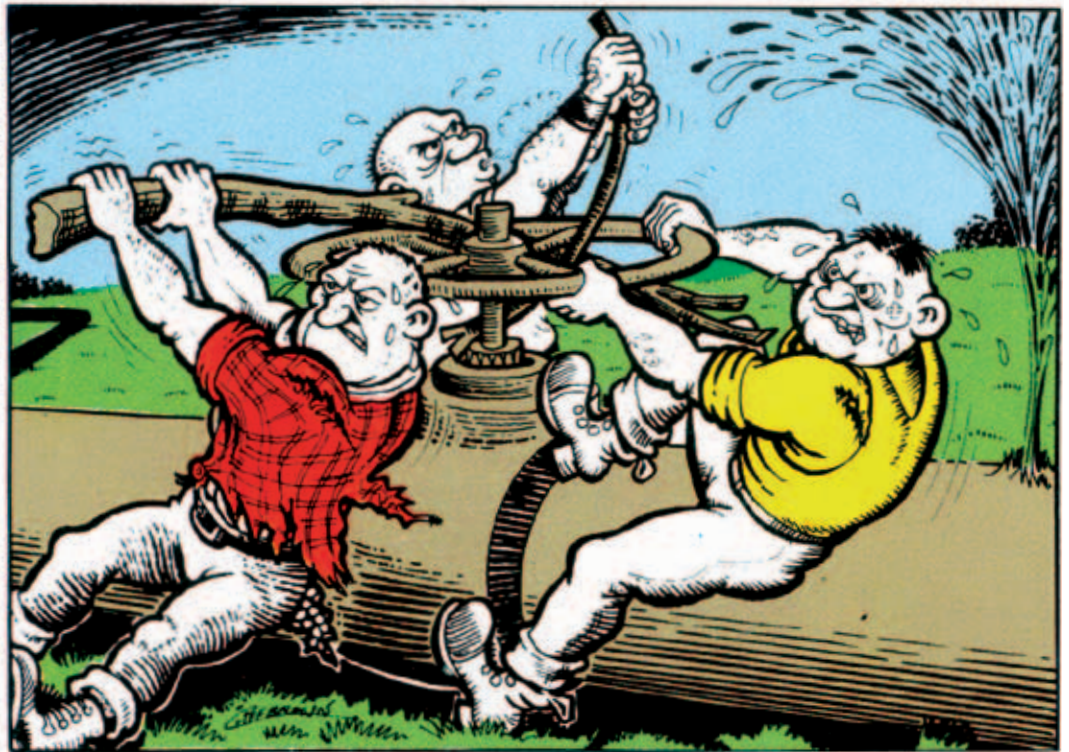
Everybody knows that the majority of valves and gates are operated by a threaded nut and screw mechanism. Nearly everybody appreciates that by this means you can obtain a large thrust from a moderate torque, and also lock in position. Many people realise that if the thread angle, or lead, i.e., lift per turn, is too great the nut will not lock in position. Those who went to Technical College recently remember this has something to do with mechanical efficiency. The few involved in sizing motor actuators know that the lower the lead, the lower the torque required and the less expensive the actuator, but with correspondingly low stroking speed as a result.

Hardly any of us stop to question what actually goes on in the nut as a result of the final decision. Hand operation is so slow and intermittent that there is no problem other than finding someone willing and able to wind the wheel. In the majority of cases of motorised valves of moderate size and intermittent duty, it doesn't matter all that much. But when you come to large motorised valves or sluice gates, stem nut efficiency, or lack of it, becomes critical.

Example

Let's take a practical example of a really big sluice gate with a high lift, like 12 feet, and an unseating thrust estimated at 150,000 lbf. The manufacturer is using a $3\frac{3}{4}$ " diameter thread stainless steel stem, and wants to achieve 12" per minute motor operation via a thrust-bearing gearbox of suitable ratio. Let us ignore the actuator implications, and concentrate entirely on the gearbox output requirements at the stem nut. Because it is a standard as far as he is concerned, the manufacturer suggests using $\frac{1}{2}$ " lead thread.

The first in a series of articles designed to explain the various aspects of successful valve actuation. Here, we take a look at threaded valve stems.



