

# Automation of Glazing Bead Sawing: Design of Input and Output Buffer

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## 1. Context & Problem Statement

- Aluzon is a company located in Zonhoven that specializes in the production of aluminum joinery, including window frames, door frames, and more.
- Currently, the glazing beads used in the production of aluminum joinery are manually placed in an outdated glazing bead sawing system, see Figure 1. They then need to manually adjust the sawing system to fit the specific type of glazing bead and subsequently manually label and sort the sawed glazing beads by hand. This process requires a significant amount of time and manpower, which could be better utilized elsewhere.



Figure 1: Current sawing process

## 4. Results

The final machine exists out of multiple chains with hook attached to be able to carry the glazing beads for the supply buffer, as shown in Figure 2. These chains lower the glazing beads onto the conveyor belts, which in their turn place the glazing beads onto the back conveyor belts to feed the saw. Only one glazing bead can be placed on the conveyor belt at a time. The remaining beads are held in a holder. Once the conveyor belt becomes available again, the loading mechanism, operated by pneumatic cylinders, will place the next glazing bead onto the conveyor belt via a transverse movement, see Figure 3.

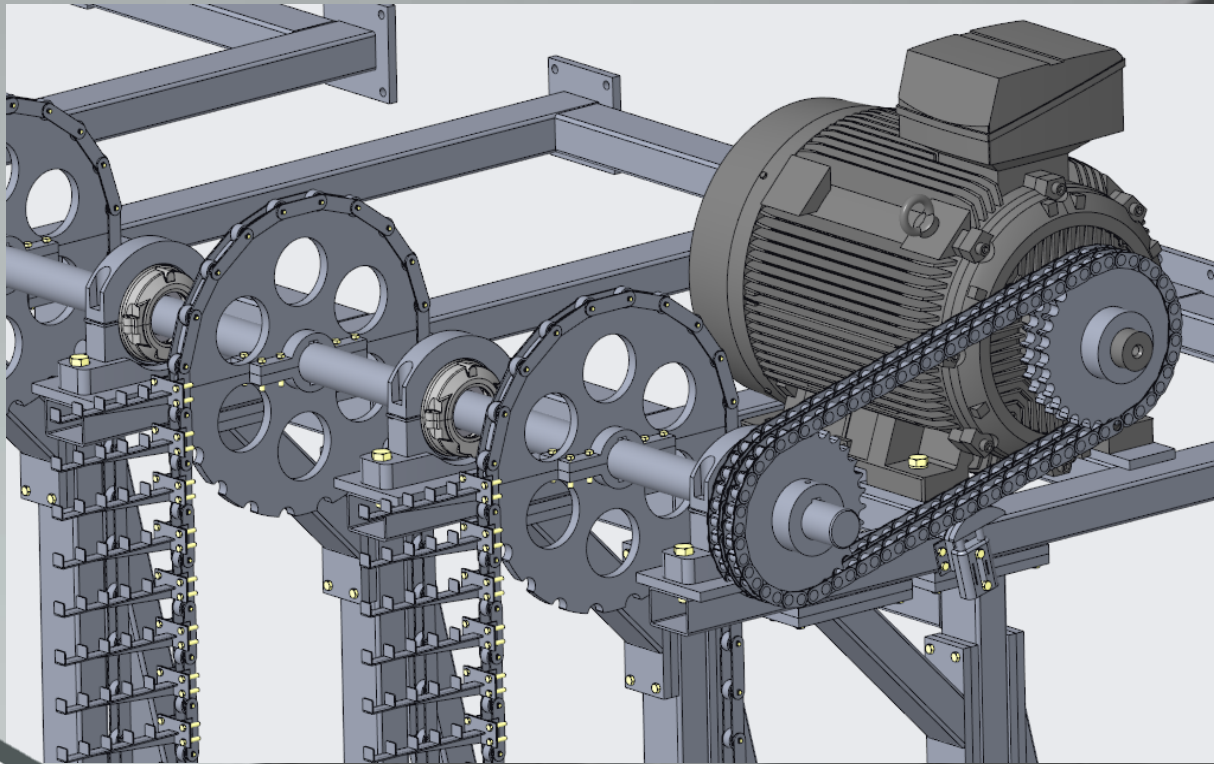


Figure 2: Chains input buffer

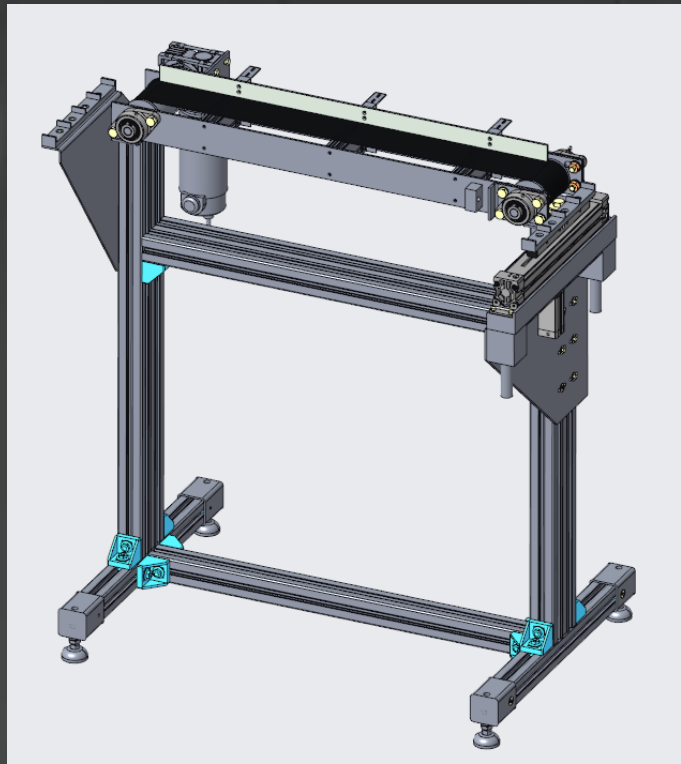


Figure 3: Conveyor belt with holder

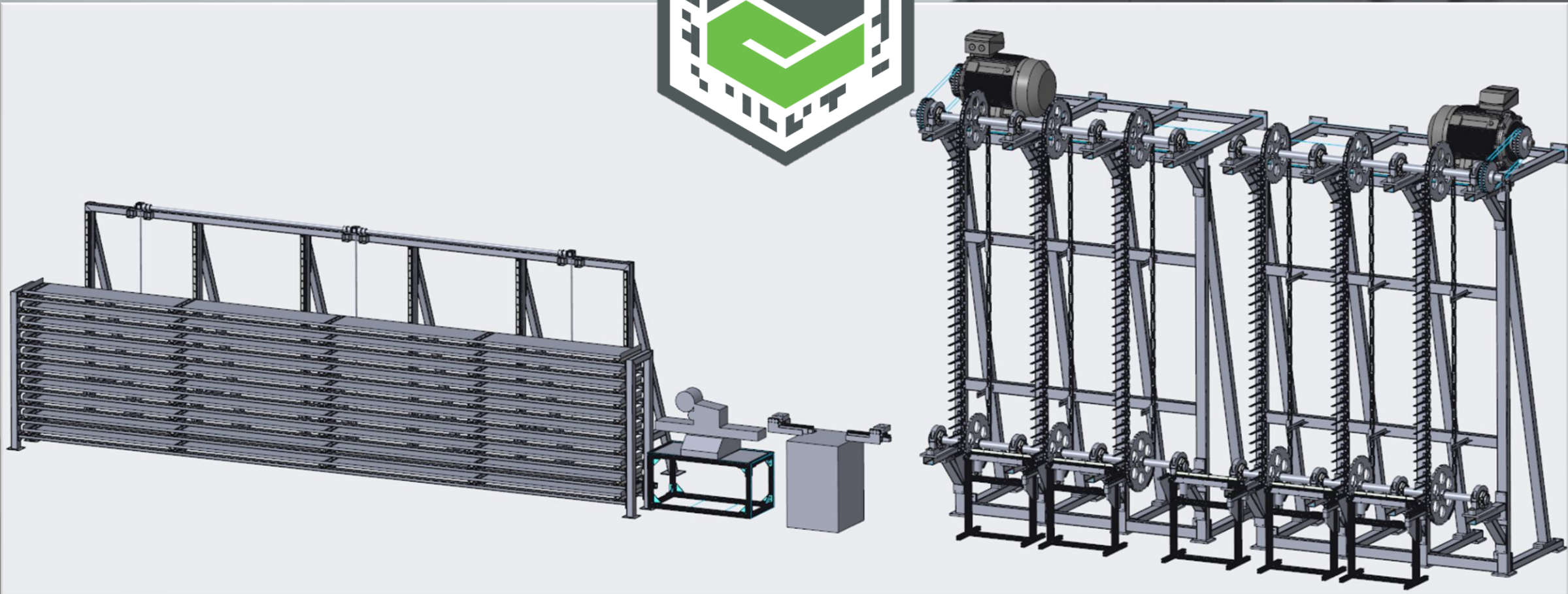


Figure 6: Complete machine

## 2. Goals

The goal is to design a machine that completely automates this process, with the following demands in mind:

