

How to manufacture a Projectile Launcher?

Milena Tomaszewska, Jason Evans, Harry Grundy, Jacob Lewis, Gwydion Clement

Kerry Tudor, Richard Morgan

School of Engineering

BEng (Hons) Engineering Portfolio



The Background

Ballistics have been a huge part of an engineering world for decades. From the earliest developed golf balls, to gun bullets and missiles. All involving a mechanism of using pressure to project an object over a distance.



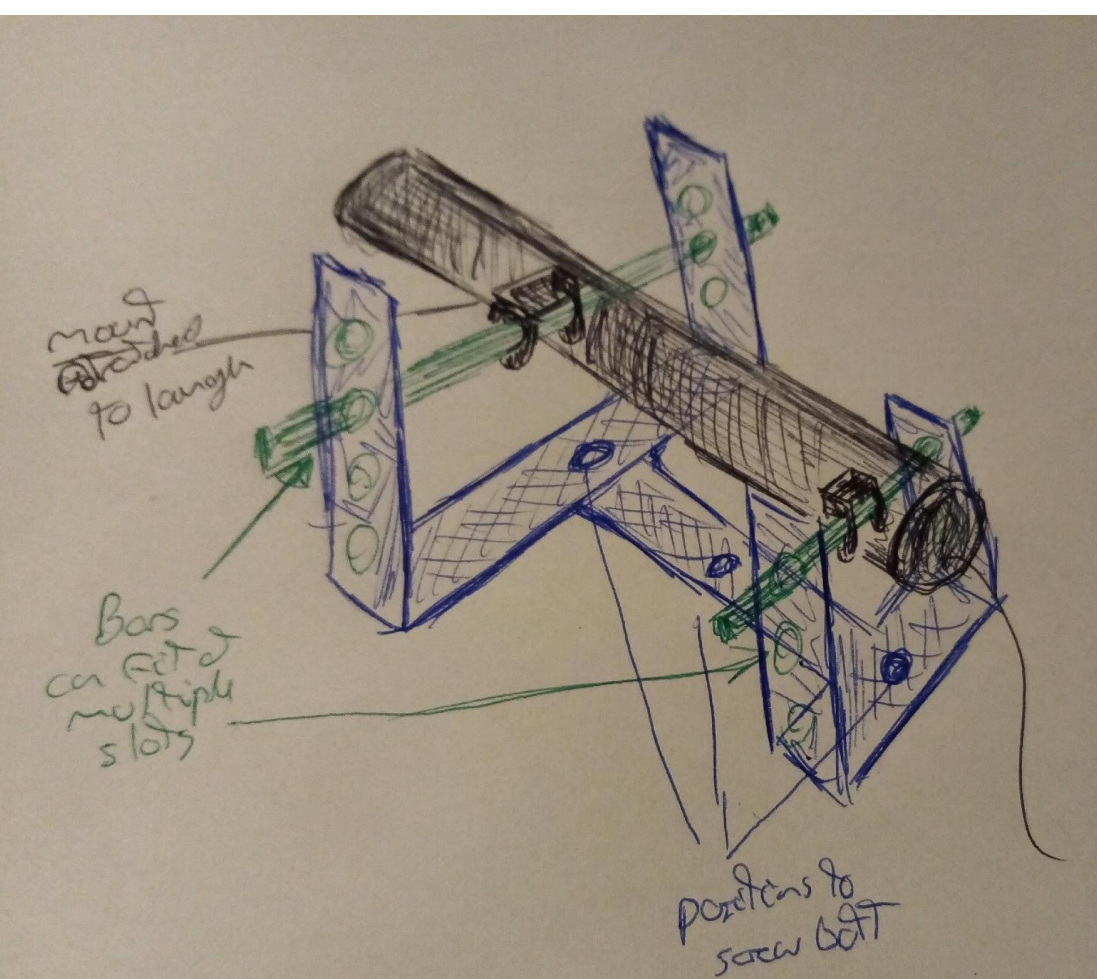
An example of a ballistic device from the FANDOM, *Ballistics Manipulation*, https://powerlisting.fandom.com/wiki/Ballistics_Manipulation# [Accessed: 23/02/2020]

As a group of five engineers we have designed and constructed our own ballistic device - a projectile line launcher which purpose is to launch a squash ball. Milena took care of the projectile launch. Jason worked on the Power generation, working along with Harry whose job was the energy release system. Jacob has modelled the aiming system and Gwydion has worked on the main body of the launcher - the mounting system.

The mounting system

A key design came from looking at solar power mounting. The mounting system drew heavily on its ability to support and angle the device. The key features are:

- A 10mm hole within the base for attaching the wing nut.
- Max height of 400mm on the front uprights

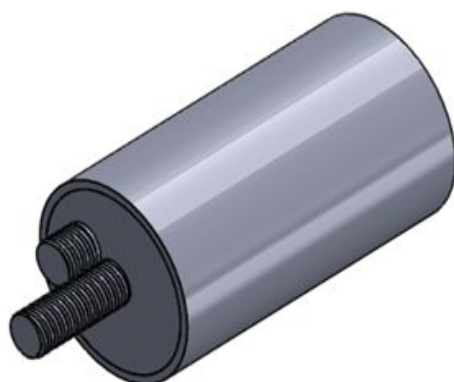


Final concept of the mounting system

Energy Release

Design consists of two switches in parallel, a large bank of batteries and an electronic car door solenoid. To fire the device:

- Prime the red safety switch to allow power to the second switch allowing the launcher to fire.
- The door solenoid is used to punch the locking plate out of its slot and releasing the tension in the spring results in the squash ball being launched.

