SARSEF Supply Drop Experiment	
Purpose This project was made in order to fix to problem of not being able to deliver supplies to a disaster site safely and economically. We made this project in hopes of being able to fix these problems by making a design which will match all the criteria to fix the problem.	***Customers*** The project that was created was for people who are in a turmoil need of assistance including food, communication, medical and shelter in the quickest period of time. People from crucial need to almost little to know need in a turmoil of events causing tragic.
End result Our desired end result was to produce a contraption that would double in being indestructible and holding and protecting the materials inside. Our last iteration of the project made sure that our contraption had met its expectations by being dropped from high heights and being indestructible and would keep the materials inside safe.	***Measures of success*** To know when the project is done and ready to go, we need to know if it can get there safely, have every material used in the delivering to help in some sort, and if it really helps the people its intended for.

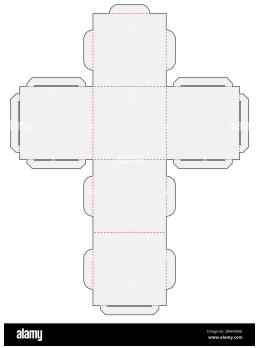
Introduction

We began this question with one goal and one question. Would we be able to build a contraption that would safely deliver supplies and goods to those stuck in disastrous situations? We first went to the red cross website in order to fully understand and grasp the concept of delivering and offering help to those who are in need of goods and services. Then we proceeded to look up how different scenarios are handled and taken care of in order for us to take into consideration how we would need to build our product. Engineers previously had made small, indestructible contraption that would be so resistant of any damage that could be done to it, and it would be able to protect the materials on the inside without breaking them with using supima cotton and we took inspiration from that ideology of protection. This worked to many people's expectations and needs and ended up in the way they envisioned it would work, so, we had decided to take inspiration and used their cotton to our needs.

American Red Cross

Question/Problem and Predictions

The Questions that we had at the beginning of the project were that, how would we be able to craft a contraption that could double as a shelter and perform as a contraption that would hold supplies and withstand anything. So, we had decided something that would be pretty rigorous to create in order to fully meet expectations. We would make the sides and the bottom of the box covered in cotton, then the top could be removed in order to collapse the box into a shelter by all side falling down. We predicted that the collapse of the box would be very difficult to craft and that the box would break or crack due to the complex composition of the contraption. It ended up exceeding expectations.

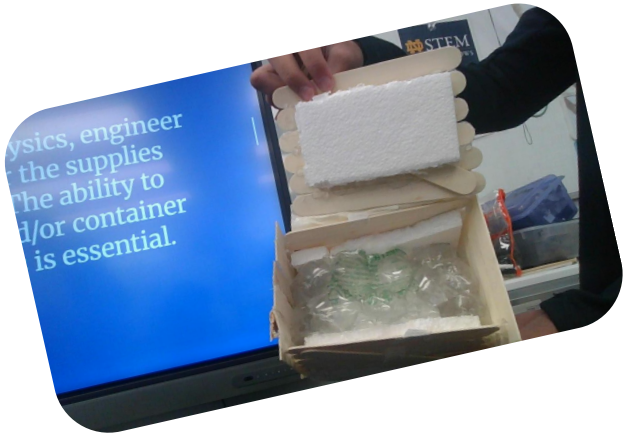


Investigative Methods or Procedure

As we investigated the problem and tried to come up with a solution, we decided on going for an airdrop process, in order to deliver supplies asap but safely at the same time. This would increase efficiency and effectiveness on trying to get all the supplies safely. As we will see on the chart in a few slides, less than half of the people experiencing disasters have supplies or any sort of help sent to them. Coming up with this process can hopefully inspire and help real scientists to put these processes into action so that we may make that percentage way better. For the process, we will have an aircraft drop a wooden crate with protection around it along with a parachute. The crate will land safely on the site and will also be able to be disassembled in order to also provide walls or anything that it could be needed for.

