Integrated project Engineering Technology

2024-2025

Design of a machine for impregnation of PVA with PMMA

Schepers Kjell

Bachelor of Electromechanical Engineering Technology

Cretskens Leo

Bachelor of Electromechanical Engineering Technology

Context

Boonen is a mechanical engineering company based in Dilsen-Stokkem that designs, creates and installs industrial machines that are based on the clients needs. They also provide these services on their own, like machining a part if the engineering and drawing work has already been done. They will also service and repair any existing machines.

Problem

The client is specialized in advanced splinting technology, and they need a new machine to impregnate a PVA foam with a PMMA solution. The current machine does not meet the demands of the client, so they want a completely revised way for this process.

Objectives

- Dosing of the impregnation
- Width of at least 1250 mm
- PMMA-resistant components
- Input and output buffer
- Variable speed of PVA-foam
- Fast cleaning possible

I Feeding

The feeding of the PVA from its roll into the impregnator is done using 2 parallel rolling pins. The bottom rolling pin is driven by a motor. The top rolling pin provides pressure on the PVA using 2 pneumatic cylinders.

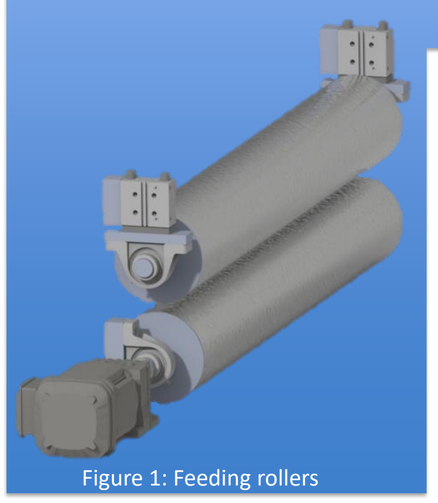


Figure 1: Feeding rollers

II Spraying

The impregnation of the PVA foam is done by spraying the foam with an array of spray heads. The dosing of the impregnation is controlled by the speed of the pumps for the PMMA solution. Any excess solution will be gathered underneath the sprayers and will be reused.

Figure 3: spraying array

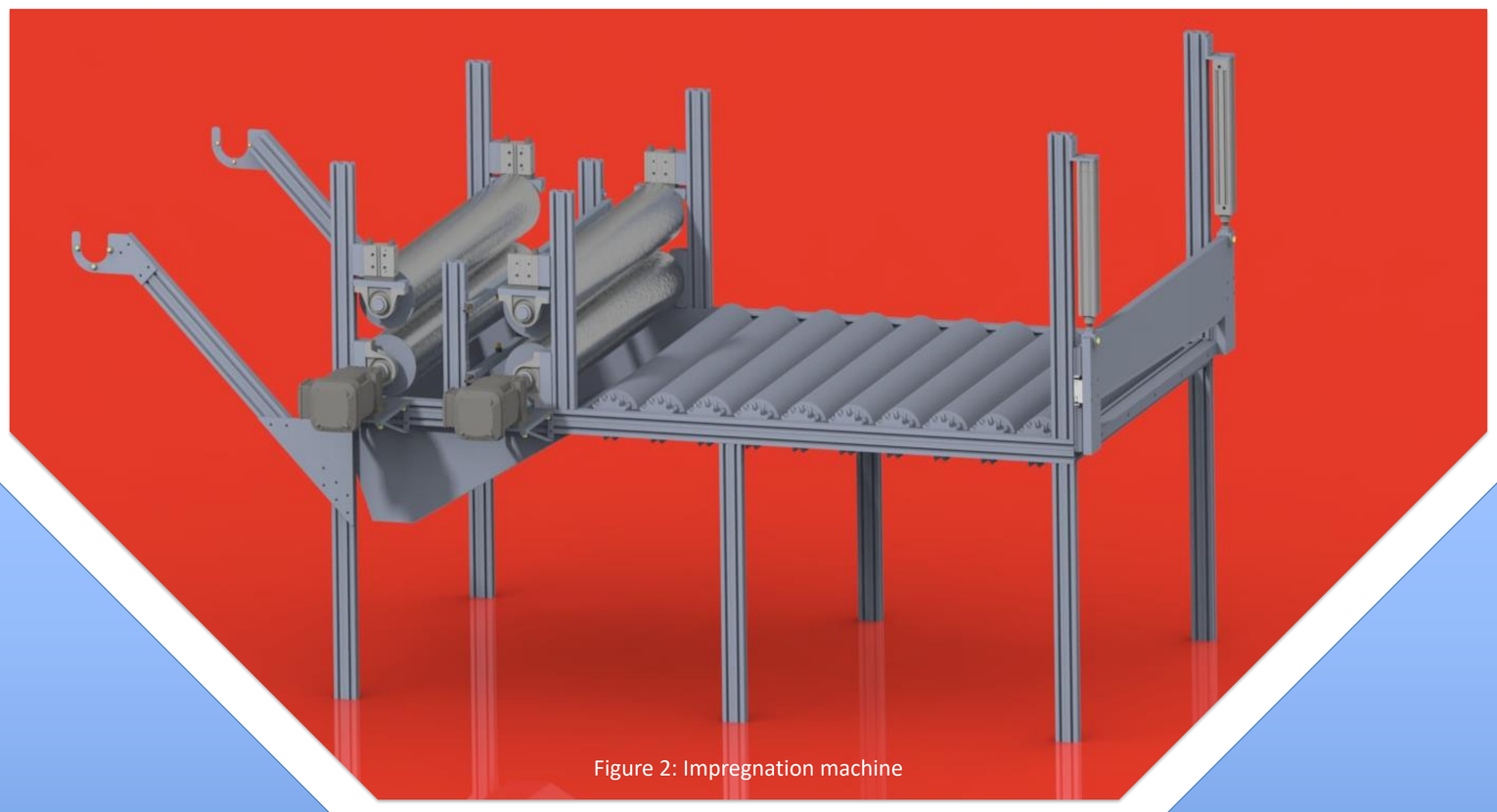
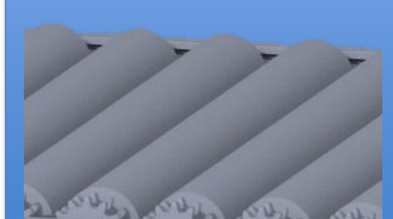


Figure 2: Impregnation machine

III Transporting



The impregnated PVA is transported trough the machine using chain driven rollers. The rollers are used to transport the PVA without creasing or blocking.

Figure 4: Transporting rollers

IV Cutting

The PVA must be cut to size before buffering. A scissor is moved by two pneumatic cylinders. The scissor plate provides a clean cut and make sure the PVA does not tear.

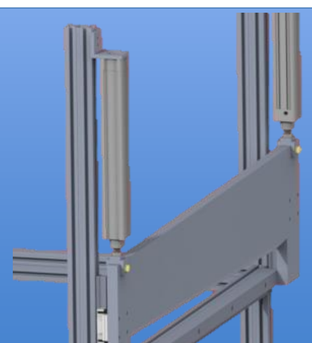


Figure 5: cutting blade

Supervisors / Co-supervisors / Advisors: Kellens Karel
Daenen Michael