
Neuqua Valley High School

Super Mileage Club



Sponsor:

Mr. Derek Kaminski

Team Members:

Jackson Benco*

Tom Benjamin *

Chris Bockrath

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Ricky Mitacek

Nathan Reeverts*

Dustin Runge

Brent Russell

Nathan Schaefer*

Phil Thekel

*These participants have been selected to receive the certificates should our team receive an award.

Safety Items:

The vehicle will be designed with two safety turn off switches. One will be on the steering wheel for easy access of the driver. The other will be located on the right side of the vehicle by the vertical support of the roll bar. A fire extinguisher will be located on the floor pan by the driver's right thigh. For driver safety the vehicle is equipped with a three point automotive safety belt.

The roll bar is integrated with the rest of the vehicle frame. It extends 8 inches above the driver's helmet and completely surrounds the driver. This will give the driver complete protection in the event of a roll-over.

Steering:

The steering system is a fourteen inch rack-n-pinion steering unit that has a four inch throw with one and half turns. We purchased this from Desert Cart Racing. The steering shaft is connected to the rack and suspended from a down tube that is connected to the frame.

Basic Vehicle Configuration:

The vehicle consists of a 3-wheel chassis with the drive wheel in the rear. The independent front suspension was designed around four control arms scavenged from a Toyota Corolla. The rack and pinion steering was purchased from Desert Karts.com. The vehicle has an upright seating position so the driver has an easy 180 degree line of sight. The vehicle's total length is 8'10.5" and has a width of 4'10". The vehicle has 20" BMX rims and 2" wide street tires.

Power train configuration:

The vehicle has a rear mounted 6.0 horsepower Tecumseh engine with a MaxTorque clutch with 12 teeth and a 13 tooth jack shaft directing power to the rear wheel. The free wheel was purchased from Electricscooterparts.com and does not have external sprocket teeth on it. Instead, the free wheel has a flange that permits a 72 tooth sprocket with #35 chain.

Brake System:

Two linear pull V brakes are hooked up in unison on the rear wheel. The driver can activate the brakes through a foot pedal.

Problem Solving Essay:

The challenge was to build a vehicle with high gas mileage according to certain boundaries and limitations on its construction. We encountered many problems with the vehicle such as, a weakness found in the mid-section of the vehicle. We also found it to be a major issue that very few of the members had any experience welding, plasma cutting, grinding, and the use of other power tools.

The limitations on the car include having the vehicle fit inside a rectangle nine feet by five feet. Last year, this was a major issue as our choice of drivers became very limited. To prevent the problem of not having enough space for our driver, the Research and Development Team designed the vehicle by first measuring the height of the tallest person on the team. We then designed the car with enough leg and arm room for him to be able to move his arms enough to steer. We also made the vehicle so it would have enough leg room for him to get out of the car within seven seconds.

Many of the members had little or no experience in welding. As a solution to the lack of understanding welding, the Research and Development Team researched different welding techniques such as arc, Mig, stick, and Tig welding. They then relayed this information to the other group members.

One problem was the durability of the welds in the mid-section of the vehicle. This was solved with the placement of gussets. These were made of $\frac{3}{4}$ inch steel tubing and steel plating. They were then reinforced with steel plating.

We successfully accomplished our goal despite the challenges presented. We successfully kept the vehicle within the nine feet by five feet limitations while maintaining enough space for the engine and driver. We also successfully strengthened the mid section of the vehicle with gussets. Also, the Research and Development Team was able to discover ways to successfully weld and construct the vehicle. Using this problem-solving process, we successfully complete the vehicle within the limitations and specifications required.