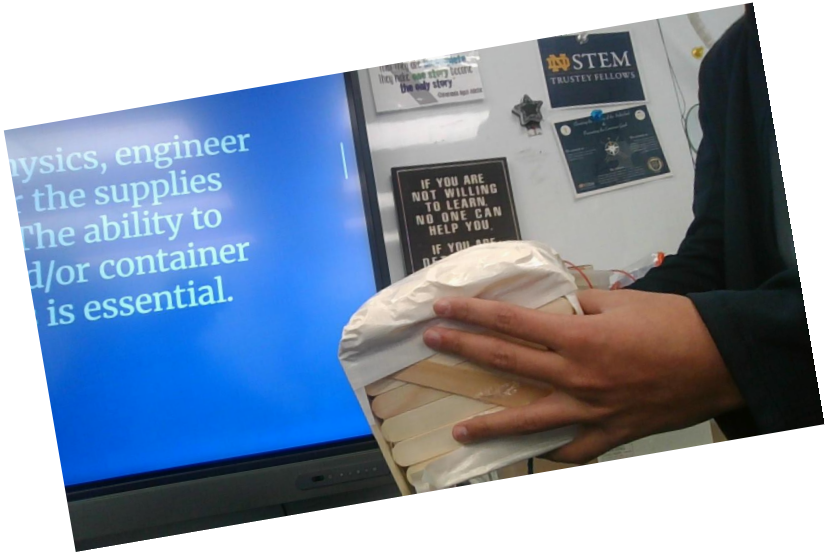
Investigative Methods or Procedure

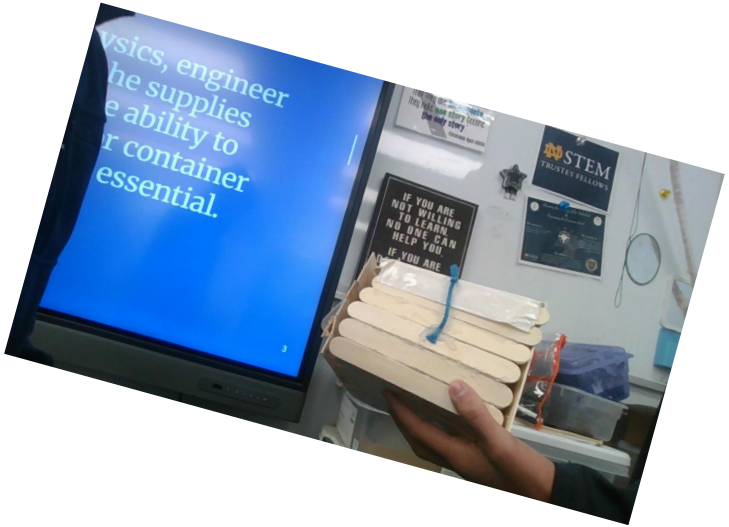
The process of making this was time consuming because of the failures of the parachute and we the time we used to keep the bow safe. To keep the safe we had to tape cotton balls to side of the crate so that if it does land hard on the ground because of a parachute failure that the box does not break. And in the inside we even added foam to the inside to insure the safety of the crate and the supply inside. The crate can hold many items and even can handle a fall from the great height because of the precaution that we took to make this work.



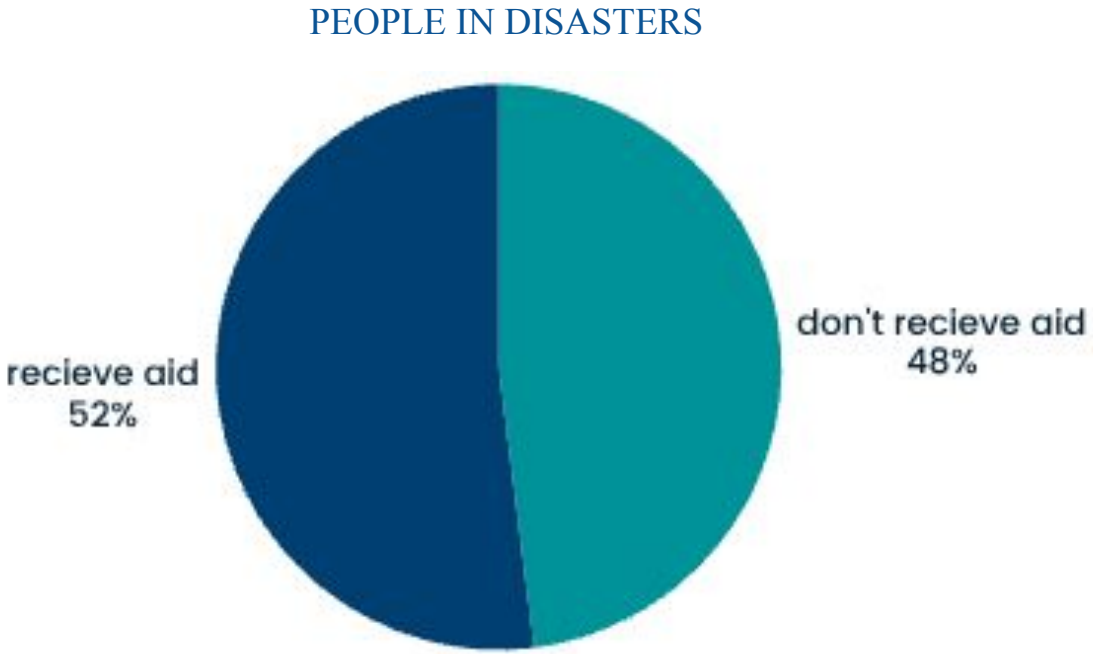
Investigative Methods or Procedure

Inside of the parachute we had added a a square phone hollow. We did this so the parachute will stay open while falling a short distance making the air capture increase by a lot more than just a flat parature that will open as its falling instead of one that will be already open by the second we drop it from our hands. This will ensue the opening of the materials and will make sure that these materials are safely delivered but also letting the person receiving the airdrop to get the materials on the inside.