From our standard data we note that for a $3\frac{3}{4}$ " diameter stem with $\frac{1}{2}$ " lead on an exposed sluice gate, we required 0.035 lbf ft per lbf thrust, which gives us $150,000 \times 0.035 = 5250$ lbf ft at the stem nut. To operate at 12" per minute, the nut must turn at 24 rpm - So far, so good. All the lifting will be done at the stem of the nut. If it fails, a lot of gate may hit the deck with a shock, which will worry seismologists from San Francisco to Siberia.

So how long will it last? That 150,000 lbf load was a maximum; what the average load will be through a lifting stroke we can only guess at in the absence of specific data; let's assume it averages one third of maximum, i.e. 50,000 ft lb per minute. But how much work are we putting in to the stem nut?

This will be $2 \times \text{rpm} \times \text{torque}$. Again we assume one third of maximum torque i.e. 1,750 lbf ft. So the work done is $6.28 \times 1,750 \times 24 = 263,760$ ft lb. per minute. But all we are getting out is 50,000 - what has happened to the other 213,760?



Photographs courtesy of Severn Trent Water.

It has all gone into wearing out the nut! Over four times as much as lifts the gate!

We can restate this as almost 6.5 horsepower or 5kW of energy being dissipated in the nut for the whole 12 minutes the gate is lifting. The heat generated at the nut will obviously be considerable and will break down the lubricant film, which will lower the efficiency further and generate even more heat. So it is most unlikely that any nut would last more than a few strokes of the gate.

So let's try improving the efficiency by doubling the stem lead to 1". The output work done remains the same. The torque required for our average 50,000 lbf has increased to 2,000 lbf ft a surprisingly small increase owing to the improved thread efficiency. But to obtain 12" a minute we can now drop the nut speed to 12rpm. So the input work falls to $6.28 \times 2,000 \times 12 = 150,720$ ft lb per minute. So the difference is now 100,720 ft lb per

minute, 3 horsepower or less than 2.3kW. So we halved the power dissipation at the nut by doubling the lead. Mind you, it is still a lot of power, so nut life will depend very much on selection of compatible materials, which is not easy where stainless steel is involved.