- The machine needs to be fully automated
- It needs to be able to house around 100 glazing beads
- The maximum measurements can't exceed 16 m x 5,5 m x 2 m
- The glazing beads need to be loaded and unloaded via the front
- The used energy sources are electricity and pressurized air

## 3. Working methode

To be able to achieve these goals, researching similar existing systems is needed to see if these systems would meet the requirements. If the existing systems do not meet the requirements, a custom system needs to be created from existing components or Components that are within standardization. But before doing so it is advised to divide the tasks of the machine into different steps. After that all possible options to complete each task were explored. By eliminating the options that weren't viable or not best suited for the job at hand a new system is crated. The complete machine can be seen in the middle of the poster.

## Augmented reality experience

In addition, the machine can be explored in Augmented Reality (AR) by scanning the QR code provided. Simply use your smartphone to scan the code and point the device at the designated ThingMark (symbol in the middle) to view a 3D representation of the machine overlaid onto the real world.



On the saw itself is also a clamp that grabs the glazing bead and places it into the saw to be able to cut it to the right size, see Figure 4.

The clamp on the other side pulls the sawed element out and places it into the automatic label machine. Which rolls the element onto an in height variable conveyor belt. This conveyor belt raises to the right drawer of the output buffer and a pneumatic cylinder pushes the element in to the back of the drawer, thus sorting all the elements, see Figure 5. A complete overview of the machine's operation is shown in figure 6.

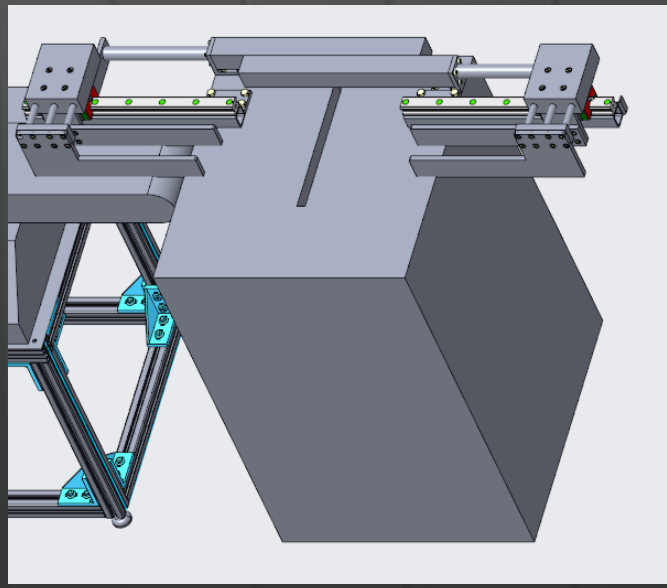


Figure 4: Saw with clamps

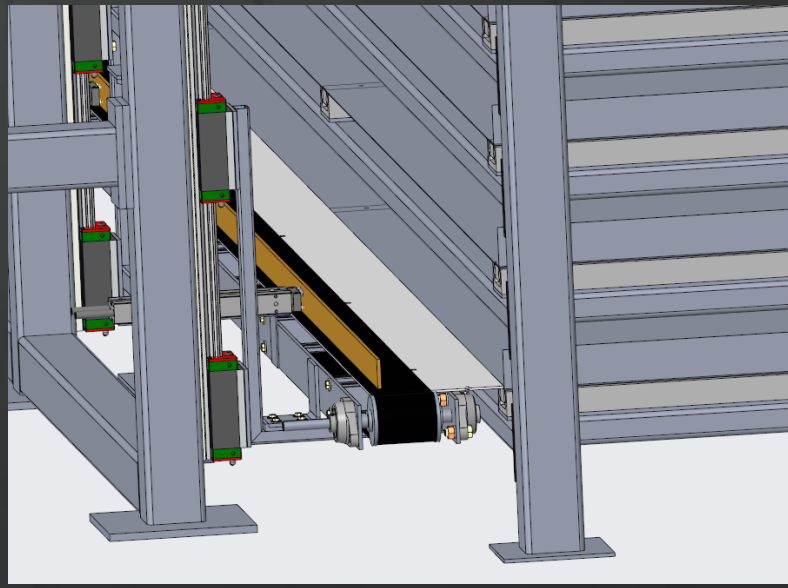


Figure 5: Height variable conveyor belt

## 5. Conclusion

We believe we have exceeded the goal, but there could be some big improvements. An example would be to make it so that the hooks are sealed, and the glazing beads can rotate in place so the full chain can be used for carrying glazing beads instead of just one side. On top of that the drawer system at the end could be optimized.