Miami University
College of Engineering and Computing
ENT 498 Senior Design
Reza AbrishamBaf, PhD

Automated Wire Stripper

Andrew Bischoff, Wes Heuerman, Joshua Inkrott
May 1, 2020

Executive Summary

For our groups ENT 498 Senior Design Project we decided to design and build an automated wire cutter and stripping machine. Our final machine can automatically feed, cut and strip wires to a given length and quantity. Our end goal was to have a functional machine that was not only reliable and budget friendly but also easy to use and aesthetically pleasing. The main motivation behind this project was to eliminate the need for a person being required to hand measure, cut, and strip large quantities of wires. With our machine, they can input their desired parameters through an onboard HMI and then let the machine do the tedious and repetitive work. This automated task frees up a worker and allows for a huge increase in productivity, thus making it a very valuable asset in industry. In order to make this project successful, we had to rely on what we have learned through our academic and professional careers, as well as teach ourselves some new concepts along the way. This project was a huge milestone for our academic careers and gave us invaluable insight to what we may be doing in the workforce after we graduate.

Table of Contents

Scope & Methodology

All of our team members have worked in an industrial setting in some form or another. The majority of us have seen a machine built from the ground up and our project idea stemmed from the panel building side of the whole process. At work, we see and work with the build and wiring up of industrial electrical control panels, all of us to a varying degree, and saw a chance for improvement. Inside a machines enclosure housing you will find the PLC's for that given piece of equipment. Within these PLC's you may have hundreds if not thousands of wires that are all almost identical in length connecting the PLC's. The building of this panel requires a worker to manually cut and strip every wire individually. The time spent doing this adds up financially very quickly, especially when paying a skilled panel builder to do this task. This is why we saw a chance to optimize the process and replace the requirement and cost of a human with an automated machine. After our initial concept, we surveyed some individuals that work in industrial panel building and they confirmed our original assumptions and beliefs. Following this information, we were confident that our original project idea has a place in industry and could be used as a tool to optimize the process.

Before beginning our design, we first defined our criteria as the following:

- User friendly interface
- Automatic in/out feeding
- Customizable lengths & strip options
- Compatible with multiple wire gauges (12 – 22 AWG)

- Self-Contained unit (no external computer/interface)
- Aesthetic Build

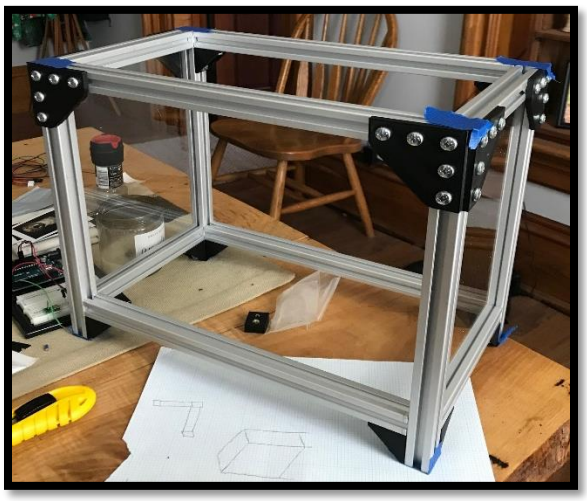
Once we defined our design criteria, we began to conceptualize and design our final machine.

Mechanical Design

We started the design process with a goal in mind that we wanted to design a machine that was capable of taking a spool of wire and automatically feeding, stripping, and cutting wire lengths to a user's given specifications. There are a few commercial grade machines out there that accomplish this task but many of them start at a price tag around $12,000, which makes it a very hard sell to your hobbyist or machine builders looking for a simple, cost effective solution. After seeing this opening, we concluded that this is the market we were hoping to enter into and helped to define the design.

Enclosure

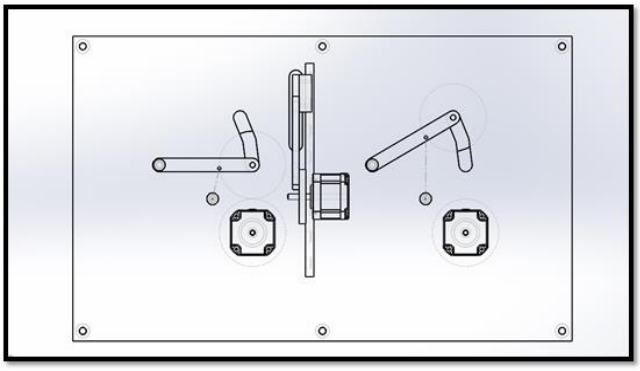
For our enclosure, we initially chose to use an extruded aluminum frame with clear Lexan side panels to allow easy presentation of our design. This would leave us with a simple, tabletop unit that would hold up well in a work environment. This enclosure design was kept the same throughout the whole design



