

# RESCREWER SORTER

## @ GTA WOODWORKS

A compact system for sorting reusable screws by corrosion and length



### 1 What is the ReScrew?

The **ReScrew** is a compact semi-automated system that sorts reusable screws by **rust and length in a small studio environment**. The system **reduces the need for manual sorting** and rescues screws that would otherwise be discarded. The name ReScrew comes from the word "rescuer," as we aim to rescue otherwise discarded screws.

### 2 The Current Method

- Used screws are discarded
- **Time** and **attention** to separate screws exceed their value

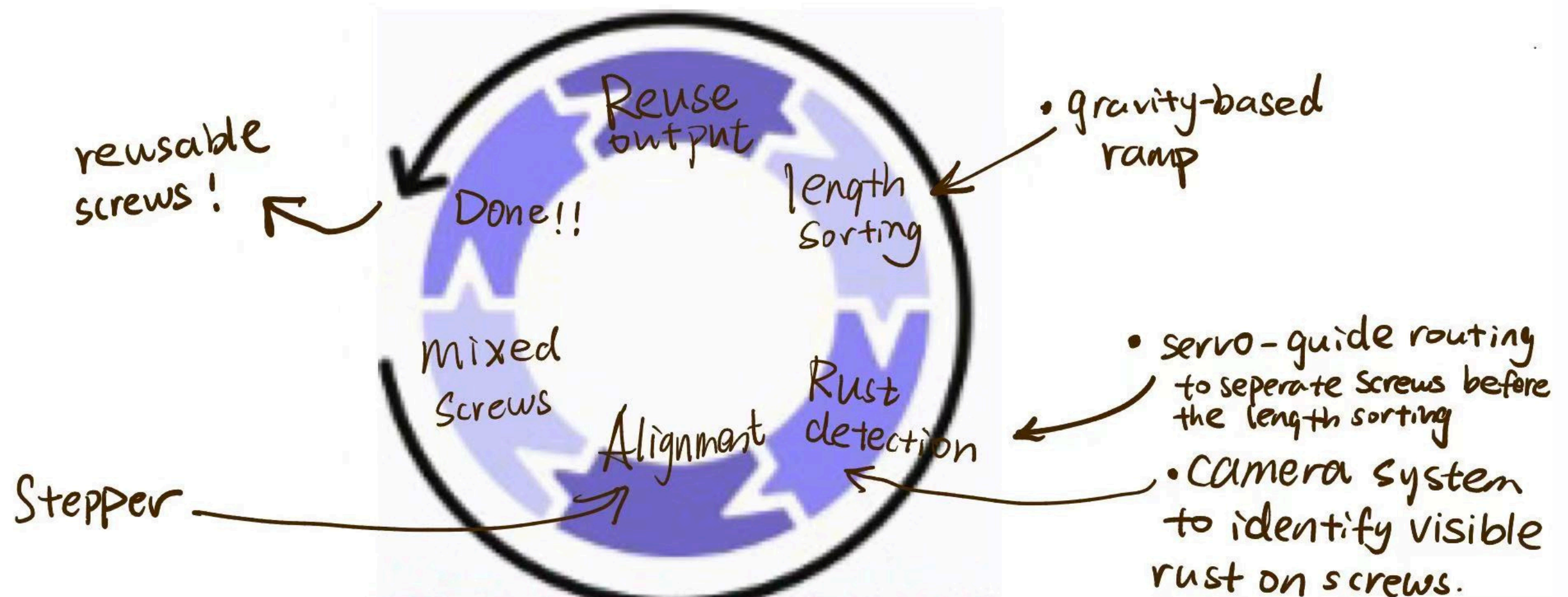
### 3 The Opportunity

We aim to achieve **high-accuracy screw sorting** by **length** and **rust** **without adding time costs** for stakeholders at GTA Works.

### 4 Key Objectives

- D1: Fit within a **30 × 30 cm** base area during operation
- B3: **Operate continuously for ≥ 5 minutes** without user interference
- A1: Sort by **corrosion**
- A2: Sort by **length** using grouped bins

### 5 Reclaiming Process



# THE FINAL CONCEPT

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## The Order of Operations

### 1. Screw Input & Alignment

Uses a stepper-driven feeder to separate screws and release them one at a time in a controlled orientation.

### 2. Screw Transport

A motorized conveyor moves screws through the system at a steady speed for inspection and sorting.

### 3. Rust Detection

A camera and lighting system capture images so that computer vision can identify visible corrosion.