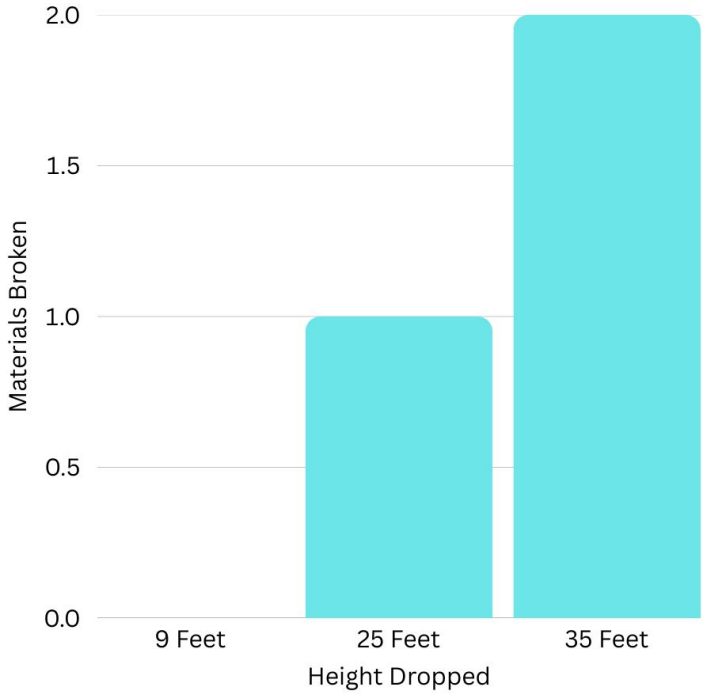
Results and Data Visualization



This pie chart shows how many people receive aid after experiencing a disaster

- By looking at this pie chart, we can see that less than half of the people who are in disaster sites don’t receive aid.
- Using our model, we hope to increase this number significantly so that people don’t have to go through hard times after going through a natural disaster.

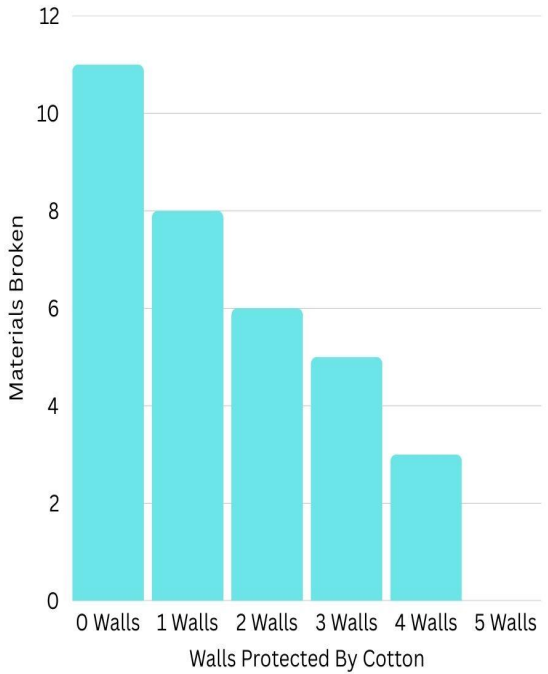
Results and Data Visualization



The more iterations we created of our contraption, the more we gradually reached new heights. Of course the more the height was enlarged, the more materials were broken but this truly showed how indestructible our contraption was.

- At 9 Feet, our contraption did not break whatsoever.
- At 25 Feet over many different tries it finally broke only 1 of our materials.
- At 35 Feet, approximately after our 51st attempt, it broke only 2 materials proving that it would be able to work at its full potential and would rarely break.

