



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Cornelius Harmon	Project Number J2009
Project Title Oil in a Day's Work: The Power of Pistons in Heat and Lubricity	
<p style="text-align: center;">Abstract</p> <p>Objectives The objective of this study is to measure the efficacy of various 10w30 motor oils to reduce heat caused by friction. Using a wooden test stand, aluminum cans, electric motor, pistons, eye dropper, and temperature probes. Tests were performed to measure the ability of various motor oils to lubricate and cool an engine during metal interactions over a 10 minute period. A controlled volume of various brands of motor oils was placed in aluminum cans. The temperature increase of the aluminum cans, when exposed to heat, was recorded at multiple intervals. Repeated trials were run to calculate an average temperature increase. The difference between Castrol oil and the other motor oil temperatures were statistically significant. To within the accuracy of the measurements, the presence of Castor motor oil significantly reduced friction to lubricate and cool the engine. However, the difference between the other brands of motor oils was not statistically significant. As measured by the ability to control heat, I found that there is a significant difference between generic and the Castrol brand motor oil. This experiment continues my broader study of minimizing energy loss in internal combustion engines.</p> <p>Methods A test stand that was required for this experiment. A test stand was created to decrease the variability within the test. Each of the four cylinders was filled with its designated oil. Each cylinder was also outfitted with a digital temperature probe. This engine, however was not constructed like an ordinary one. The crankshaft and piston assembly were above the block because each cylinder needs to contain different oil types and they need to be isolated from each other. In addition, the engine block was made from material that does not transfer heat well, an isolator. Wood, an insulator, was chosen for the material to build the engine block.</p> <p>Results 1) Wooden test stand (4) 2 diameter aluminum cans (4) 6 x 8 aluminum sheet (1) Electric motor (drill) (4) Pistons (1) Timer (4) Temperature probes (1) Quart of Mobil One motor oil (1) Quart of Pennzoil motor oil</p>	
Summary Statement The objective of this study is to measure the efficacy of various 10w30 motor oils to reduce heat caused by friction.	
Help Received I would like to acknowledge my dad for his assistance with constructing the test stand.	