



the solution to CNC routing mess

*Taylor Woller, Sid Brod, Casey Phipps,
Joe Strackbein, Andrew Weber, Brenden Beekman*
Sponsor: *Kyle Jansson*

Problem Statement

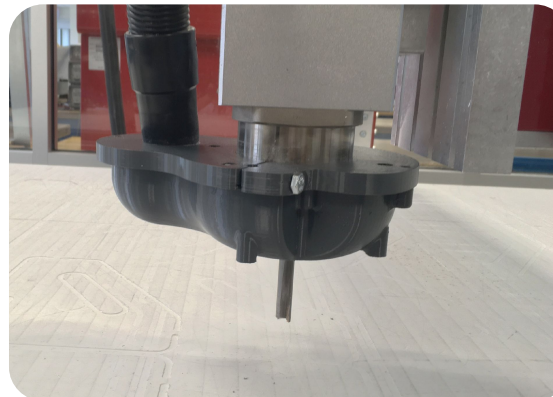
There is no reason CNC router users should be wasting their time with clean up after a job. Common solutions on the current market for dust collection are not effective enough and still leave residual chips from cutting. This is mainly attributed to their inability to contour to complex geometries while maintaining proper dust containment.

Requirements

- Stop debris from entering the air and dirtying the workspace
- Adaptive to a variety of router spindles
- Accommodate a range of end mills
- Work with a variety of stock materials
- Easy retraction for tool change



Linear actuation system for collection tube

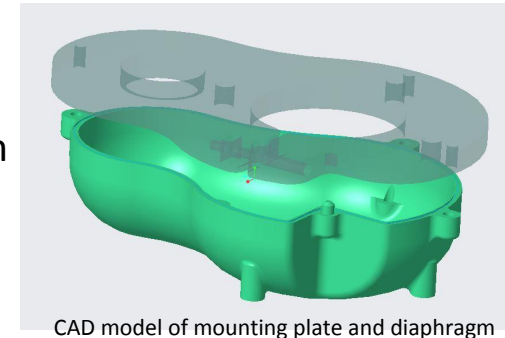


Dust collection body installed on a CNC router

The Prototype

Separate prototypes have been created to showcase the functionality of each system of the full assembly:

- Mount and Diaphragm
- Linear actuation
- Collection tube



CAD model of mounting plate and diaphragm

Functionality

The final prototype will be customized by the user to mount to any router spindle and allow a vacuum plug in as shown in the figure. The diaphragm will attach magnetically to the mounting plate, leading to the collection tube. Magnets allow for easy disengagement for cleaning or tool changes. The tube contours to the toolpath while keeping suction and preventing the escape of debris into the surroundings.