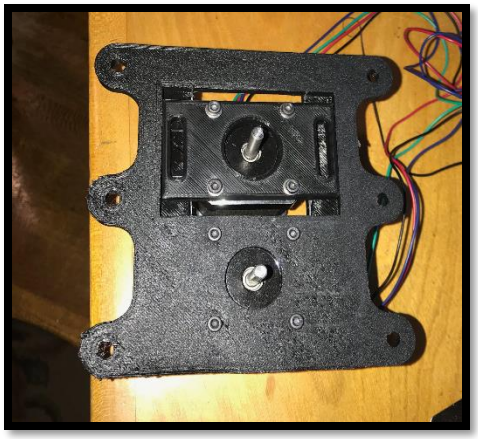
process and exceeded our expectations. In the future if this does develop into a market ready design these Lexan panels will likely get replaced with something that is not clear to give a more refined aesthetic to the design.

Feed Rollers

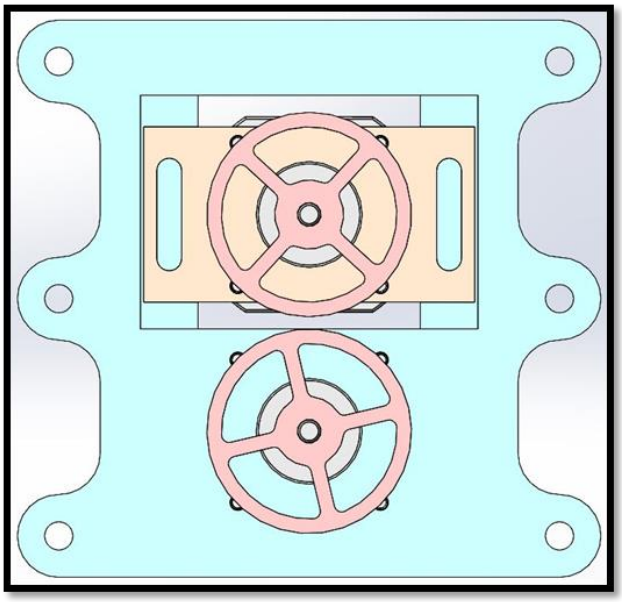
Our initial concept for the mechanical components was to have four feed rollers to feed the spool of wire to and past our main operation, the cutting and stripping of wire. To do this we planned to use four knurled rollers attached to a stepper motor. The lower roller of the set would be the driven roller and the top would be mounted to an arm on spring-loaded pivot allowing the rollers to apply compressive forces to ensure there is adequate friction to pull and drive the wire.

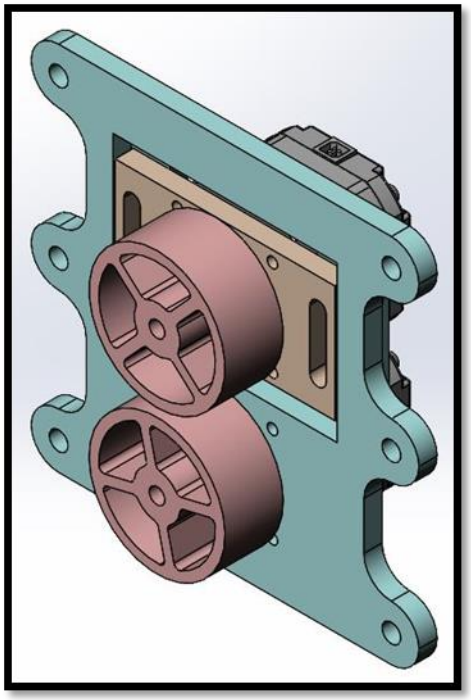


The roller design and the cutter design both changed throughout the design process. As we began to fully flesh out the ideas we realized that there were better options. For the roller tensioner we realized that this an unnecessarily complex design. The upper roller being on a pivoting arm introduced unneeded motion into the design that added more maintenance and failure points to the machine. Additionally we found that in order to pull a full spool of wire we required two driven rollers on the entry side, thus eliminating the solution. The new solution was to design a motor mounting plate that the stepper motor would directly



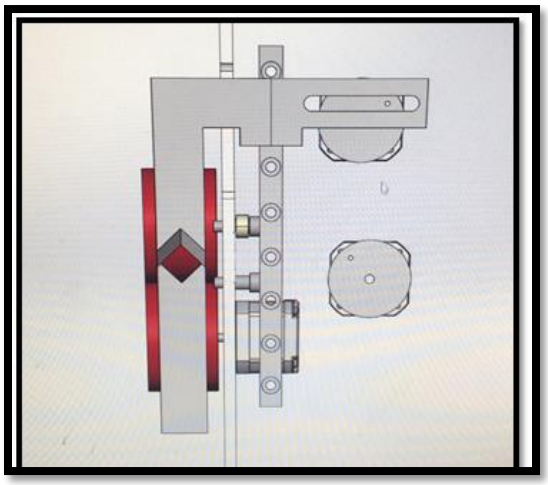
mount to as well as have an upper motor adapter plate to allow manual adjustment of the drives wheels.