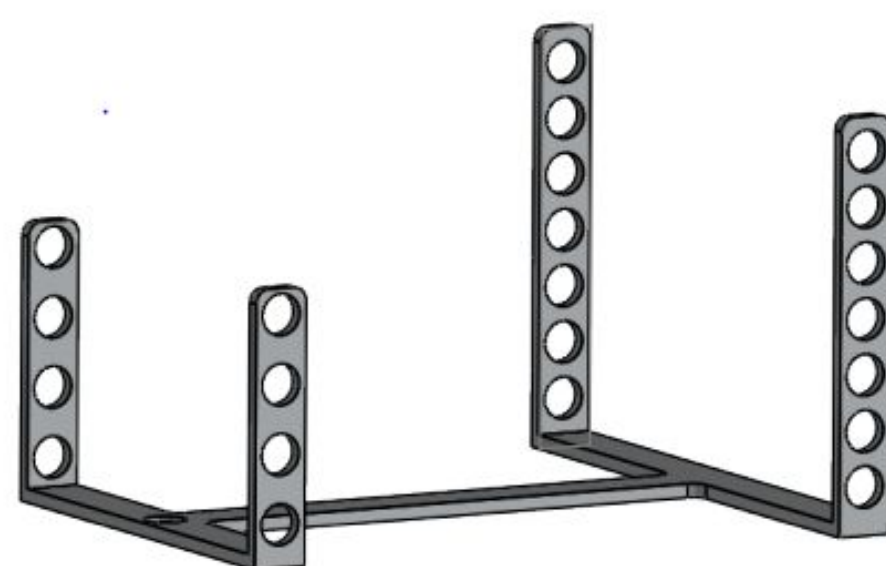


The Energy release system

Aiming System

The design used for the aiming system was to use metal bars parallel on the frame, the frame would hold the metal bars in place using holes drilled through the wood at every 3cm.

The bars would slot through the holes at whichever height is necessary for the front and back on the launcher, using the different heights for both ends would allow you to adjust the angle of the launcher.



The frame for the aiming system. The metal bars fit through the holes and adjust the launcher at a certain angle.

Projectile Launch

- The barrel is 500mm long.
- Diameter is 50mm
- The squash ball has a diameter of 40mm, which means the barrel is just wide enough to fit it and also has some space to make sure the squash ball doesn't get caught inside it when attempting to be launched.

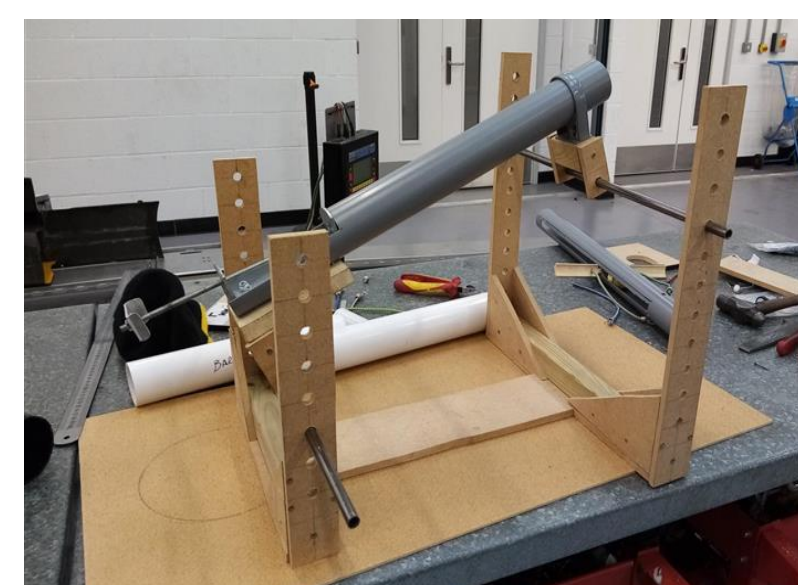


The barrel used to launch the squash ball.

Power Generation

- Springs have energy stored in them once compressed and all they need is to be released from their compressed state to release their energy.
- The length of time this can be used for is not determined by any sort of fuel, which means it won't need to be refilled to work again.
- The springs are adaptable so, more springs can be added to increase distance.
- The springs 2x 15mm diameter approximately 100mm in length each.

The final launcher



The final launcher constructed in the workshop

References

Projectile Motion - real-life Applications , Science Clarified
<http://www.scienceclarified.com/everyday/Real-Life-Chemistry-Vol-3-Physics-Vol-1/Projectile-Motion-Real-life-applications.html> [Accessed: 18/02/2020]