

Joey Piek

Early-Career Project Engineer & Project Lead |
Mechatronics | Automation & Process Improvement

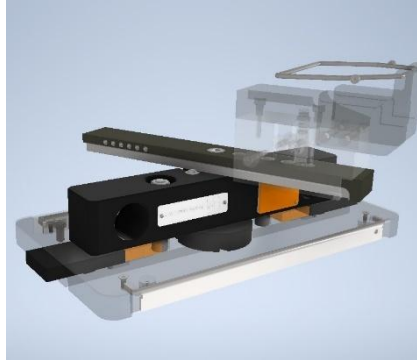
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BIRKENSTOCK®

Sandals last carrier



What?

- Internship task at Birkenstock
- Copy dimensions and parts of the current Last carrier and convert them to **3D and 2D CAD** files for manufacturer so that it can be reproduced

How?

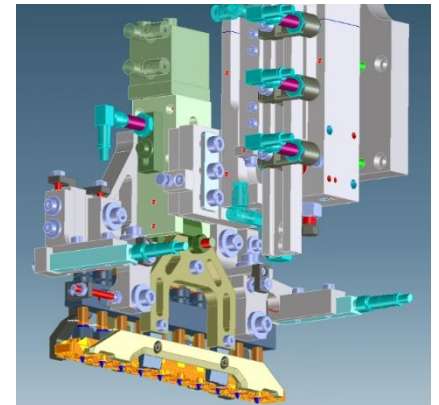
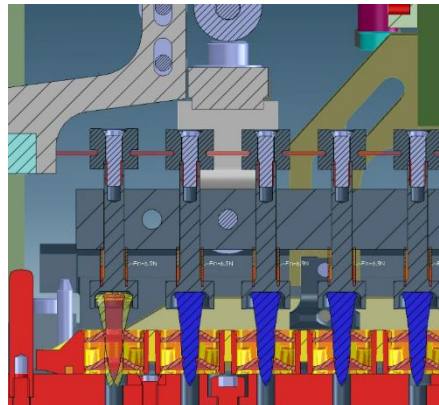
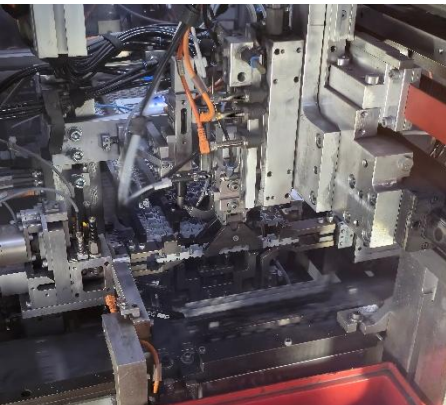
- Measured dimensions by hand
- Used **Autodesk Inventor** to draw out all the parts and materials
- Created files that are compatible with all programs

Results

- Fully finished 3D and 2D rework of the current Last carrier ready for manufacturing
- Gained experience with **CAD design**, mainly **Autodesk Inventor**

HILTI

Inline monitoring sensor system



What?

- Final thesis internship project at Hilti
- Acted as project manager responsible for developing and implementing an inline detection system to verify completeness and alignment of X-ENP19-LP15MX nail magazine strips
- Goal: ensure 100% detection of missing, protruding, or misaligned nails to improve product quality and customer satisfaction

How?

- Managed the full project: concepting, budgeting, design, supplier coordination, manufacturing, and implementation
- Led technical analysis and concept selection using HIRA and cost-effectiveness evaluation
- Oversaw design and integration of a mechanical detection system with spring-loaded pins and laser sensors
- Coordinated with supplier and internal teams to ensure seamless integration into the assembly line

Results

- Delivered a fully implemented inline detection system meeting all key requirements within the budget
- Achieved reliable detection of missing, protruding, and misaligned nails with no impact on OEE for good parts
- Gained experience managing an industrial engineering project including concept development, supplier management, budget control, technical design, and implementation leadership

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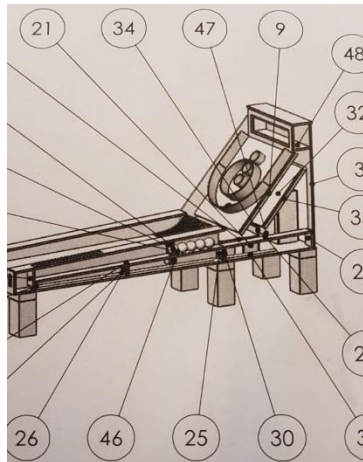
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Noorderpoort

Skee-ball machine



What?

- Vocational education level 4 graduation project
- Design a project of our own choosing with plenty technical depth and documentation
- Created a skee-ball machine, which is an arcade game where players roll balls up a ramp to jump into holes with different point values

How?