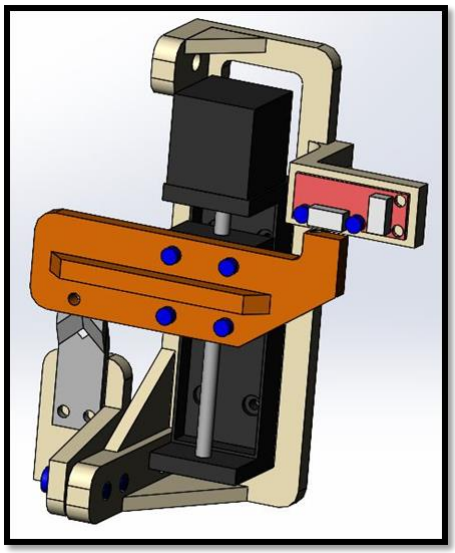
Cutter Mechanism

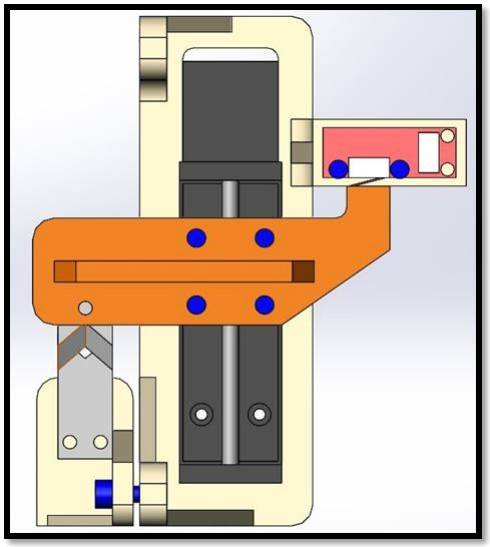
For our cutting mechanism, we initially had a design using a v-blade mounted to a linear rail that would be driven using an eccentric cam attached to a stepper motor.



Just as with the needlessly complex roller system, we also elected to eliminate the eccentric cam driven cutter. Instead, we chose to use a linear stage actuator powered by a stepper motor to simplify the design. With the cam design, we lost a lot of resolution in cutting depth, which is critical when stripping the wire. The new solution gives us a much better cutting resolution and is much simpler to program and run with. We designed a common mounting plate for the linear actuator that

allowed us to cleanly mount the actuator, limit switch, and cutting blades in an easy to assemble and easy to replace package.

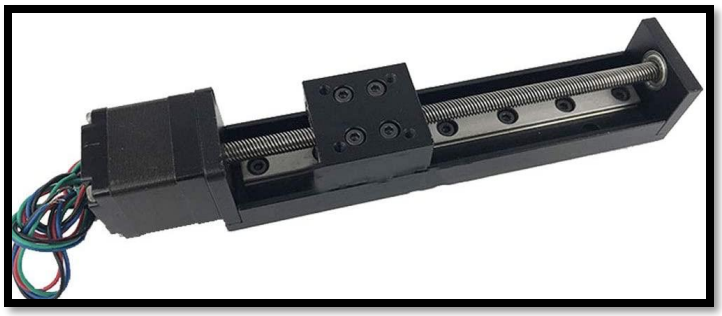




Mechanical Components

Three NEMA 17 Stepper Motors drive our wire cutter and stripper. We chose these motors due to their popularity and use within the world of 3d printing. This allows any hobbyist that would potentially purchase this machine to replace or switch out motors with common off the shelf components. This motor is also easy to control using our Arduino “brain” using readily available stepper drivers. Additionally these stepper motors offered us an amazing tolerance on our feed length. These motors are capable of moving in 1.8 degree increments that allows us to adjust our wire length down to approximately .030” increments.

Our original cutter design required many mechanical parts that would make it hard to service or replace parts in the future. To solve this problem we decided to go with a Linear Stage Actuator powered by a NEMA 11 stepper motor. This was an off the shelf component that can be directly bolted into the adapter plate for ease of assembly as well as ease of maintenance. Just as with the stepper motors for driving the wire, this NEMA 11 stepper motor allows us to achieve cut lengths within .004". For this application, these tolerances are likely overkill but we wanted to ensure that our product was never the limiting piece of the puzzle.

