

# Sleep Clip

Mr. Hoffman

PTLW

EDD

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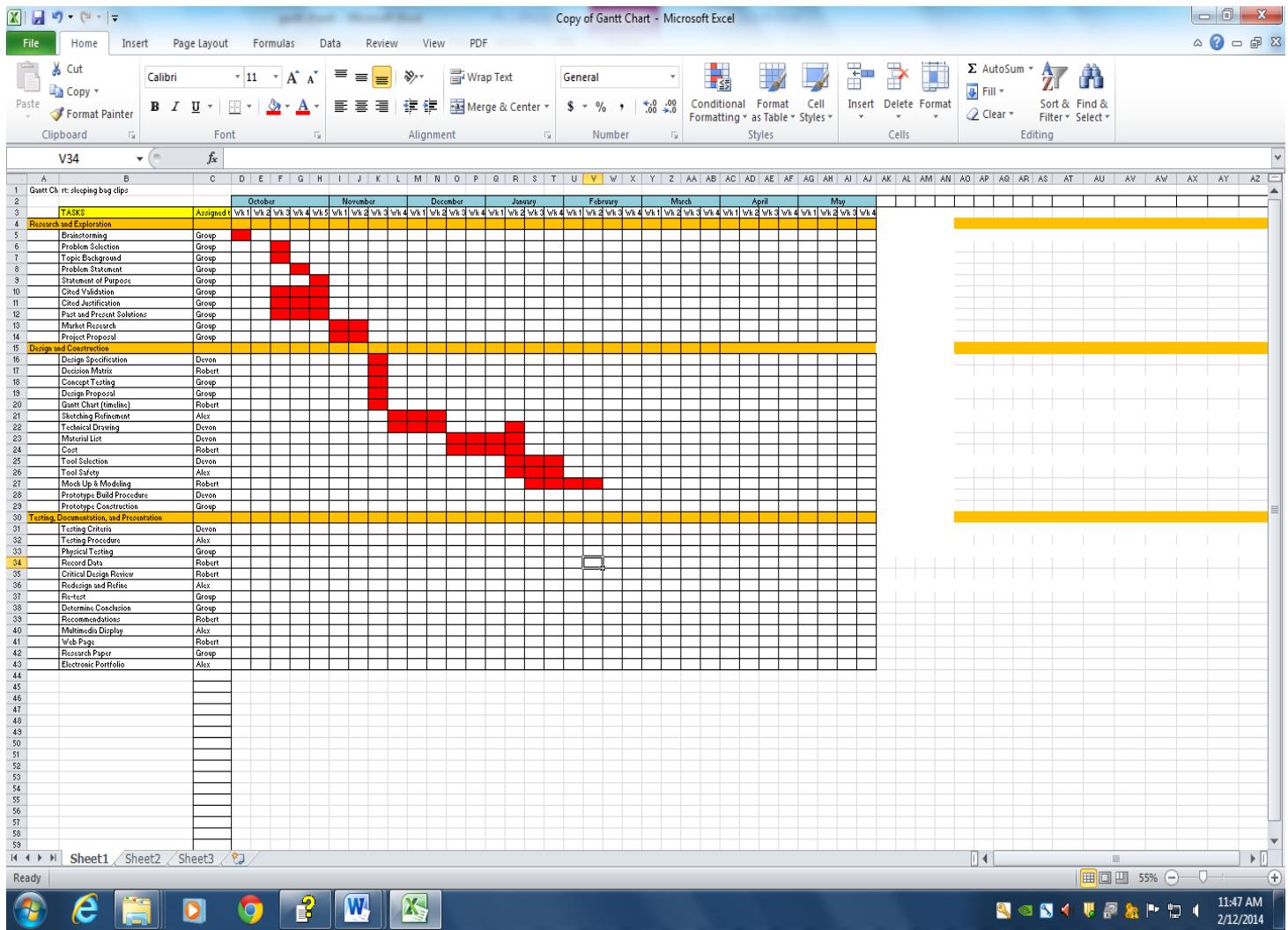
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# Table of Contents

- Gant Chart
- Problem Statement / Statement of Purpose
- Justification of the problem
- Background Research
- Problem Proposal
- Design Specification
- Brainstorming
- Decision Matrix
- Product Improvement
- Considerations and Consequences
- Business Plan
- Design Proposal
- Prototype
- Change Order
- Prototype Images
- Testing
- Reflection
- Recommendations

