

Automated Cutting and Placement Machine for PP Sheets

Tom Claus & Vincent Ercken

Bridging programme for Master of Electromechanical Engineering Technology

SITUATION



The current process at Aperam for placing protective polypropylene sheets on stacked steel plates is entirely manual. This results in inefficiency, increased labor costs, and an inconsistent level of protection for the final product. Additionally, the manual handling of the sheets leads to ergonomic strain and a higher risk of damage or incorrect positioning.

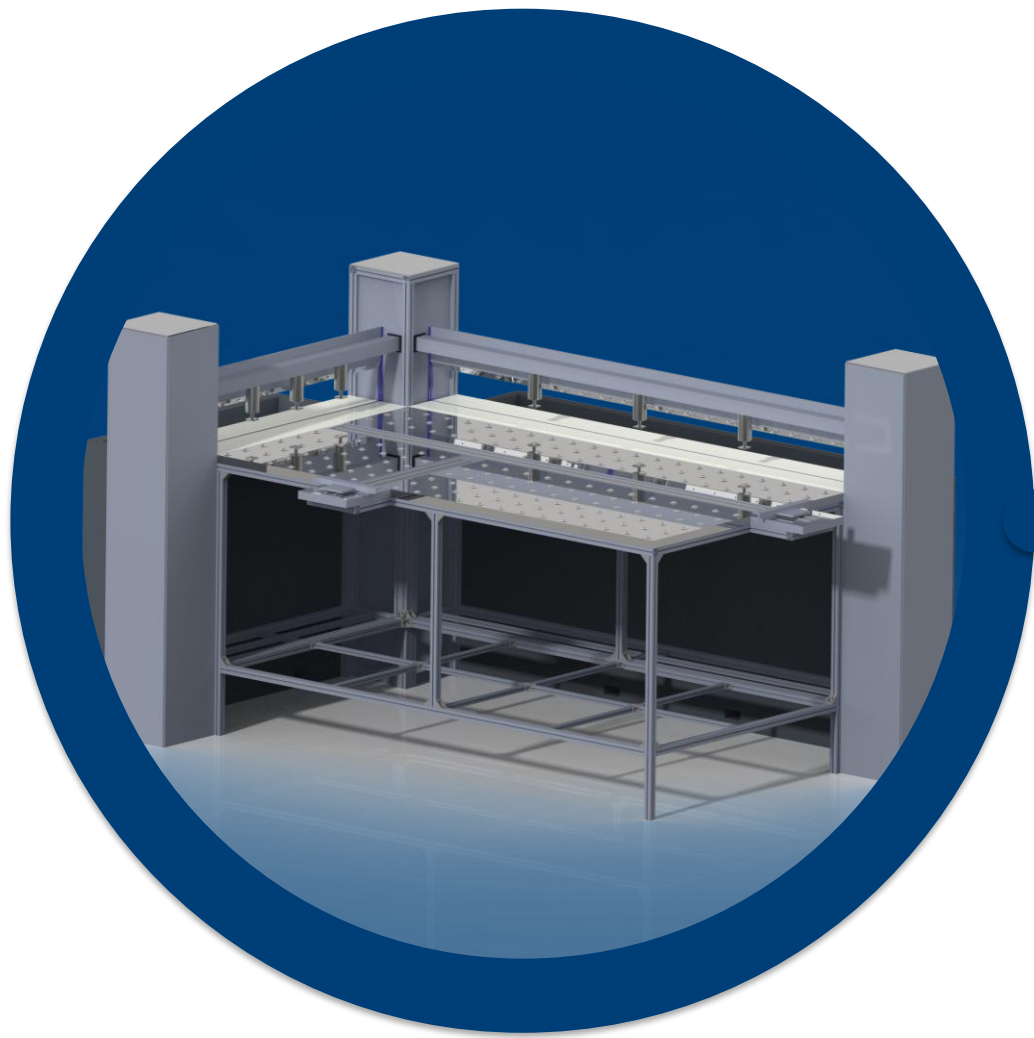
The goal of this project is to develop an automated machine capable of cutting protective polypropylene sheets (PP sheets) to size and automatically placing them on stacked steel plates with variable dimensions. This installation is intended to replace the current manual process, thereby improving efficiency, accuracy, and safety within Aperam's production department. In addition, the design aims to be maintenance-friendly and reliable, allowing for easy integration into the existing production line.

