

Team #16: Eclipse Weather Barrier Tape Applicator

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Background

Eclipse Weather Resistant Barrier delivers an alternative house wrap solution. A tape-and-panel method integrates a weather resistant barrier with the energy efficiency of a reflective insulation and structural panel.



Objective

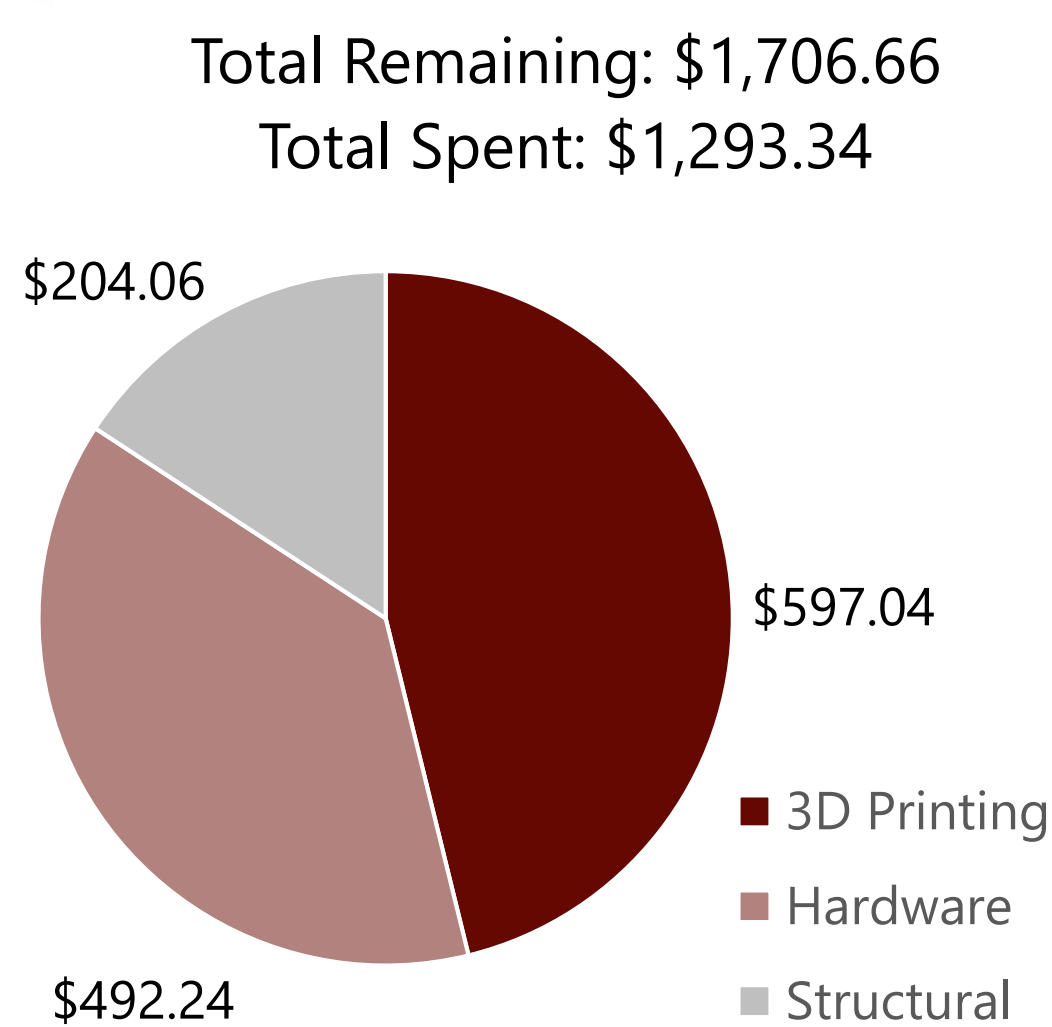
To design and manufacture a lightweight, robust, and user friendly, tape applicator to apply RoyOMartin's Eclipse Weather Resistant Barrier woven reflective tape to flat surfaces, re-entrant and external corners with a sufficient amount of pressure while collecting the paper backing.