# Gantt Chart



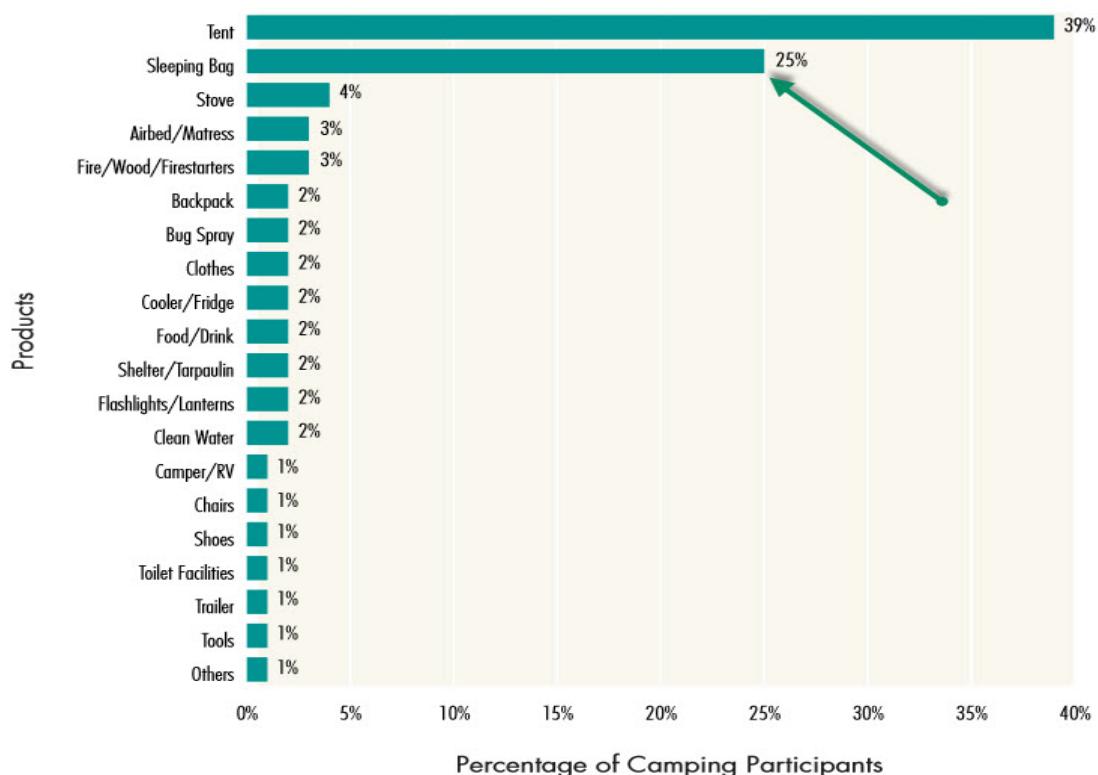
# Problem Statement / Purpose

A COMMON PROBLEM WITH SLEEPING BAGS IS WHEN THE USER IS SLEEPING IN THE MIDDLE OF THE NIGHT. WHILE THEY ARE ASLEEP, THEIR BODY ROLLS AROUND TO BECOME MORE COMFORTABLE. IN TURN, CAUSING THE SLEEPING BAG TO SHIFT WITH THEIR BODY WRAPPING UNCOMFORTABLY AROUND THEM. COMPANIES SUCH AS SIERRA DESIGNS HAVE CREATED SEPARATE SLEEPING BAGS THAT ARE DESIGNED IN A CONE SHAPE TO MOVE ALONG WITH THE BODY. BUT REVIEWS SHOW THEY DO NOT HAVE ENOUGH ROOM AD USERS ARE STILL LIMITED TO THAT INDIVIDUAL SLEEPING BAG.

CREATE A PRODUCT THAT MAKES ALL SLEEPING BAGS HAVE THE ABILITY TO STAY IN PLACE AND NOT SHIFT ALONG WITH THE USER

# Justification of Problem

With the sleeping bags taking in 13% of last year's total outdoors profit and rated the second most important item to have it shows to have a large market. Data shows that consumers are continuing to buy sleeping bags with 20% of all age groups listing it as their most recent purchase and 49% being replacements. This shows that sleeping bags are a common household item. Many people have problems with their sleeping bag making it need replacement.

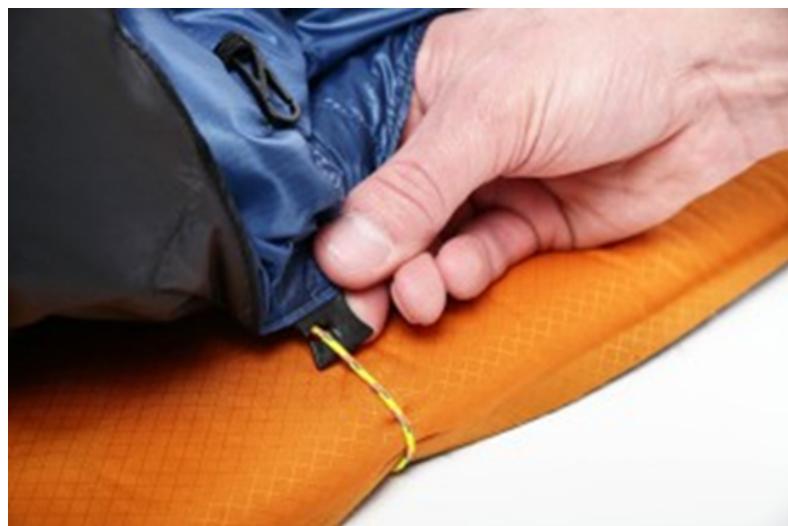


Sierra Designs has a product line called DriDown™ this product is designed to make the user comfortable in all aspects. The main feature of this product is to keep the user completely dry by making the sleeping bag water resistant, but they also use there conned shaped design allowing the user to shift in the sleeping bag without the sleeping bag becoming scrunched up and wrapped tightly around the user.





Katabatic gear has a new design they are working on that provides the user a mat that goes underneath the sleeping bag that gives better insolation for cold nights. The main feature that sets this product close to ours is that It has clips built into the bag that connect to the mat. Causing the sleeping bag to stay in put.





Companies such as llbean, Sierra Designs, and Slumber jack all make similar products. The standard sleeping bag design for comfort while shifting around is a conned shape sleeping bag. Many companies make this design and as of right now it is the only product of its kind.



We compete with our competitors with our price and versatility, instead of spending hundreds of dollars on a new sleeping bag we offer the same solution the competitors solve on every sleeping bag you own.

## Design specifications

- Aesthetics – we are using plastics so we are able to make many forms of color
- Ergonomics – we believe this product is well suited for human use. It is very user friendly because it is pretty self-explanatory on how to use it. No we made it as easy as we possibly could.
- Safety – this product is extremely safe to use. The only hazard is the possibility of chocking for kids under the age of 3 and you may get pinched.
- Cost – no we are using plastic which is cheap already. We will be selling it for \$5. And the manufacturing and assembly process will be simplified already.
- Standardization – our products does not require the use of any tools.
- Quality control – our product will be east to manufacture. The only maintenance that will be requited is cleaning after use.

