Recipe and Data Management Case Study

Overview

Our customer was leveraging a Programmable Logic Control (PLC) system to store recipes for their manufacturing process. As the system was complex and becoming too cumbersome to be practical, the customer worked with an Avanceon consultant to design and implement a server-based solution that unified the recipe storage process for all the Cast-on-trap (CoS) machines, allowing the addition and implementation of new battery configurations simpler and more robust while at the same time making troubleshooting easier.

The Challenge

The customer's array of 19 individual Cast-on-Strap machines made it difficult to change recipes for the manufacture of automobile batteries: these machines controlled the assembly of the various components – the empty battery case, positive and negative plates, plate envelopes, and lead – and assembled them while casting a lead strap for the terminal lug. Each CoS had seven separate PLCs which controlled the process on that individual machine, so making any changes to variable items such as battery dimensions, timers, or other variables was a complex process that was difficult to implement and troubleshoot.

The customer sought to remove the recipes from the individual machines and consolidate them on a single server, allowing for both central control of the recipe process and the gathering of additional data for supervisors and quality control.

Analysis

Each existing PLC had tags and data files with differing tag names and conventions that accumulated over multiple decades, making consolidation of the CoS process difficult. Through the design phase it became clear that the customer required a standardized solution that would be consistent across all lines. It also became clear that any solution would need to involve a minimum of down-time. In the

analysis it was determined that some machines were not gathering accurate information, so further field investigation and remediation was required to ensure that the project started on a solid foundation. Lastly it was determined that that most machines had to be converted to Ethernet from DH+ in order to communicate with the new recipe server in order to maximize the potential functionality. The project required working with operators, supervisors, quality control personnel, IT, payroll, and process engineers; so timelines, communication, and solution foresight were all critical to project success.

The Avanceon Solution

Avanceon provided the customer a standardized application that addressed the dynamics of the complicated CoS area of the manufacturing process. The project was developed at the customer's facility in order to allow the entire team to have immediate and effective access to all the project issues, clarifications and questions. Working together in partnership with the customer , a solution was designed and implemented delivering a more new, more efficient method to recipe management while permitting programming changes to be done while the COS machines were operating This approach created little to no down time for production and allowed maintenance technicians to perform changes and testing without delaying the project deadlines.

The newly designed system successfully implemented standardized recipes to the machines and provided a more seamless way for new battery recipes to be added. It also provided for easier troubleshooting, as technicians could rely on parameter tags being at the same address on every machine and for the data to be accurate and reliable. Supervisors were also able to collate and gather larger amounts of data which they could configure in flexible reports to their customers. The data and reporting functionality increased efficiency, opened up new clientele and expanded orders for the company.

This type of recipe and data collection situation was not unique to this specific customer. It is a fairly common need where, based on experience and understanding of recipe and set point management concepts, a simpler, more streamlined and efficient way to load recipes across diverse machines can be realized. This application typically creates significant benefit in product production and quality regardless of the industry it is applied upon.