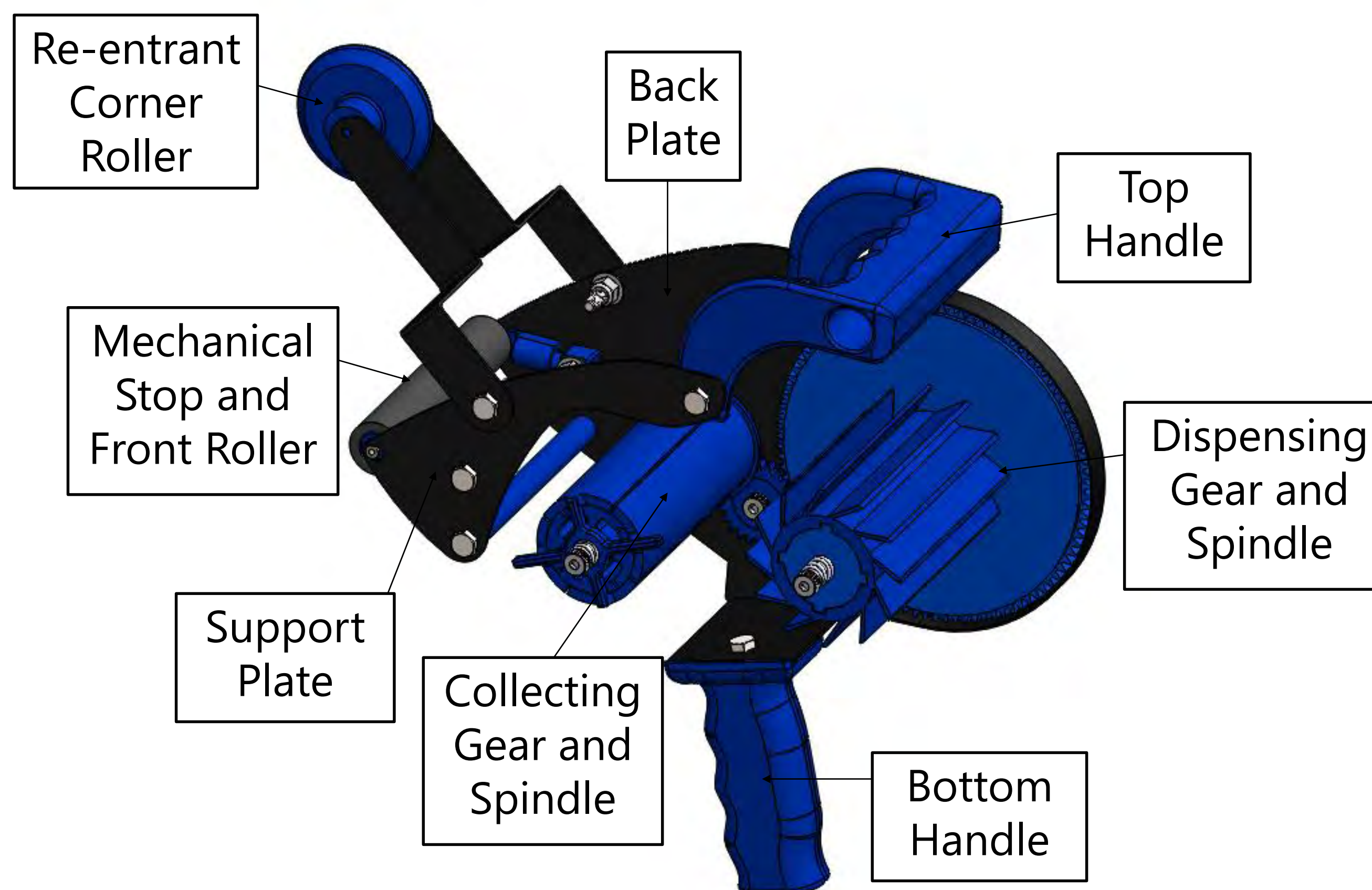
Specifications

- Minimum Applied Pressure: 8 psi
- Maximum Weight of full assembly: 7.50 lbs
- Outer diameter of full roll of tape: 5.65 in
- Inner diameter of full roll of tape: 3.03 in