3D model

- 1 Scan the QR-code
- 2 Download the Vuforia View app
- 3 Using this app, scan the cube logo
- 4 Experience our design!

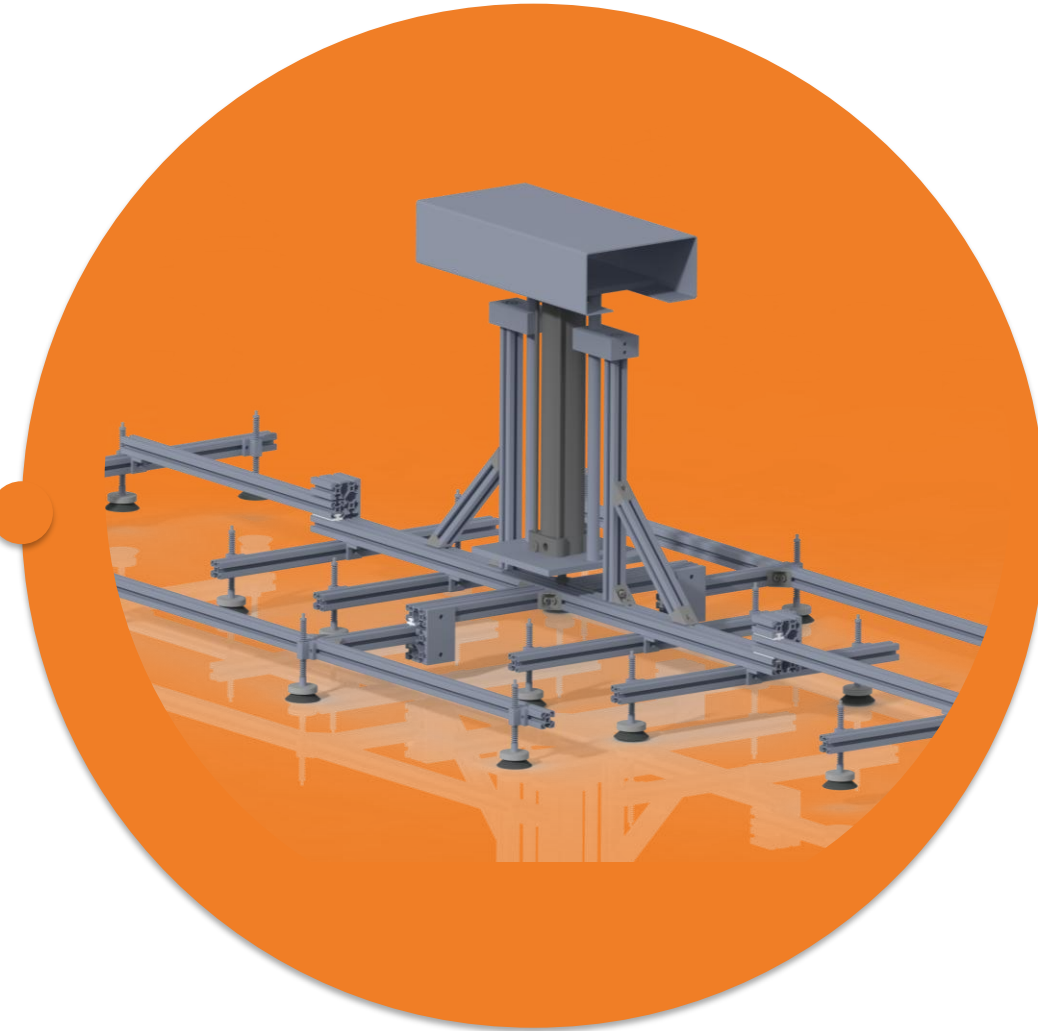
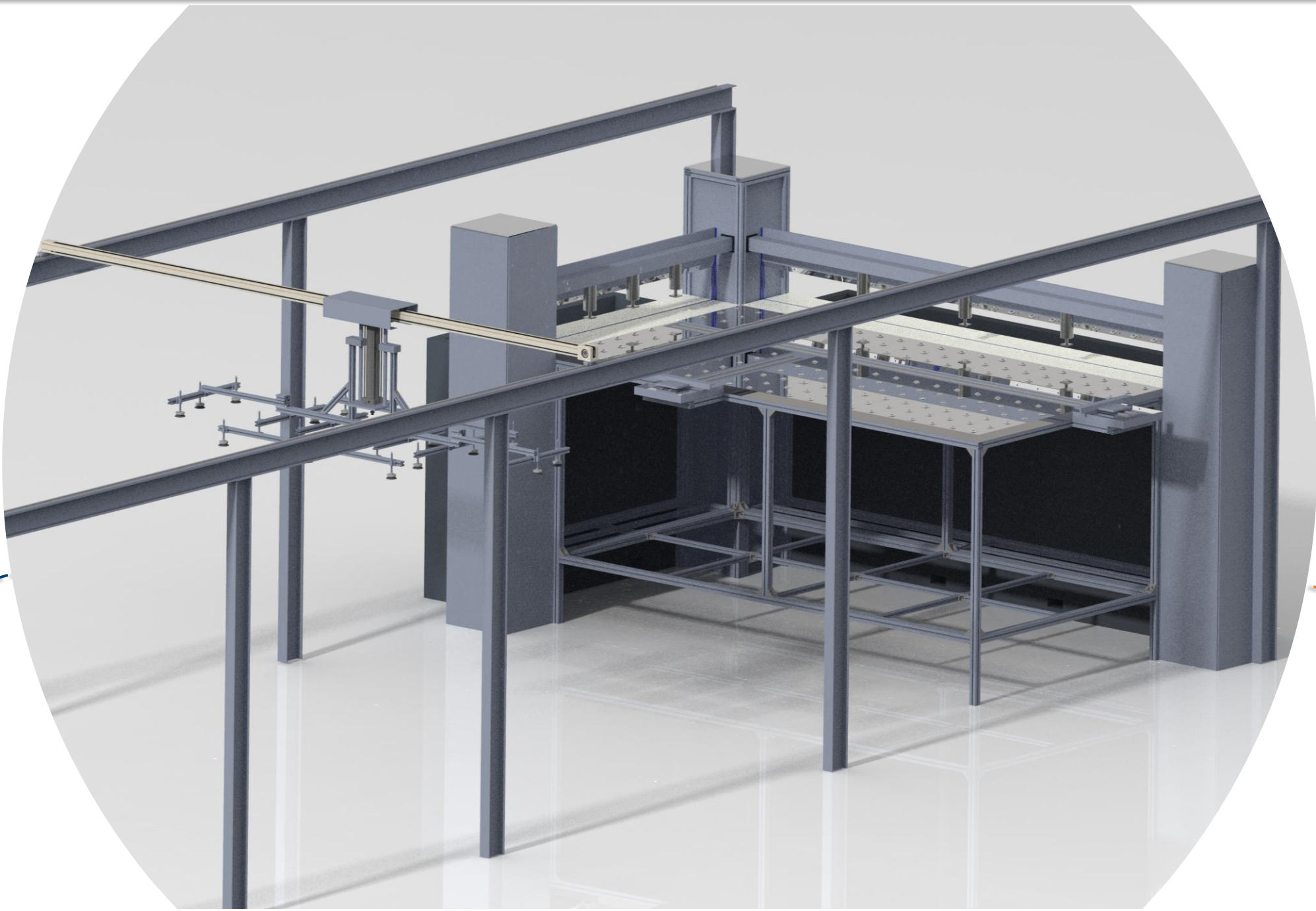


