

To: Professor David M. Willy

From: Capstone Team 5

Date: 8/29/2022

Re: Project Management

## **Reflection**

### Project Management - Successes

- Weekly Client meetings: Communicated with the client every week with the ME team to coordinate scheduling and Project timelines
- Weekly Team meetings: This led to great teamwork within the ME team leading to a proficient prototype by the end of the semester.
- Project Time Management: The team planned assignments and deadlines efficiently, leading to the completion of the prototype ahead of class schedule.

### Project Management - Room for Improvements

- Communication with the EE team: There was a lack of meetings and communication with the EE team. This caused some confusion as to where the Stent Crimper project was heading
- Better Scheduling for the Client meetings, especially meeting agendas
- Select Assignment Time Management

### Project Management - Action Items

- To fix the communication issue with the EE team Alex will be more assertive with each member of the EE team and hold weekly meetings to efficiently work together.
- To better schedule the Client meetings the Project lead will make sure to send meeting Agendas within of a client meeting
- Time Management with the team will be correct with a shared calendar corresponding with the Gantt chart of when certain tasks need to be completed.

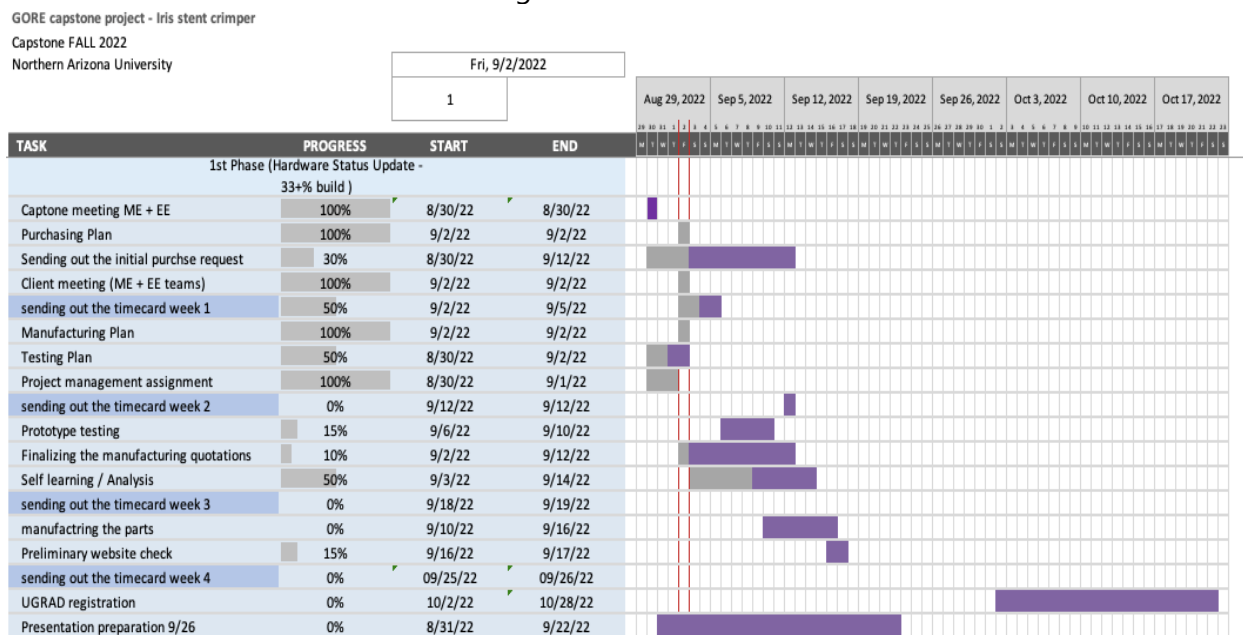
### Remaining Design Efforts

- Finalize Manufacturing Plan: This includes parts that will be sent out to be manufactured such as the leaflets, and the plan to weld and make the body of the Stent crimper at a local machine shop.
- Finalize the EE team responsibilities as well as the user interface controls. This is to make sure the EE team understands the needed inputs and outputs for the Stent Crimper.
- Manufacture the Stent Crimper Base: This will start early into the first Hardware check. The team will first create a .DXF file for the base and manufacture it at the local machine shop.

