**Problem Statement**

We set out to design an easier method of draining a car’s motor oil. In doing this we hoped to encourage more people to drain their own oil instead of having somebody else do it for them, or having to pay an auto mechanic to perform the task.

**Abstract**

We began the process of designing a new motor oil drainage system by drawing out some possible designs of our product, researching relevant patents and existing products of various automobiles, choosing a Benchmark product, and putting together our initial Product Design Specification (PDS). Our design process involved much iteration on the actual product design, and research on parts that applied to each new design. Once our product design was finalized and a prototype was built we began testing using the knowledge we gathered from our data analysis of what the new oil valve would have to withstand.

**Benchmark**

**Automobile:** 1984 Cadillac Seville  
**Parts Used:** Oil pan and plug

**Automobile Specifications:**  
YEAR MODEL CYL CID  
1982-85 SEVILLE V8 250 LTR VIN Dr. Plug # Gasket # 4.1 8 1003 2403  
**NOTES**  
Plug: M12 x 1.75  
Hex Size: 15  
Thread length: 25

**Required Specifications**

- Ability to drain motor oil without motorist having to go underneath their automobile.
- Product must be easy to attach to existing oil pan.
- Valve should be electronically activated by a switch.
- Valve must completely seal in the closed position.
- Product has to be able to withstand the conditions a car undergoes.
- Product must be able to withstand a specified temperature and pressure range.

**Testing**

**Prototype Results:**  
Water Flow Rate: 9.42 mL/s  
Oil Flow Rate: 0.651 mL/s

**Water Weight Test:**  
Filled the oil pan with 9 quarts (8.514 L) of water exerting a force of 0.0124 lbs (0.0552N) on the gate. The valve was still able to open, close, and seal properly.

**Solenoid Valve Weight Test:**  
Loaded the solenoid valve with 4x its weight. The solenoid still remained fully secure and operational with no leaks.

**Market**

Our survey results show that our product could be marketed to both individual motorists and car manufacturers with an emphasis more towards car manufactures due to the needed product installation.

**Conclusion**

With our prototype, we have designed and built a product that eliminates much of the hassle involved with draining and changing an automobile’s oil. This would encourage people to perform the task on their own instead of being forced to pay thirty or more dollars for the service of an auto mechanic.

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For Complete Reference List see Accompanying Project Portfolio.