

Increased reliability and safety at Czech refinery through partnership in valve maintenance

Every turnaround in the process industry represents a major investment. To achieve smooth and efficient use of downtime requires careful planning and evaluation of the potential risks.

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In April 2009, Česká Rafinérská refinery had challenging turnaround activities related to instrumentation maintenance.

This fact is well known, also to **Milos Hlavacek**, Head of Instrumentation and Electrical Maintenance Department at Česká Rafinérská, where he was responsible in April 2009 for coordination and planning of the turnaround activities related to instrumentation maintenance.

“In the past, Česká Rafinérská’s strategy has been to carry out turnarounds every four years. This was the first time that the interval was extended to 5 years. After 9 years of operation, some problems were expected,” explains Milos Hlavacek. “However, on this occasion Česká Rafinérská’s approach was different from that adopted for the previous turnaround. The control valve scope was reduced and the on/off valve scope increased to include overhaul testing based on the SIL classification,” he explains. “The Metso field survey and Neles ND9000 diagnostics formed the basis for the valve turnaround planning. A criticality analysis by Metso helped us in the spare parts and overhaul planning.”

RCM and Metso’s iValveSurvey – the key to efficient maintenance

It was decided that the overhaul testing should be based on SIL classification and the IEC 61511 standard. The on/off valve scope was planned on the basis of SIL classification, operational experience and Metso’s iValveSurvey results. The iValveSurvey was carried out in 2004 and formed a basis for the valve turnaround planning.

“This was the first time that RCM (Reliability Centered Maintenance) was performed and that on/off valves went through an overhaul test based on an RCM maintenance plan,” observes Milos Hlavacek. “In the overhaul test, both tightness and functionality were tested. Tightness was tested against the ANSI VI standard.”

Because the control valve scope was reduced, it was even more important to define very carefully which valves should be maintained during the turnaround. “This was achieved by defining the control valve scope by thoroughly analyzing the Neles ND9000 diagnostics,” Hlavacek explains. “The data was analyzed to identify particular valves and their potential



According to **Milos Hlavacek**, all turnaround work at Česká Rafinérská was completed within 35 engineering days.

problems, so that the workshop activity could be planned and the right spare parts made available."

Valve maintenance from an experienced service provider

Milos Hlavacek has been very satisfied with their existing valve maintenance partner, Elmep, which is also a Metso Authorized Service Provider. "They have excellent skills and all the right capabilities in their workshops," Hlavacek confirms.

Cooperation between Metso and Elmep began ten years ago, when Elmep was selected as a Metso Authorized Service Provider during the erection work at an FCC (Fluid Catalytic Cracker). Elmep's employees are regularly trained in Metso factories and are in daily touch with Metso's office in Prague.

All turnaround work at Česká Rafinérská was completed within 35 engineering days. In the old refinery Block 25, 297 control valves were diagnosed, 75% of which were from other suppliers using Neles ND800. Based on the diagnostic analyses, 15 non-Metso valves were taken out of the pipeline for workshop servicing and 76 valves were calibrated without disassembly

from the pipeline. In the Block 24 (the FCC Unit), 235 control valves were diagnosed, of which 98% were Metso valves. Only 6 Metso valves out of the total number were taken out for workshop servicing and 41 valves were calibrated without disassembly from the pipeline.

Importance of ESD valves

Česká Rafinérská paid special attention to ESD (Emergency Shutdown) valves throughout the turnaround. Altogether 187 ESD valves were tested (in body pressure, seat leakage and function tests) in the workshop. Of the 57 Metso ESD valves, 15 were serviced. This included 7 valves, which were classified as 'top critical' from a technological point of view. In the case of these 'top critical' valves, all the internal parts were replaced, even if the valves were in good condition.

Two-thirds of the ESD valves from other suppliers did not pass the tests. This demonstrates the importance of overhaul testing, but similarly reliable partial stroking with diagnostics features can also help in identifying early problems with on-off valves.

"Less working capital and less risk; we would use these services again!"

In turnaround execution, having the right parts and skilled people on site is essential in order to keep tight schedules. Metso's criticality analysis helps in defining the right parts and planning valve maintenance activities. In the criticality analysis, all TAGs are reviewed to define their criticality, based on their effect on availability, quality, safety and customer process targets.

"Metso's role in the criticality analysis helped us significantly in optimizing spare parts and planning valve overhauls,"

says Milos Hlavacek.

"And, we followed the recommendations of the criticality analysis: full overhaul with new spare parts for highly critical valves and Metso's Valve spare container for medium and less critical valves."

"This was the first time that we had used the Valve spare container service," Hlavacek confirms, "and we found we were better equipped for the potential surprises found in the workshop."

Many benefits resulted from these services, such as

- Minimizing the amount of spare parts 'left over' from the turnaround
- Making workshop processes more efficient and reducing errors, because the spare part sets were clearly marked with the TAG identification by Metso
- Avoiding the need to rush ordering and spending on spare parts during the turnaround.

"There was an excellent service in defining valve criticality and using that information for accurate overhaul instructions and spare parts. Metso's Valve spare container was very good in helping us to execute the turnaround effectively, with less working capital and less risk," concludes a very contented Milos Hlavacek. "At Česká Rafinérská, we would use these services again!" □

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Česká Rafinérská is the largest Czech oil refining company and the largest producer of oil products in the country. The company operates two refineries, located in Litvínov and Kralupy nad Vltavou, with the combined capacity of 175,000 bbl/d (27,800 m³/d). The major shareholders are Unipetrol, Royal Dutch Shell, ConocoPhillips and Eni.

