

Squash Ball Launcher Project

Balls In Holes (Group J)

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Introduction

Our group have been given a task to create a device that will then launch and retrieve a squash ball. The group have come up with ideas that will be explained in this poster and will help the reader understand the goals that this group is trying to achieve.

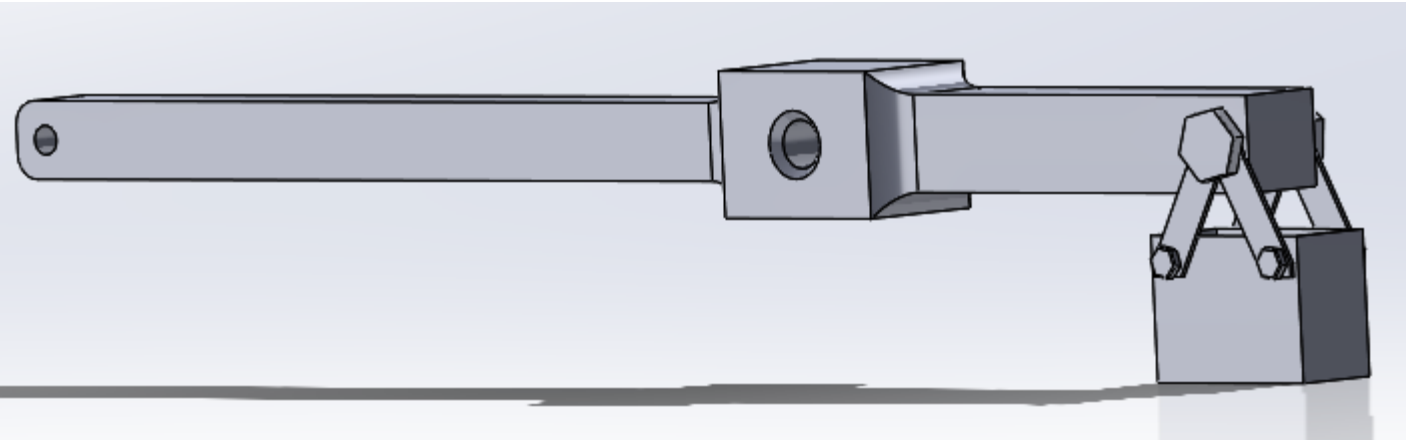


Figure 1

Projectile Launch

The projectile launch is one of the most important parts of the trebuchet because there are many different factors such as length, weight, material, etc.

In our final design we will use a whipper trebuchet to insure greater distance. A whipper trebuchet is a slightly different design where the launch position is different the longer arm has almost rotated another 180 degrees. this will raise the counter weight above the main axle thus increasing the gravitational potential energy.

Line Management

As line management we believe there is no better solution than a 'thick spool' fishing reel:

- The line flows out freely
- Able to adjust the speed of retrieve
- Able to use different strength fishing line

One of the key benefits of a fishing reel will be the little clip that allows us to set a distance for the squash ball to travel.



Figure 2 (Vastavalo.net, 2020)

Base design

The base the trebuchet is very simplistic because it only has to function as a holder for the swing arm and axel. The base is wide to stabilise the swing arm when the counterweight is movements. The action on a trebuchet is often very violent which in previous design has led to their destruction. The base also gives ample room for the guidance and trigger mechanisms to be attracted including the line management system. Holes have also been made so that the aiming system can be attached which would change the trajectory of the projectiles for us to aim it into the marked holes.

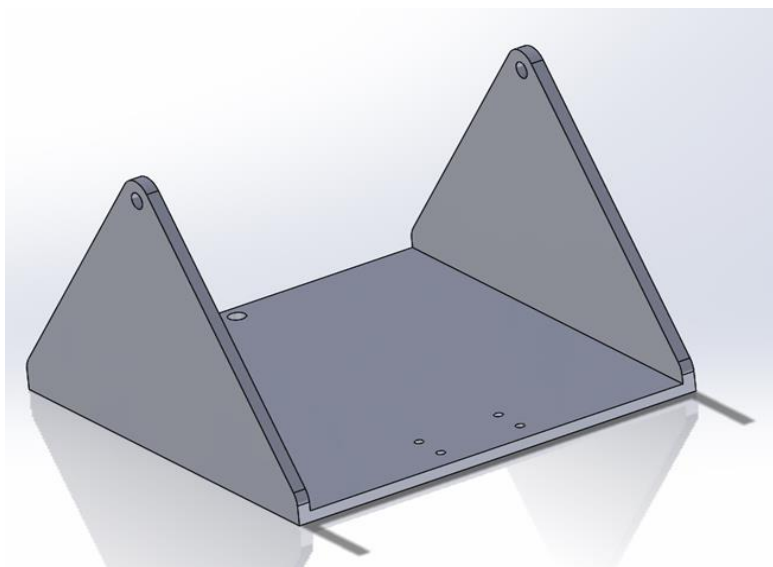


Figure 3

The axel points are exactly 300mm from the base, this allows the swing arm to be the maximum size but within the design restrictions. The base also includes the anchor point in which the design must sit. We aim to use the anchor point to stabilise but also pivot the design from.

As a team we have never built or designed trebuchets much of our design concepts and cad drawing do not include feature that we may later add. For example, we have already modified our base design changing the anchor point and reducing its width dimensions. Modification are made only to improve accuracy and reliability of the design.

