

Argentine Polypropylene Plant Stays Innovative with Advanced Process Control Software

Tighter process control has given the facility greater ability to minimize deviations in production conditions and improve model building capabilities.



Project Report

System 800xA

- Operations
- Engineering
- Control & I/O
- Device Management
- Asset Optimization
- Information Management
- Production Management
- Safety
- Applications

There is a continuous need to increase production efficiency and maximize economic benefits for any given process plant. Typically, hundreds of PID loops are employed at the basic regulatory level for controlling the process. In the particular case of advanced control strategies, these applications are very dependent on an optimum base level of regulatory controls. ABB Loop Performance Manager meets this important requirement.

Petroquímica Cuyo pioneered the production of polypropylene in Argentina and special polyolefins in Latin America. They continue as a leader in innovation, quality and variety of products fully committed to their clients, industrial safety and environment.

In 1995, it became the first Argentine company, and the first petrochemical company in the Americas, to obtain ISO 14001 certification in Environmental Management.

The following year, the company was accredited under the ISO 9001 standard, which encompasses design, development, production, sales, customer service and aftermarket service.

In 1998, working in Safety and Health Management, under the guidance of BS8800, it was certified in the equivalent IRAM 3800 standard.

Given this emphasis on innovation and efficiency, Petroquímica Cuyo sought to improve productivity at its Mendoza, Argentina, facility which has a capacity of 120,000 tons/year, producing homopolymers, impact copolymers, random copolymers, terpolymers, and special polyolefins.

The strategy was to establish optimum regulatory control at the plant, which is essential for

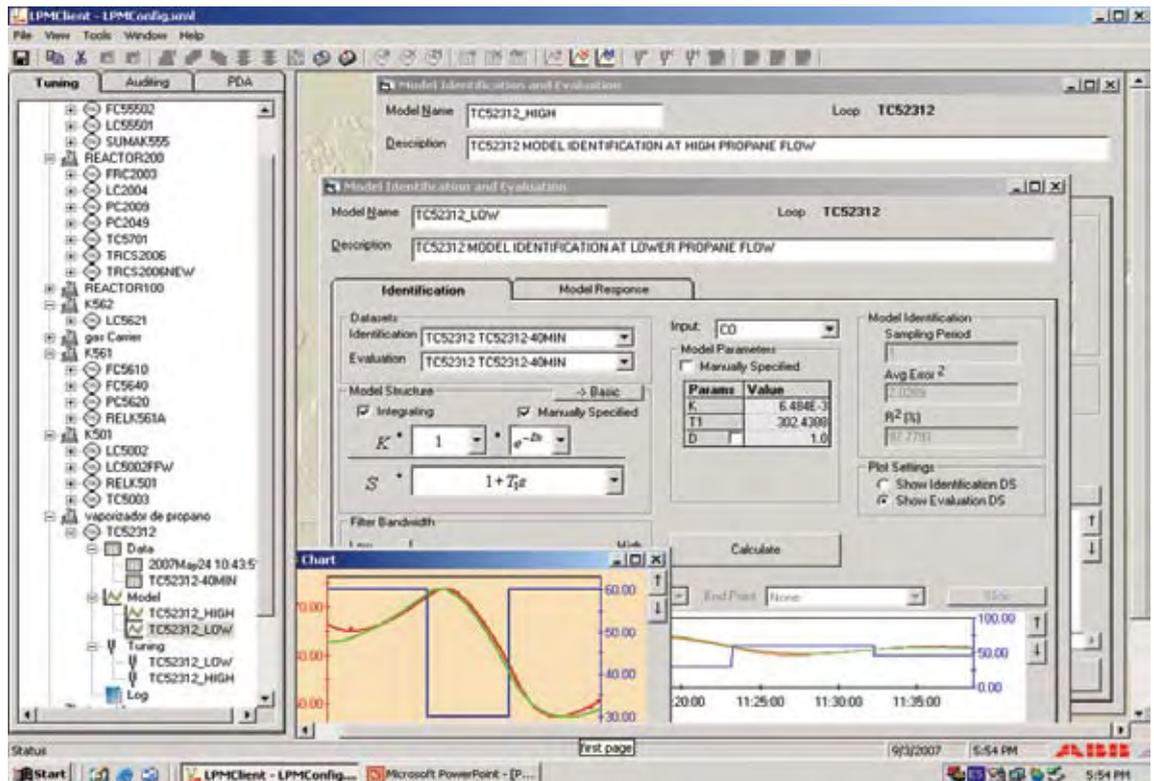
providing consistent, safe process operations and securing economic benefits.

Petroquímica Cuyo determined that the regulatory control it was seeking could be achieved through advanced tuning software. Several software packages from different vendors were considered, and the decision was made to select the ABB Loop Performance Manager (LPM) for the Mendoza plant.

