Stacking Blocks

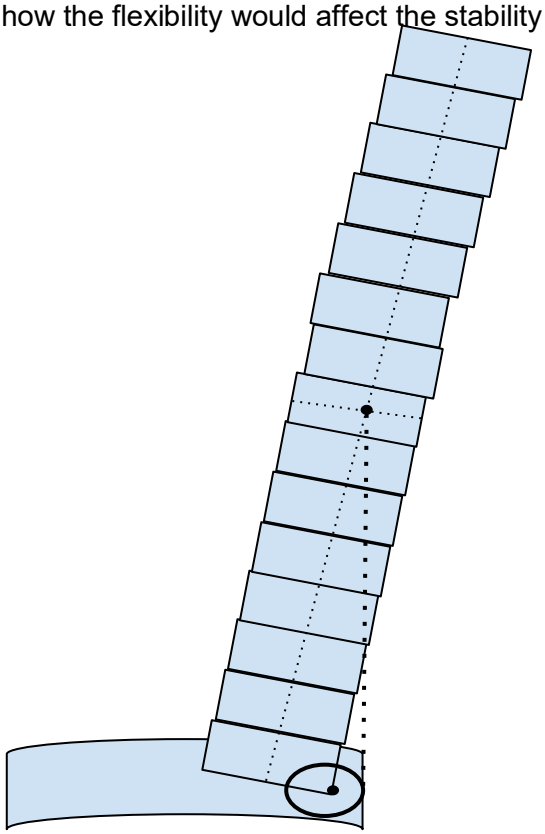
In order to approach the foundation scoring elements, we figured that it would be important to first learn the different patterns found when stacking. Knowing that we would eventually be dragging the foundation, we wanted to learn how to make the stack as stable as possible. During this practice, we set up a couple of different experiments to see how resilient the towers were. We took videos of each trial and recorded the data in a table. We placed the blocks in different places every time and we got some interesting results.

At first, we wanted to see how high the blocks could be stacked without tipping over on its own. We placed them close to the edge of the foundation and the stack fell at 15 blocks.

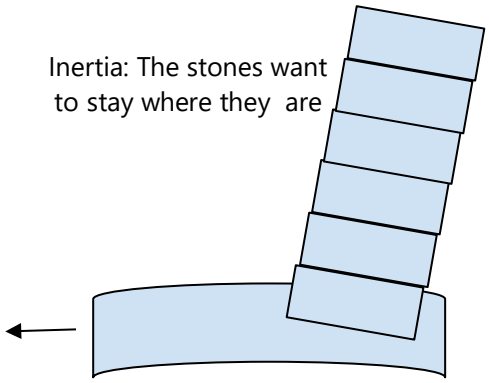
After doing this again, we got the same number and realized that the stack had fallen over in the same direction both times. We then tested stacking on the other side of the foundation.

What we found was that the stack fell over in the direction it was away from the foundation center. To further test this theory, we placed the stack in the center. What we found was that the stack had gone to its highest yet; we were able to place a total of 18 stones.

We hypothesized that this was due to the foundation's flexibility and the weight of the stack. This is a diagram of how the flexibility would affect the stability of the stack:



Due to the flexibility, the blocks are put at an angle. This causes the center of gravity to go over the tipping point much earlier than if the stack was in the middle. This is important because while dragging the foundation, the inertia of the blocks will naturally make them tip.



Placing the stack in the middle will make the stones more stable and will decrease the likelihood that it falls over.

In order to test this, we set up the stack on the edge again, but this time we had a “counterbalance” of two blocks on the other side.

This in fact did prove our theory and the stack went up higher to 16 blocks. When adding more weight to the counterbalance (2 more blocks), the stack went even higher to a whopping 19 stones.

We thought that placing a “shield” in front of the stack might also increase the stability of the stones. We placed <u>two blocks</u> in front of a larger stack in order to test this.

What we found was the the “shield” did not in fact help the blocks stack higher. We were only able to place 13 block before the stack gave out. this was two blocks less that of the original test. This further supported our theory that the distribution of weight factored in with the flexibility of the foundation resulting in smaller stacks.

Overall, we found that the positioning of our stack did have an effect on the stability. While this was true, the difference was only seen in stacks far exceeding what we expect to make during tele-op.