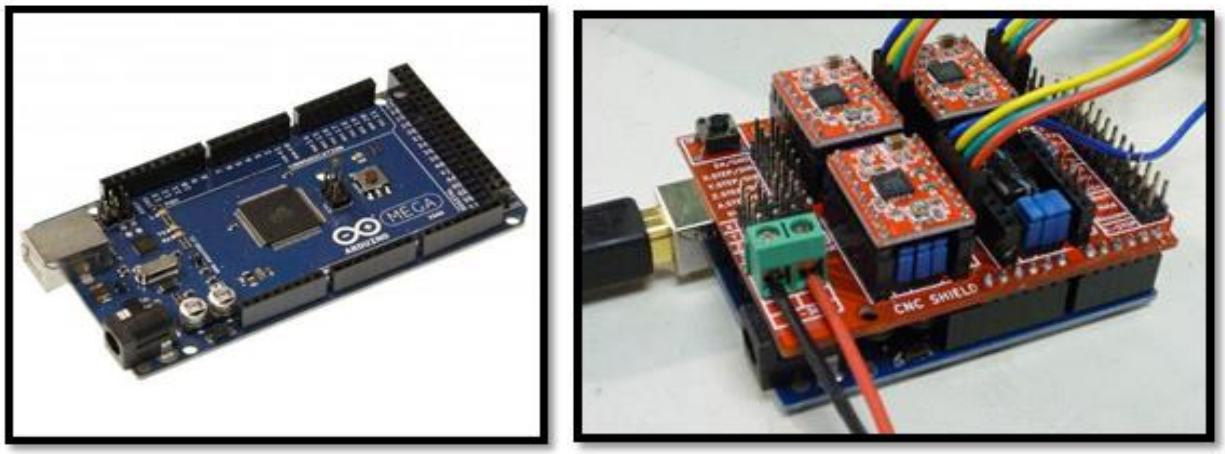


Electrical Specifications

The main power supply a 12v 30a DC power supply. It will convert our 120 VAC power to 12 VDC (30A max) which will be usable for our components. The 120 VAC is received from a standard wall outlet to our unit via a mold IEC plug and cable. The 12VDC is than used to power the cooling fan, CNC Shield, and the Arduino. The Arduino's onboard power supply is used to power our Nextion 3.2 in Touchscreen HMI.

The brains of this unit is the Arduino Mega. We chose this particular board so that we can utilize the extra I/O options, as well as the additional memory for our somewhat large program.

This will be necessary as we are utilizing a premade CNC shield and Driver attachment to control our stepper motors. This shield covers all the pins on the standard Arduino UNO, leaving us no options for other components, such as our HMI. The Arduino also serves as the second power supply, giving 5V to the HMI screen and limit switch.



We selected the CNC shield for ease of integration. The premade shield came with drivers, allowing us to skip the guesswork of buying components individually. Additionally this made the programming to move the motors much simpler. It also makes connecting power and other wires much easier with the screw terminals.

We are using a simple limit switch to detect the top of the cutter stroke, which also serves as the home point for the blade.

To allow the user to give inputs to our Arduino, we have selected the Nextion 3.2 inch Touchscreen. Our research shows that this touchscreen works well with the Arduino, only requires four connections, and it is easy to physically add to the system. The HMI allows users to select quantity, wire gauge, strip options, and lengths. The following is an outline of the program logic/sequencing:

Program Sequence / Logic

1) User will use the HMI to enter their inputs
    a) Wire Gauge
    b) Wire Length
    c) Stripped
2) One or Both Ends
3) ii) Length of strip
    a) Total Qty.
4) The Arduino will wait for a begin command (button) and at this point we will retrieve the inputs.
5) The user will have to feed the wire up to the cutter (manually or with a button on the hmi) and perform an initial cut to set a 0 point.
6) Now the program will run automatically
7) *Feed the wire past the blade the length of one strip.
    a) In/rev will be calculated based on roll diameter and converted into inches/step.
        i) Use a 2” Diameter roll for this example.
        ii) In/rev would be 2.00” x pi = 6.283”/revolution
        iii) If we have 360 steps we can find the required number of steps for feed length. We will take our in/rev and convert to in/step. (6.283”/rev) / 360 = 0.017”/step.
        iv) Now take .25” and divide by the in/step. 0.25/.0017=14.23 steps
        v) Now the program will know how many steps we need to “send”. In this case we might want to increase the step count to be more accurate.

8) Linear Stepper will make a stroke of predetermined length to strip the wire, and return to the top of the work area.

9) Feed the wire the length of the part minus 2 strip lengths.

10) Linear Stepper makes the strip stroke (If needed)

11) Wire is fed the length of the strip

12) Linear Stepper makes a cutting stroke

13) Run just the exit roller enough to either clear the wire or get it out of the way.

14) Loop steps 5-11 until it has been run the given quantity of times.

Code Examples

While the entirety of the code will not be discussed in this report, there are a few interesting details that play a large role in the function of the unit.

```
162  memset(buffer, 0, sizeof(buffer));
163  memset(wireSizeBuffer, 0, sizeof(wireSizeBuffer));
164  tWireSize.getText(wireSizeBuffer, sizeof(wireSizeBuffer));
165  Length = atof(wireSizeBuffer);
166  Serial.print("Wire Length:  ");
167  Serial.print(Length);
168  Serial.println(" Inches");
```

