

# Redesign of palletiser to prevent incomplete pattern formation

Niels Geenen & Kian Kleijnen

Bridging programme for Master of Electromechanical Engineering Technology

## Situation

Greenyard is an international company specializing in processing and distributing fresh, frozen, and prepared fruits and vegetables. It supplies supermarkets, food companies, and hospitality businesses worldwide, with a strong focus on sustainability and food safety. They specialize in preserved foods in glass jars or cans. Our project focused on canned fruits and vegetables



Figure 1: Greenyard Prepared products

## Problem & Objectives

At Greenyard Prepared, pallets are filled with cans using palletizers. Cans arrive on a buffer conveyor, where they spread across its width by colliding. They are then magnetically lifted as a layer onto a pallet. However, incomplete patterns often form, leading to inconsistent layer placement. Figure 2 illustrates an example of incomplete pattern formation. The incomplete patterns make it difficult to predict the number of cans per pallet, resulting in over- or under-deliveries to customers and costly, time-consuming corrections. Our goal is to solve this problem. We began by investigating the root cause. We found that the issue was due to the cans not being evenly distributed on the buffer conveyor.

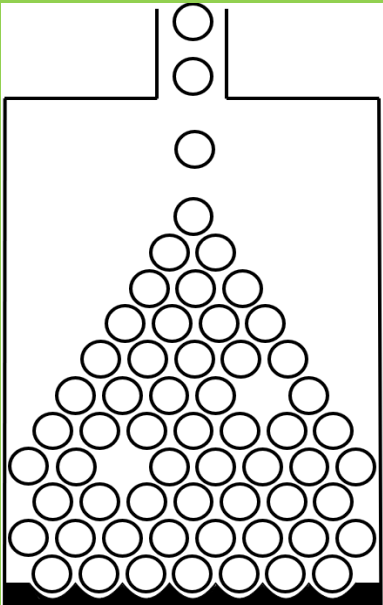


Figure 2: Incomplete pattern formation



Figure 3: Incomplete pallet

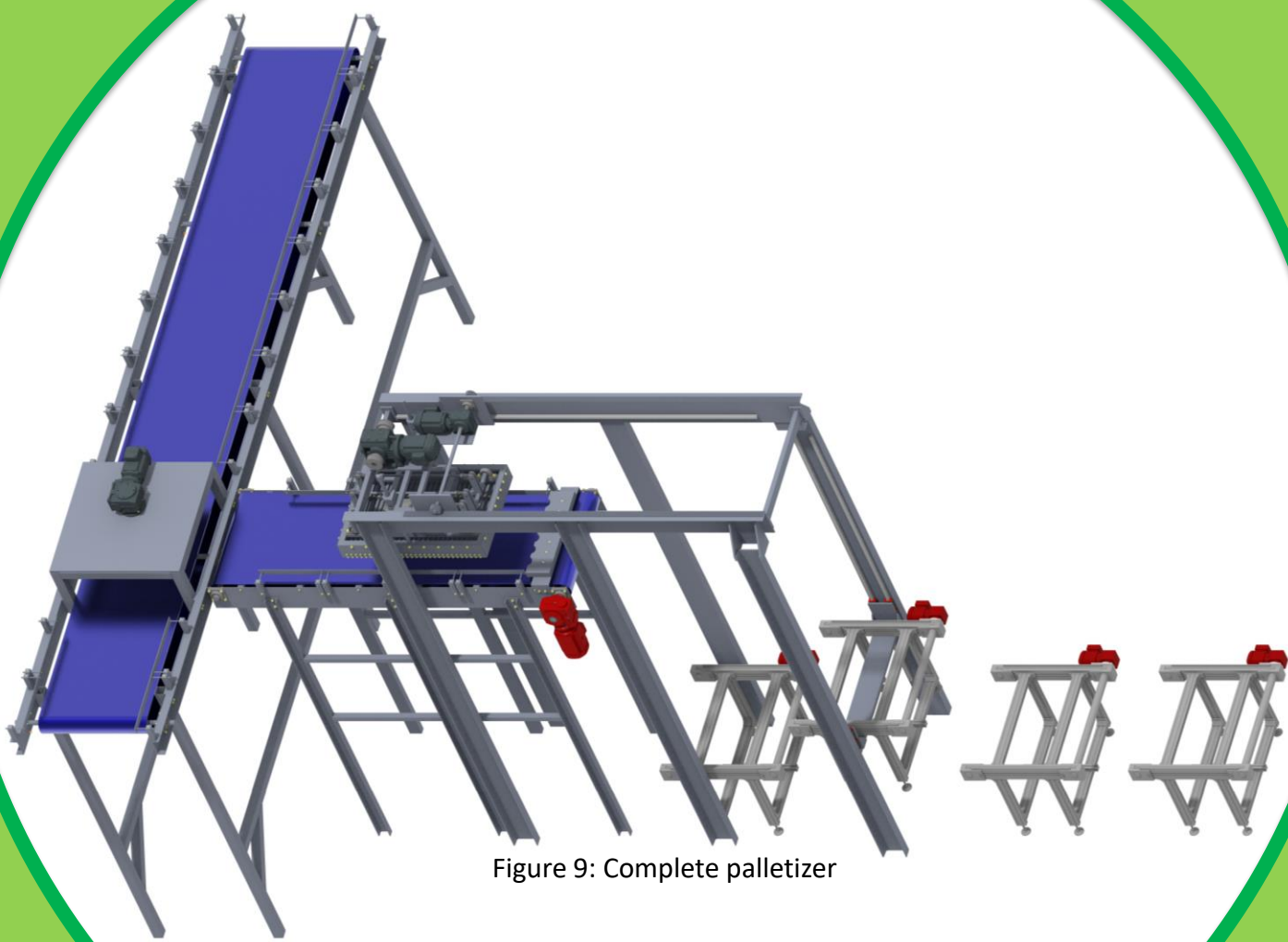


Figure 9: Complete palletizer

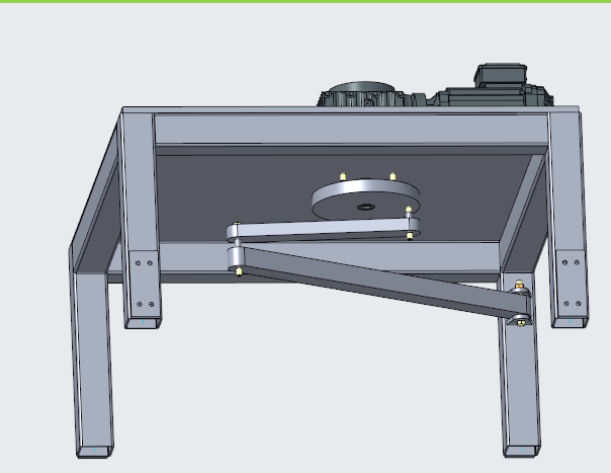