- Ease of maintenance – our product will not need much maintenance. The only maintenance that will be required is cleaning after use.
- Durability – our product isn't very durable as it is made out of plastic. As long as you don't over use it, it should last about a year or longer. Our product will wear out all at the same time because It is all one part.
- Environment – our product could be harmful to the environment if you lose it in the woods because plastic takes a long time to disintegrate. Our entire product can be recycled.

## Brainstorming and sketches

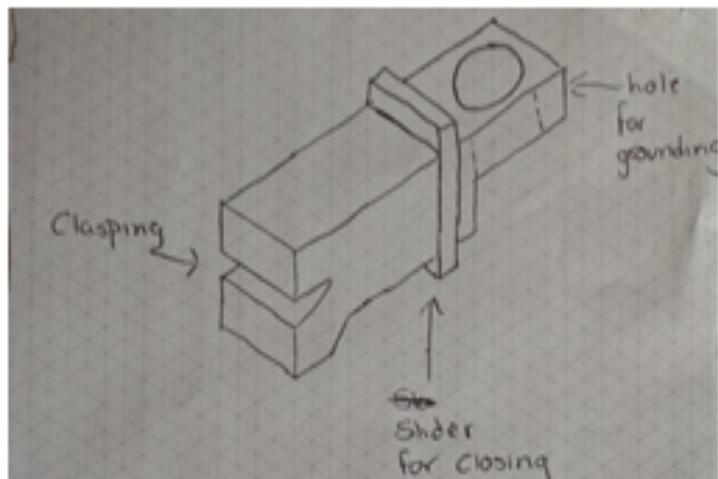
1. Four corner clips.
2. Rod bag.
3. Rod clip.



# four corner clip

## DESIGN 1

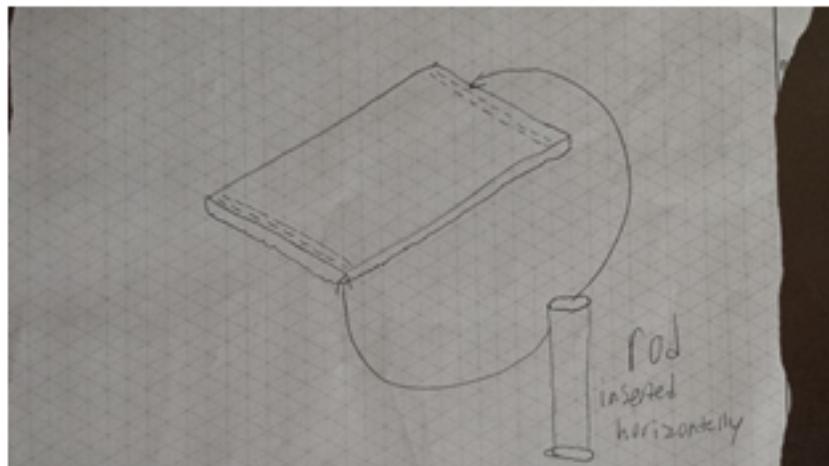
- This design was very simple, cheap, and fictional but required a pair of 4 in order to work as intended. The clip has a simple clasp on the front which is closed down using a slider on the back. We also wanted a way for it to lock to a surface so we included a hole in the back for mounting in on the ground or other surfaces



# Rod Bag

## DESIGN 2

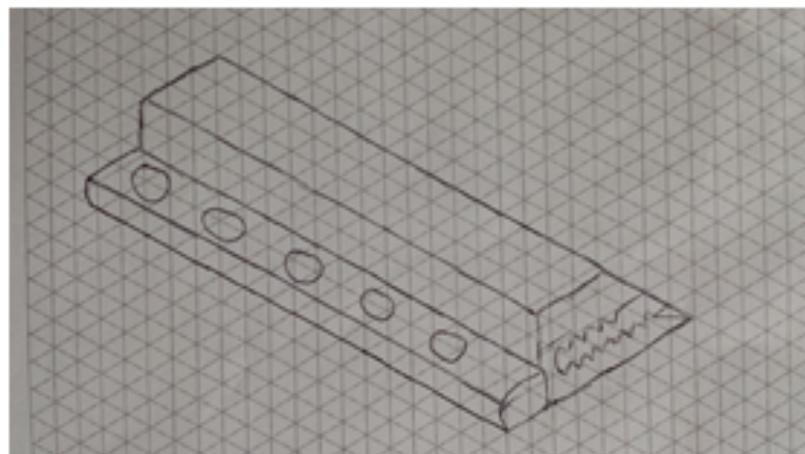
- The second design was a new way of making the sleeping bag by including 2 rods going along either side making it so the sleeping bag would be stiff. But this would lead to complication for storing the sleeping bag.



# Rod Clip

## DESIGN 3

- The third design was most similar to the first except it was a pair of 2 much wider than design one that stretched along either side. This solution was simple and very effective. We used the same clasp and hole method as design one.



sdfgsdfgsdfgsdfgsdfgsdfgsdfg

# Decision Matrix

		Problem Statement Ideas					
Criteria	Weight	Idea 4	Idea 5	Idea 6	Idea 7	Idea 8	Idea 9
The problem can be accomplished in the given time.	2	3	2	3	3	4	2
The problem can be solved with the available resources.	2	4	3	3	3	3	3
Initial research indicates that others also believe the problem exists.	1	2	3	2	2	3	2
The solution is likely to meet a specific need and/or be marketable.	1	2	3	2	2	2	2
The problem is interesting enough to keep the team interested.	1	1	3	2	3	4	2
	1						
	1						
	1						
Total Score		19	19	18	19	23	16

h v /

	idea 4	idea 5	idea 6	idea 7	idea 8	idea 9
Devon	7	29	27	31	0	12
Jarrett	16	21	25	19	15	16
Robert	16	19	19	18	19	23
Total	39	69	71	68	34	51

# Product improvement

- We improved the slide on clip
- We made an angle to the inside the clip
- We angled the back
- We added teeth to the front

# Ethical Considerations

Ethical Considerations:

Raw material- the plastic can be harmful if eaten by animals.

