



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Brady Elliott	Project Number J2005
Project Title Fire in Your Sole: Reducing the Thermal Conductivity Found from Outdoor Sports Surfaces	
<p style="text-align: center;">Abstract</p> <p>Objectives Since I have been playing competitive soccer I wanted to find a cure to the constant injuries presented by the heat on artificial turf. The goals of my project were not to fix the astroturf itself, but it was to fix what goes inside of your cleat. After doing numerous tests to see which product is the most effective, I found that the manufactured products worked the best. Later I sent these results to the owner of Blusol and he will be using my data on the patent of Blusol.</p> <p>Methods To complete my project, I used placed a bag of sand (since sand acts as the turf heating up) in a crockpot and gradually heated up the sand to 170 degrees Fahrenheit with the cleat with the insole inside of it. Next, I graphed the temperature of the sand and the temperature inside of the cleat to see which product had the most effective against the conduction presented by outdoor sports surfaces.</p> <p>Results After testing and graphing the thermal conductivity found between a cleat and a surface, I have found that the more reflective insoles are ineffective, whereas the more insulated inserts have shown the best results. In addition, the control and the engine shield had vastly different outcomes. For example, the control kept the cleat cool by 40 degrees, while the engine shield saved the cleat by 59 degrees. Also, there were two distinct groups shown on the graph due to the fact that the control, Mylar Blanket, and aluminium foil had the worst end results. Whereas, the Cleat Shield, Blusol inserts, and engine shield had the most beneficial results regarding the protection upon thermal conductivity. As we can see, the more insulated inserts have shown the best results and the more reflective inserts have had the worst outcomes, creating two distinct groups of thermal protection.</p> <p>Conclusions The three best inserts where the Blusol, Cleat Shield, and Engine Shield inserts; whereas the three ineffective inserts were the manufactured inserts or control, aluminium foil, and the mylar space blankets. This shows that the more reflective products have the worst results as the more insulated products had the best results. After performing numerous tests on the effectiveness of 5 different products have received many great opportunities. For example, I got the chance to sit down with the owner of Blusol and reflect on the data. In result, My name will be included in the patent of Blusol Heatshields.</p>	
Summary Statement To solve the problem of the extreme thermal conduction found on artificial turf, and I wanted to test which shoe insole would be the most effective in solving this problem.	
Help Received I have gotten the opportunity to work with the owner of Blusol since we reflected on my data throughout the process.	