There were a number of reasons for this preference, including the ability to use a single user interface for all the PID tuning processes such as data collection, modeling, tuning and simulation. LPM has online data collection through OPC, which supports open connectivity via open standards.

LPM has a very simple and powerful Model Identification and Evaluation package that is oriented to different users profiles. Additionally, LPM can support a wide variety of commercial PID controllers, as well as various configuration options for PID control algorithms.

LPM features a very flexible and complete set of tuning methods, plus automatic tuning and analysis for Feed Forward (FF) and Cascade Control Loops.



Figures 1 and 2 show different steps of the tuning process using LPM.

Figure 1. Model Identification with LPM

Control engineers appreciated the full functionality of the ABB loop tuning software, especially the ability to create process models.

The control engineers found LPM very useful. Consider the LPM application on a distillation column and heat exchanger. Single loops were tuned primarily with the Lambda method for simple loops, and Dominant Pole Placement for complex ones.

Cascade loops were treated in a special manner by LPM, considering the inner loop when tuning the outer loop.

Feed Forward controllers were implemented for some pump-around flows, visibly reducing the variation of the column level loops.

In cases where gain scheduling was needed due to non-linear behavior, such as heat exchange temperature control at different operating points, the possibility of LPM to create process models and tuning was very helpful.

The engineers found the effectiveness of these techniques useful for important reductions in the standard deviations at the regulatory level.

Among the advantages the customer identified with LPM were the capability to analyze the current tuning of a PID based on the built process model, using the manual tuning option, and the fact that the PID parameters were given in the controller's own form of implementation, that is, no conversion was needed.

BENEFITS:

- Convenient, single interface for all PID tuning processes is provided
- Problem-solving is simplified with LPM's ability to create process models
- Comprehensive set of tuning methods are provided with features such as automation tuning, depending on application

Also mentioned were the possibility to specify the control behavior using one or more sliders defining the trade-off between the robustness and performance for a chosen tuning method, as well as the frequency domain analysis parameters.

Petroquímica Cuyo found LPM the software they were looking for. Besides its usefulness for loop tuning activities, it can be used to gain valuable process insight through its model building capabilities. It is helping the Mendoza facility operate at peak efficiency and meet market demand.