Material Processing- the pellets for the plastic can be eaten by humans or animals and cause many problems

Component Manufacture- the components also use plastic pellets so the same problem applies

Assembly – parts can be missed placed and lost.

Packaging & Distribution- the packaging can be harmful if left out in the environment.

Installation and Use- the clip can pinch the user. Or the clip can harm animals on the ground.

Maintenance and Upgrading- the user must return the device to be properly recycled for an upgrade.

Disposal- the device can be returned to us for proper disposal.

# Business Plan

Jumping into the camping industry with a new idea can have its challenges. Many of the companies that are selling products have been in the business for years. That being said there will also be many advantages, one being that no one else has come up with a product like ours. This gives us a jumping start in the race with sleeping bag utilities. Many companies are already in the business such as Katabatic and sierra designs each selling different product solving the same



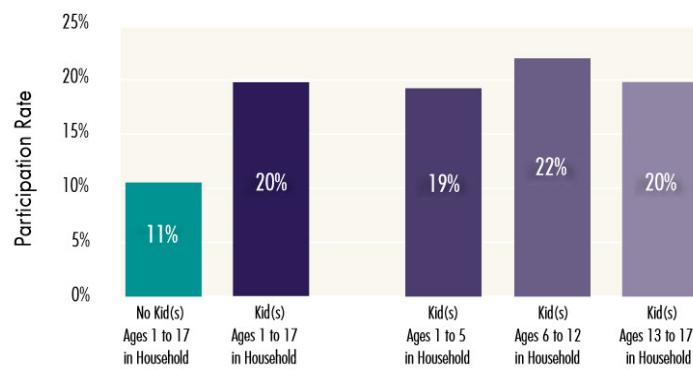
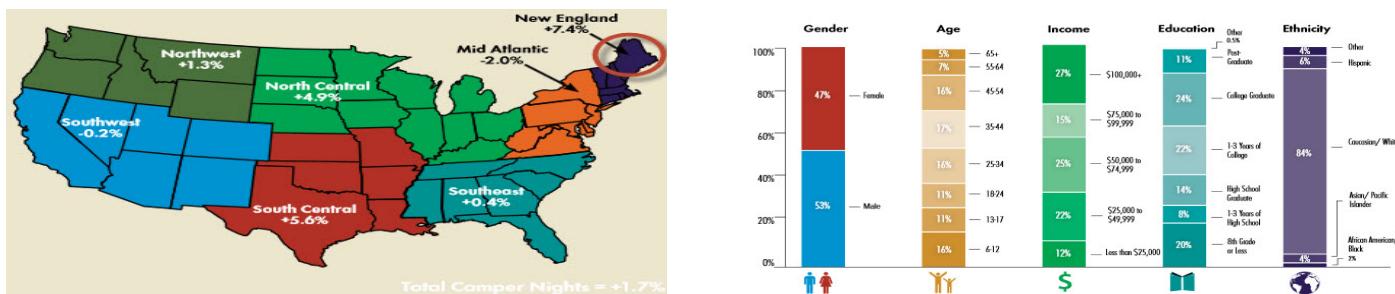
problem. The outdoors market is expanding dramatically just in October there was a 2.9% increase in sales over September. Last year there was a total earnings of \$1,598,412,587 with a 10.7% increase from the year before.

Sleeping bags came in at 3rd taking 13.1% of the total earning that year. This being said many of the companies such as Sierra design and katabatic are making millions of dollars. Sierra designs last year made a

Camping Equipment	End of Year 2012 Sales	End of Year 2011 Sales	Percent Change
Lifestyle/Travel Packs & Bags	\$347,683,713	\$293,616,272	+18.41
Tents & Shelters	\$223,384,259	\$196,469,510	+13.70
<b>Sleeping Bags</b>	<b>\$210,378,269</b>	<b>\$191,759,449</b>	<b>+9.71</b>
Stoves/Campfire	\$192,644,480	\$184,902,485	+4.19
Hydration	\$160,399,196	\$147,446,274	+8.78
Lanterns/Lighting Products	\$133,941,654	\$128,672,425	+4.10
Technical Packs & Bags	\$133,533,548	\$120,424,596	+10.89
Airbeds & Accessories	\$102,249,489	\$97,836,222	+4.51
Coolers/Containers	\$94,197,979	\$82,451,599	+14.25
<b>TOTAL</b>	<b>\$1,598,412,587</b>	<b>\$1,443,578,832</b>	<b>+10.73%</b>

earnings of \$500 million and Katabatic made \$10 million. We believe that we can make a lot of money on this idea because it is new and has not been done. Millions of people buy sleeping bags everyday. Some even spend hundreds of dollars on advanced sleeping bags to provide them the comfort we are providing. We believe that we can lower the cost spent on sleeping bags and provide an alternative to buying multiple sleeping bags.

## THE MAJORITY OF CAMPERS TODAY ARE CAUCASIAN MALES BETWEEN THE AGES 35-44 MAKING \$75k-\$100k WITH CHILDREN



# Design Proposal

Our design must maintain the usefulness of any sleeping bag and must be able to work with all makes and models. We want our product to be available for everyone and inexpensive.

