
Process Automation of Dyeing Factory

Jagadeesh Rajendran
Instrumentation Engineer
Gyan Data Private Limited
Chennai-600113 India
jagadeesh@gyandata.com

Prakash Ramamoorthy
Instrumentation Engineer
Gyan Data Private Limited
Chennai-600113 India
prakashramamoorthy@gyandata.com

About the Client

Arihant Garments Pvt. Ltd., located in Ambattur has more than 20 years experience in garment dyeing. The company does dyeing and washing of stitched cotton fabrics in sample or bulk quantity. Their service extends to customers from various countries. Their expertise in garment dyeing and interest in automation has driven them to improve their dyeing process through automation of their existing systems.

Motivation

The garment dyeing process involves various steps: recepies for dye mixtures, control of water level, temperature, pH etc. Certain steps such as reactive dye preparation, transfer of dye to the drum in which the clothes are processed, control of process during transfer & fixation of colour from dye to fabric, subsequent drying etc were being done in manual mode. These manual interventions not only require additional manpower but offer little to no control over the process. This creates reliability and repeatability issues which can be overcome through automation.

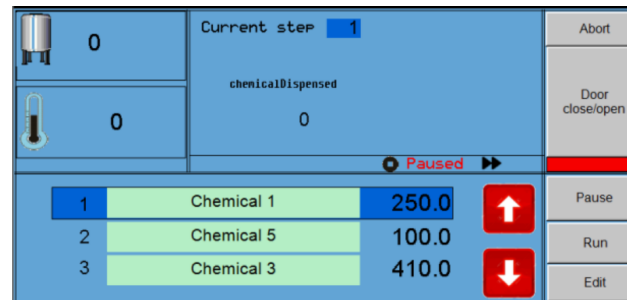
Problem

Though machines were available in the market which offer complete automation of the process, they were prohibitively expensive and could only be sourced from

outside the country. In order to keep costs low, the developed automation solution needed to be retrofit to existing equipment. This posed a challenge as most equipment currently used in dyeing houses neither had sensors nor control mechanisms in place. Complicating matters further was the lack of chemical dispensing units which would integrate seamlessly with the existing dyeing equipment

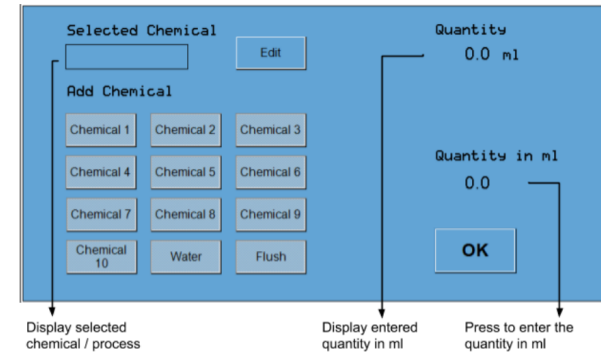
Solution

Development of centralized controller with associated sensors as a single solution was the key to provide automation to existing dyeing machines. A high speed controller with a touch based user friendly interface was built which could execute multiple operations of the dyeing process at the same time. Realtime pH control for a wide range of pH values was also added via a sensor.



The program running screen

A chemical dosing system was also developed sporting a semi-automatic mode where the user could specify and dispense precise quantity of a chemical immediately.



Chemical dispensing screen

Since variations in the dye recipe and the fabric affect the sequence of steps and the steps themselves of the dyeing process, a custom programming interface was also created. This enabled users to create custom programmes simply by touching and selecting icons in the interface. Suggestions were also made to connect this developed system to a central server over the network in order to perform predictive maintenance and centralized monitoring of the dyeing equipment



The chemical dispensing tanks