

Soccer With Shapes

M7-20

M7-15

Picture



Question

Testable Question- What effect will the shape of the soccer shoe have on the soccer ball when kicked.

Rationale

Rationale- The reason we chose this topic is so we could help soccer players choose the best shoes so they can get their best kick. Also this can help shoe designers perfect their shoe design. This will make players buy their shoes over other brands.

Soccer with Shapes

M7-20 Milwee middle, Orlando Florida

Our experiment was testing what shapes would kick a soccer ball the farthest on the end of a hammer. The hammer would fall and hit the ball with different shapes on the end to simulate a kick from a person. This would show what shapes of shoes would be the best for playing soccer for maximum kicking potential. We used a rounded end, a flat end, and a pointed end to the hammer as our testing variables. Our hypothesis was that the round end would make the ball go fastest, but it was incorrect because the flat end made it go the fastest, leaving the pointed end with the slowest times. We said that the round end would go the best because it would have a lot of surface area but not so much that not all the energy can hit the ball at once. We were partially right in that surface area is what we needed for the fastest times, but we needed as much as possible because the flat surface had the best times, a.k.a, the one with the most surface area. We concluded that the more surface area the better because the point had the longest times, and would be longer depending if the point hit the center of the ball perfectly, and even if it did it was still slower than the other two ends to the hammer.

Hypothesis

Hypothesis- If we change the shape of the soccer shoe, then a round pointed shoe will kick the ball the furthest because, it gets a lot of contact with the ball but also maximum pressure.

Materials

- Sledge hammer
- Rope
- Some 2 by 4s
- A size 5 soccer ball
- Different shapes of rubber
- A pair of cleats
- A measuring tape

Procedures

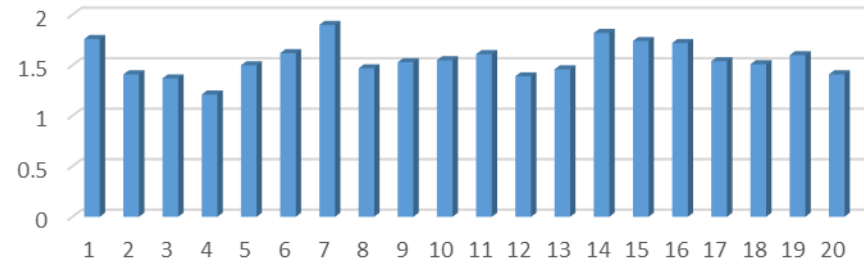
- First we will glue the rubber shape to the end of a cleat.
- Next we will attach this to the sledge hammer.
- Then we will place the ball on a set spot and lift up the hammer with shoe on it.
- Next we will drop the shoe and measure how far it goes x20.
- Now we will change the shape of the rubber and repeat for each shape x20.
- Finally we will record all of the data and figure out which one is the most effective

Variables

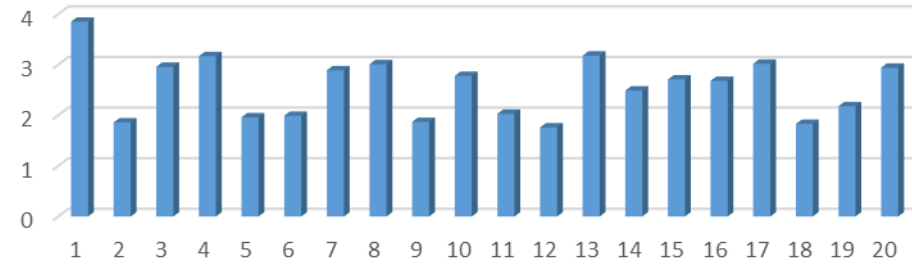
- Our independent variable is the shape of the soccer shoe because that is the thing that is changed throughout the experiment. Our dependent variable is the distance the soccer ball travels because this is what will be affected when we change the independent variable. Finally our constants are the air pressure in the ball, if this is changed then the whole outcome of the experiment will be affected. Also how hard the ball is kicked, if this is changed you can't have a controlled experiment. Finally the size of the ball, this is because the size affects the mass, which then makes the ball travel different distances with the same independent variable.

Graphs

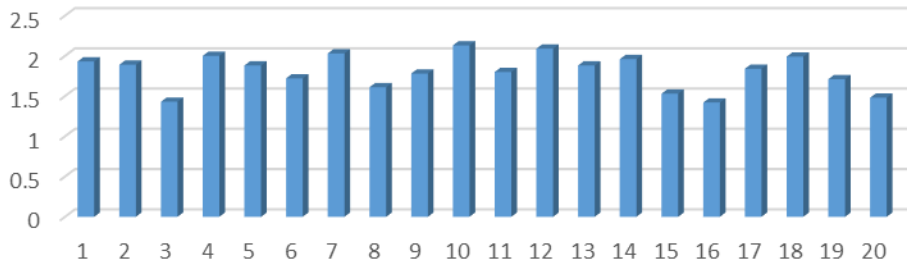
Flat Surface



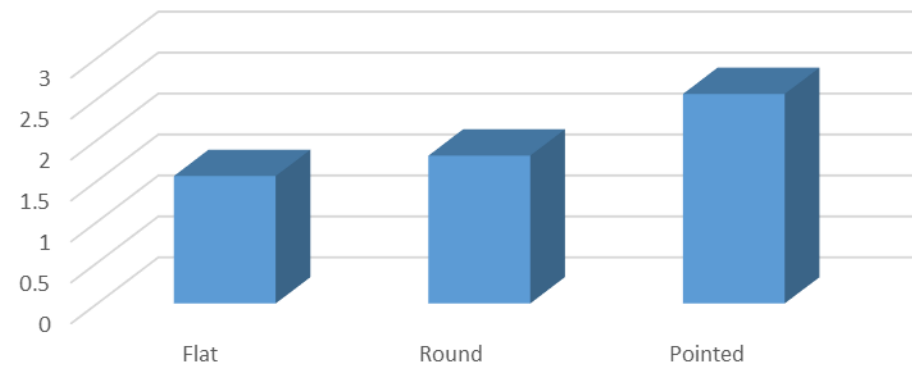
Pointed Surface



Rounded Surface



Surface type



Results

We figured out that the pointed tip had the fastest times, with the rounded in second and the flat in last. Though if the pointed end didn't hit the ball straight in the center it wasn't the fastest it could be, but even then it was slower than the other two hammer ends.

Conclusion

Our hypothesis was incorrect because the rounded surface didn't have the fastest times, but we weren't completely wrong because we said that the more surface area the better but not too much, but that was wrong because the one with the most surface area was the fastest.

Citations

- <http://www.mathematicshed.com/uploads/1/2/5/7/12572836/physicsofkickingsoccerball.pdf>
- <http://www.ipl.org/div/farq/soccerFARQ.html>
- <http://sporteology.com/interesting-facts-soccer-cleats/>
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