

Borealis Improves Operator Training and Achieves Record Startup with UniSim



“With Honeywell’s UniSim operator training simulator we were able to train our current and new workforce prior to our plant expansion with real-world testing scenarios. This was by far the best plant startup, faster than planned, with significant improvements in production rates and lowest ever flaring. The simulator continues to deliver major benefits in refreshing skills and developing knowledge, and in preparing, testing and training on plant changes prior to implementation.”

Jari Vettenranta, Senior Staff Engineer APC&OPT, Borealis Porvoo

Benefits

Borealis, a leading provider of chemical and plastics, was faced with several challenges at its plant in Porvoo, Finland. With an operator workforce on the brink of retirement and an expansion project that would change process operations, the company needed to speed up the training of existing operators, train new operators, achieve a fast startup, minimize disturbances and avoid any kind of shutdown.

Borealis turned to Honeywell and its proven UniSim® operator training simulator to train its operators in advance of the plant expansion. As a result, operators were ready for the plant startup, turnaround and expansion. Specific benefits included:

- Record plant startup time documented as the best in the history of the Porvoo cracker plant
- Ethylene product was on-spec in a record three days, 10 hours from feed in – two days earlier than planned
- Ramp-up was the best ever recorded with new production capacity target exceeded in just 21 days
- Average normalized production rates to boilerplate capacity 45 days after feed in was at 92 percent, compared to 67 percent and 57 percent for previous turnaround
- Flaring losses were 2000 t less than ever before
- Significant return on investment - total value of the startup improvement was estimated at over five times the cost of the simulator
- Utilization factor in first 1.5 years was more than 70 percent for refresher training and preparing for changes on the plant



Honeywell’s UniSim provides onsite operator training at the Borealis plant in Porvoo, Finland.

Background

With more than 50 years of experience in polyolefins, Borealis focuses on providing plastic materials to the infrastructure, automotive and advanced packaging markets across Europe, the Middle East and Asia. The company’s production facilities, innovation centers and service centers work with customers in more than 120 countries to provide materials that make an essential contribution to society and sustainable development.

Located 40 kilometers east of Helsinki, Porvoo has provided a home for Borealis for the past 35 years. It is a fully integrated petrochemical complex comprising five plants:

- Cracker for the production of olefins (ethylene, propylene and butadiene)
- Phenol and aromatics plant that produces phenol, acetone, benzene and cumene
- Two plants for polyethylene
- One plant for polypropylene

Challenge

With the Borealis Porvoo chemicals plant ready to undergo an expansion, the company needed a solution to help maintain the skills of its current workforce and train new employees ready to replace the planned operator retirement in the coming years.

“We had to find a solution that would provide real-life operator training at our facility and provide needed testing for new DCS control schemes, APC controls and field operator training for the cracker process,” said Jari Vettenranta, Senior Staff Engineer, APC & OPT, Borealis Porvoo. “In addition, we had to achieve a true believability factor for our employees.”

Because the plant was undergoing a capacity expansion and much of the workforce had never experienced a startup, it was critical to try to maintain historical startup performance and avoid safety incidents, equipment damage and loss of production.

Solution

Borealis selected Honeywell's UniSim training simulator to provide training to its operations teams in advance of the Porvoo plant expansion to help optimize plant operations.

The results exceeded expectations. The UniSim simulator provided a high-fidelity, real-world training environment to train Borealis operators and engineers how to appropriately respond during upset conditions. Operators were able to see and view operating scenarios that helped to identify problems before they occurred to avoid potential incidents. New hires were trained more quickly in a stress-free way, enabling them to try different operating measures and see how they work.

The Honeywell project team of experts worked closely with Borealis to ensure simulator accuracy was extremely high and training scenarios were appropriate.

Even after plant startup, the simulator has proven to be a useful tool for developing new controls and procedures, testing and optimizing process performance, and training on process changes prior to implementation. For example, the plant was shut down by the loss of external 100 bar steam. After recreating this scenario on the simulator, the operations team was able to devise a mitigation practice that maintained operations. This was used as a training exercise, and the next time this incident occurred the plant was saved. On another occasion, the simulator was used to test and optimize a new fuel gas lineup and controls. The hot cutover to the new section of plant and controls was then performed flawlessly.

Continued Vettenranta, “With Honeywell's simulator, we developed successful and consistent training programs to keep our employees up-to-date on the plant – something they demanded once they experienced the real-world scenarios. Our operators were excited about the process and took an active role in learning to help make this plant as profitable as possible.”

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More Information

For more information on UniSim, visit www.honeywell.com/ps or contact your Honeywell account manager.

Automation & Control Solutions

Process Solutions

Honeywell

1860 W. Rose Garden Lane

Phoenix, AZ 85027

Tel: 800-822-7673

www.honeywell.com/ps