Integrated project Engineering Technology

2023-2024

Automation of a powdercoating line

Natan De Ceuninck, Jonah Fastré

Bachelor Engineering Technology EM

Iko Metals, a global leader within the metal roofing industry, is recognized for its production of metal roofing panels. Operating on an international scale, the company specializes in the fabrication of metal roofing panels. offering two distinct finishes: stone coated, as depicted in Figure 1 and Powdercoated, illustrated in Figure 2. Notably, Iko Metals' biggest production facility is located in Tongeren, Belgium. This plant provides us with the subject for this bachelor's thesis. Our focus will center around the powdercoating production line.

Figure 1: Stone coating

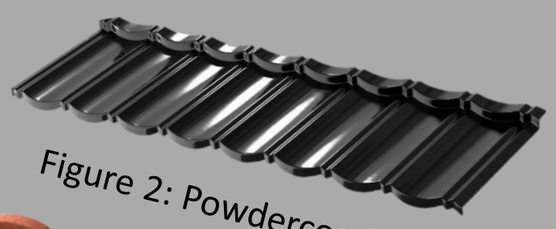

Figure 2: Powdercoating

Situation

Problem

At this moment, the production of the powdercoated panels is only a partially automated process. Upon arrival, panels are received in the form of a pallet-based stack. They are subsequently hung onto a powdercoating line as shown in Figure 3. Here the panels are powdercoated in a fully automated process. After this process they are again manually removed from the powdercoating line and stacked in a certain sequence. These not yet automated steps are very labour-intensive.

During the stacking of the finished product, certain panels need to be equipped with a sticker. This is something that is still done manually. This production line is also experiencing a high rate of failed powder coatings. This because of the design of the racks where the panels are mounted to on the powdercoating line.

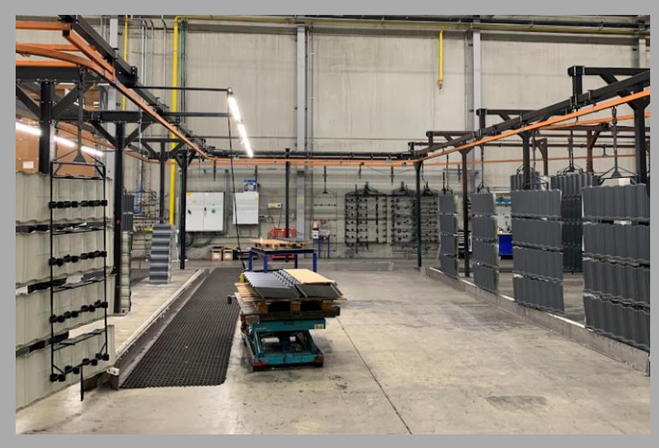

Figure 3: powdercoating line

Goal

The main goal of this thesis is for the powdercoating line to be fully automated. For this to happen there's various steps in this process that require a solution. A list of requirements was made and formed into a detailed block diagram, figure 4. For every step in this diagram machines should be developed as well as redesigning the racks to be compatible with the new system.

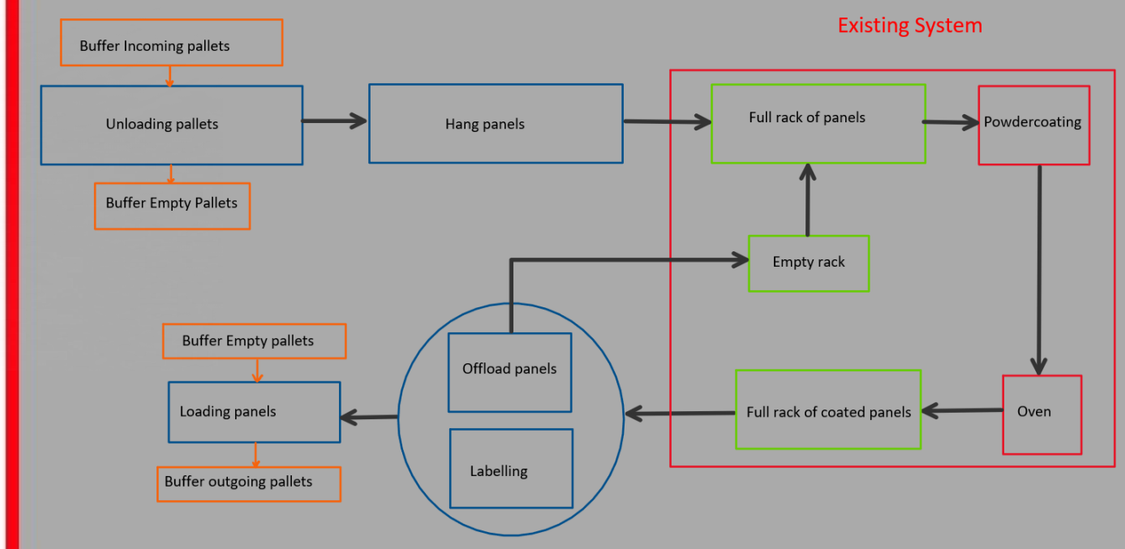

Figure 4: Block diagram

Solution

The machine to unload and load the pallets is shown in figure 5, its called the revolver. It has one rotation axis, every rotation it simultaneously picks up two panels and drops off two panels using suction cups. Additionally, the tool can be adjusted in real time to remove stacking errors.

The second machine loads and unloads the panels, to and from the racks, figure 6. It picks up four panels and rotates up to meet the racks, to load or unload the panels.

Figure 5: Revolver

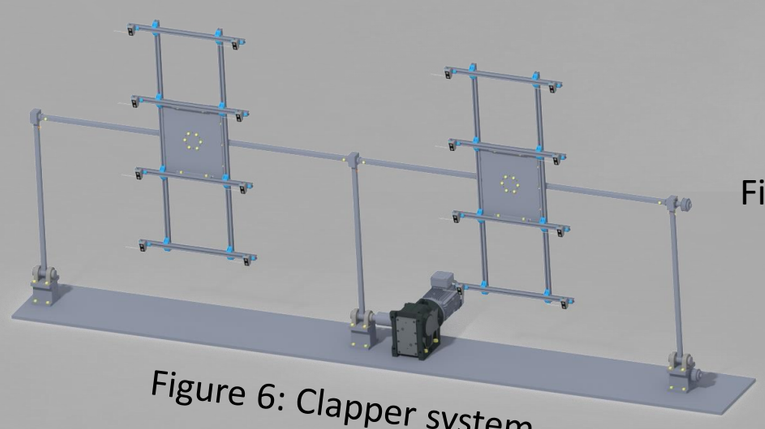

Figure 6: Clapper system

Supervisors / Co-supervisors / Advisors: Michael Daenen, Karel Kellens, Wim Olaerts