Supportive Safety Stirrups
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Aim of the Project

The main aim of this project is to design supportive safety stirrups for the equine industry and test them to the maximum ability. While also having a modern design.

Background

Figure 1: Traditional stirrups on a saddle

Stirrups are hung from a saddle using a piece of leather. Stirrups come in a range of shapes, sizes and colours. The main objective of stirrups is to make it easier to ride a horse. Stirrups support the riders feet and also support all their weight.

There is major importance on safety when it comes to stirrups as horse riding is an extremely dangerous sport where a safety stirrup could save someone's life.

Materials

Stirrups can be made from various types of material such as metals, plastics and wood.

Originally stirrups were made of steel. Then there was the addition of a rubber pad to add gripping texture to the stirrup.

There was also a need for grips on the rubber as when it got wet or muddy it would be hard to keep your foot in place.

Figure 2: stirrups with rubber grips

The stirrups which I designed are made from aluminium, cast iron, Neoprene and plain carbon steel. These materials worked out the best for the design.

Design

There are many design considerations including yield strength, mass, malleability, durability, shock absorbing and safety.

The stirrups are going to be designed on SolidWorks software. Using the features on SolidWorks it will be tested and a Failure Mode and Effects Analysis (FMEA) will be completed

Features

<u>Magnetic and Shock Absorbing systems</u>

The magnetic system keeps the foot safely attached to the stirrups and aids the ability to stay in control even in hectic situations.

Alongside having a magnetic system, the stirrups have a safety release system in the case of an accident.

Figure 3: Magnetic stirrups

The shock absorbing stirrups use elastomer shock absorbers with a wide footbed, which cushions the shock-waves from the horse's movement.

This helps the rider's stability and reduces the stress being placed on joints.

Figure 4: Shock absorbing stirrups

Conclusion

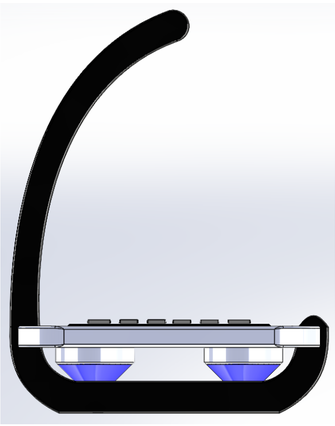

Figure 5: Finalized supportive safety stirrup

This design is supportive and safe whilst also having a keeping to modern design.

The design incorporates a magnetic foot sole, a wide footbed with grips, an open safety release, two shock absorbers and a parallel stirrup leather attachment.

References

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