The Length/Strip length needs to be input as a decimal, but the numeric variables in Nextion only act as integers. This code receives decimals as a string and saves them as a floating variable in the Arduino.

```
526  float pi = 3.14;
527  float d = 1.5;    //diameter, inches
528
529  float Circumference = pi * d;
530
531  float LengthinRot = Length / (pi * d);
532  int LengthinSteps = LengthinRot * 200;
533
534  float rightStripRot = f_rightStrip / (pi * d);
535  int rightStripSteps = rightStripRot * 200;
536
537  float leftStripRot = f_leftStrip / (pi * d);
538  int leftStripSteps = leftStripRot * 200;
```

We than needed to convert these numbers. Variables and arithmetic in this code require decimals, but the variable used to control the motors must be an integer (step count). Given length and roller diameter, convert to rotations. We know there are 200 steps per rotation, so we can convert to steps. Saving the answer as an “int” variable automatically rounds up to the nearest whole number, which is plenty accurate for our application.

```
for(int x = 0; x < Quantity; x++){

  if(f_rightStrip > 0){
  ////////////////////////////Infeed strip Dist//////////////////
    Serial.println("Feeding Wire... ");
    digitalWrite(dirX,HIGH);
    digitalWrite(dirY,HIGH);      //Wire Y backwards of X
    for(int x = 0; x < rightStripSteps; x++) {
      digitalWrite(stepX,HIGH);
      digitalWrite(stepY,HIGH);
      delayMicroseconds(FeedRate);
      digitalWrite(stepX,LOW);
      digitalWrite(stepY,LOW);
      delayMicroseconds(FeedRate);
      nexLoop(nex_listen_list);
    }
```

Arduino’s built in Stepper Library was not used. We instead opted for “for()” loops. This allowed extra commands to occur WHILE motor movement was still being executed. The nexLoop(nex_listen_list); lets the Arduino receive Nextion commands during the loop. This needed for our Stop and Pause button to function properly.

Costing/Purchasing

For this project, we elected to use Amazon as our main source for purchased parts. This choice was mainly because Amazon offers fast shipping on a massive variety of parts all at a reasonable price. While there is a considerable markup on the parts offered for sale on

Amazon, as compared to buying directly from suppliers, we felt this slight upcharge was worth the expedited availability needed for prototyping in a timely manner. This choice allowed us to make design changes as well as implement those changes into a functional prototype without having to delay progress for lengthy lead-times. This was something we had in mind before starting the project and was one of the main driving factors for our choice to use Amazon as our supplier. This actually proved to pay off during the project in many cases. The main area that we had a lot of redesign on was our cutting mechanism. Our first rendition of the design had a blade mounted on a linear rail that would be raised and lowered using an eccentric cam mounted to a stepper motor. When we implemented this, we found there to be many issues, as mentioned above, and we then elected to swap to a linear stage actuator system instead. Sourcing this new part would have taken 4-6 weeks to receive which was not feasible for the timeline of our project. We ordered the identical part from Amazon, at a 15-20% markup, and it was in our hand within 2 days. Another example, as mentioned above, was the actual cutting blade. This new part we needed was quoted from overseas with a 6-8 week lead time, whereas once purchased on Amazon we only had a two day lead time. Once again, we did pay a markup but in our minds, it was worth it for the first initial machine.

Now, onto the actual cost. Before starting the project build, we prepared an estimated cost. When preparing this cost we added in a little extra cost here and there as a buffer. We felt as if it would be better to overestimate the cost than to underestimate. Below we have broken down the cost. We covered what our estimated cost was, what our actual cost was, and what our potential future cost may be. I will go into what we mean by potential future cost after this.

