CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0130

Project Title
Do Particulates or Liquid Contaminants Affect Oil Viscosity When Heated?

Abstract

Objectives/Goals
The goal of my project was to discover if there was a substance that could be added to oil to enhance the viscosity, and what affects the contaminants had on the oil.

Methods/Materials
To determine this I performed two experiments. The first experiment I performed using a viscometer cup. I poured 60 milliliters of oil that was heated to 212ºF into this cup that has a small hole on the bottom and timed how long it took for the oil's flow to stop. This was done a total of 40 times with 6 different contaminants for each test, and also a controlled test. My second experiment consisted of meter tubing and a ball bearing. I used 7 separate lengths of meter tubing. I pushed a ball bearing into one end of the tubing. I used a turkey baster to squirt 70 milliliters of 212ºF contaminated oil into the meter tubing. Then I dropped a small ball bearing in the tubing and put a cork into it making sure no air was trapped. I flipped the tubing that was attached to a meter stick 180º and timed how long it took for the ball bearing to fall to the other end. I also conducted this experiment 40 times with the same 6 different contaminants as the first experiment and one control test.

Results
I hypothesized that the liquid contaminants would affect the oil's viscosity the most but this proved to be incorrect. I found that the granular substances changed the viscosity the most. The sand affected the oil the most. Following the sand was the oil and sugar. Then came the control test. Following that was the first liquid contaminant, water. After the water was the salt, the last of the granular contaminants. Second to the last was the oil and brake fluid mixture. The contaminant to have the least time was the oil and antifreeze mixture.

The results concluding my second experiment were that the salt had the greatest affect on the oil. The oil and sand mixture was the contaminant to have the second highest time. Third was the control test. Preceding the control test was the oil and sugar. The brake fluid was the first of the liquids to have the highest time. Followed by the antifreeze. Lastly was the water contaminated oil having the least time.

Conclusions/Discussion
To conclude this experiment I found that there is no "safe" contaminant to mix with oil. As shown in my experimentation none had the same consistency as the 30 wt. Oil.

Summary Statement
Determining whether liquids vs. granular substances when contaminating oil have any affect on oil's viscosity when heated.

Help Received
Mother helped edit papers.