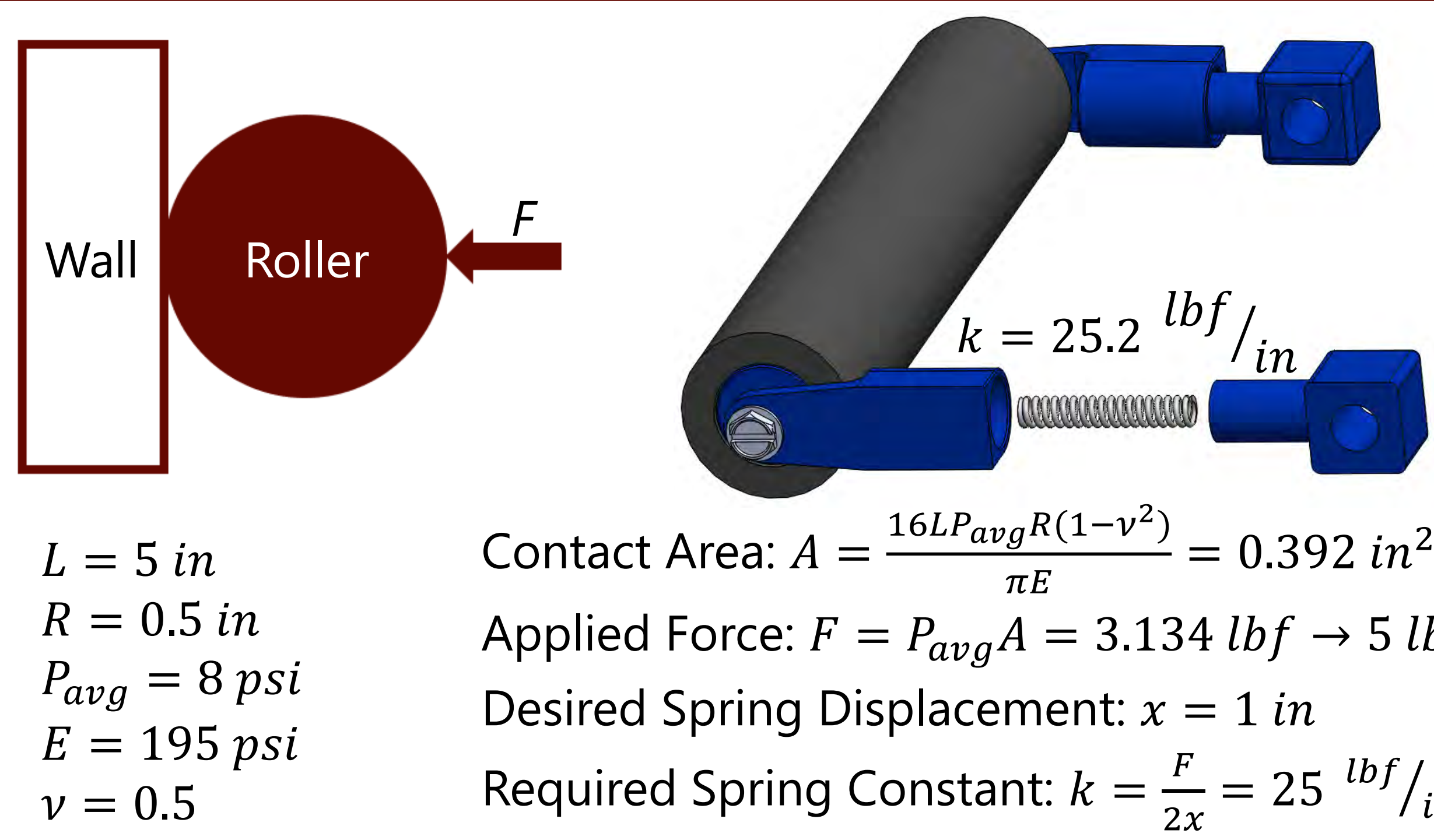
Budget: \$3,000



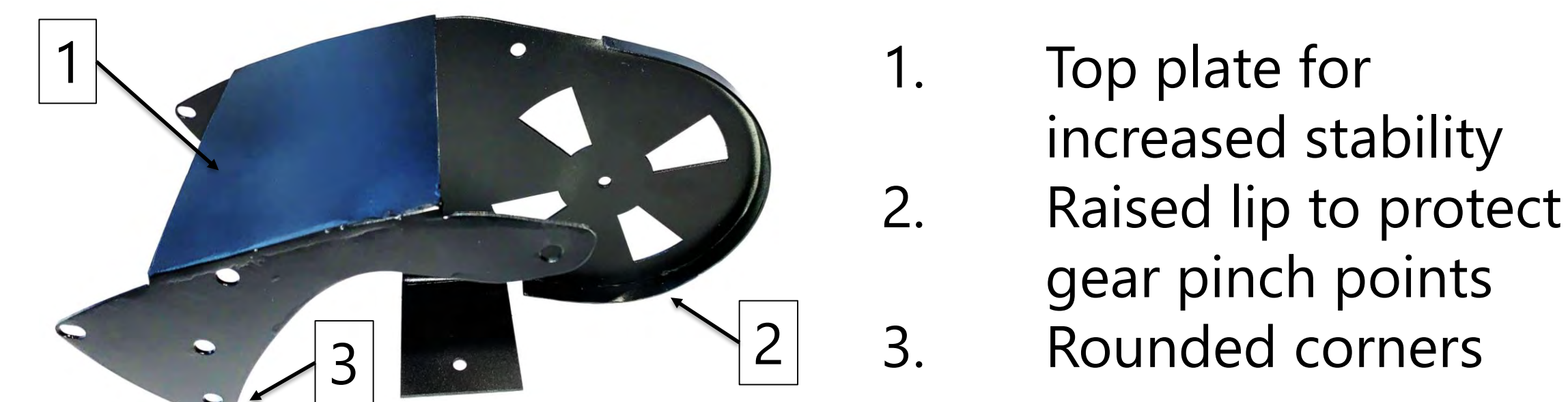
System Overview



Analysis



Safety

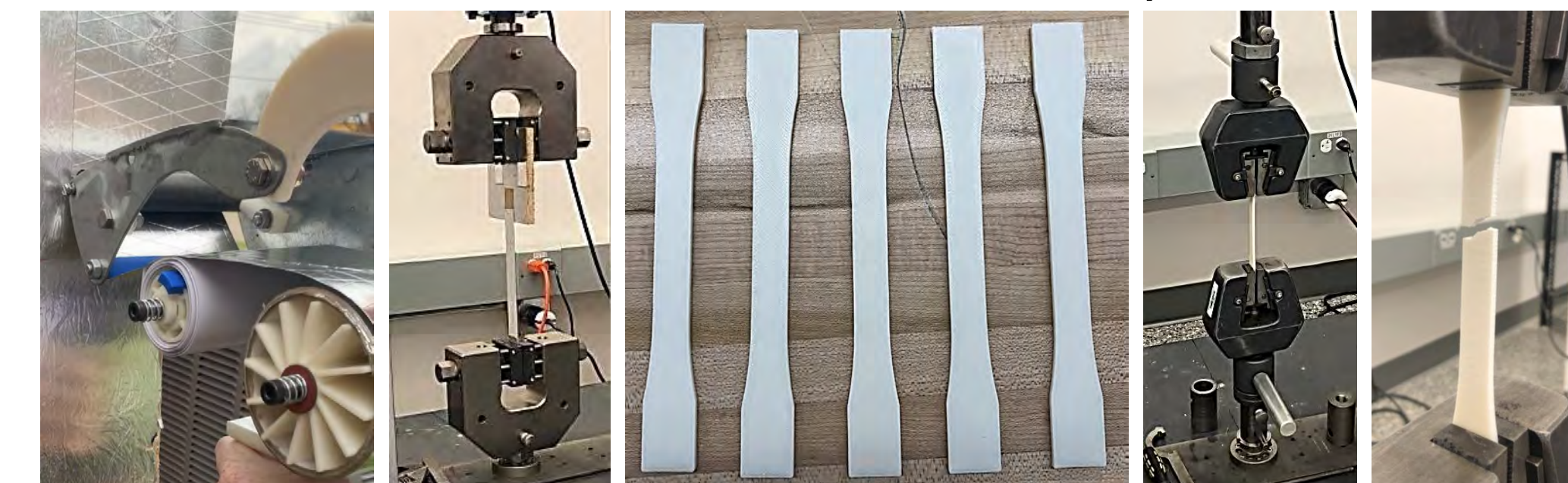


Manufacturing

Part	Proof of Concept	Mass Production Recommendation
Backplate	CNC Milling	CNC Milling
Support Plate	CNC Milling	CNC Milling
Gears	3D Printing	Injection Molding
Handles	3D Printing	Injection Molding
Corner Roller	3D Printing	Injection Molding
Front Roller	Purchase	Extrusion

Testing Results

Test	Expected	Results
Mechanical Stop	8.00 psi	9.56 psi
Flat Surface Adhesion	1.72 psi	2.49 psi
Internal Corner Adhesion	1.72 psi	2.26 psi
External Corner Adhesion	1.72 psi	1.99 psi
Weight of Tape Applicator	7.50 lbs	7.25 lbs
Material Test	4,050.00 psi	3,525.34 psi



September

- Project Definition
- Develop E-specs

October

- Concept Generation
- Preliminary Design

November

- Engineering Analysis

December

- Design Revisions

January

- Purchasing
- Manufacturing

February

- Design Revisions
- Manufacturing

March

- Testing and Validation
- Performance Analysis

April

- Testing and Validation
- Final Prototype

Sponsor: Bobby Byrd, RoyOMartin

Advisor: A.J. McPhate