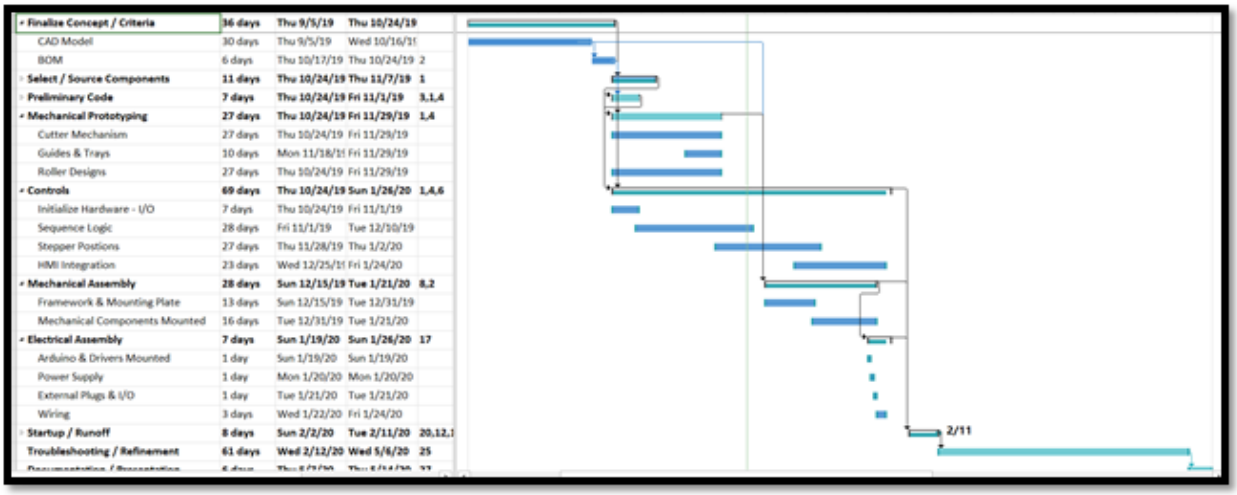
	Part	Estimated Cost	Actual Cost	Estimate Future Cost
Electrical Componeents	Motors and Drivers	$ 80.00	$ 62.99	$ 15.00
	12v Power Supply	$ 30.00	$ 18.95	$ 8.00
	LED Touch Screen	$ 80.00	$ 31.99	$ 19.00
	Arduino Controller		$ 14.99	$ 7.00
	Misc. (Wire/Cable Ties)	$ 40.00	$ 18.47	$ 5.00
	Category Total	$ 230.00	$ 147.39	$ 54.00
Mechanical Components	Aluminum Frame	$ 120.00	$ 40.17	$ 16.00
	Front Plate	$ 50.00		
	Lexan Side Plates	$ 30.00	$ 5.60	$ 5.00
	Linear Bearing	$ 30.00		
	Tensioner	$ 40.00		
	Roller	$ 30.00	$ 6.00	$ 5.00
	Motor Mounts		$ 8.00	$ 4.00
	Linear Actuator		$ 49.00	$ 28.00
	Cutting Blade		$ 65.00	$ 5.00
	Bearings		$ 6.99	$ 1.00
	Misc. (Nuts/Bolts)	$ 60.00	$ 15.10	$ 5.00
	Category Total	$ 360.00	$ 195.86	$ 69.00
		Estimate	Actual	Estimated Future Cost
	Combined Totals	$ 590.00	$ 343.25	$ 123.00

As you can see our ending, cost for the final machine was $343.25 completed. This cost reflects all of the parts used in our final machine, not necessarily, all of the parts that we purchased, tested, and not used.

As mentioned, there is also an estimated future cost. This is a project that we are thinking about potentially continuing with after the completion of the course. When we chose Amazon as our supplier, we knew we were going to incur some additional upcharge on the purchased part in exchange for expedited shipping and availability. This also allowed us to purchase items in smaller quantities. During this process, we got rough quotes for all of our final used parts through overseas suppliers that have longer lead-time and bulk order requirements. If we were to take this product to market we would likely use these services and

anticipate the lead times allowing us to cut the cost by almost 65%. This would also take into account product optimization to ensure there is little to no wasted or extra parts/ materials. We are happy we chose to go the route we did for purchasing, but like mentioned in the future we would look for a better-suited supplier to ensure we get the highest quality possible at our desired price point.

Gantt Chart



While the project as a whole was completed on schedule, the timelines of our individual goals definitely saw some changes and delays. We originally planned to have the entire assembly and programming complete by the beginning of February, and spend the entirety of the Spring Semester fine tuning and testing the machine. Due to changes and unforeseen holdups, assembly was not completed until the beginning of March. We also chose to include some of the final startup and troubleshooting into the design and build to eliminate any major design changes at the end of the project. Programming and testing (Runoff) occurred simultaneously, and were completed during the beginning of April. This caused some amount of

last minute stress to finish the project, as we did not have much time to cycle the machine and work out any unforeseen issues. However, the project was completed successfully and on schedule.

Conclusion

To conclude, we have all learned a lot throughout these last two semesters of senior design. It was very rewarding to start with nothing but an idea and turn it into a working, automated machine all on our own. We now have a fully functional machine that can cut and strip any amount of wires that a user commands it to through an HMI. Our automated wire cutter could be a very useful machine in industry. We feel that with the amount of money we have invested into this machine, the return on investment would be very high. Upon completion of this course, we may proceed further with this project and explore the potential in the market for this product. It was very rewarding to apply things that we had learned throughout our academic and professional careers and it was exciting to learn so many new things along the way. We had a lot of fun working on this project and we're looking forward to doing a lot more of this in both our personal and professional careers.

Reference

"Amazon", Amazon.com [Online]. Available: https://www.amazon.com/. [Accessed: 24- Sept- 2019].

"McMaster-Carr", Mcmaster.com [Online]. Available: https://www.mcmaster.com/. [Accessed: 24- Sept- 2019].

"SWG - Standard Wire Gauge", Engineeringtoolbox.com [Online]. Available: https://www.engineeringtoolbox.com/swg-standard-wire-gauge-d_1779.html. [Accessed: 29- Sept- 2019].

"Beginner's Guide to Building Things With V-Slot Aluminum Extrusion", MakeUseOf [Online]. Available: https://www.makeuseof.com/tag/beginners-guide-building-things-v-slot-aluminum-extrusion/. [Accessed: 12- Nov- 2019].

