

The Problem

Heavy Gauge is a de-coiling line in the steelworks industry. It uncoils heavy gauges of steel and cuts it to the specific size required by the customer.

It has three stages of levelling throughout the process to ensure that the final product produced is as flat as possible, and its surface brushing stage ensures that the product is as clean as possible.

The main purpose of this project was to implement a solution to reduce roller pitting on the levellers and straighteners and enhance operator safety during the roller cleaning procedure. This was essential as it caused quality issues and increased maintenance time, therefore reducing production.

The primary objectives of this project were;

- To enhance the process line by ensuring that any raw material is dry at the start of the process.
- The rollers on the straightener and levellers can easily be cleaned to remove contaminants.
- The cleaning task must be made safe so that an operator can carry out the task.

Line Layout And Safety

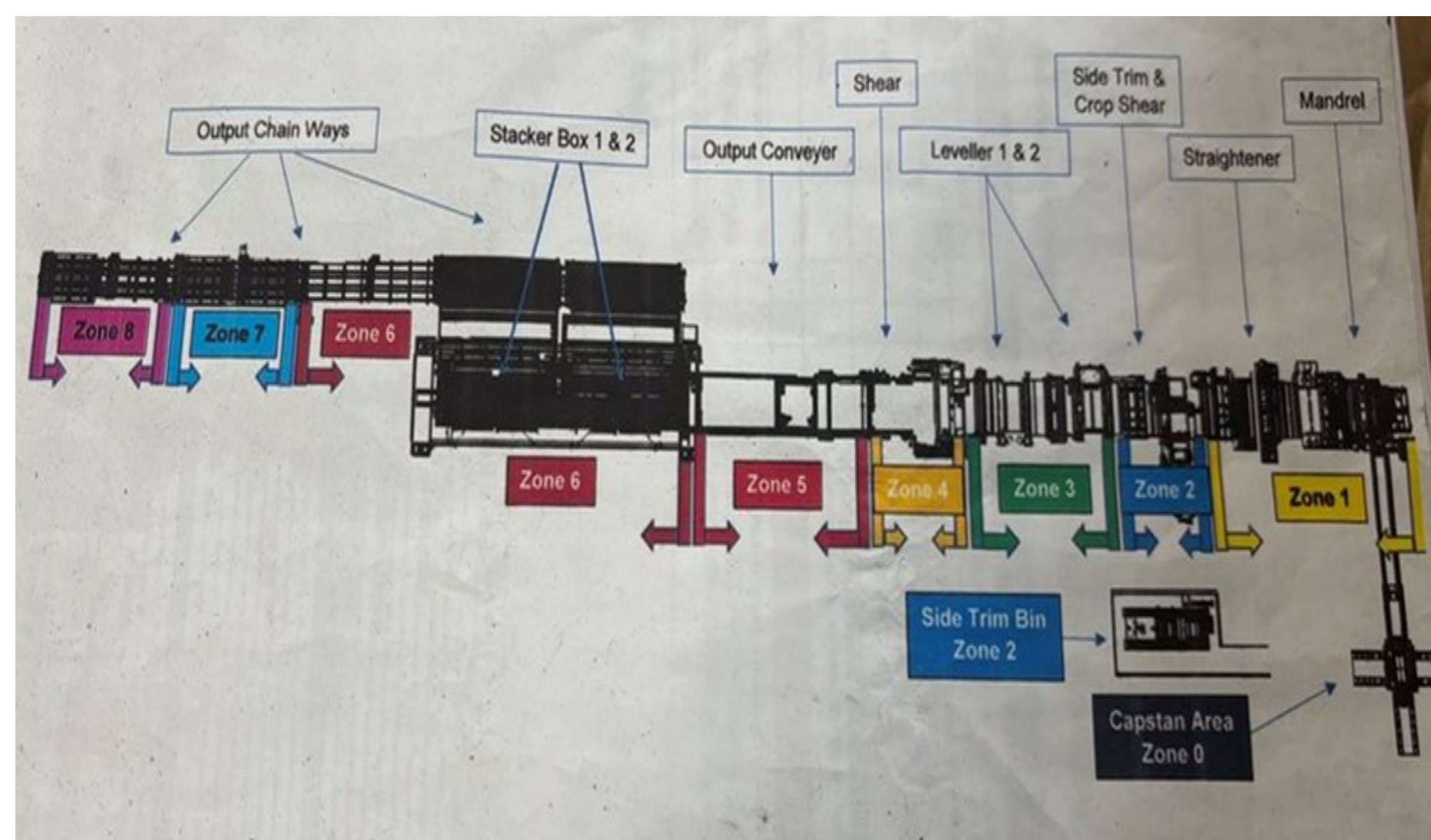


Figure 1— Line safety zone layout

Methodology

Solvair Air knives were installed to remove moisture and contaminants. They do this by using a high velocity jet of air to blow off moisture and debris from the material surface.

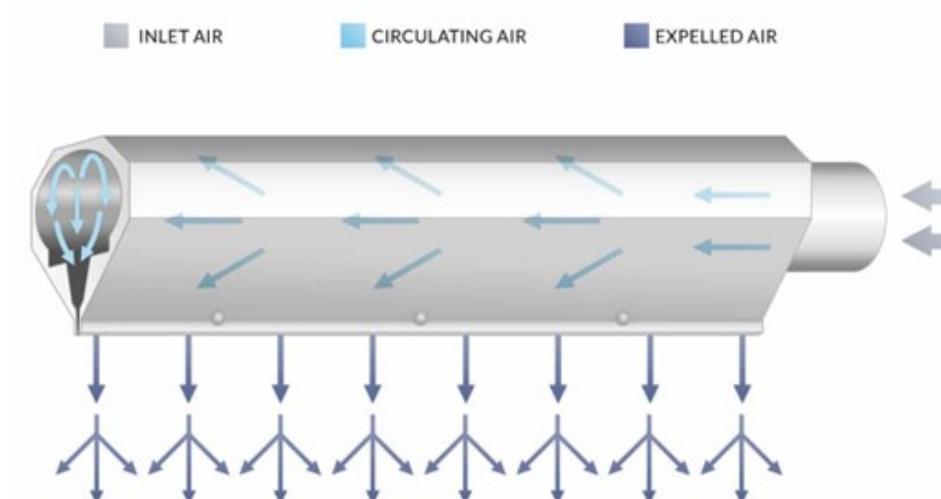


Figure 2— Air knife operation

A safer cleaning procedure was also developed with the use of carpet rollers and software modifications in the PLC. A specific mode was programmed, with independent switches on the local panel, so that normal machine operations cannot effect it.

Implementation