# Prototype Planning

## Bill of Materials

Item	QTY	Description	Vendor	Cost	Notes
ABS Plastic Pellets	1 LB	1 Pound Plastic Pellets (231 Cubic Inches)		\$5.00	Supplied by Teacher

## Tools and Equipment

Item	Exists in Lab (Y/N)	Source if not in Lab	Outside Source Notes
3-D Printer	Y	In lab	Can use whenever needed but must ask permission from instructor first.

## Needed Knowledge

Item	Need Outside Assistance (Y/N)	Source	Outside Source Notes
Need expert to review our product to see if it will work properly	Y	Moosejaw	We can email them our questions and pictures to see what suggestions they have.

# Change Orders

1. Clip
2. Clip
3. Clip
4. Slider



# Engineering Change Order

**Project:** Sleeping bag clip

**Change Order Number:** 1

**Date:** 4/24/14

**Approved by:**

**Date Approved:**

<b>Change Request Description</b>	
Description: Redesign of base of clip. Put an angle on the back of the clip.	
Justification: Needed a better angle so the clip is sturdier and stronger so it doesn't break.	
<b>Change Order Cost</b>	
Original Cost:	\$10
Net cost changes prior to this change order:	
Cost prior to this change order:	
Cost will be (increased /decreased/unchanged) by:	unchanged
New Cost:	\$15
<b>Change Order Time</b>	
Build time will be increased by:	30 min
Revised date of completion:	



# Engineering Change Order

**Project:** Sleeping bag clip

**Change Order Number:** 2

**Date:** 4/24/14

**Approved by:**

**Date Approved:**

<b>Change Request Description</b>	
Description: Redesign of teeth on inside of clip. Made them more angular and pointed backwards.	
Justification: Needed sharper teeth and a better angle so it can clasp the sleeping bag better.	
<b>Change Order Cost</b>	
Original Cost:	\$ .10
Net cost changes prior to this change order:	
Cost prior to this change order:	
Cost will be (increased /decreased/unchanged) by:	unchanged
New Cost:	\$ .15
<b>Change Order Time</b>	
Build time will be increased by:	30 min
Revised date of completion:	



# Engineering Change Order

**Project:** Sleeping bag clip

**Change Order Number:** 3

**Date:** 4/24/14

**Approved by:**

**Date Approved:**

<b>Change Request Description</b>	
Description: Changed width of the opening of the clip.	
Justification: Shortens arch of travel so that you don't need as much force to close the prongs.	
<b>Change Order Cost</b>	
Original Cost:	\$ .10
Net cost changes prior to this change order:	
Cost prior to this change order:	
Cost will be (increased /decreased/unchanged) by:	unchanged
New Cost:	\$ .15
<b>Change Order Time</b>	
Build time will be increased by:	30 min
Revised date of completion:	