FINAL DESIGN



Cutting station

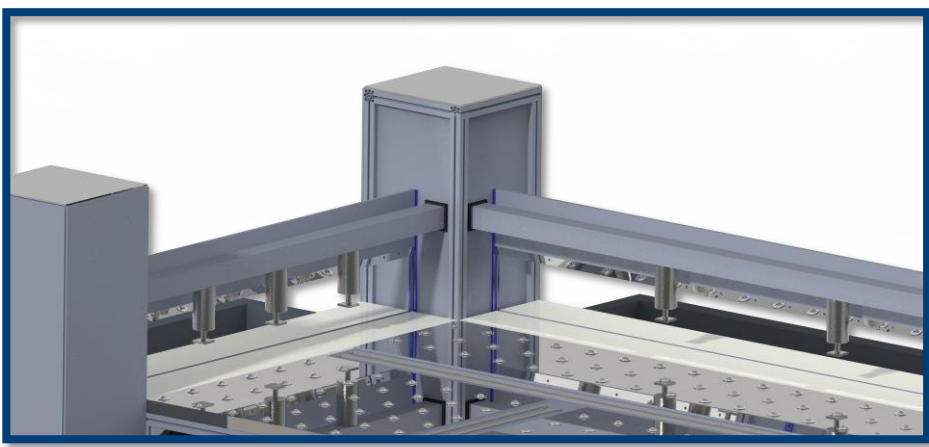
The cutting station trims PP sheets with precision using two push carriages that move the material in either direction. Cutting edges on opposite sides of the table are each driven by hydraulic cylinders, ensuring a clean cut every time. Any surplus material falls into a forklift-transportable collection box.



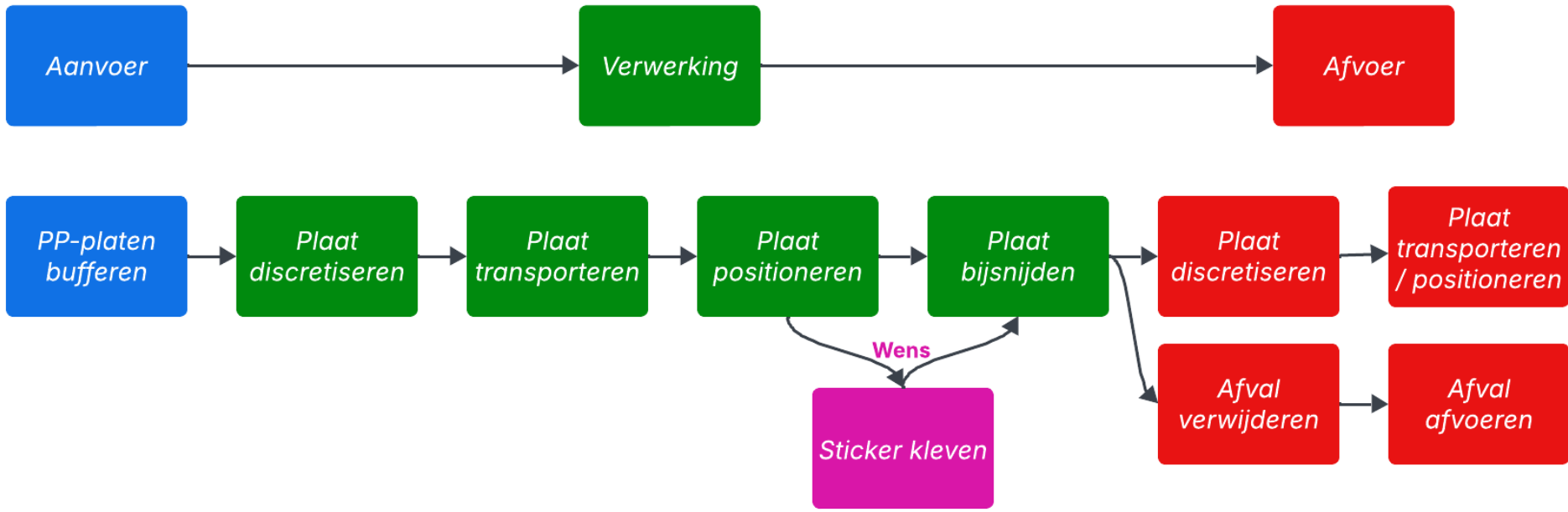
Pick & Place Unit

The pick & place unit serves as the system's transport mechanism, driven by a gantry that moves it along both the X and Y axes. A pneumatic cylinder controls vertical movement, while movable suction cups handle plate pickup. The entire unit is designed to support a maximum load of 50 kg.

CLOSE UP



PRINCIPLE



Max. plate dimensions
4000 mm x 2000 mm x 4 mm

Cycle time
< 180 s

Max. space available
19 m x 4,5 m x 6 m

Power available
Electric and pneumatic

Cutting accuracy
+ 10 mm / - 0 mm

Supervisors / Co-supervisors / Advisors: Prof. dr. ir. Daenen Michael
Prof. dr. ing. Kellens Karel
Ing. Bijmens John