"All About Stepper Motors", Adafruit Learning System [Online]. Available: https://learn.adafruit.com/all-about-stepper-motors/types-of-steppers. [Accessed: 12- Nov- 2019].

"Arduino Reference", Arduino.cc [Online]. Available: https://www.arduino.cc/reference/en/. [Accessed: 12- Nov- 2019].

2016, Youtube: Schleuniger EcoStrip 9380 - Entry Level Cut & Strip Machine.

"Pololu - DRV8825 Stepper Motor Driver Carrier, High Current", Pololu.com [Online]. Available: https://www.pololu.com/product/2133. [Accessed: 19- Nov- 2019].

"How To Control Stepper Motor with A4988 Driver and Arduino", HowToMechatronics [Online]. Available: https://howtomechatronics.com/tutorials/arduino/how-to-control-stepper-motor-with-a4988-driver-and-arduino/. [Accessed: 19- Nov- 2019].

Industries, Adafruit, 2020, "Stepper motor - NEMA-17 size - 200 steps/rev, 12V 350mA", Adafruit.com [Online]. Available: https://www.adafruit.com/product/324. [Accessed: 19- Nov- 2019].

"A BASIC INTRODUCTION TO NEXTION ARDUINO LIBRARY - Nextion", Nextion [Online]. Available: https://nextion.tech/2017/09/15/basic-introduction-nextion-arduino-library/. [Accessed: 23- Feb - 2020].

"Nextion Display with Arduino - Getting Started | Random Nerd Tutorials", Random Nerd Tutorials [Online]. Available: https://randomnerdtutorials.com/nextion-display-with-arduino-getting-started/. [23- Feb - 2020].

Appendices

Weekly Journals

Sept. 19

Topics Discussed - This evening we began to brainstorm more on the project and discussed more about what all we wanted the project to do and how we are expecting it to

function. In addition, we started to look at the cost of some of the major components to estimate what kind of funding we will need to come up with for the project. One of the big things we started to discuss were options for the enclosure of the machine. One option that we feel may be a good choice is constructing the enclosure out of aluminum extrusion, aluminum plate, and plexiglass in some places. We also started to look into what component we will need to use to accomplish our goals. Towards the end, we began to think about how we would like to schedule the project and discussed some deliverables.

Actions Taken- At the end of class we decided to have each member look into a different part of the project to explore ideas of how to accomplish what we want, where to source materials, and what the cost would be. Josh looked into the electrical components. (What microcontroller to use, what drivers to use, ideas for a hmi, ect.) Wes looked more into the motors and mechanism we are hoping to use to actually feed, strip, and cut the wire. (Types and sizes of motors, rollers, ways to feed wire, ect.) Andrew looked more into what type of enclosure to use. (Aluminum extrusion vs steel, material of side panels, cost, ease of manufacturing/assembly, ect.)

Sept. 26

Topics Discussed - The topics we discussed tonight were creating a rough bill of materials for the project and working on creating a rough sketch to share with the class of our project. We discussed where we are going to start meeting outside of class. Also discussed how we would like the HMI to be mounted along with the cutting mechanism.

Actions Taken - Andrew is going to continue to work on closure designs and work on getting some sponsors for the project. Josh is going to start looking at code for electrical components.Wes is going to start looking into rollers and how to mount the spool of wire that is to be cut.

Oct. 3

Topics Discussed - Reviewed Andrew's 3D Models. Discussed finances for the project such as company sponsorship and personal funds. We outlined basic functions for the code (Inputs, Outputs, flow chart of operations.)

Actions Taken - Josh is going to work on the meeting journal and begin outlining code. Andrew is going to refine CAD models and finalize dimensions. Wes is going to work on part purchasing and the project proposal.

Oct. 10

Topics Discussed- This evening we worked more on our proposal and tried to begin thinking of a schedule. In addition to this we brought together some of our ideas on where and what to purchase. We also discussed options for when and where we want to start meeting outside of class. Josh talked about what his work said about doing some machining.

Actions Taken- Work on finishing up the proposal and nailing down a schedule. Josh is going to start on the code.

Oct. 17

Topics Discussed - We discussed what types of specific parts we think will be best for our project. Continuing to work on the project timeline / Gantt chart and then our proposal will be finished. Mostly discussed just what parts we should order right now and what other stuff can wait.

Actions Taken- Continuing to work on the project proposal and timelines for objectives. We also ordered several parts for our project including stepper motors, drivers, Arduino Mega, power supply, power switch and a linear rail. Josh will work on the Gantt chart in Microsoft project for the proposal.

Oct. 24

Topics Discussed - We discussed that we should create our bill of materials and work on writing code to get our stepper motors running.

Actions Taken - We worked on setting up our Arduino mega with the shield and the drivers. We wrote code to get our three stepper motors all running at once. We also made a bill of materials.

Oct. 31

Topics Discussed - We talked about what we should add to our proposal. We discussed how we are progressing in the project as well and if we have run into any issues.

