

Major achievement for Finetrol in Brazil

Direct-fired heaters, containing a series of tubes called passes, are used in oil refineries to bring crude feedstock to the required temperatures for processing. The process temperature, typically 280 °C to 380 °C, of the feedstock being pumped through these passes depends on the time the feedstock takes to pass through the heater. Each heater usually contains from 6-8 passes and each has its own control valve.

Long-term problems

In 2001, a number of refineries in Brazil were experiencing common problems in their heater pass valves, most of which were 'top and bottom guided' double-seat globe valves. Due to the close tolerances used in globe designs, the valves tended to seize up and to stick due

Petrobras REVAP has selected Metso Automation's Finetrol control valve to solve the problems with the heater-pass application.

BY JANIE JEFFREYS

to the ingress of grit and coke and as a result of both oil temperature and oil viscosity. The crude oil was becoming encrusted in the top and bottom guides, which prevented the valves from moving. Another critical problem was caused by serious

oil leakages, resulting from hot oil seeping through the stem and packing, which were creating a fire risk because of the large amount of oil residue accumulating on the valve bonnet and on the floor beneath the fired heater.

As a result, unscheduled shut-downs would occur and maintenance services were required on average every 2-3 months, which was very costly in terms of both labor and reduced productivity. Furthermore, there were often critical problems with the local environmental departments.

Looking at the options

"Early in 2001, we started on tests for Petrobras REVAP in São José dos Campos City to determine the best valve option to solve the problem they had in the passes of the direct-fired heaters used prior to the cracker tower," explains **Eron Fernandes**, Metso Automation's Field Systems National Sales Manager in Brazil. "Neles MBV metal-seated ball valves and Top 5 heavy-duty rotary control valves were both possibilities. However, we also needed to convince the customer that there were more effective solutions than their existing globe valves."

Petrobras in figures

Petrobras, a leading oil company in Brazil, operates 16 refineries with a throughput of 1,707 million barrels of crude oil per day. The company's net revenue last year totaled US\$ 30,797 billion with net income at US\$ 6,559 billion. The company has 35 drilling rigs, 22 of which are offshore. Petrobras' 98 production platforms have a daily production of 1,701 million barrels of crude oil and 53 million m³ of natural gas. The company operates 27,120 km of pipeline and a fleet of 97 tankers.



Finetrol control valve is the preferred solution for heater-pass applications at Petrobras.

Introduction of Neles Finetrol

"Initially we decided to supply Neles Top 5 valves with the same face-to-face dimensions as the original globe valves and Q-Trim to reduce incipient cavitation. The Top 5s worked well. However, in 2002, we decided to supply 16 Neles Finetrol™ valves with Q-Trim® as an even better solution."

"Neles Finetrol high-performance rotary control valves combine the control benefits of linear valves with the inherent benefits of rotary valves to extend the traditional applications of rotary technology and provide wider rangeability and control accuracy. Rotary valves do not suffer from the leakage problems associated with globe designs because there is no pumping action



Mentzingen dos Santos has successfully implemented the Neles Finetrol and FieldCare solution for the Petrobras REVAP.



After implementation of Finetrol control valve with the ND smart positioner, the process operation has been more stable and accurate, which has enhanced both quality and productiv-

on the packing. Because of the simplicity of rotary designs, they are easier to maintain – offering non-clogging flow ports – and they can also be fitted with robust hard-faced trims. As they can be supplied with the same face-to-face dimensions as globe valves, upgrading to rotary designs eliminates the need for costly changes in pipework configurations,” explains Fernandes.

Neles Finetrol proved to be the answer to the heater pass valve problems, providing the answer to all the critical issues involved.

Orders for smart controllers and Metso FieldCare

In addition, Petrobras ordered Neles smart valve controllers, which monitor and adjust valve performance in real time, and Metso FieldCare™ configuration and condition monitoring software. This software

is based on open FDT/DTM (Field Device Tool/Device Type Managers) technology and designed to provide accurate information flow during commissioning, operation and maintenance of processes. It can manage any smart device from any vendor in any fieldbus communications protocol.

Assessment by Petrobras

According to **Luiz Henrique Mentzingen dos Santos**, Senior Instrumentation Engineer at Petrobras REVAP: “Unlikely as it may seem, flow control in the heater passes of the refining plant involves peculiarities that need to be carefully evaluated when specifying the control valves. Our experience shows that important factors need to be taken into account – such as the predominantly stationary role of the control network during the whole heating cycle, as well as viscosities and temperatures – considerations which are often overlooked by designers.”

“In the case of our particular heater passes, there was a high frequency of stem jamming with the original globe valves, which inevitably caused instability of the process and raised concerns regarding integrity and safety. In order to solve these problems, we decided to change the design of the valves used to control the heater passes, 16 in all, and replace them with rotary plug-type valves, which led us to adopt Metso’s Neles Finetrol valves.”

“Following more than a year of continuous operation, we can confirm the good performance of the

Neles Finetrol valves as well as the validity of our decision to change the control strategy in this application. When all the criteria regarding start-up and stop of the equipment are observed, we have seen a large reduction in the incidence of jammed valves in the steady-state mode.”

“Furthermore, we can confirm the total elimination of leaks through gaskets, in addition to an increase in installed CV, as well as greater stability in the smart positioner/actuator unit without additional costs for installation,” says Mentzingen dos Santos.

Customer benefits

There have been many customer benefits for Petrobras. For example, there has been no unscheduled maintenance for the last two years, which has led to reduced servicing and spare part costs, and no un-

scheduled shutdowns. Process operation is more stable and accurate, which has enhanced both quality and productivity. Environmental problems previously associated with the heater have been eliminated.

“All the valves, controllers and the FieldCare software have been running smoothly for a long time now,” explains Fernandes, “and the Petrobras maintenance staff has found that FieldCare is also a valuable tool for predictive maintenance. For even higher levels of performance, the advanced valve controllers are ensuring higher positioning accuracy and faster response.”

Neles Finetrol – the preferred solution in Brazil

Key people from other Petrobras refineries in Brazil have visited the REVAP site to study and inform themselves about this Neles Finetrol and FieldCare solution which was implemented by Luiz Henrique Mentzingen dos Santos at São José dos Campos.

Following Metso Automation’s close cooperation with Petrobras and the success of Neles Finetrol valves over a two-year period, Petrobras RTD has accepted this solution as the preferred answer to the majority of heater-pass flow-control problems when handling high-viscosity, high-temperature oil products. As a result, Neles Finetrol is now the valve type recommended to sites with similar process conditions throughout Brazil and elsewhere in South America. ■

Accurate information flow

FieldCare™ device and asset management software, based on open FDT/DTM technology, is designed to provide accurate information flow during the commissioning, operation and maintenance of virtually any production process.

This single software can manage any smart device from any vendor in any fieldbus communications protocol, thereby reducing investment costs. Its web-enabled interfaces allow for the information to be distributed in real time anywhere across the user’s network. FieldCare’s ability to show both standard configuration parameters and device-specific functions eliminates the need for vendor-specific tools.

Online data flow from all devices is visualized through an innovative color-coded alert system and a series of selective alarms, which provide a clear view of process performance as well as easy and early problem recognition.

FOR MORE INFORMATION, PLEASE CONTACT:

Eron Fernandes,
National Sales Manager
Sorocaba, Brazil
eron.fernandes@metso.com
or
Vesa Lempinen,
Product Manager
Helsinki, Finland
vesa.lempinen@metso.com