# Engineering Change Order

**Project:** Sleeping bag clip

**Change Order Number:** 4

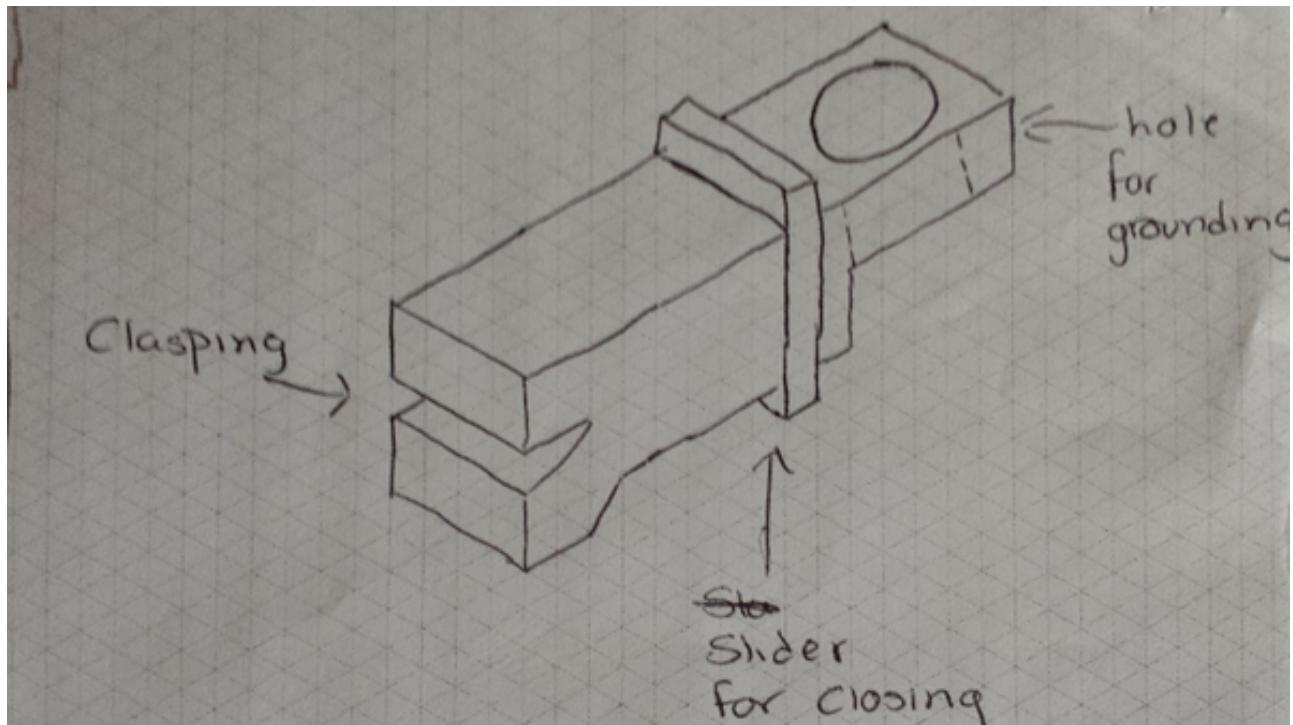
**Date:** 4/24/14

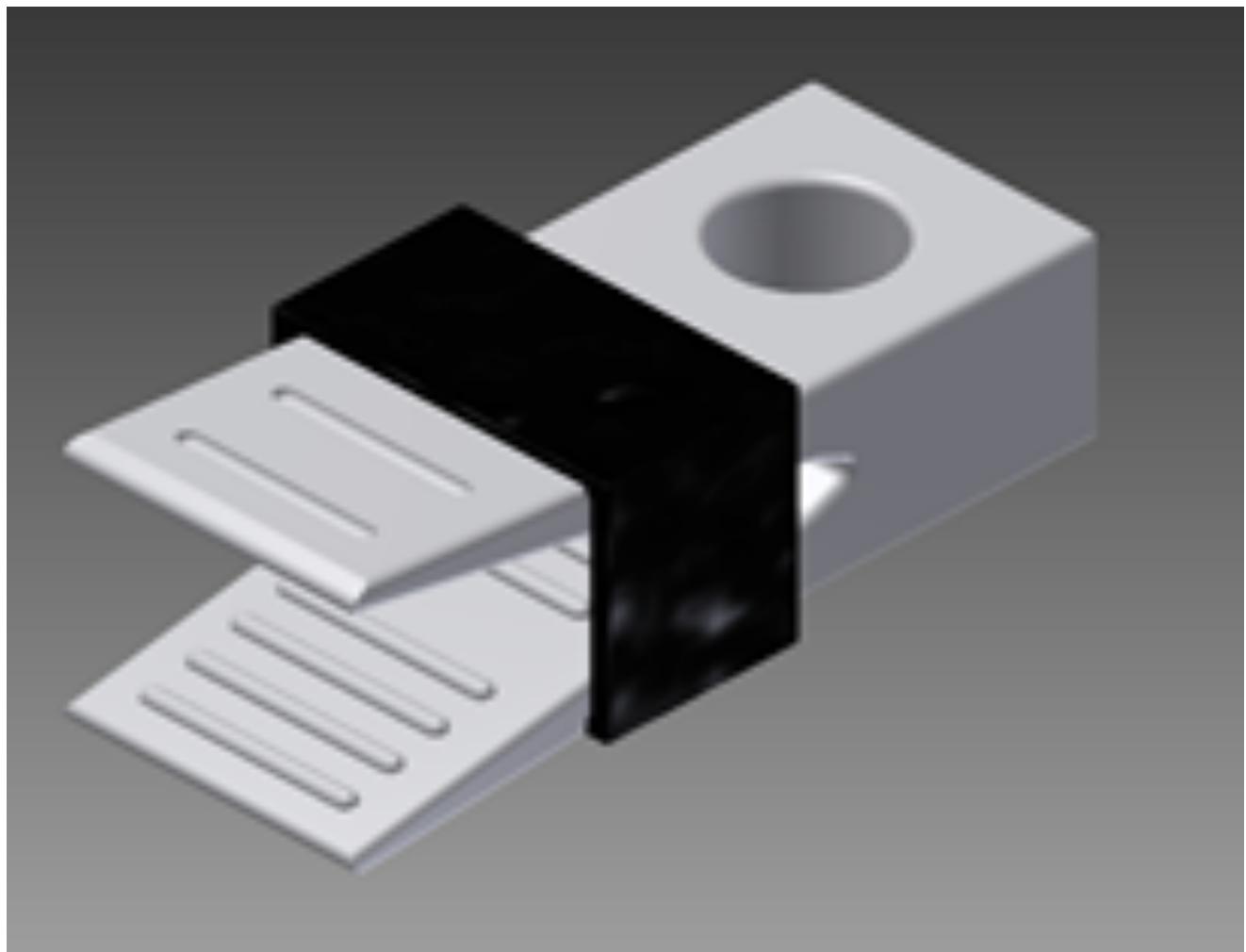
**Approved by:**

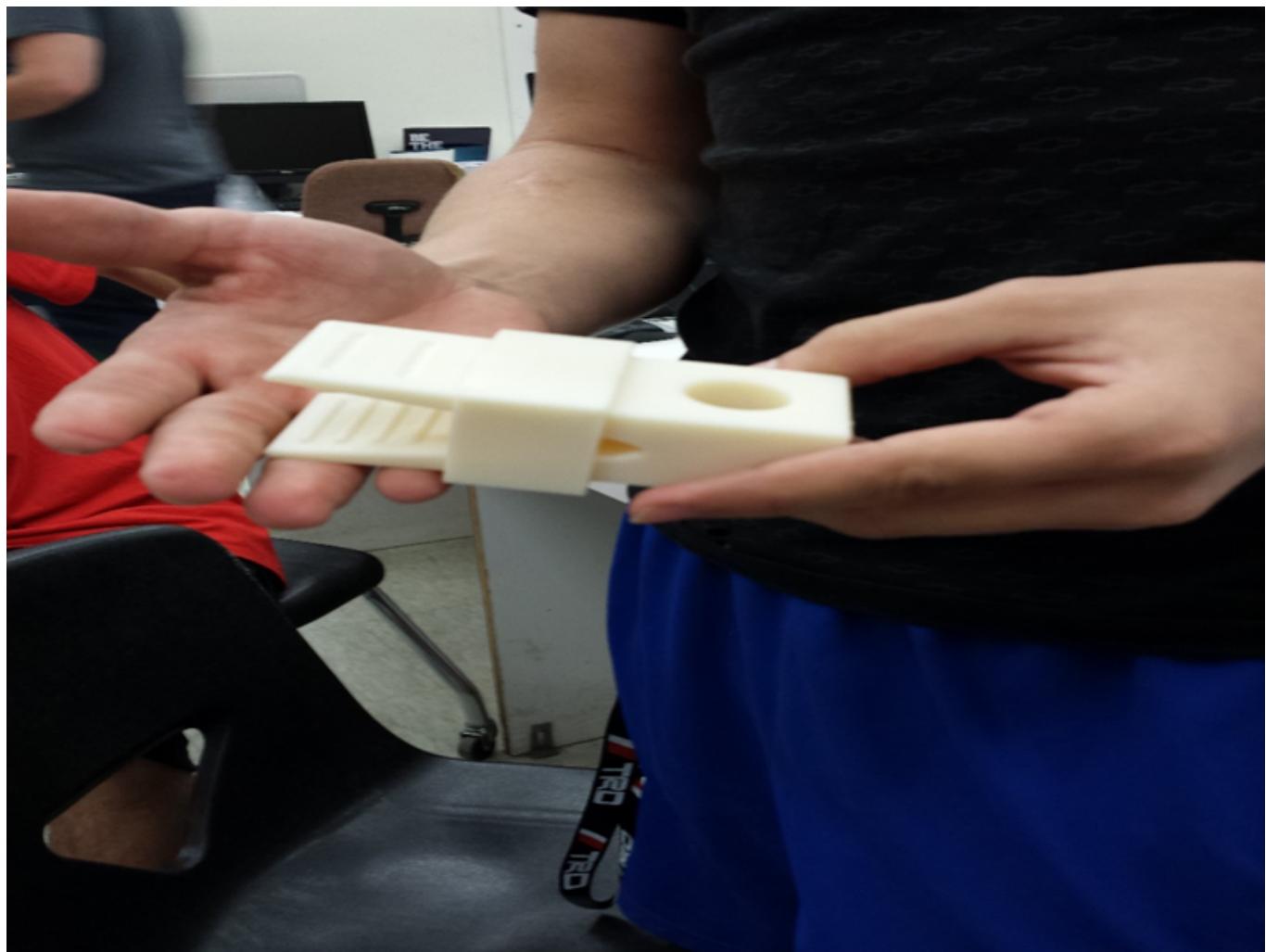
**Date Approved:**

<b>Change Request Description</b>	
Description: Removed second set of teeth on inside of clip.	
Justification: They were redundant.	
<b>Change Order Cost</b>	
Original Cost:	\$ .10
Net cost changes prior to this change order:	
Cost prior to this change order:	
Cost will be (increased /decreased/unchanged) by:	unchanged
New Cost:	\$ .15
<b>Change Order Time</b>	
Build time will be increased by:	30 min
Revised date of completion:	