### 4. Sorting Decision

A microcontroller processes the vision result and determines whether each screw is rusty or reusable.

### 5. Rust-Based Routing

A servo motor diverts rusty screws into the reject path while allowing usable screws to continue.

### 6. Length Sorting

A gravity-based ramp separates usable screws by length into different paths and bins.

### 7. Output Collection

Collection bins store the sorted screws, including rusty screws and usable screws of different lengths.

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## Verification & Design Outcomes

- Accuracy of computer vision testing rust

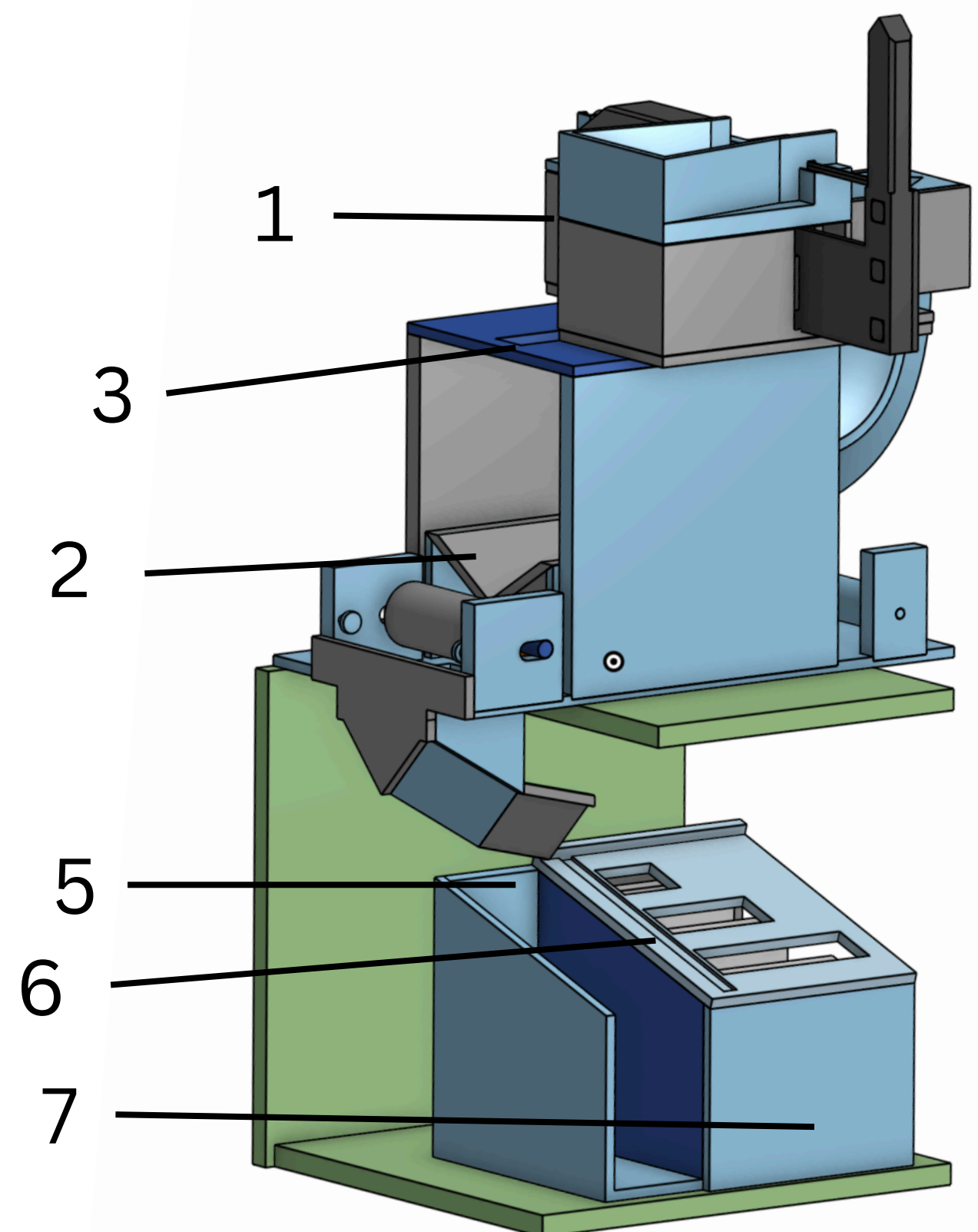


- Accuracy of ramp sorting length



- Occupied base area

27 cm x 15.7 cm (< 30 x 30 cm)



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## 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