Figure 7: Push system

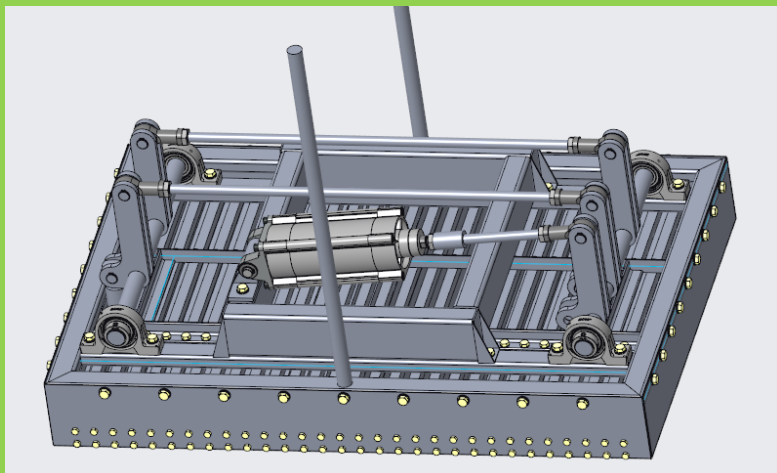


Figure 8: Magnet

The newly designed push system utilizes a rotating disk, eccentrically linked to two rods. Because of the eccentric connection, the rods evenly distribute the cans across the entire buffer conveyor. The magnet mechanism requires only one pneumatic cylinder to pick up and release the cans. This cylinder is used to move a permanent magnet.

## Results

## Methodology

We re-engineered the system responsible for transferring the cans onto the buffer conveyor, ensuring that the cans are automatically and evenly distributed across the entire conveyor. This solution was developed through a morphological analysis that included all potential approaches to the issue.



Figure 4: morphological overview

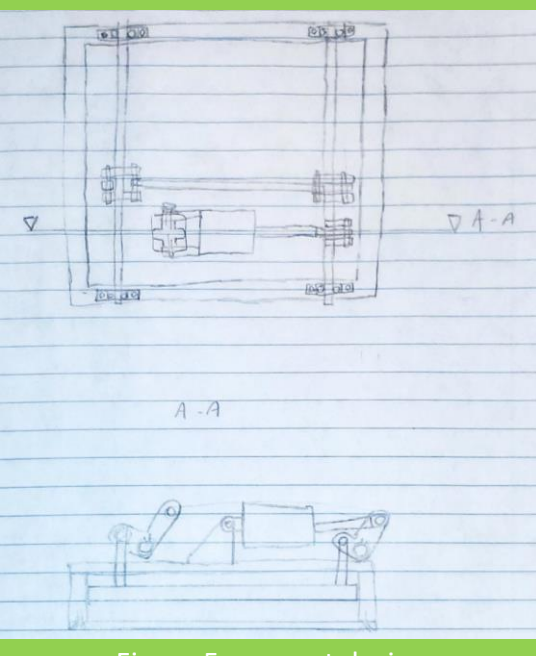


Figure 5: magnet design

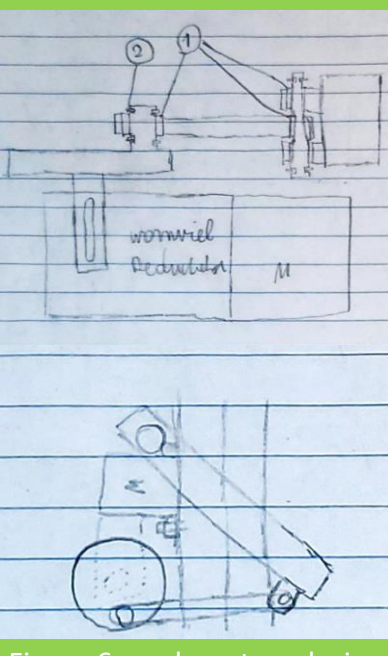


Figure 6: push-system design

## Conclusion

The redesign of the palletizer system effectively addresses the issue of incomplete pattern formation through the implementation of a push system featuring an eccentrically connected rotating disk and two rods. This solution ensures uniform distribution of cans across the buffer conveyor, resulting in more consistent and reliable pattern formation. This project demonstrates a successful application of morphological analysis, delivering a practical and cost-effective solution for industrial automation.



Supervisors / Co-supervisors / Advisors: Karel Kellens  
Michaël Daenen  
John Bijnens  
Jeroen Lievens