Actions Taken - We are going to work on adding details to the proposal. Josh now has all of the stepper motors running and is going to work on starting to refine the code. Wes and Andrew are going to get some mechanical parts ready to prototype and 3D print to test.

Nov. 7

Topics Discussed - We talked about plans to start prototyping parts.

Actions Taken - Josh is continuing to work on code, while Andrew and Wes are finalizing some prototype parts. We resubmitted our project proposal with more information

Nov. 14

Topics Discussed - We talked with Reza while he was here at Northwest State about our project and gave him updates on where we stand. We discussed a different cutting mechanism.

Actions Taken - We ordered a linear stage actuator. We created a lamacoid panel to mount our motors and cutting mechanism to to help visualize what we are working with.

Nov. 21

Topics Discussed - We brainstormed how we want our cutting mechanism to attach to our new linear actuator. Talked about how we need to figure out which HMI screen we want to use.

Actions Taken - We researched and purchased an hmi screen. Wired up our new linear actuator to test it out and it is going to be much easier to work with rather than our last idea.

Feb. 6

Topics Discussed - We discussed how we want to be able to adjust our rollers to be able to pinch down on the wire. We talked about which aluminum extrusion we wanted to use. Talked about how we need to work on designing our blade.

Actions Taken - Going to work on designing the blade, ordering 20/20, and enlarging our rollers to be able to function better.

Feb. 13

Topics Discussed - Discussed options for coatings for the rollers. We need to have a material that has no slippage. Discussed that we need to come up with dimensions for our enclosure.

Actions Taken - Redesigned the mounting system for the cutting blades to mount four razor blades. Going to trial a rubberized undercoating on the roller wheels. Also going to trial some grip paper to use for the rollers. We may need to order a new HMI screen.

Feb. 20

Topics Discussed - Grip paper worked really well for the rollers. Talked about meeting on the following weekend to really make some big progress on this project and get the enclosure built and more work done on the faceplate.

Actions Taken - Andrew designed a new mechanism for how the rollers will be adjusted vertically to be able to clamp down on the wire for it to feed properly. Need to 3D print a lot of things this week. Ordered another HMI screen and got it to work properly over the weekend.

Feb. 27

Topics Discussed - We talked about how we were going to meet on Saturday and work on our project to make some good progress.

Actions Taken - We met on Saturday and built the enclosure out of the 20/20. Andrew came up with another good design for adjusting the rollers. We made a new laminoid plate to use for a prototype on our enclosure. Our initial test of our 3d printed structure for the cutting mechanism failed but it has been redesigned. The wire feeds really well now through the rollers with the sliding adjuster and grip taped wheels.

Mar. 5

Topics Discussed - Met on Saturday morning to work on the project.

Actions Taken - Josh got the limit switch to work. Currently having problems with getting our cutting mechanism to actually cut the wire. Brainstorming different ideas for that. Bolted all of our rollers and the cutting mechanism to the lamanoid and then bolted that to our enclosure.

Mar. 12

Topics Discussed - Met on Friday morning to work on the project

Actions Taken - Wired up our power supply. Figured out that the problem with our cutter not running was the power supply. Adjusted the current going through our drivers to reduce heat. Fit some more lexan into our enclosure. Our new cutting blades arrived this week as well. Wes had a spare computer fan laying around that we are going to use to push air out of the enclosure. Josh is continuing to work on arduino code and HMI. Andrew is going to redesign our cutting mechanism to accept our new cutting blades.

Mar. 19

Topics Discussed - Met on Saturday morning to work on the project.

Actions Taken - Josh wired up the power switch to the power supply. Josh also did a lot of cable management in the enclosure. Got our outfeed motor to work and everything is permanently wired. On Saturday morning we mounted our new cutting blades and they worked perfectly. Cuts every single time. We temporarily wired our fan to make sure it works. Talked about cutting two windows in the lexan, one to mount the fan and another to have air move out of. Andrew 3D printed some covers to protect the fan blades from being touched from outside of the enclosure. The cutter was also stripping wires fairly well. Going to work on making guides for the wire to feed through along with an object to hold the spool of wire that will be cut. Also going to design and print a screen protector for the HMI.

Mar. 26

Topics Discussed - Met on Saturday morning to work on the project

Actions Taken - Printed off a cover to go over the fan and the open window to let air out. Printed a base and cover for our HMI. Printed wire guides as well. Josh continues to work on HMI.

Apr. 2

Topics Discussed - Did not meet this previous weekend.

Actions Taken - Josh has been continuing to work on our HMI. He got the Nextion screen working with the Arduino. Manual control is all programmed and the rest is still in progress and

close to being finished. We haven't met recently because of the stay at home orders for the coronavirus.

Apr. 9

Topics Discussed - Did not meet this previous weekend.

Actions Taken - Josh continuing to make progress on HMI, he attached videos in the canvas link.

Apr. 16

Topics Discussed - Did not meet this previous weekend.

Actions Taken - Starting to work on our report and PowerPoint and getting ready for final presentation