THE CHALLENGE

Constant Downtime

Quality dips, inability to fill orders, and diminished profitability at multiple plants were caused by obsolete machinery and technology that failed on a regular basis creating constant downtime.

Obsolete Variable Frequency Drives

Outdated VFDs were no longer supported making it difficult to find replacement parts and compatible drives. Plant management was perpetually fearful of the next failure or shutdown and how long the issue might last.

Control System Modernization

Solution: Strategic Plan and Tech Upgrades

Shutting down production to upgrade and replace drives line-by-line needed to be done quickly and efficiently. Extensive preparation of the shutdown took place to anticipate upgrades and minimize downtime resulting in plant operations resuming to a full production on schedule.

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EXECUTIVE SUMMARY

Control System Modernization

Client: Global Beverage Company

Challenge:
Creation of a critical strategy to update the high number of obsolete VFDs line-by-line in order to increase quality and profitability with minimal downtime.

Solution:
Bringing Polytron in as a strategic partner to construct a plan of action that eliminates the risks and costs incurring from obsolete VFDs.

Results:
Eliminating the risk of increasing downtime due to the lack of vendor supported hardware was accomplished by successfully using a migration model across each line in multiple facilities. Risk was alleviated by upgrading and replacing the obsolete hardware and creating a spare parts inventory for other facilities.

The Challenge: A Struggle Just to Keep the Equipment Running

Plant Management at a major beverage company was concerned about constant downtime and the risk of trying to run their plants with hundreds of obsolete variable frequency drives (VFDs) that failed on a regular basis.

Many of the VFDs had been phased out altogether by their manufacturers. One would go down, and because it was no longer supported, maintenance teams scrambled, searching for replacement parts on eBay or having to find new compatible drives. Faulty VFDs mean equipment runs poorly. The beverage company felt the pain in terms of:

- Quality dips
- Inability to fill orders leading to customer service lapses
- Diminished profitability at multiple plants and hits to the bottom line

Fear hung over the plant: would the next VFD failure be resolved in a few hours? Or would the production line grind to a halt for a day or longer?

Solution: Partner Who Can Eliminate the Risk

Although it can be difficult to accommodate the planned downtime expected to replace VFD, the Corporate Engineering Manager knew the current situation was unsustainable.

The uncertainty and unplanned downtime due to VFD failure was becoming far too expensive. The pressure he was under to eliminate the risks and costs was becoming too great.

But where to start? At the company's largest plant, for example, a single line relied on over 80 variable frequency drives. Shutting down one line at a time would reduce production over a significant time period.

Polytron was engaged to help the beverage company assess the issue and develop a strategic plan to strategically replace the obsolete drives – with as little downtime as possible.

The Strategy

The manufacturer's approach was to upgrade the drives line-by-line in the facilities that were the easiest to upgrade. The old drives being replaced could be refurbished, warehoused, and available to serve as spares for other facilities not targeted for an upgrade.

With Polytron's help, the beverage company evaluated its facilities and chose to upgrade the lines that presented lower risk to overall downtime.

Minimizing Impact on Production

The company's facilities operated on a six-to-seven day production schedule. The Corporate Engineering Manager worked with Polytron to arrange line upgrades over a three-to-four day production shutdown, so the work could be completed over a weekend.

To minimize time required, changes to the original operation of the line were limited only to the upgrade of drives.

Preparing for Shutdown Process

In-depth preparation in advance of the shutdown helps manufacturers anticipate upgrade issues and minimize downtime. For each line upgrade, Polytron relied on its proven protocol for VFD upgrade prep:

1. Secure and review the control system drawings and programmable logic controller (PLC) programs for the line.
2. Record VFD parameters, such as speed, acceleration and deceleration times to ensure new VFDs operate with the same parameters as the current equipment being replaced. This practice reduces risk of incompatibility issues when production is resumed.
3. Conduct an inventory of the drives in the control panel, capturing the part number, wiring schema, and the function for each drive.
4. Update the drawings with the new VFDs, communications, and wiring schema.
5. Order the new drives and materials needed for the upgrade.
6. Order a communication gateway PLC to connect existing equipment and the new VFDs. (A communication gateway is frequently required in drive modernization projects because of the age of the existing PLC equipment.

Production Line Shutdown and VFD Installation

Plant Operations stopped production on the line for the installation of the new drives. The Polytron team then began upgrading the VFDs, following a process informed by decades of experience:

1. Power-down electrical and perform lock out/tag out for the control panels involved.
2. Remove old drives one-by-one and mount and wire new VFDs in the control, then connect them to the communication cables for the new gateway PLC.
3. Power-up electrical and load original specific parameters in the new drives.
4. Validate each VFD to ensure that forward/backward rotation is correct.
5. After all new drives are loaded and validated, run production system in automatic mode to verify proper operation.

Upgrade Challenges

- New VFD replacement is not a simple "plug-n-play" scenario. Upgraded VFD's can pose integration capability issues, requiring communication devices and reprogramming of new drives to work with existing hardware.
- As with most VFD upgrades, Polytron installed a communication gateway PLC, which was necessary for the existing PLCs and the new VFDs to communicate.
- In some projects, lack of adequate space for the new VFDs in the existing control panels may necessitate the addition of a supplemental control panel enclosure.

CONTINUED SUPPORT

Polytron continues to supports the beverage manufacturer by upgrading over 1,000 obsolete drives, HMIs, and PLCs at more than 15 client sites.

Resuming Production

With verification that the upgraded line was running properly in automatic mode, plant operations resumed to full production on schedule.

Results: Lowered Downtime Risk

The most significant business objective was accomplished - minimize the increasing risk of unscheduled downtime due to obsolete hardware.

An additional benefit was that the project allowed the creation of spare parts inventory for other facilities not targeted for the control system modernization project.

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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.

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