

Deliverable F

Prototype I and Customer Feedback

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Thinker Titans

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1 Feedback

After meeting with the client and our peers, we received plenty of feedback on our design concepts, and subsystems. Specifically on the scraper subsystem where we found our original concept was too complicated and would most likely not be available to purchase, as well as on where the scraper was placed. Taking this, we then made the changes to the scraper itself changing it to a simple razor blade, and changing where it was placed.

We then received feedback on the body of the design, where we found that our design would not work as we planned, as when the bottom was spun the whole thing may not spin with it. We concluded that it would be more difficult to fix it than to just alter the design. So we changed it from a telescoping design to a pipe which can be taken apart into three pieces and connected by pins.

We received feedback on whether to use a motor or not for the handle to spin and to consider changing our feedback subsystem as the sensor may not be able to accurately detect the material. As well as if either the motor or the sensor would fit in our budget.

Finally we got feedback on our collection system as there were concerns on whether it would be able to collect and contain the material in all orientations. We used this feedback to alter our collection subsystem to be able to collect vertically.

2 The Prototype with analysis



Figure 2.1. Prototype 1: scraping tool

2.1 Analysis

For our first prototype, we decided to prototype the scraping tool. Since it is the most important subsystem, we decided that our focus should be directed towards it first. This prototype was made using a blade from a snap off knife, cardboard, and superglue. The blade was first snapped off the knife to acquire a blade that is a good size for our desired tool. Then, a long rectangle measuring about 16 cm in length and 4 cm in width was cut from the cardboard. This piece was then folded in half such that the length was shortened to 8 cm, and a slit was cut in the folded end for the blade to slide into. Then, the blade was superglued to the cardboard on both sides. The two longer sides of the cardboard were also superglued together, however the bottom was left unglued in case we wanted to secure something into this tool during future testing.

3 Prototyping Test Plan

Test #	Test Objective (Why)	Description of Prototype used and of Basic Test Method (what)	Description of Results to be Recorded and how these results will be used (How)	Test Duration (When)	Results
1	Size	Scraper Prototype, will be measured and compared to the target size and dimensions of the pipe	If the Prototype is within the proper size range it is valid	1-2 minutes	The size of the prototype was measured and confirmed to be within the target dimensions, meaning this prototype can provide us with an accurate idea of the size of our final scraping tool.
2	Scraping ability	Will use the scraper prototype and will test scraping on similar surfaces	Will record if the blade is capable of scraping metal Results will tell us if we need to use a different scraping tool (if it doesn't work) or how well the blade works (if it works)	5-10 minutes	The prototype was able to successfully scrape various surfaces, but when it came to metal, it wasn't very efficient. This tells us that we need to adapt the blade of our scraping tool. A couple ways we could do this is to use multiple blades or look for a sharper/stronger blade.
3	Durability	Will see how the blade holds up after testing it on the material	If the prototype keeps its durability after 5-10 test scrapes it can be deemed durable. If	5-10 minutes	The body of the scraping tool held up well, and the blade did pretty well too. However, the blade did appear to have a little bit of

			not, we will need to adapt to it.		damage/scratching on it after the tests.
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4 Updated BOM

Below is the link to the spreadsheet of our BOM.

 **Group 10 BOM**