



**MOL Danube Refinery, Szazhalombatta, Hungary  
Plant of the Year 2010 Award Winner**

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**MOL Refinery Connects Thousands of Smart Devices for Maintenance Savings and Greater Profits**

**PROJECT OBJECTIVES**

- Increase operational reliability and availability
- Establish a predictive maintenance strategy
- Reinforce CAPEX project support, investment justification

**SOLUTION**

- Created an online network of 3,700 field devices
- Connected online network to a new plant maintenance system.
- Instituted cost-saving maintenance strategy for alarm management.

**RESULTS**

- Realized savings of US \$2 million in reduced maintenance costs and avoidance of unscheduled shutdowns.
- Online HART communication reduced commissioning time by 20 percent.
- Increased plant profit potential through increased loop-control accuracy and overall data availability.
- Saved, in one case alone, €637,000 or more when data availability enabled personnel to diagnose and repair a head pressure control's intelligent positioner, rather than remove the entire valve.
- Reduced from 60% to 5% the number of valves selected for repair during a planned shutdown for estimated savings of €54,600 per unit, per shutdown.

HART technology plays a key role at MOL Group's Danube Refinery in Százhalombatta, Hungary, where 30,000 instruments are HART technology-based devices and thousands of those are networked to the plant's maintenance system.

The MOL Group's Danube Refinery in Százhalombatta, Hungary, set-out to profit with HART technology in 2002, and only three years later, decided to overhaul its maintenance systems with a new, unified asset management system (AMS) strategy. The combination of the two technologies has changed the way MOL runs maintenance, and the way it looks at diagnostic data.

"We made the decision going forward to purchase intelligent field instruments that support the HART Protocol and then to develop and use the in-depth and sophisticated communication options embedded in those HART instruments," says Gábor Bereznai, MOL instrumentation and electrical department head. "Our directive became 'let's get connected—off-line and on-line—and put these HART instruments to work.'"

The company set out to connect many of the plant's HART devices, such as control valves and instruments used in critical control loops, directly into the plant's AMS. This has resulted in an online diagnostic system in which instrument signals are directly connected to plant maintenance and control systems. To date, HART communication is used on 30,000 of the plant's 40,000 instruments. Of those, roughly 3,700 of these are connected to on-line maintenance systems which are, in turn, integrated to the plant's AMS.

"On-line diagnostics provided by the HART instruments does something more than preventive maintenance," says József Bartók, automation engineer at MOL Danube Refinery, adding that this "ensures the stable operation of the system and increases the precision of control." Beyond fixing what breaks or keeping the plant running, a reliable, stable operation contributes to bottom-line profitability.



Online and off, HART has proved its mettle. In one case, the head pressure control was slow on one unit, which led to the assumption that a valve was stuck and in need of removal and repair. But technicians, using on-line diagnostic tools, used HART protocol-supplied data to interrogate the valve and found that the I/P (current-to-pneumatic) converter in the intelligent positioner to be damaged – but not the whole valve. Operators put the valve in manual and the fix took a half hour of instrumentation work. This saved the

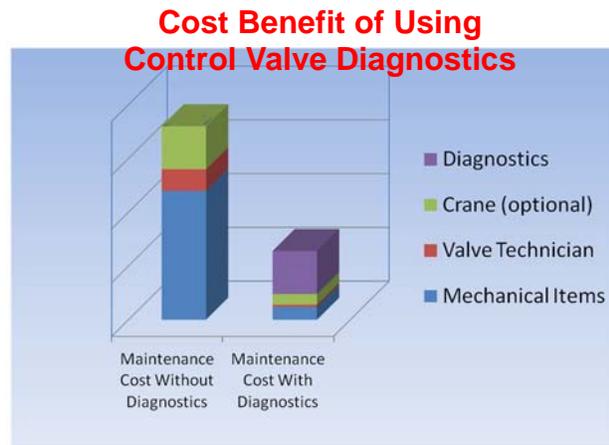
plant at least two days of unscheduled downtime, or at least €637,000.

Additional examples, and a broader view of MOL's use of HART technology, can be seen in areas including alarm management, operational stability and during commissioning and shutdowns.

The refinery’s alarm management system bases its alarm priorities based on HART communication data. Alarms are grouped according to severity, and sorted in two groups – those associated with actual defects, and those serving to *prevent* actual defects. HART communication data has enabled this data flow and in turn the ability to conduct preventive maintenance – and realize substantial cost savings. Results have been borne-out by a reduction of severe failures that require additional business-system reporting.

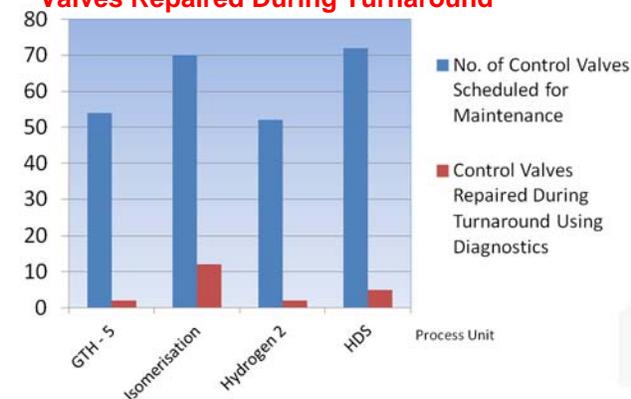
On-line diagnostics have gone beyond preventive maintenance to ensure stable system operation and increased control system precision. “This is an aspect of the technology that comes directly to the bottom line, increasing the profit generating capability of the unit,” says Bartók.

Explaining how a loss of accuracy becomes a loss in profits, he explains: “In a given unit, the inaccuracy of the loops controlling the applied separation processes—which can typically be traced back to the de-tuning of the control valves—could not be identified without the use of intelligent valve positioners supporting HART technology... With the application of this technology, valve failures can be screened out and the corresponding loss can be minimised by repeated calibration.”



Online HART communications also has helped streamline the installation and commissioning of control loops by allowing transmitters to be checked without driving to the device in the field. Additionally, commissioning data are automatically stored in the AMS. Engineers have reduced commissioning time by 20 per cent.

### Number of Scheduled vs. Actual Control Valves Repaired During Turnaround



Before the implementation of HART, about 60 per cent of the control valves were selected for repair in a typical plant shutdown. While all faulty valves were likely corrected, others may have been removed unnecessarily due to a lack of data. With HART device data, the company estimates average savings of €54,600 per unit, per shutdown – it’s no longer necessary to disassemble and repair failure-free control valves the workshop.

HART technology plays a role in data shared between maintenance and the company’s business systems, as well. In general, MOL has proven that HART technology has profit potential that extends from the field to the workshop to the front office.

The system works so well and has proved to be so beneficial that the company has set up a separate unit of three people to operate the applications and systems. Using HART diagnostics has resulted in MOL saving an estimated \$2 million USD in reduced maintenance costs and avoided unscheduled shutdowns.

The company continues pushing ahead with HART technology. Two units are now running with *WirelessHART* technology in applications include four temperature transmitters and five control valve positioners integrated with the plant maintenance system.

