Physical Design Prototypes

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ECE 3760 A01

March 29, 2025

1 Physical Design

1.1 Skip and Sweeper Devices

The skip and sweeper devices share a similar overall design, with the key difference being the top section. The skip device, shown in Figure 1a, has five larger holes to accommodate buttons for sending commands, while the sweeper device, shown in Figure 1b, has twelve smaller holes arranged in a ring for the LED ring we used as the indicator.

Both devices have a modular design, with identical bottom halves that simplify assembly and reduce manufacturing costs. The top and bottom halves connect via matching screw threads, allowing for easy attachment and replacement if needed. Additionally, each device includes a ring for a lanyard that the skip can use to attach to a neck strap, or belt loop. For the sweeper this is an unecessary feature, but it is included for consistency in design. The sweeper's device would ideally be attached to the base of the broom handle so it is always in view.

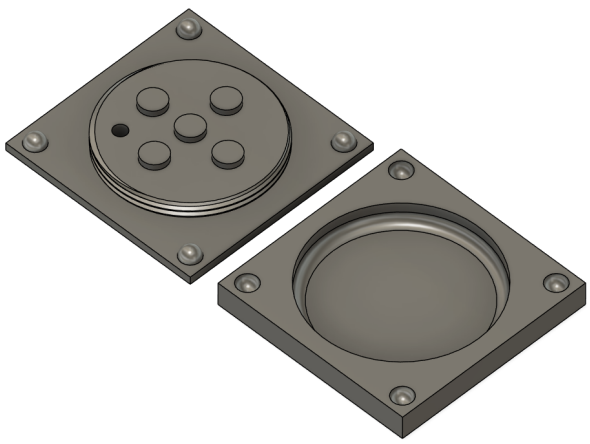
(a) Skip Device (b) Sweeper Device

Figure 1: Skip and Sweeper Devices

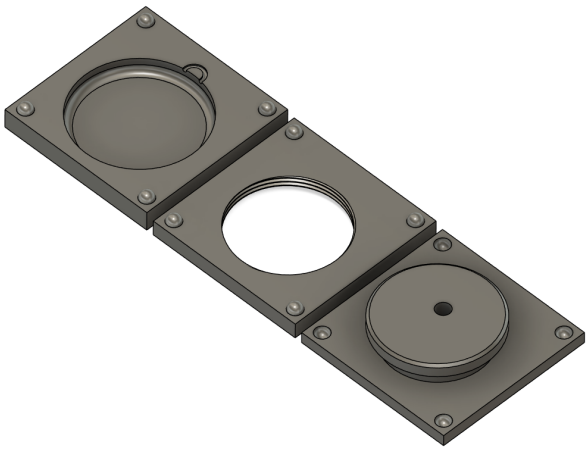
1.2 Mold Design

The mold for the skip device's top part, shown in Figure 2a, is a two-part mold designed for easy removal of the finished piece. Alignment holes on both halves ensure proper positioning, while the pour hole, located on the top half, allows the material to fill from the inside out. This approach should help minimize visible imperfections on the exterior surface.

For the bottom part, shown in Figure 2b, is a three-part mold. The additional section accommodates the lanyard hook, ensuring it is molded as a single piece. As with the top mold, the material fills from the inside out to keep imperfections internal. While a two-part mold could be an alternative, it would require a different cutting geometry, whereas the current design maintains three flat parting surfaces. Similarly, the pour hole is positioned to fill the mold from the inside out, ensuring that any imperfections remain on the inside of the case.



(a) Skip Top Mold



(b) Sweeper Top Mold