Integrated project Engineering Technology 2023-2024

Automated storage unit for CNC machines

Huybrechts Sander

Van Vosselen Rik

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Context

At RoboJob, they're automating CNC processes by storing tools and workpieces in a warehouse with a manual and automatic throughput.

Problem

Robojob automates batch CNC productions but needs a solution for producing multiple workpieces on one machine. Our aim: Design an automated warehouse for this.

Solution

Our solution is to utilize the existing robot to place various products in a storage unit.

Robot + Gripper Plate

Figure 3: Fanuc robot

From the conveyor, a robotic arm will pick up the inlays using a gripper plate. This process involves the use of a Fanuc robot. The gripper plate will be connected to the robot via a pallet coupling from Schunk. Furthermore the gripper plate will precisely grab the inlays with the assistance of locating pins.

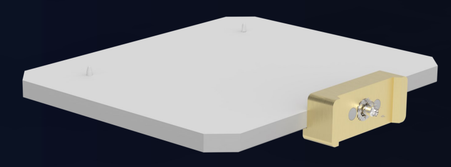

Figure 4: Gripper plate

Input

The journey of the workpiece starts at the Input, the workpieces will be put on an inlay. The intput will move the inlay from the operator's side into the storage.

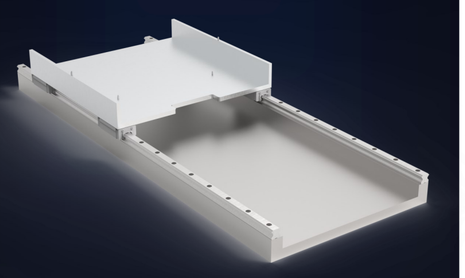

Figure 2: Input

Figure 1: Full assembly

Storage

In the storage area, up to 24 inlays can be placed, allowing the CNC machine to operate autonomously for up to 50 hours.

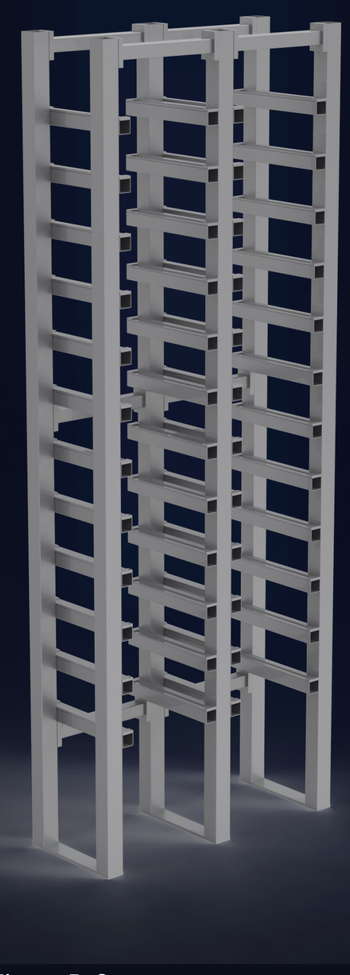

Figure 5: Storage

Docking

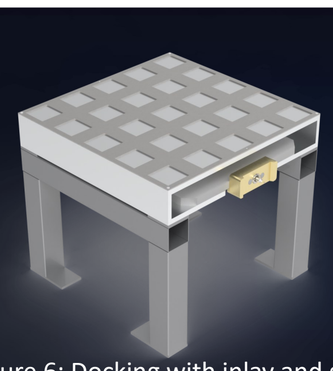

Figure 6: Docking with inlay and gripper plate

The docking is a place where the robot can precisely place the inlay, using locating pins to ensure that the inlay is always placed in an exact position. The docking is also used to store the gripper plate. This can be placed at the bottom of the docking and be disconnected from the robot, allowing the robot to feed the individual pieces from the inlay into the CNC machine, locating pins are also used here.

Supervisors / Co-supervisors / Advisors:

Prof Dr. Ing. Kellens Karel
Prof Dr. Ing. Daenen Michaël
Prof Dr. Ing. Bijnens John