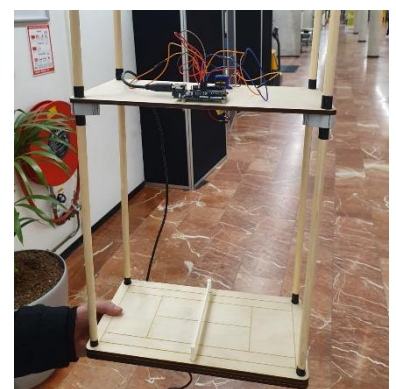
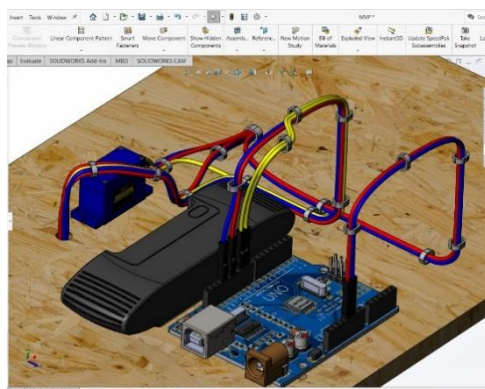
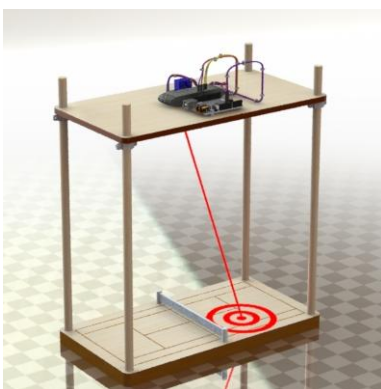
- Used **SolidWorks** to design the main body and interior
- Bought cheap components that were easy to connect and install
- Connected all components to 24V power converter
- Controlled the system with a **PLC**
Build the main body with wood and an inner layer of steel support

Results

- Completed the project with a **9 as final grade**
- The project was shipped to the city Groningen where it was put on display for anyone to see and use
- Gained experience with **CAD Design, PLC programming, electrical schematics** and **Woodworking**



Tennis Smart Court POC



What?

- Project for the minor: Technology to Innovate
- Create an innovative prototype that appeases the wishes of the client
- Make tennis more interesting while also aiding in training
- Do comprehensive **research** and a **market analysis** create a unique and innovative project

How?

- Used **SolidWorks** to design the main body and position the components
- Utilized a Logitech camera and **computer vision** to measure ball and player statistics
- Controlled system using an **Arduino** and laptop running a **Python** program
- Used a laser mounted on two servos to aim the laser at the playing field, which is also how we projected the games
- Utilized **laser cutter** and **3D printer** for wood and the "net"
- Used laptop as feedback screen for the player

Results

- Completed the project with an **8.5 as final grade**
- Achieved theoretical estimated **increase of 30% in the club members** when deployed, which roughly translates to 120 members
- Gained additional experience with **computer vision, CAD design, Python programming, 3D printing** and **Laser cutting**

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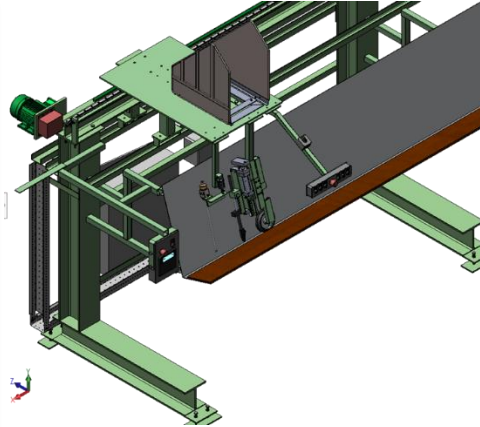
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Polytech

Semi-automated gutter assembly machine



What?

- Vocational education level 4 internship project
- Copy dimensions and parts of the current SAGAM (semi-automated gutter assembly machine) and convert them to **3D and 2D CAD** files
- Reconstruct the SAGAM guiding a team of interns

How?

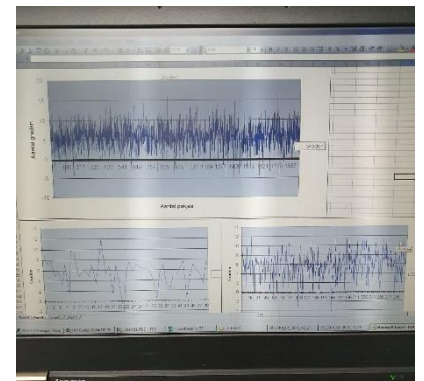
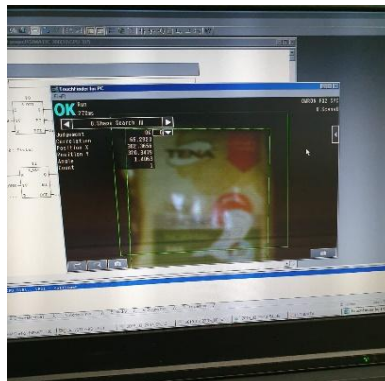
- Measured dimensions by hand
- Used **SolidWorks** to draw out all the parts and redesign the main body
- Reached out to companies to ask advice and order parts
- Led the construction of the new machine by **guiding a team of interns**
- Controlled the main system with a **PLC** and stepper motor

Results

- Partly finished the construction (only partly because internship period ended)
- The machine has been finished in a later stage and is now operating side by side with the original, resulting in twice the capacity to create the assembled gutters, which translates to a **100% increase in capacity**
- Gained experience with **CAD design**, **building relationships with companies**, **team leadership** and **hands-on work**



Process optimization project



What?

- Vocational education level 4 internship project
- Measure amount of packages, distance, angle and type on conveyor belt while plotting these statistics in a live graph while also feeding the information to the live database of Essity
- Get rid of the cause that leads the machine to lose efficiency because of faulty positioned packages

How?

- Used a combination of **computer vision** and **PLC** control to detect packages positions and amount
- Deployed special camera that sends data through to laptop/database to plot in graphs
- **Analyzed graphs** to find error
- Contacted machine supplier and discussed possible solutions
- Solution consists of 3 belts, two at the sides and 1 at the top to guide the packages

Results

- Completed the project with an **8 as final grade**
- Multiple live graphs and statistics of how packages behave on conveyor belt
- Temporary solution of getting rid of faulty packaging positions by blowing them off the belt, resulting in higher efficiency, but more work for crew
- **Improved machine efficiency by 5% after solution was implemented**