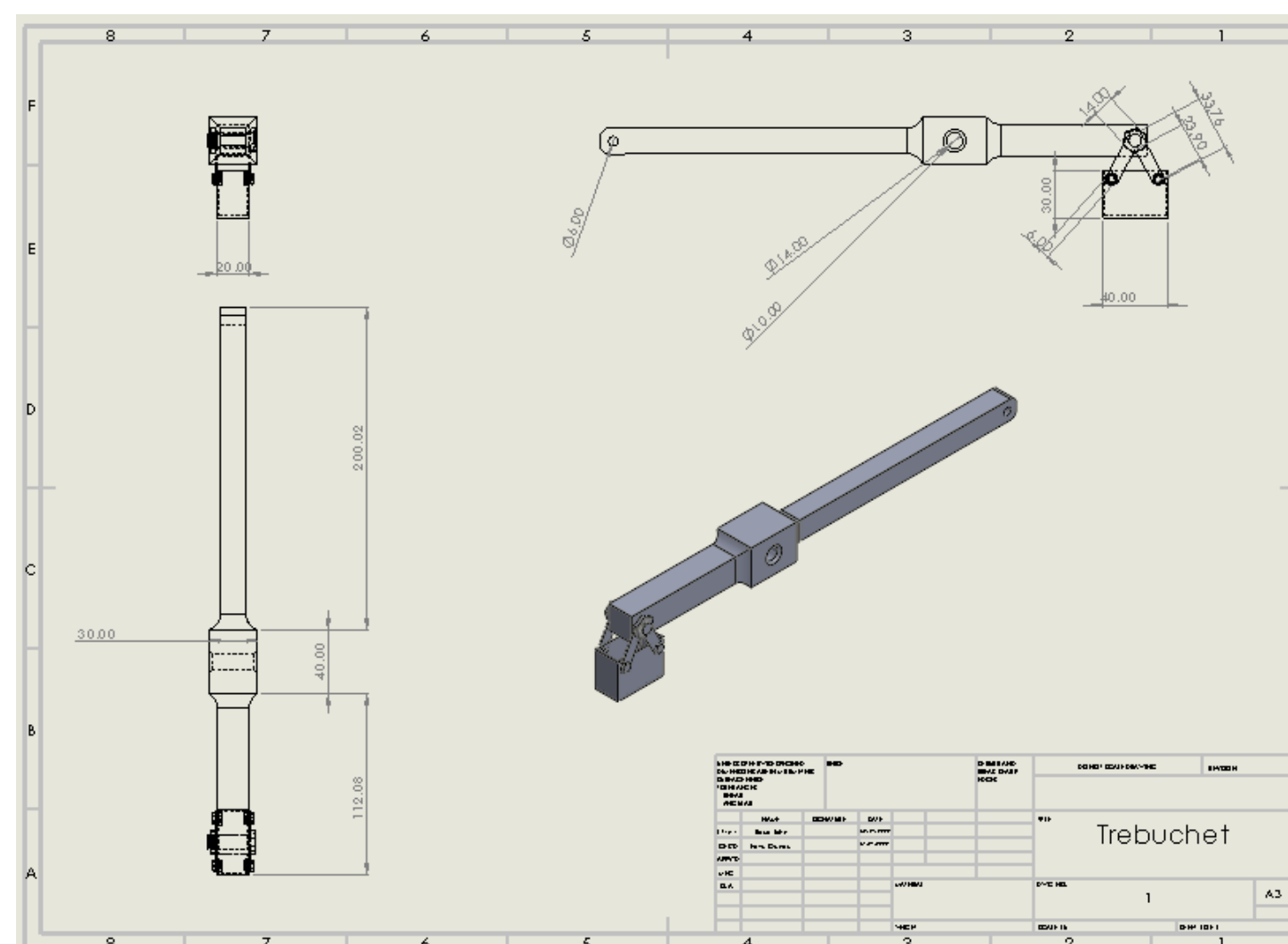


Figure 4

Mounting System

The mounting system is a very simple thing to design however the group attempted to design something more complex, something that could be more than just a mounting system and help with the aim adjustment or some other attribute.

The mounting system for the concept that we have thought of is a simple and effective one. It uses adjustable stands to level itself with the component above. Inspiration was taken from the stand from a war rifle.



Figure 5



Figure 6

The rifle has a dual leg stand which gives the gun great balance and we think this is an ideal solution for a mounting system. Inspiration was also taken from a go kart seat strut. This gives the mounting system the ability to lower or extend the leg stands meaning it will be able to attach to the component above better. For stability, research shows that having the legs at an angle will produce better stability than having the legs straight. Items like a tripod will support this argument as they are used by 100s of photographers over the world. Having a material that is rubberised and grippy will aid the stability of the entire component.

Team Members and Positions

The positions available in this project are Mounting System and System Integration which will be done by Sam Johns, Power generation and storage system will be by Timothy Lee, Trigger release and safety system will be done by Bilal Mohamed. Timothy Lee will also be designing an Aiming and Range Adjustment system leaving Lloyd John to do launch and line management.

References

Vastavalo.net. (2020). Kuva: Virveli ja joki - virveli kalastus vapa siima harrastus kes viehekalastus - Kuvapankki - Kuvatoimisto Vastavalo.net. [online] Available at: <https://www.vastavalo.net/virveli-kalastus-vapa-siima-virveli-ja-joki-431625.html> [Accessed 24 Feb. 2020].

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