# MOL PLC. PERFORMS SUCCESSFUL TDC 2000 HIWAY AND SAFETY SYSTEM UPGRADE AT DANUBE OIL REFINERY

Case Study

Honeywell

# OVERVIEW

**At Hungary's only crude oil refinery, a well-planned approach to control system and safety system migration extended the life of technology investments, expanded automation capabilities, and replaced legacy assets with a reliable and supportable system.**

## BACKGROUND

A growing number of oil refining operations are under pressure to address their outdated Distributed Control System (DCS). An older DCS may exhibit a host of age-related problems and failures. In addition, newer DCS technologies can impact refinery profits by expanding automation capabilities. For these reasons, many refinery owners/operators are looking to perform major upgrades or even migrate to a new platform.

MOL PLC. faced a host of challenges with its existing DCS. A leading multinational oil and gas firm headquartered in Budapest, Hungary, MOL's activities range from petroleum exploration, production, refining, distribution, and marketing, to petrochemical production, power generation, trading and retail operations.

MOL PLC.'s Danube Refinery, located at Százhalombatta near Budapest, began operations in 1965. It is the only crude oil refinery in Hungary with a capacity of 165 000 bpd (8.1 mtpa). Its products include fuels, chemicals, lubes and asphalt. The refinery employs three crude distillation units with coking, catalytic cracking, hydrotreating, and hydrocracking operations.

> Refining companies are faced with an increasingly competitive business environment. Control system performance and reliability can have a huge impact on their profitability.

## CHALLENGES

The MOL Danube Refinery sought to modernize its DCS technology due to the possible negative financial and operational impact of utilizing an unsupported system. The facility was dealing with an increased number of system malfunctions, as well as rising maintenance costs and an unreliable source for spare parts.

MOL PLC. identified important goals for migration of the DCS platform at its Danube facility:

- Extend the life of automation investments
- Replicate existing process control strategies
- Expand capabilities with a modern and reliable solution
- Replace legacy assets with a supportable system

The success of the DCS upgrade depended on maintaining the original budget and meeting the limited turnaround timeframe. It would be the first complete DCS modernization in recent years. The Honeywell TDC 2000 system was installed at the refinery in 1984 and most of the legacy hardware and software was still in use. The overall project timeframe for the upgrade was set at 32 days.

MOL PLC. enlisted Honeywell's help in bringing its control system assets up to date. Control system modernization was undertaken on the Danube Refinery's Crude Distillation Unit 2. The project involved migrating the TDC 2000 Data Hiway to C300 controllers, upgrading Fail Safe Controllers (FSCs) to Safety Manager, and replacing all DCS marshalling and multi-core cabling (approx. 2,200 signals).

*Figure 1. MOL PLC. collaborated with Honeywell to modernize its control system*


*Figure 2. Honeywell's TÜV SIL3 certified Safety Manager solution.*

> Refineries cannot afford a "wait and see" attitude when it comes to aging control systems. Failure to address looming obsolescence could lead to crucial assets being rendered inoperable.

The project team undertook a comprehensive planning process. A local engineering contractor prepared DCS specifications and detailed design documents, and team members fine-turned the technical content, cost estimates and schedule. Management approval took two months, and tendering required another four months. Contracts with the general contractor and Honeywell as DCS supplier were signed seven months prior to unit turnaround.

## SOLUTION

The MOL Danube Refinery successfully upgraded its TDC 2000 Hiway system to Honeywell's latest generation Experion® PKS solution on an off-process basis. The work involved direct conversion of logic for FSCs to Safety Manager, as well as migration and upgrading operator displays in the Human-Machine Interface (HMI). The migration retained the familiarity and intellectual property in new graphics. Honeywell Site Support Specialists, responsible for maintaining the DCS, assisted with the upgrades.

The Safety Manager system embeds Honeywell expertise for integrating process safety data, applications, system diagnostics, and critical control strategies. The system integrates seamlessly with Experion alarm and event capabilities, enables easy analysis via single window access on an Experion Station, and provides the latest generation of safety features.

The use of C300 controllers greatly improves engineering productivity, reduces maintenance costs, and maximizes process uptime. These modern controllers utilize a new, powerful hardware platform while retaining the specific user application. They integrate with existing Honeywell input/output (I/O) families and communicate with the other controllers the network.

## RESULTS

As demonstrated at the MOL Danube Refinery, significant cost savings and productivity benefits can be realized from a well-designed and properly implemented control modernization strategy. This includes fewer malfunctions and reduced support costs.

MOL PLC. gained a number of valuable insights from its control system replacement project:

- Careful preparation of DCS specification provided valuable technical content
- Detailed design process helped to ensure a proven control concept
- Well-defined technical documents eliminated ambiguity and confusion
- Early EPC Involvement and LEAP technologies allowed control-related items to be ordered without waiting for detailed design

*Figure 3. As demonstrated at MOL's Danube Refinery, significant cost savings and productivity benefits can be realized from DCS modernization.*

- Demolition time can have a significant impact on overall project schedule
- The Operator control room and the rack room was reorganized and separated. Therefore, the work conditions became more ergonomic and healthy. Especially the noise (coming from the cooling fans of the cabinets) were reduced significantly.

The method of project planning, scheduling and implementation utilized at the Danube Refinery will be applied to similar efforts at other MOL sites in the future.

## SUMMARY

Thanks to control system modernization, MOL PLC. elevated the performance of its Danube Refinery and now has a secure path forward for future upgrades. DCS reliability has been improved with modern technology and plant operators are more effective with an enhanced HMI. In addition, maintenance and support costs are lower, and control system assets are fully supported and up to date.

This successful migration project gave MOL the confidence to commit to a much broader enterprise level service agreement using Assurance 360 which will be rolled out soon.

### About Honeywell Migration Solutions

Honeywell offers a wide range of modernization solutions and Is committed enabling continuous Innovation that enable users to leverage their foundation and focus on high value Improvements.

**For More Information**

To learn more about how Honeywell Migration Solutions can improve performance, visit www.honeywellprocess.com or contact your Honeywell Account Manager.

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