THE CHALLENGE



Low Yield, Poor Quality, Unplanned Downtime

Excessive production losses, inferior financials, low yield, poor quality, and unplanned downtime were all created by the problematic batch control system with 12 mixing stations and ingredient delivery systems.

Locked-down Proprietary Code

The existing code was inaccessible and "locked-down" as a precaution of the proprietary software. The frustration mounted daily as everyone recognized the challenges of untangling it while maintaining the pace of business.



New Batch System Yields High Returns

Solution Choices

Do nothing and suffer the ills of an aging system. Or, shut down each of the 12 mixing stations one-by-one over a long and drawn-out transition period, replacing and testing code in each of the 14 individual PACs. Both choices were high risk without a guarantee of much needed business improvement. What if there were a third option?



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EXECUTIVE SUMMARY

Batch Management Replacement Yields High Returns

Client: Globally recognized snack baker

Challenge:

Excessive production losses and inferior financials as a result of a problematic batch control system, exacerbated by proprietary software featuring inaccessible code. Unable to modify the code, the plant manager faced two high-risk options: do nothing or implement changes that would disrupt production for months.

Solution:

A third option was offered by Polytron:

Write and test a new batch management solution offline using PolySimsm emulation and work out coding and other issues virtually before putting production at risk.

Results:

PolySim emulation enabled resolution of batch control problems without any unplanned downtime:

- Guess work and uncertainty eliminated at start-up
- New code introduced seamlessly into the system, resulting in on-time start-up
- Dough quality improved 30%
- Downtime decreased by 25%

The Challenge

A large global brand snack baker had suffered excessive production losses and inferior financials at one plant for far too long. Low yield, poor dough quality, and unplanned downtime were all created by the problematic batch control system for their 12 mixing stations and ingredient delivery systems.

To complicate things, the existing code was inaccessible and "locked-down" as a precaution of the proprietary software. The frustration mounted daily as everyone knew the problem but recognized the challenges of untangling it while maintaining their pace of business. Undue stress, worry and weak performance eventually brought them to their knees.

It seemed that there were only two options: First, do nothing and continue to suffer the ills of the aging system, poor production, inefficiency "tax," and lack of flexibility to upgrade.

Or the second option: shut down each of the 12 mixing stations one-by-one over a long and drawn-out transition period, replacing and testing code in each of the 14 individual PACs. And hope, after several months of change, that production for the entire plant would improve. Both options were high risk without a proven solution to guarantee much needed business improvement.

What if there were a third Option?

What if all the code for the 14 PACs, all the HMI stations, and a new batch management solution could be written and tested on a running system offline? This could significantly shorten downtime, create confidence in the new code, and nearly eliminate the risks to the business – unpredictable results, escalating costs, and an indefinite shutdown being just a few.

A PolySimsm Emulation of the mixing systems would provide the confidence necessary to shut down the entire mixing area – effectively the entire plant. By creating a digital twin of the physical manufacturing system, the plant could test the approach first. The production manager, senior technicians and even the plant manager experienced making batches using the PolySim model.

These test batches gave them confidence that this alternative method was the best choice for the plant and business. They could replace all mixing stations and ingredient delivery systems' programming with assurance that production would start back up just a few days later.

Specializing in Minimizing Risk

But let's face it, shutting down the entire plant and, figuratively, doing a brain transplant, was still not considered a low-risk proposition. Despite the pressure from corporate leadership to use a company 300 times the size of Polytron, plant leadership chose the partner who had demonstrated prior success, proving they could be trusted to deliver.

Dealing with Locked Code and a Challenging Supplier

The baker required an open, standard approach to give them the ability to operate and maintain their systems with their internal staff. The problem was that the existing batch control system had been installed several years ago and contained lockeddown, proprietary code that still had bugs, and the plant could not support or modify the system on their own. The snack baker had been forced to rely on a supplier that was tough to schedule, hundreds of miles away, and came at a high cost.

Replacing locked code presents its own challenges. With no documentation for the existing system, Polytron and the snack baker had to redefine how the system would operate and reverse engineer all the existing code before starting on the new code.

Working side-by-side, Polytron's team of engineers and the plant's batching systems experts tapped into the expertise and knowledge of the operations supervisors to ensure that the appropriate technology transfer was applied so that critical information was captured in the new code definition.

Creating a detailed description of how the new system would operate was essential to ensuring that the snack baker would not lose time retraining its operators on a completely new system. HMI screens had to look and operate the same. Sequences had to work just as they did previously. And all the batch recipes had to be followed precisely in order to meet strict food quality standards. Finally, the integration with each of the subsystems had to be rewritten to flawlessly integrate each critical system into the entire solution.

Meanwhile, another team created a simulation model of the plant's entire mixing system: 12 mix stations plus nearly two-dozen dry and liquid ingredient delivery subsystems. All-in, over 700 devices were modeled.

Solution met all expectations:

No unplanned downtime; technicians now had access to examine code at will, and quality specifications were on target.

The Value of PolySimsm

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When connected to the PACs and HMIs, and new batch management solution, the baker had a fully operational batch system that could be tested offline. They spent days verifying recipes, operating scenarios, manual and automated sequences, and even potential faults and recovery steps.

After participating in some of this extensive testing, the plant manager said, "I'm confident that we're prepared to shut down our plant and meet our start-up production date with little risk.""

Moment of Truth

Will it work - without hitch or glitch on Monday morning? That's the question and the buzz around the plant. The baker extended its already planned Thanksgiving shutdown by just one day. Polytron had to deliver and have them back in production Monday morning.

The planning, modeling and testing paid off. According to the baker, "the ability to run a full pre-check was invaluable and eliminated the 'guess work' and uncertainty at start-up. The new code was introduced into the system in a seamless fashion, which resulted in an on-time startup." By nine o'clock Monday morning, only five days later, all the systems had been cleaned and new dough was flowing.

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The Real Pay Off

The completely new batch management and control solution met all expectations: no unplanned downtime, technicians now had access to examine code at will, and quality specifications were on target.

Even better:

- Downtime was decreased by 25% no more unplanned downtime!
- Dough quality improved 30% they now had no bad batches!
- Operators were up and running in no time at all. One even asked a week after the programming was updated, "So, when are we going to make the changes to the system?"

About Polytron, Inc.

Since 1983, Polytron has been an industry leading system integration and engineering consulting firm delivering a broad spectrum of innovative manufacturing solutions. Polytron serves manufacturers in the food, beverage, consumer packaged goods, chemical, and life sciences industries across North America.

To learn more about Polytron, visit us online (**www.polytron.com**) or contact us (**www.polytron.com/contact-us**) to talk to a specialist.





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