Project Deliverable (H) Project: Cardboard Bed

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Project Deliverable H: Prototype 3 Tic-Tac-Toe Design

The tic-tac-toe design is an improvement on our previous box star design. Where the box star was not connected at the corners and therefore wobbly, the tic-tac-toe design is connected and sturdy. As with the previous prototype, the legs of the tic-tac-toe design are compact and able to fold into itself which would be ideal for making the bed foldable and as small as possible. The objective of this prototype and its testing is to confirm that this leg design is suitable for use in our final design and can withstand the weight of a person laying upon it.

Why

We did the tests on the tic-tac-toe design because we believed it had the properties to fulfill all of our guidelines/specifications. It had a foldable aspect to it which would aid us in finding a way to make the entire bed foldable. In addition, we performed a test of strength on the design. We built a smaller subsection of the tic-tac-toe design and placed it underneath a hydraulic press. The design can sustain much more weight than what is required (it was found to hold 1 metric tonne). Through this test, our group is now confident that this design will satisfy the conditions of our design criteria.

What

We chose the tic-tac-toe design because of its essential properties. It is extremely strong, can condense/fold into a smaller size, and uses a small amount of cardboard. We came up with this design through the analysis of our old design and where it fell short. We noticed that the box star design had wobbly side supports, so we eliminated that aspect in this design by connecting the cross side supports. Now, the legs can stand on their own and do not sway.

When

On February 25th, 2019, our team conducted various unofficial tests on various designs. We built small models of some ideas we had. Our team leader, Brytan, sat or stood on the designs to test the strength of each design. We found that the tic-tac-toe design would be able to withstand the weight it is required to withstand because Brytan sat on it without it breaking. The designs were built without the use of proper cardboard, as in the cardboard used was previously used and

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had creases and bends in it. That means that the bed will be even stronger when it is built in full-size because it was already able to withstand the 225-pound Brytan. Then we used the hydraulic press test on the design on March 9th, 2019. As stated before, the hydraulic press showed that the tic-tac-toe leg design can withstand over a tonne of weight spread over its surface. Both of these tests took a very short amount of time, we simply created our designs and tested till collapse.

The following links show videos of our first test with our leader sitting and standing on the prototype.

https://drive.google.com/a/uottawa.ca/file/d/1H3vUphc3otqv5NLaG33IrudYtpX-utLP/view?usp =sharing

https://drive.google.com/a/uottawa.ca/file/d/15OHlJmPXOm3FJSHp7ZGpe964MMRj-24y/view ?usp=sharing

The following links show videos of our design's strength being tested with the hydraulic press. https://drive.google.com/a/uottawa.ca/file/d/1EqB-usOY6tZ5slW68vRli_0iymwn1HI4/view?usp =sharing

https://drive.google.com/a/uottawa.ca/file/d/1DL5xQ5oNXAelEHtEioC7os2UX0pTNhqc/view? usp=sharing