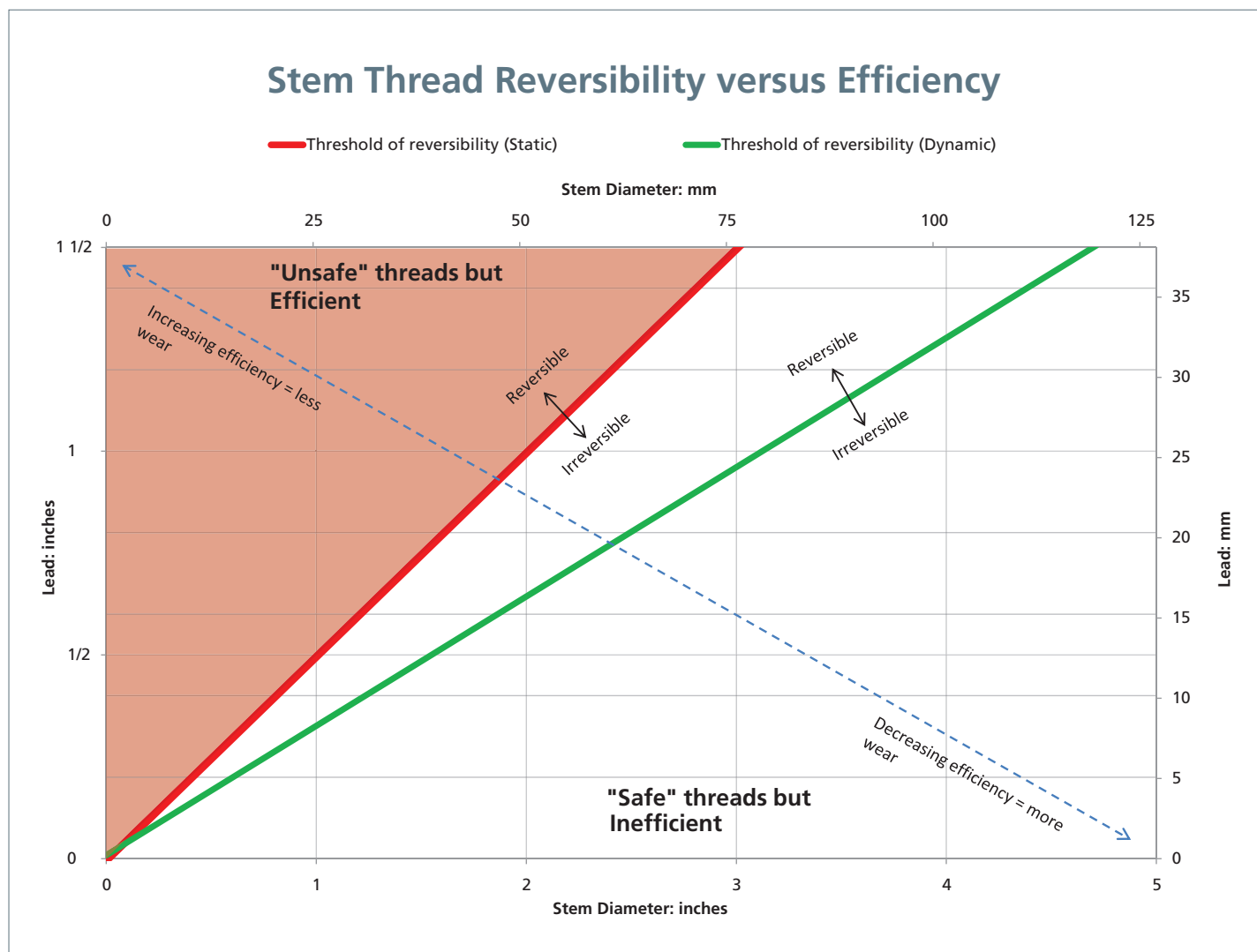
So why not increase the lead even further? The problem is that we then run the risk of becoming too efficient, and approach the threshold of reversibility. The graph shows the relationship between the stem lead and diameter, and the point at which reversibility is likely. It is clear that a 1" lead on 3³/₄" stem is irreversible, but that increasing it to 1¹/₂" lead, for instance, would bring it to a point at which it would become statically irreversible, but dynamically reversible.

In other words, as long as the nut was not turned, it would lock in position, but starting the nut turning might be sufficient to enable the load to take over



and run out of control. There is obviously a practical limit to the use of nuts and screws to operate heavy sustained loads over long strokes. The only general rule is that the higher the stem nut efficiency within the limits of

dynamic reversibility, the lower the power loss at the stem nut, and the better the life which will be achieved. Ideally the lead should aim to be 1/3 of the stem diameter – or as close to the green line as possible in the following chart.



rotork.com - Rotork's 'encyclopaedia' of valve actuation!

Rotork's new and upgraded website has been designed to present an image of the company that truly reflects Rotork's unrivalled world-class status and reputation, but beauty is not just skin deep at rotork.com

Designed and produced with the collaboration of media experts, the site pushes the boundaries of web technology to deliver easily accessible, user friendly functionality encompassing every area of company activity. The comprehensive scale and scope of the information available from the website can be gauged by the fact that a team of twenty people, inside and outside of Rotork, are involved in maintaining and updating a list of contents ranging from an actuator/gearbox sizing guide to worldwide vacancies and a delegate booking system for open days and events.

Functionality based on customer feedback

Functionality starts on the clearly laid out new homepage, from where the majority of the tools, resources and features are swiftly accessible. Over the years, these have been constructed and honed in direct response to feedback from customers and the Rotork sales network. The range of resources is designed for internal and external usage to assist and facilitate all aspects of worldwide company activity. For Rotork staff, distributors and agents, these resources include some striking new features, such as the actuator sizing guide.



Web Home – The new Rotork Website Home Page.



Web Documents – One page from the extensive document download menu.