The project was implemented and set up on site by fitting all the components. This included fitting the air knife system, carpet rollers and proximity switches onto the process line, and the operator controls and inverters in the control room and sub station.



Figure 3— Air knife inverters



Figure 4— Cleaning mode switches



Figure 5— Carpet rollers

The PLC was backed up as a fail safe procedure, and then the edited program blocks with the cleaning mode were downloaded ready for testing.

Testing and Commissioning

Testing was carried out at IAC prior to fitting the air knife system on site. Once testing was complete, the components were installed on site and commissioning commenced. A factory acceptance test was used to help with commissioning the project and the customer signed it off once completed.

Challenges

The project encountered minor challenges, including the replacement of an isolator during the blower commissioning and time constraints with planning being moved forward. These challenges however, were resolved efficiently with minimal cost and time implications.

The specification was changed after completing the project due to an issue with an operator not starting the Air knife. This meant that the operator controls were removed from the control room and the air knife was started automatically by editing the PLC program.

Conclusion

Overall, the solutions implemented improved the product quality, reduced the maintenance required to the rollers due to pitting and also enhanced the operator safety with regards the cleaning procedure.

TATA have reported that the amount of cleans needed to be carried out to the rollers have reduced from almost 3 times a day to only once every 3 to 4 weeks. This means that the air knife system is effectively drying off the material and meeting the aim of this project.