Design Graphics Team Project
Fall 2020

Reverse Engineering a Toy Nerf Gun

Nerf Rebelle

Audrey Pick - *Team Leader*
17295
(audreygpick@gmail.com)

Owen Mann
17350
(owen.mann@utexas.edu)

Keri Christian
17350
(keri.em.christian@gmail.com)

Justin Campbell
17350
(campbelljustin989@gmail.com)

Brenna Hurley
17295
(hurleybren@gmail.com)

Lab Instructor: Mark Chiarello

Project Proposal

For our project we will be reverse engineering a toy Nerf gun (*See Figure 1*). The specific Nerf gun we will be taking apart to redesign is called the “Nerf N-Strike Elite Jolt Blaster”. It is a smaller nerf gun that can only shoot 1 bullet at a time and the gun needs to be primed by pulling down on the attachment before pulling the trigger to fire the gun.

Customer Perspective

A customer looking for a toy Nerf gun would mainly be looking at the object from the perspective of how they can play with it. The main customer demographic would be small children, and they will care about the overall look of the gun and will want it to look cool. The customer will be concerned with how far the gun shoots the bullets. They will want to know how the gun actually works including how many bullets it holds and if it uses a specific type of bullet or shooting mechanism to know how to use the gun when playing (disc or bullet, barrel or no barrel). They will care whether the toy gun’s bullets would hurt someone would be a factor in considering buying this toy.

Engineers perspective

Engineers will be concerned about the material makeup of the toy nerf gun in order to make it lightweight and also accomplish its function of shooting nerf bullets. It should also be a durable material as it is intended to be played with. As the nerf gun is intended to be used by children, it is important for the engineer to consider safety when designing the mechanism used for shooting. The speed of the bullet and shape of the bullet should not lead to physical harm.
An engineer should consider the size of the nerf gun as it should be portable but also big enough to contain the components needed to launch the bullets. It should also be balanced as

to ensure a comfortable grip by the customer. The engineer should be aware of what kind of shooting mechanism they want to employ to optimize the parameters for their specific kind of shooting mechanism. This will determine how the gun shoots, how many bullets it can take, and the way it will convert potential energy into kinetic energy.

Engineering Specifications List

- Testing for optimal shooting velocity and distance the bullet can travel (3-10 meters and 15-25 meters/second)
- Durability of nerf gun (meant to last a long time, about 1 to 5 years)
- Dimensions and of overall gun (2 x 12 x 12 cm - 3 x 13 x 13 cm)
- Low force of the bullet for safety (0.5-2 Newtons)
- Total weight of the gun (80-90 g)

Graphical Picture

Figure 1 The Nerf N-Strike Elite Jolt Blaster placed next to the foam nerf bullets. This gun can be purchased at https://www.amazon.com/Nerf-N-Strike-Elite-Jolt-Blaster/dp/B01HEQHXE8/ref=sr_1_41?dchild=1&keywords=nerf+gun&qid=1599087057&sr=8-41 in order to reverse engineer it. It is a smaller nerf gun that is reloaded manually and looks to use a hand pump spring mechanism for firing bullets.