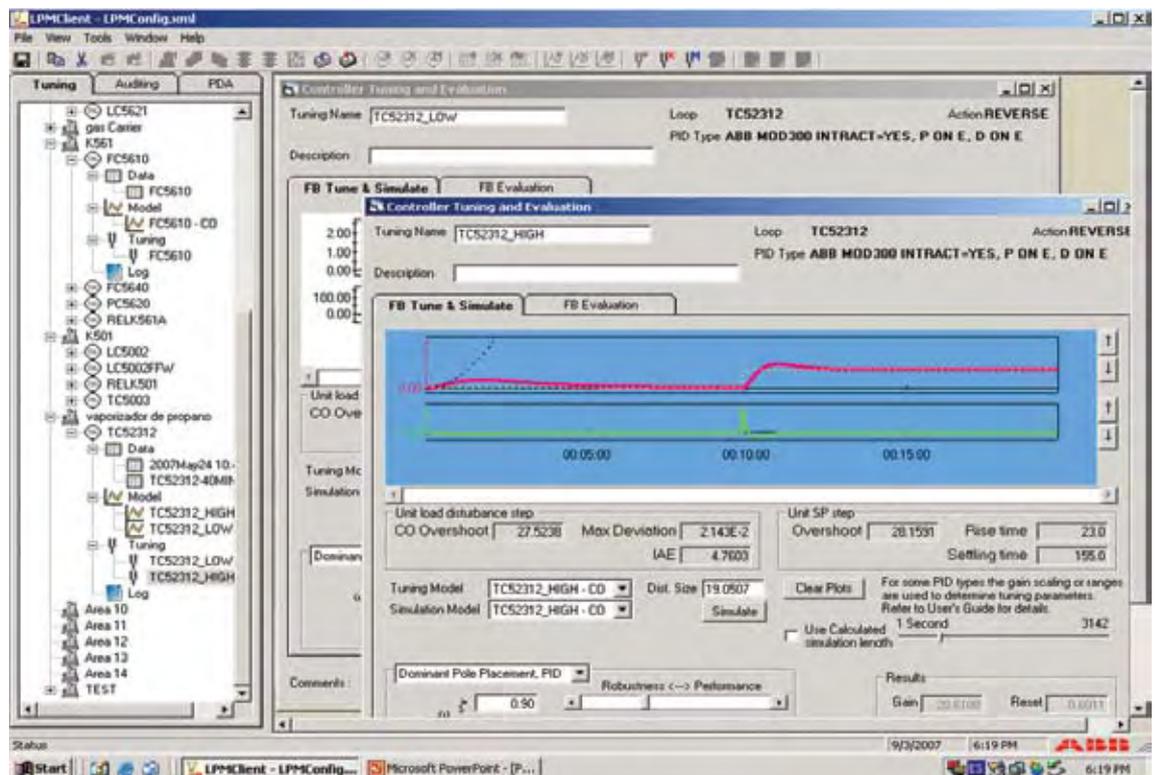


Figure 2. Loop Tuning and Evaluation with LPM

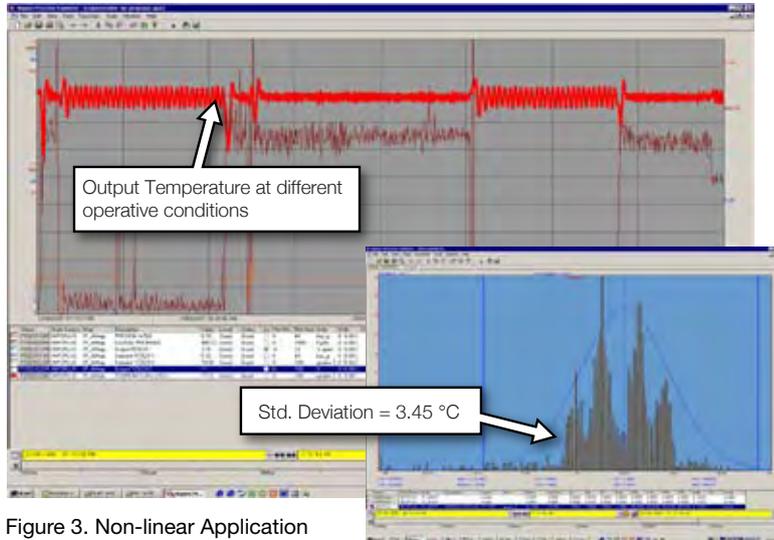


Figure 3. Non-linear Application Tuning using LPM: performance before tuning activity

Figures 3 and 4 show different trends and standard deviations of the output temperature of a heat exchanger before and after the PID controllers were tuned with the ABB LPM.

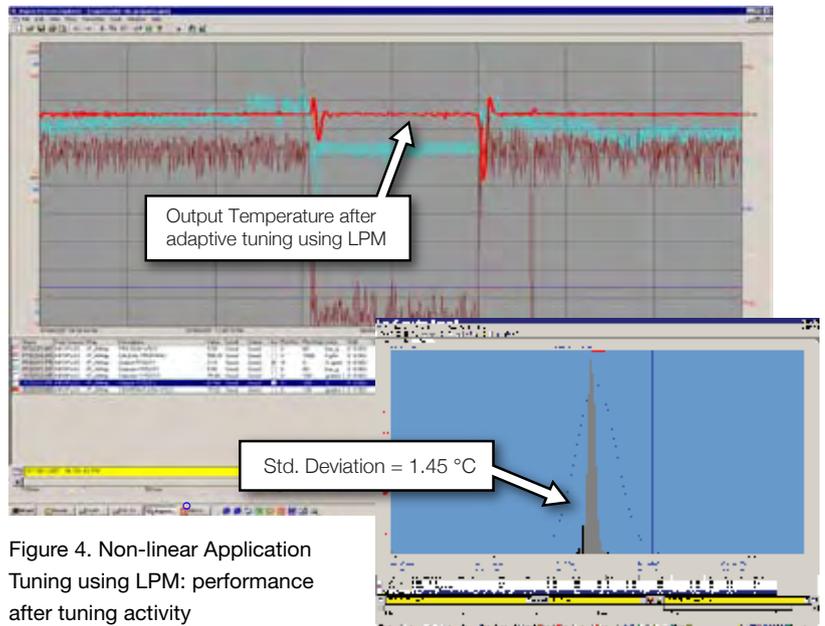


Figure 4. Non-linear Application Tuning using LPM: performance after tuning activity



ABB
Process Automation Division
 Västerås, Sweden
 Phone: +46 (0) 21 32 50 00
 Fax: +46 (0) 21 13 78 45
www.abb.com/controlsystems
 email: processautomation@se.abb.com

ABB
Process Automation Division
 Singapore
 Phone: +65 6776 5711
 Fax: +65 6778 0222
www.abb.com/controlsystems
 email: processautomation@sg.abb.com

ABB
Process Automation Division
 Wickliffe, Ohio, USA
 Phone: +1 440 585 8500
 Fax: +1 440 585 8756
www.abb.com/controlsystems
 email: industrialitsolutions@us.abb.com

ABB
Process Automation Division
 Mannheim, Germany
 Phone: +49 (0) 1805 26 67 76
 Fax: +49 (0) 1805 77 63 29
www.abb.de/controlsystems
 email: marketing.control-products@de.abb.com