Supporting Documentation

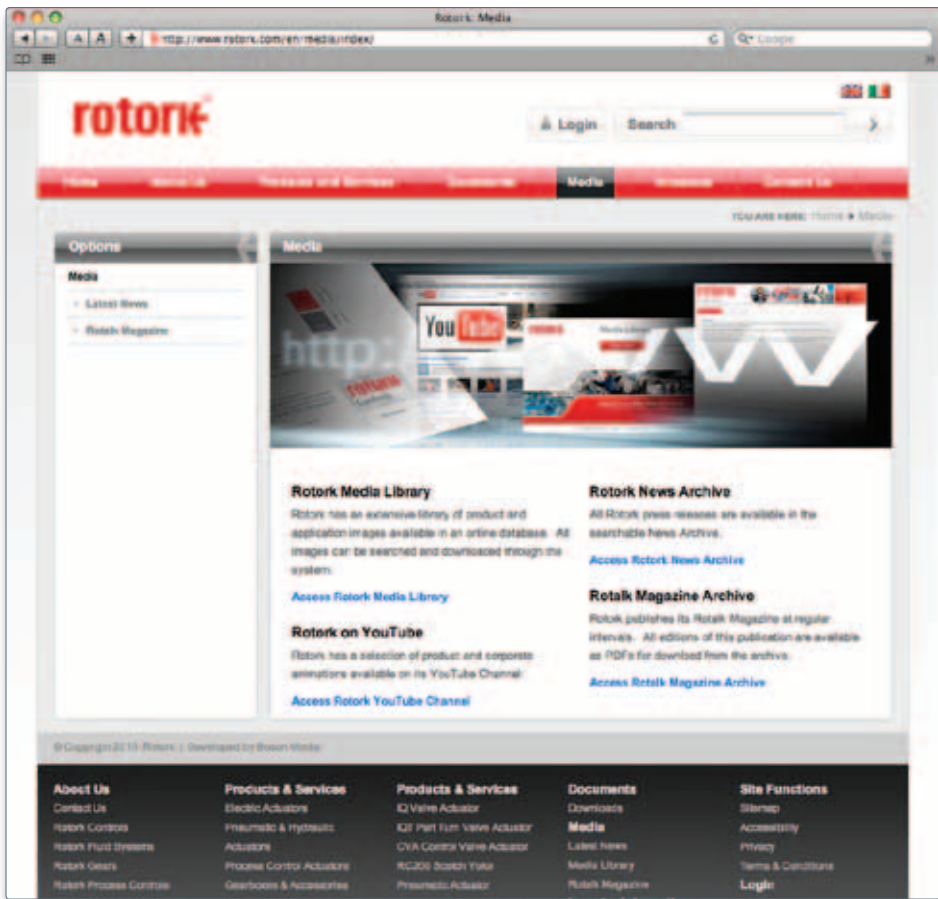
With over 4,000 Brochures, Engineering documents and User Manuals available for download from the Documents area of the website, Rotork customers can count on instant access to a full range of supporting documentation.

Other resources available on the website include IQ Insight and CVA Enlight software packages for actuation commissioning and predictive valve maintenance programming, as well as the language modules for multilingual IQPro actuators.

The new media centre, displaying the latest company news, is complemented by a comprehensive photo library and a link to Rotork's own YouTube channel where an archive of corporate and product animations, and a selection of 'How to' guides can be viewed. <http://www.youtube.com/user/rotork>

Rotork media news from around the world

ROTORK MEDIA NEWS



Web Media Index - featuring links to Rotork Media Library, Rotork on YouTube, Rotork News Archive and Rotalk Magazine Archive.

Global Network

The global locator encompasses the entire network of Rotork offices, distributors and agents, enabling users to reach local contacts directly with their enquiries and requests. The whole web package is supported by expanded information about the Rotork group, the divisions and companies, history, key people, exhibitions attended etc, as well as a comprehensive section for investors.

Currently published in English, Italian, Japanese and Korean, the website will soon be rolled out in further languages, including Chinese, Spanish, French, German and Russian.

In future editions of Rotalk we will publish further articles, focused on specific features of the website. In the meantime don't forget to have a look at these additional highlights:

E-Learning, a valuable resource

The new E-Learning section is aimed at anyone needing to commission and use Rotork actuators and associated equipment. A growing list of modules can be run as live exercises by clicking on the appropriate link.

