The Challenge

• Integrate certain aspects of their current system into an updated and improved Batching & Mixing Control System

• Reduce the amount of out of specification batches

The Solution

• New Control System to Maximize Production

• State-of-the-art Weighing System To Weigh Raw Materials

The Results

• Improved production capacity

• Increased batch integrity

System Valuation

A Batching system and Controls solution similar to those featured here will typically range in price from $80 - $100 Thousand per system. The price is subject to change due to project requirements and selected options. Call for current prices.

OVERVIEW:

A global manufacturer commissioned Sterling Systems And Controls, Inc. to create a customized Batching and Mixing Control System to improve rubber compounding batch integrity and increase overall production through automation.

THE CHALLENGE:

The customer needed to update their existing aged batching system. The new system would need to add more capability and automate the handling of bulk dry and liquid materials, scales, and manual weighed materials that are introduced into the Banbury Mixers.

Overcoming the old batching system interlock of not being able to process different formulas at the same time was another challenge. The limitation of the old system resulted in substantial lost production time. The company determined that Sterling’s customized automation capabilities were the perfect fit to satisfy their demands.

THE SOLUTION:

The control system was designed to incorporate four main processes: The Hand Add Weighing Process, the Main Batching Process, the Mixing Process and the Batch-Off Process. Each manual add station consists of a control panel with a PanelView Plus and an Ethernet weight instrument. The system allows the Hand Add Stations to batch ahead and pre-stage totes for the...
main batching process. Hand Add HMI screens prompt the operator to place a container on the scale and to use an RFID scanner to scan container tags. The system then displays which ingredient to weigh into the container in a pre-determined sequence to complete the batch. The system utilizes bins with limit switches on the lids in order to confirm that the correct ingredient has been selected and after confirming, the operator is prompted to weigh the specified amount of the required ingredient. The operator continues the entire batch sequence weighing each ingredient in this manner. As the operator completes each tote, it is placed on the Hand Add Conveyor.

The main batching process is controlled from the main control panel using an integrated dual screen display and Industrial Computer running Rockwell Software FactoryTalk View to provide a wide touch screen interface and a dedicated mixer display monitor. Password protected ingredient codes, bin assignments and formulation data are entered into the batching computer either at the main control or via remote access through WebCentral Software. The scheduling operator will select the formula and create a batch schedule. The batching process screen displays a graphical schedule.

By integrating an RFID reader and a scale, the system verifies with RFID verification that the ingredients have been weighed within tolerance and all starting conditions for the mixer are met. The system starts the Banbury Mixer at a formula specified speed, introduces scaled ingredients, energizes the mixer pneumatic ram and sets pressure. It then prompts for and confirms the addition of Hand Add Ingredients at appropriate times during the batch, based on Mixer Power Usage, Time and/or Batch Temperature conditions programmed for the selected formula. The system continuously monitors and verifies mixer health and batch temperature is within tolerances. Once a scale finishes discharging, it will automatically begin weighing the next batch or formula while the mixer is processing the current batch in order to maximize batch throughput.

**SYSTEM FEATURES:**

- Weighing System is responsible for the automatic and manual weighing of raw materials used to produce the customers finished product.
- Controls will track raw material data and insure that each weighment is accurately scaled.
- Data tracking of the system will allow the end user to maintain inventory and usage of each raw material and validate the correct materials are used in the batch process.
- Records maintained by the controls include batch summaries, cycle time, production, raw materials, finished product, lot data, actual weights and batch operator information.

Sterling Systems and Controls, Inc. designed a HMI-PLC based Batching/Mixing Controls system that consisted of a Main PLC Control Panel using Allen Bradley Control LogixPLC with Rockwell’s FactoryTalk HMI software, a PanelView Plus based Rubber Hand Add Station, Minor Ingredient Weighed Hand Add Controls, and a Mixer Hand Add Check-weigh Control. The Customer’s existing RFID scanners were incorporated into the system to ensure batch integrity. Additionally a WebCentral Database Access Software package was included to provide access to the plant floor data from PCs on the corporate network. Panel mounted Manual/Off/Automatic selectors with a master key switch provided true manual back-up in case of a PLC failure.