▶ PRODUCTIVITY

▶ INNOVATIVE

▶ LOW BUDGET

BRAKE LINING, CLUTCH PLATE AND FRICTION MATERIAL INDUSTRY

SEMI-AUTOMATIC

Batching
system

How do you automate a process that involves 65-80 raw materials in quantities that vary from Kgs to grams. What is the right level of automation to achieve quality, consistency, Poke-yoke (Mistake proofing) and traceability?

SEMI-AUTOMATIC BATCHING…

THE CHALLENGE

The brake-lining, clutch plate / friction material industry deals with over 65-80 different raw materials, which have very poor flow characteristics: such as fibers, fiber cakes and ultra-fine powders.

And these have to be batched in accurate quantities for creating the pre-form composite mixture. In a typical batch consisting of 10-12 materials, some materials have to be added in kilo grams and some others just a few grams. Depending on the production batch being run, the recipes will vary.

Since each material is unique and the quantity to be added is also unique for each material you need close to 10-12 weigh hoppers, 65-80 storage bins and special purpose and unique feeding systems for each one of the materials.

So even plants in advanced / developed countries, use a completely manual process to batch the required quantity. Setting up a completely automated batching plant is neither technically feasible (given the constraints of factory floor space available) nor economically viable.

SO WHAT IS WRONG WITH MANUAL BATCHING?

Human error can spoil an entire shift's production. Some of the common mistakes are :

1. Wrong sequence of materials added in to the mixer.

2. Wrong materials added in a particular batch

3. Completely wrong quantity added / Accuracy of quantity added is beyond tolerance.

POKE YOKE, MISTAKE PROOFING AND TRACEABILITY

Improving productivity, ensuring consistency of quality, mistake proofing the process and ensuring traceability are the objectives. And these can be achieved using a semi-automatic system at a fraction of the cost. These are some of the innovative approaches that Autosys has used to automate this process:

- The material does not come to the weigh hopper, the weigh hopper goes to the material

- The system uses a trolley based system that shuttles between multiple storage bins to collect the materials required for each batch. The trolley stops at the outlet of the right storage bin, based on the recipe selected. The batching operator travels on the trolley.

SEMI-AUTOMATIC
Batching system

- The bins have doors that refuse to open, unless it is authorized from the system which in turn depends on the recipe step and the material required.

- The trolley refuses to move further to the next bin / step, unless the correct quantity is added within the accuracy tolerance specified for each material.

- The operator uses his gloved hand to pick or add material from the storage bin in to the weigh hopper as per the recipe instructions provided by the system. This is the only manual step.

- The sequence of adding materials is strictly enforced.

- At the end of each batch, materials collected in 3 different weigh hoppers are discharged in to the mixer in a pre-defined sequence. Weigh hopper outlets have an RFID and would refuse to open if the wrong bin is aligned to the mixer inlet. …. See next page

- The system monitors / measures the inflow and outflow from each storage bin and keeps track of the inventory of each raw material in each bin. Batch sequences of a recipe will not be started unless adequate quantities of the required materials are available in the storage bins.

- A trolley based loading station is used to fill raw materials in to storage bins.

- Raw material Issues from stores are bar coded and these have to be scanned at the loading station. The inlet of the storage bins are also controlled by the system and hence will not open unless the material bar code matches with the storage bin.

- An online sieving solution is also provided to sieve raw materials before they are filled in the storage bin.

THE CONDUCTOR

All these activities are orchestrated and controlled by a PLC based system with Touch screen based MMI Interface. A complimentary bar code generation system is also provided to the stores.

A PC based SCADA system in industrial enclosure is provided to monitor and control the process.

The PLC and SCADA software is programmed and customized to suit the specific requirements of each customer.

Batch report, production report, consumption report, recipe report, alarm report etc. can be generated from the system Custom reports can also be provided.

CAPABILITIES & EXPERTISE

- Material Handling
- PLC, SCADA and MES
- Automatic Dosing
- Automatic Weighing
- Instrumentation
- Telemetry
- MCC and PLC panels
- Project Management
- Turnkey Contracts

Benefits Summary
Semi Automatic Batching System for Brake lining, Clutch plate and Friction material industry.

- Low cost solution
- Improves productivity of manpower used
- Reduces operator fatigue
- Improves quality and consistency of the end product
- Mistake proofing (Poke Yoke)

COMPLIMENTING
PRODUCT
Xeleer
Automatic Dosing System
For pre-form composites
Accuracy : +/ - 2 g
Batch size : 10-500 g
Cycle time : 25 seconds

ABOUT AUTOSYS

Autosys provides end to end plant automation solutions to a wide variety of industries. Combining its multi-disciplinary expertise in mechanical, electrical, electronics, PLC and computer systems with deep domain knowledge about each industry, Autosys is able to provide fixed price turnkey solutions. Whether it is an existing plant or a green field project, from Rs10 Lacs to Rs100 Crores, Autosys can execute plant automation projects within time and budget like no one else. Call us for a more detailed discussion.

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