Special product animations

Currently featuring the CVA control valve actuator and the SVM smart valve monitor for partial stroke testing, these animations bring innovative products to life to illustrate design benefits and functions.



Web product design - Features and benefits of Smart Valve Monitoring and CVA are explained with animated presentations.



Web E-Learning - The CVA control valve actuator is one of the E-Learning subjects.

Rotork pipeline actuators *in project to provide improved energy for Brazil*

CONTRACT NEWS

Rotork Group contract news from around the world



Rotork HPG range high pressure gas pipeline valve actuators feature in the photographs of the President of Brazil at the official opening ceremonies for the Urucu-Coari-Manaus pipeline (left) and the Gasene pipeline (above).

Rotork pipeline valve actuators have been supplied for a new transportation network that has heralded a fundamental improvement in the use of energy products in the Amazonian region by enabling natural gas to be used instead of diesel and fuel oil, particularly for the generation of electricity.

To date, over one hundred Rotork HPG high pressure gas and EH electro-hydraulic actuators have been installed on the pipeline network. The inauguration of the 661 kilometre Urucu-Coari-Manaus gas pipeline portion of

the project marks the beginning of operations for one of Brazil's largest gas transportation projects. The significance of the project has been endorsed by the presence of the President of Brazil, Luiz Inacio Lula da Silva, at the official opening of the pipeline at the Refinery Isaac Sabbá in November 2009.

The Refinery Isaac Sabbá is the first to receive natural gas from the Solimões Basin, Brazil's second largest reserve, estimated at 52.8 billion cubic metres. The new gas pipeline's initial transportation capacity is 4.1 million cubic metres per day, which will rise to 5.5 million

during 2010 when two intermediate compressor stations between Urucu and Coari come on-line. The pipeline is operated by Transpetro and, as with the company's other pipelines, is designed for remote, automated control from the National Operational Control Center (CNCO) in Rio de Janeiro.

In March 2010 President Luiz Inacio Lula da Silva was also present at the opening ceremony for the Gasene (Southeast – Northeast Gas Pipeline Integration) section of this major project, together with Jose Sergio Gabrielli, the President of the Brazilian oil and gas company

Petrobras. More Rotork actuators are installed on this part of the project, including the 303 kilometre GASGAV pipeline, where actuators have been supplied by Rotork Fluid Systems representative Superquip Oil & Gas.

At the opening ceremony the President of Brazil stressed the importance of investment in research for the development of the country, adding: "This project is remarkable because it leads to the Northeast the same opportunity to use clean energy that the South has, in addition to developing local industry".

German water company *specifies Rotork's latest intelligent electric valve actuation technology*

Rotork IQPro intelligent electric valve actuators have been specified for a drinking water supply upgrade project for the benefit of two million consumers in the Harz Region of northern Germany.

Rotork IQ isolating and IQM modulating actuators are being installed for the control of reservoir and dam valves at Ecker and Ederdam in a project undertaken by Harzwasserwerke.

The IQM actuators are operating specialised needle valves of German manufacture demanding highly accurate positioning and IP68 watertight and temporarily submersible environmental protection for long term reliability.

Rotork's order has been won on technical merit and competitive pricing in the face of fierce competition from European actuator manufacturers. Rotork's German company successfully demonstrated to the valvemaker the environmental integrity of the double-sealed IQ actuator design, together with the simplicity of non-intrusive commissioning and the benefits of operational data logging for predictive maintenance.

The valvemaker was also impressed with the responsive, positional accuracy and the 1200 starts per hour duty rating of the Rotork IQM modulating actuator design and the flexibility for remote programming and monitoring facilitated as standard by the IQ's control specification.



For more information on ROTALK articles and features contact ROTORK Bath: +44 (0)1225 733200 email: uksalesadmin@rotork.com

rotork®

www.rotork.com

UK

Rotork plc
tel +44 (0)1225 733200
fax +44 (0)1225 333467
email mail@rotork.com

USA

Rotork Controls Inc
tel +1 (585) 247 2304
fax +1 (585) 247 2308
email info@rotork.com

Rotalk is published and printed by Rotork Controls Ltd. in the UK.