ReScrewer – The Automated Screw Recovery System

Angela Jiao, Chris Peng, Emma Luo, Keira Kawada

Opportunity

Designing a compact screw-sorting system for GTA WoodWorks. The challenge is to reduce the time, effort, and decision-making required to reclaim displaced screws while sorting them in a way that fits the space and workflow of the workshop.

Design Objectives

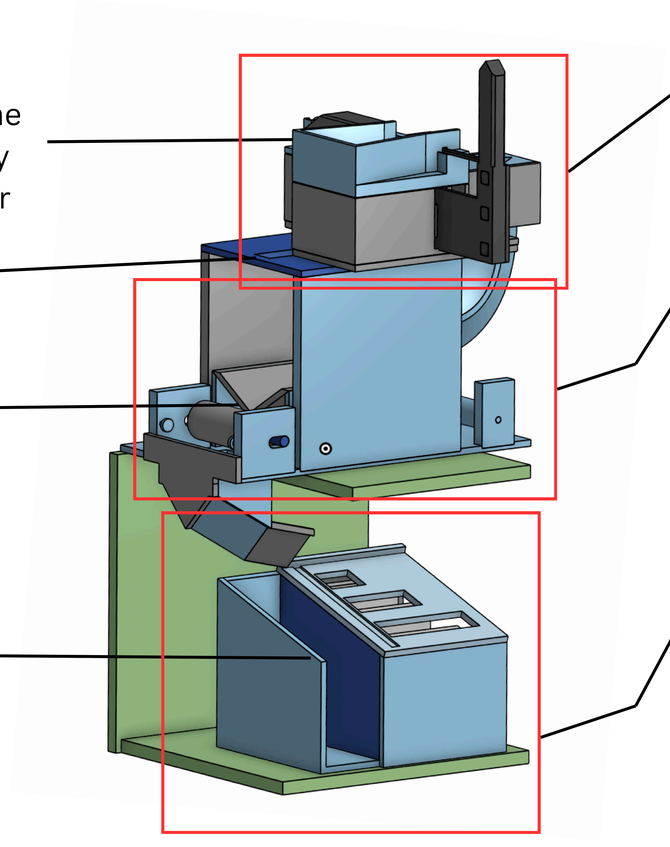
- Maximize reusable screw recovery
- Minimize manual sorting effort
- Sort screws by **corrosion**
- Sort screws by **length group**
- Minimize occupied space

Input
Stepper aligns the screws correctly for the conveyor

Camera

Conveyor

Output
Screws are easily accessible through removable bins



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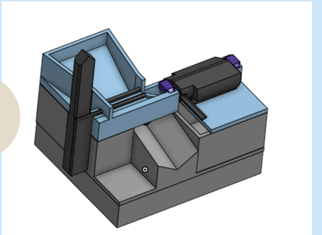
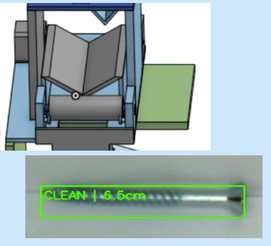


Screw Intaker Component

A ramp allows screws to fall into a lifting mechanism, which leads to a rotator that rotates by 90 degrees, lifting the screw so it aligns correctly with the conveyor belt.

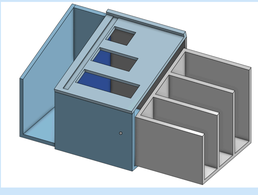
2



Conveyor Belt/Computer Vision

The screw moves along the conveyor, where a photo of it is taken to be parsed through computer vision by rustiness. Then, a servo controls a flap depending on the classification.

3



Length Sorting

Screws will slide down the ramp and fall into the correct hole corresponding to their length interval.

Next Steps

- Add another lifter and rotator to increase the rate of screw intake into the conveyor belt
- Implement the ability for the conveyor belt to stop when the screw aligns in the frame for clearer photos
- Manufacturing a better physical model with sustainable materials such as wood