Results and Data Visualization

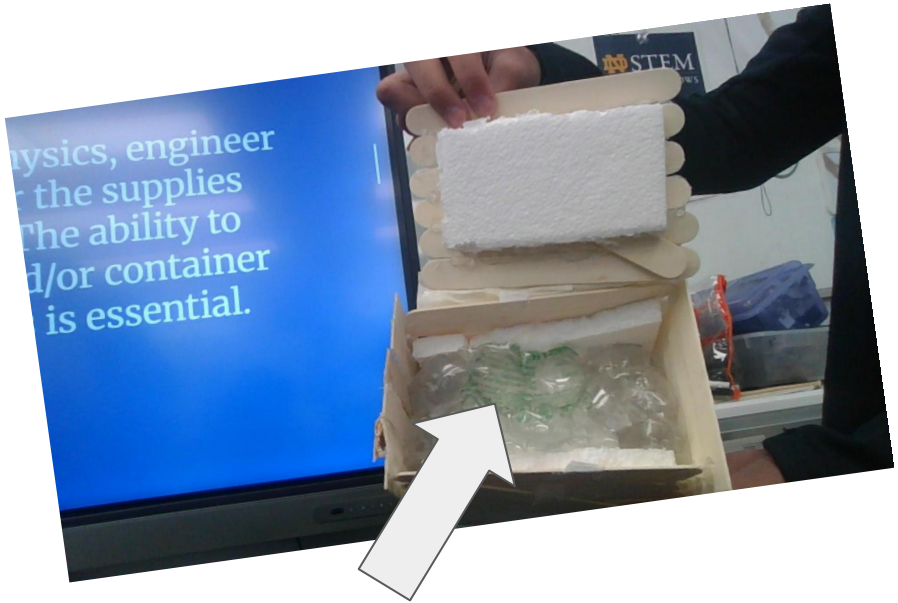


This Graph showcases how the walls being protected by cotton, has an effect on the materials used to make the box.

- 0 Walls provides no protection whatsoever leading to so much being destroyed, causing the contraption to nearly fall apart.
- With only 1 wall (The Floor) being covered on the outside, significant damage was still done to the walls but lessened the damage.
- Then with 2 Walls the damage had lessened by 2 Materials and thus we had realized the trick to protection of materials.
- Thus we kept testing by covering one wall at a time, leading to 5 Walls being covered (Other than the top wall), leading to no damage being done to any of the materials necessary.

Results and Data Visualization

This in the protective layer of cotton balls and duck tape that kept everything safe that was inside and outside if the cate.



The inside of the project had used foam, bubble wrap, cotton balls and all of these soft materials were used to add protection but not to destroy the materials inside.

Discussion and Interpretation

On the outside of the box, there's a handful of cotton balls surrounded by tape on all the sides besides the top of the box where it opens up.

1. The cotton balls on the walls of the box were there to create a soft cushion for just in case the military drop lands on its side and it doesn’t explode.
2. The square tapped foam block inside of the parachute made it capable for the parachute to stay open and not fold inside of itself.
3. The tape all around of the box had created an extra layer of glue on top of everything, this had made sure even if something had broke anywhere on the box it was perfectly fine and worked completely normal.

- If the parachute didn’t have the foam square would it be able to work the same way?
- If the box wasn’t surrounded by cotton balls and tape would it work above our expectations like it did?

Discussion and Interpretation

The reason why we decided to put the cotton balls on the outside of the airdrop contraption in order to protect it to the fullest because of:

1. The cotton balls provide support and provide protection for the contraption in order to fully protect the materials inside.
2. Cotton balls are proven to absorb friction and absorb damage that could easily break plastic of wood.
3. This was an idea we got off of the Supima Cotton website as referenced in slide 15.

These cotton balls were known to protect anything and were used to even protect some military grade airdrops for a while. So, our discussion was mainly consisting of:

- How many cotton balls do we put?
- How many sides do we cover?
- Will it hold with tape added on?

To our fullest surprise, it exceeded our expectations and answered all of our questions.

Implications and Ideas for Future Research

In future experiments engineers should upgrade the materials do it can handle a fal in it fales in a bigger model. Future experiment they should also reinforce the inside with not just foam but with steel so the wood in the outside could stay together while being dropped from a great height. The small project we made can help st a example for what to do for others that are trying to make a prototype but at a bigger scale, of course there are some mistakes that they could match up like the parachute's weight and its ability to catch wind to lighten the fall for the supplies and the crater itself for further use like for a shelter.

Implications and Ideas for Future Research

To create a better box as in shape or size because after we had put in all of the stuffers to make sure the items don’t break, we had ran out of most of the open space that was there. We should have also made a better parachute as the shoot itself didn’t work too good, it worked good but it could have been way better at a point if the parachute was a thicker material.

References

Works Cited

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Lab Notebook

If presenting a physical project, lab notebooks can accompany the project board. If submitting a digital project presentation, scan some key pages of the notebook to upload. The scanned lab pages will be uploaded as a separate file from the project slides.