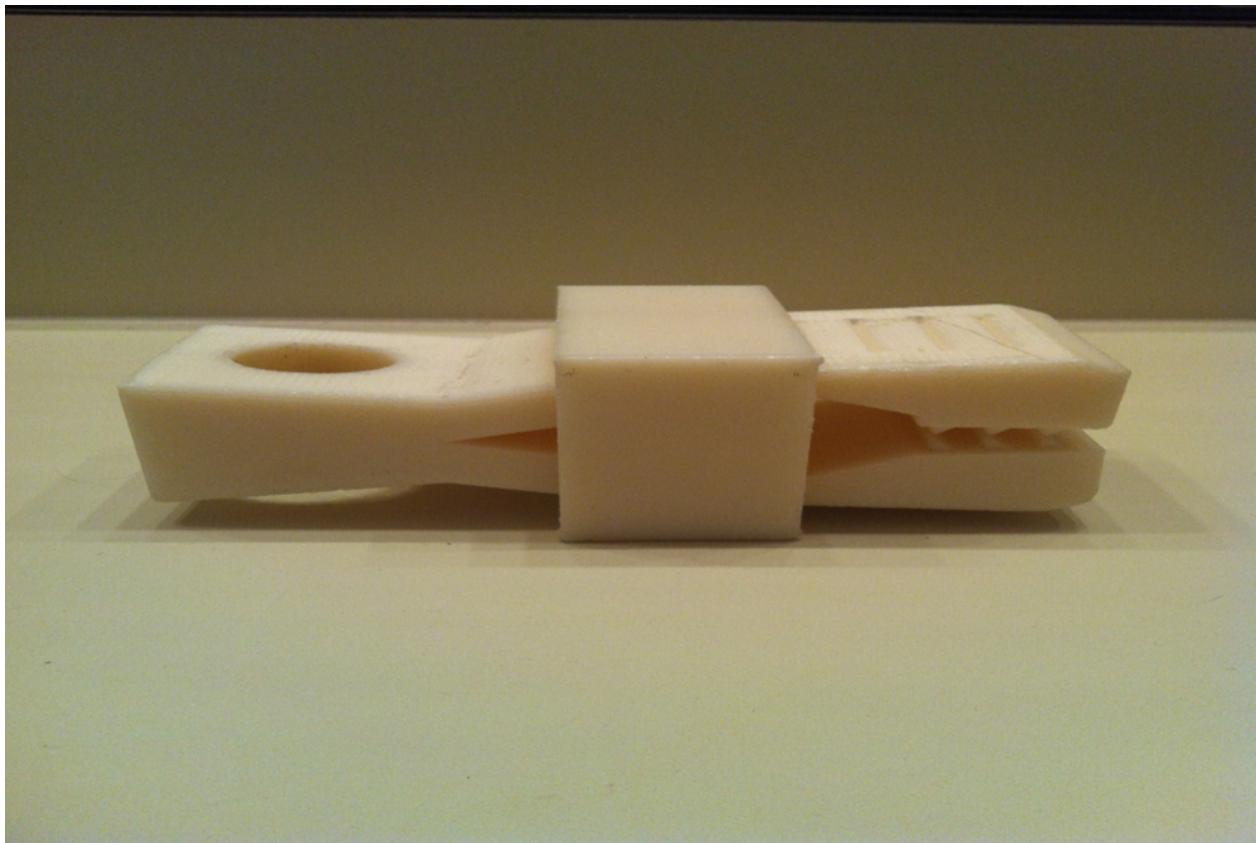
# Prototype











# Testing

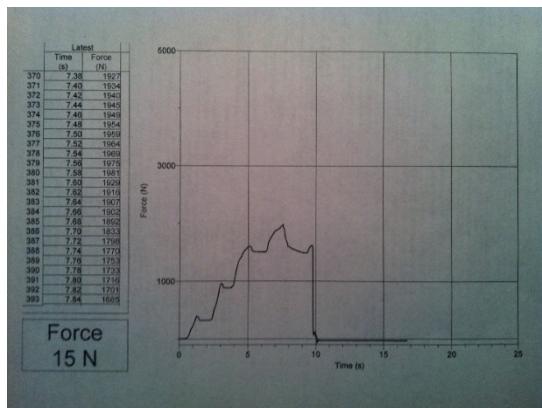
1. Stress test
2. Environment test
3. Grip test

# Stress Test

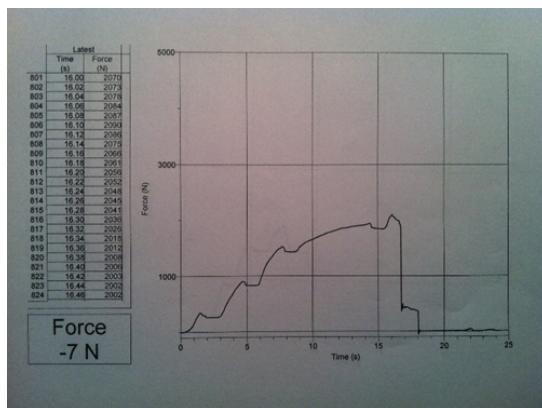
Our first test was a stress test. We needed to know how strong our clip was by pushing the slider to its breaking point



# STRESS TEST DATA



As you can see from the first test the highest peak was 1981 N equaling 495 pounds.



As you can see from the second test the highest peak was 2090 N equaling 522 pounds of weight.

# Environment test

The next test we did was a simple environmental test. Due to the nature of our device we needed to make sure that the clip would work in all environments.

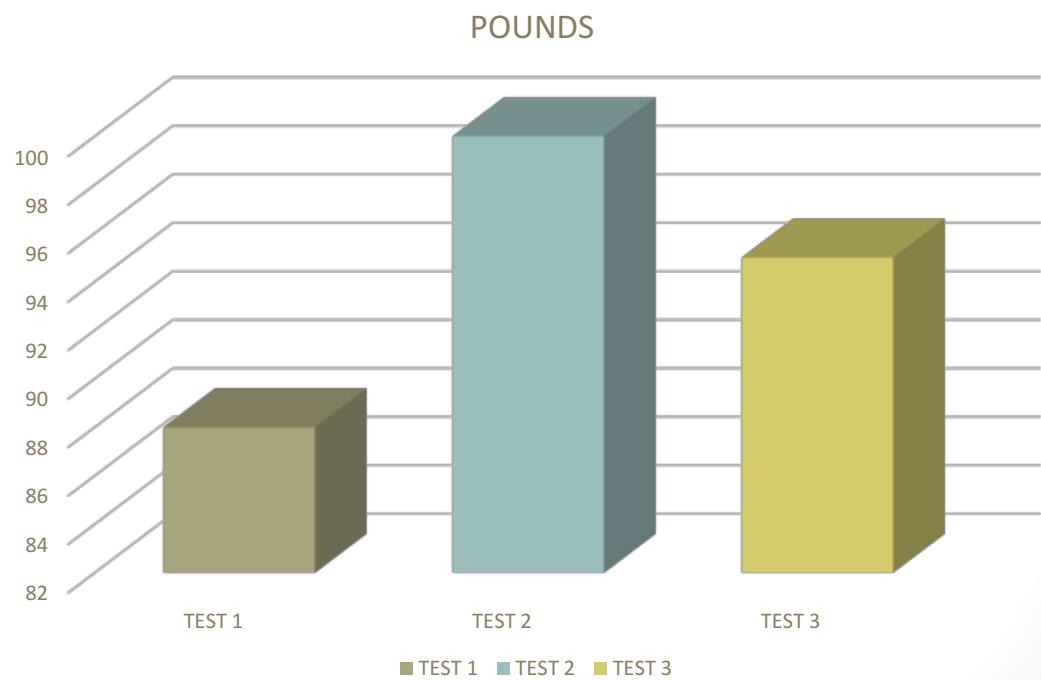


# Grip Test

Our last test was to see how well the clip as a whole was able to function. We needed to be able to see how well the clip could hold weight while in use.



# GRIP TEST DATA



# Reflection

Problem statement- we needed a problem that many people face including us. We had many good ideas but were unable to prove the problem

Brainstorming- after we had our problem we needed a solution we came up with three good ideas and at the end picked one

Selection- when we were deciding which one to do we kept price and usability at top priority

Prototyping- we needed to make a working prototype to show to the consumer.

Improvements- we had many improvements to our design.

Building Process- we needed to build the prototype fast so we used the 3D printer.

Testing- testing was a necessity we had 3 tests and all of them were successful.