

November 2013



UNIVERSITY OF MICHIGAN
SUPERMILEAGE

Editor: Agney Deshpande

Happy

Thanksgiving!

Subteam Updates: Engine Team

Engine Team has been working hard towards our goal of achieving 3,300 miles per gallon. Starting from the stock Briggs & Stratton lawnmower engine, the team has been making great headway towards having a competition-ready engine. The team has already altered the cylinder sleeve and is working on converting our electronic fuel injection system. Plans for modifications going forward include building a

reversed camshaft (for reductions in friction and height), altering the crank position trigger, and a rear chassis assembly, which will help with alignment and flexibility.

A big change for the team this year is the new OpenECU generously provided by Pi Innovo which brings some big benefits to the team. Using this ECU, as well as other Pi Innovo software such as the PiSnoop program, the team can reprogram and monitor

the ECU and monitor sensor values in real time. Engine Team has learned a lot coming off last year and has planned some changes for successful competitions this year. Reliability being the top priority, the team will begin testing early to work out problems. A safety strategy is also being developed with plans to make a back-up engine competition ready.

Sponsor Highlight: Ford



Ford is one of the largest auto manufacturers in the world. The car company founded in 1903 has helped to change the face of manufacturing. Ford utilized a technique that would allow for more affordable middle class cars, and has continued to drive innovation. A big way that Ford continues this

innovation today is through the Ford Blue Oval Scholars program.

The Ford Blue Oval Scholars program has a commitment to education. In 2012 alone, The Ford Motor Company Fund distributed over one million dollars in scholarships to students. Through their dedication and generosity, the company has helped

students and student organizations grow and develop while also helping build a more sustainable community.

Supermileage was awarded a grant through the Vehicle Challenge subsection of the program.

Ford is helping us to Go Further with our gallon!

The Engine



This year, we are making an effort to increase the diffusion of information throughout our team. We hope to foster a more relaxed transition process when we lose our awesome seniors next year. To that end, Supermileage presents a simple explanation of one of our most complicated parts.

We use a heavily (or should we say light?) modified Briggs & Stratton lawnmower engine in both of our yearly competitions based on the SAE Supermileage guidelines. We start out with a 3.5

horsepower, spark-ignited model that our Engine Team transforms into a lean-running, fuel injected, electric start engine. Along the way, we lose most of the horsepower, but gain significant mileage. With hard work and a lot of time, we turn our engine into a low output, high efficiency power train.



Some of the ways we modify the engine:

Tighten the Cylinder sleeve

The cylinder, the casing for the piston, is where combustion occurs. We have a single cylinder, 4 stroke engine. Tightening the sleeve reduces the amount of fuel needed by decreasing displacement.

Convert the Flathead system to an Overhead system.

This is in regards to the valve placement. An overhead system is more common in modern cars. This effectively increases our compression ratio by decreasing our clearance volume.

A high compression ratio is important to us, because we can get more work out of our engine from each stroke. With a higher compression ratio we get the same amount of work with less fuel.

Change carburetor to electronic fuel injection (EFI)

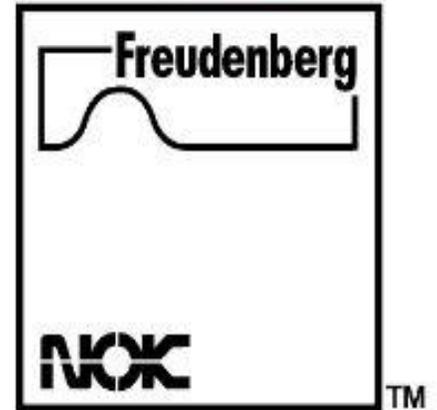
By converting to EFI, we maintain better control of our fuel input to the engine throughout the race. The spark timing and injection quantity are completely programmable and customizable using openECU software from Pi Inno.



Michigan



Pi Innovo



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