## Gantt Chart

The Gantt chart portion indicated under figure 1 mainly consists of up to first phase completion, which is 33% build of the device. On Friday, September 2, 2022, both teams met with the client to agree the dates for continuing the client meetings on a weekly basis, which works for both teams. The testing procedure would be the first phase's primary focus, along with developing the and testing the prototype with Electrical components. After completing these stages, our primary attention would be on settling on a price for the manufacturing components and hastily procuring their production. By completing this stage, we might be able to reach the 33% completion mark for manufacturing and assembling the device.

Figure 1 : Gantt chart



## Purchasing Plan

The team has chosen to produce the majority of the necessary components and reimburse the costs via NAU. The team is still awaiting quotes from the manufacturing facility. We will receive the finalised quotes by the Monday, September 12 team meeting, and we will be sending out the purchase requests to begin the reimbursement process. The purchasing plan update as of September 2, 2022, is shown in table 1.

Table 1: Purchasing Plan

								Purchasing plan	
MATERIAL	ITEM	QUANTITY	TOTAL COST	VENDOR / MANUFACTURER	SECONDARY VENDOR / MANUFACTURER	MAKE /BUY	PART STATUS	22-Sep	22-Oct
Rubber	Rubber feet	6	5.99	<a href="#">Amazon.com</a>	<a href="#">Ebay</a>	BUY	<u>Not purchased</u>	09/017/2022	-
MILD STEEL	Outer Shell	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Shell Legs	2	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Primary Retaining Ring	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Inner Ring	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Stationary Pins	12	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Motion Pins	12	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
STAINLESS STEEL	Leaflets	12	Awaiting Quote	Send out		MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Project Base	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Base Bottom Cover	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Base Pins	9	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Base Support	3	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Connecting Rod	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Gear Mount	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Gear	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
MILD STEEL	Pinion	1	Awaiting Quote	<a href="#">American Metals</a>	<a href="#">Wicked Welding &amp; Fabrication</a>	MAKE	<u>Not manufactured</u>	09/017/2022	-
PLA	Safety Plate	2	Awaiting Quote	NAU idea Lab			<u>Not manufactured</u>	09/017/2022	-
ZINC	1/2 length Bolts	6	1.39	<a href="#">Home Depot</a>	<a href="#">Amazon</a>	BUY	<u>Not purchased</u>	09/017/2022	-

### Main targets to complete in next meeting (09/12/2022):

- Receiving and finalizing the quotations from American Metals.
- Sending out the purchase requests for reimbursement
- Updating the budget portion of the Mechanical Engineering team accordingly
- Updating the purchasing plan.

### Manufacturing Plan

The team is in contact with a welding shop down in Mesa that has the capability of preparing most of the parts for this project. The materials to be prepared at this lab will be purchased from American Metals and gotten into specification at the welding shop. At the same shop or in Flagstaff at a known facility, the parts will be constructed time dependent on the shop supervisor. All manufactured components are observed in table 2.

Table 2: Manufacturing Plan

Bill of Materials									
Part	QTY	Type	Material	Construction Time	Start Date	End Date	Location	Manufacture	
Outer Shell	1	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Shell Legs	2	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Primary Retaining Ring	1	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Inner Ring	1	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Stationary Pins	12	Manufactured	Mild Steel	45 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Motion Pins	12	Manufactured	Mild Steel	45 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Leaflets	12	Manufactured	Stainless Steel	4 Weeks	9/12/2022	10/14/2022	Send-Out	TBD	
Project Base	1	Manufactured	Mild Steel	2 Hours	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Base Bottom Cover	1	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Base Pins	9	Manufactured	Mild Steel	2 Hours	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Base Support	3	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Connecting Rod	1	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Gear Mount	1	Manufactured	Mild Steel	30 Minutes	9/17/2022	9/18/2022	Mesa Welding Shop	Skylar/Alex	
Gear	1	Manufactured	Mild Steel	2 Hours	9/17/2022	9/18/2022	Mesa Welding Shop/NAU	Skylar/Lulu	
Pinion	1	Manufactured	Mild Steel	1 Hour	9/17/2022	9/18/2022	Mesa Welding Shop/NAU	Skylar/Lulu	
Safety Plate	2	Printed	PLA	5 Hours	10/7/2022	10/16/2022	NAU Idea Lab	NAU Idea Lab	

Figure 1 shows the plan for the crimping unit as an assembled unit. There are 12 leaflets inside the shell which are colored light blue. The shell legs need to be planned length wise to fit into the base and reach far enough to attach to the base support system. In place of the hex screws, the team will be welding the internal pins adding support and creating a flush face. The inner ring needs to have tolerances for about a 1mm spacing around the outer circumference between the inner and outer ring. The design was created in a metric format which will need to be converted and adjusted to the proper US unit sizing for cost purposes when purchasing materials.

