# Integrated project Engineering Technology

2025-2026

# Design of an Automated Drilling, Bending and Welding Machine for Processing PP Sheets

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Bridging programme for Master of Electromechanical Engineering Technology

## Context

AWS (Beringen) develops water treatment solutions. The ZE50 is a compact cabinet that produces chlorine on-site via salt electrolysis for pool disinfection.

Compared to liquid chlorine or tablets, the ZE50 offers:

- Safety: no storage or transport of chlorine
- Consistent quality: stable and pure chlorine production
- Ease of use: autonomous operation with minimal intervention

## Problem

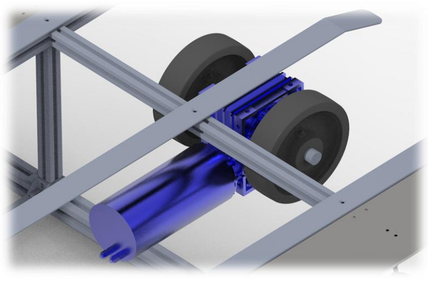
PP sheets are delivered pre-cut, but all other pre-assembly processes are done manually. These consist of drilling M4 holes in 3 out of 4 end faces, as well as bending two sides and welding them in place. Normally, these processes require molds or a second operator.

**Challenges:**
- Time-consuming and labor-intensive
- Low repeatability
- Limited scalability

**Objective:** Develop an automatic machine that performs drilling, bending and welding in one integrated process

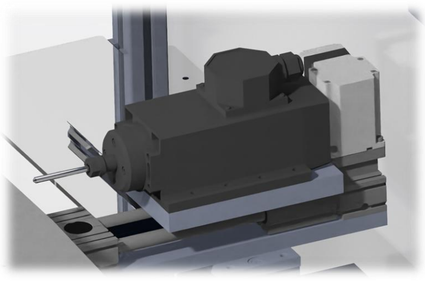
## How the machine works – Process overview

### Feeding



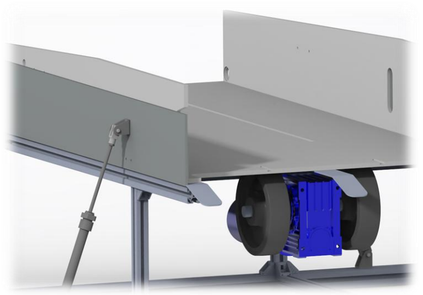
Rubber wheels driven by a motor move the plate forward

### Drilling



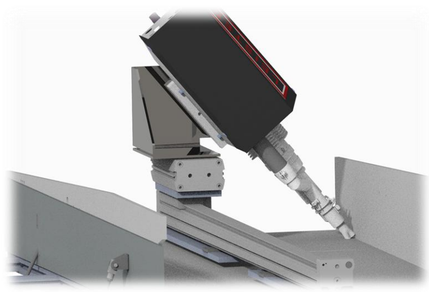
A drilling unit is guided along three end faces of the sheet

### Bending



A 90° bend is achieved with pneumatics + mechanical stop

### Welding

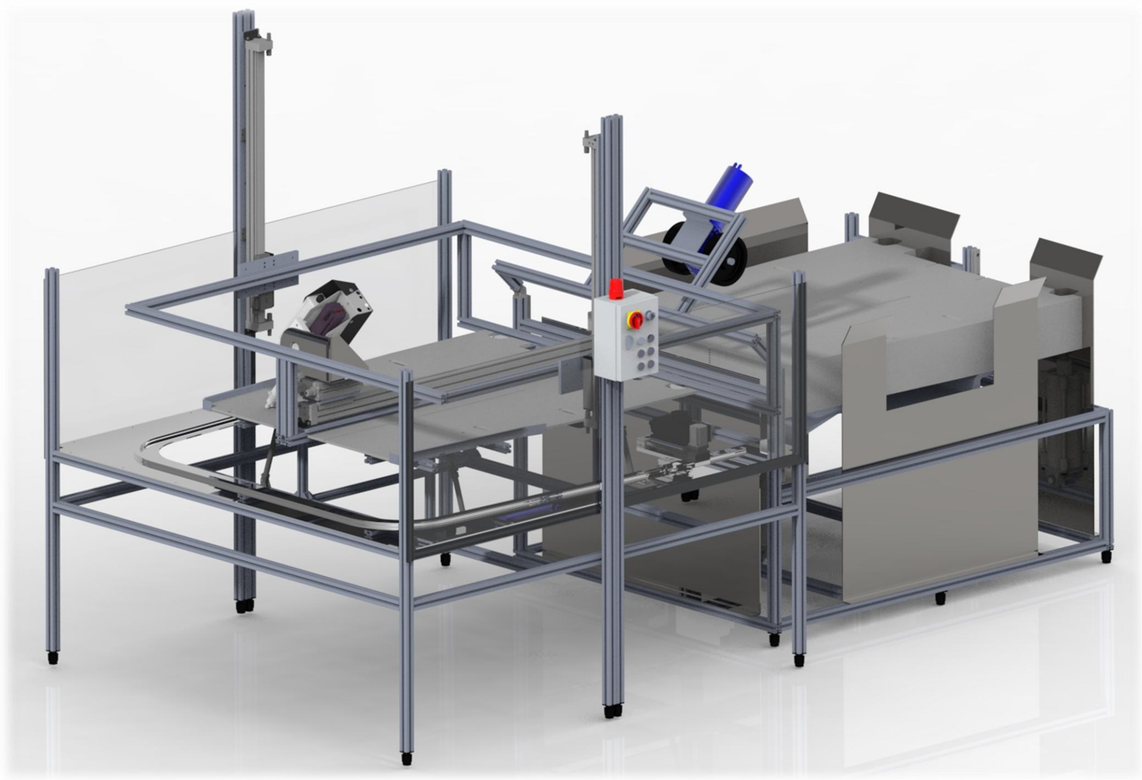


A linear rail guides a welding unit over the full length

## Overview of the machine

### Production unit

- Performs the three main processes: **drilling**, **bending** and **welding**
- Sideclamps and pneumatically powered clamping unit ensures **consistent positioning**
- Enclosed with plexiglass panels for **safety** while keeping visibility



### Supply unit

- Used as a buffer for **20 PP sheets**
- Feeds one sheet at a time to the processing unit
- **Levelled** by two pneumatic cylinders and guided by three linear rails
- Ensures correct positioning for feeding

## Expected results

- Higher productivity and shorter cycle time
- Consistent and repeatable quality
- Less manual work

## Conclusion

This automated machine integrates supply, drilling, bending and welding in one system. It delivers an efficient, safe and reliable solution for the production of the ZE50. This can be upgraded further with an output unit.

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De opleiding industrieel ingenieur is een gezamenlijke opleiding van UHasselt en KU Leuven