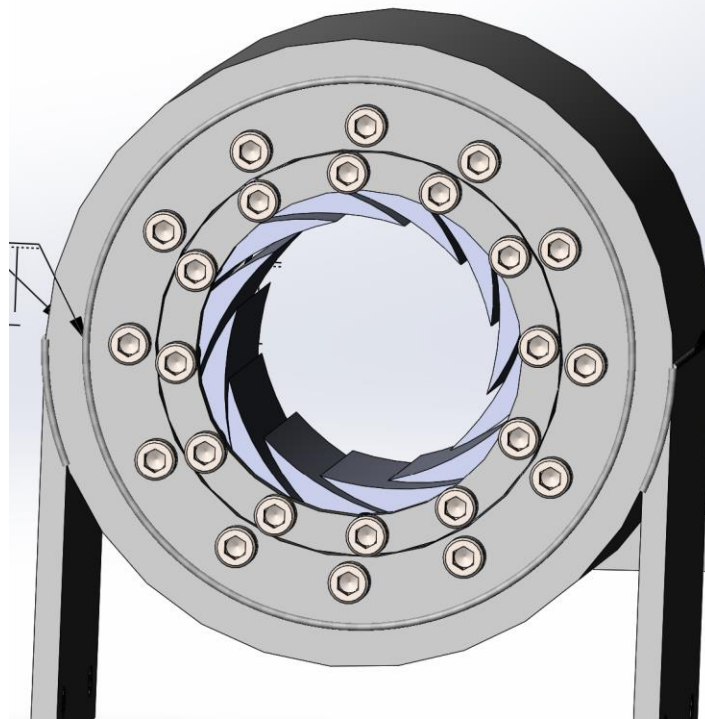


Figure 1: Primary Crimping Unit

The gear attachment is shown in figure 2. For design purposes a temporary base was made to represent the attachment of the gear to the main base unit. When designing the

DXF file for the CNC cutter, the team needs to account for the bearing attachment that the gear requires on the base support system.

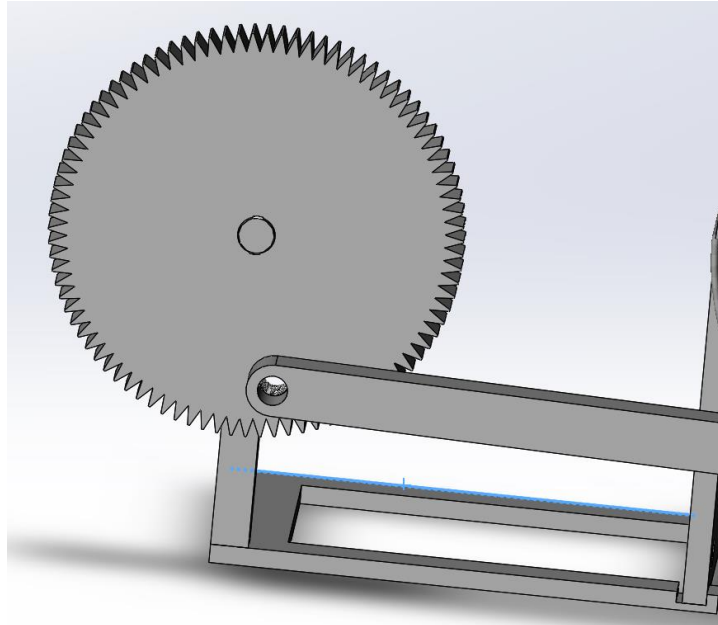


Figure 2: Drive Gear

1. The materials were planned in a metric format while most materials are sold in US units. There will have to be some adjustments made and tolerances set based on the available sizes to save money as per our customer requirements.
2. The team is currently contacting manufactures and getting quotes for the leaflets to determine where to send them out to.
3. The sketch of the base needs to be converted into a DXF to be cut on a CNC table.
4. The gear and pinion need to be determined as for tooth ratios and drive form.
5. Need to contact American Metals for a quote and arrange for pick to the materials are on hand and prepared when they are needed
6. The gear mount needs to be designed how it will attach to the support system of the base.

Reference links

[Gantt Chart and Purchasing plan- Capstone 2022 FALL.xlsx](#)