

# SAE building supermileage car

LOUIS ROBINSON  
engineering writer

It is a car that gets insane gas mileage ranging from 200 to as high as 3000 miles per gallon. That is a super-mileage car.

The Society of Automotive Engineers (SAE) holds an international competition every year to see what school can build the best supermileage car.

Now, you're not going to see these cars driving out on the road. Schools from across the country meet in Marshall, MI, at the Eaton Proving Grounds to compare gas mileage.

What defines these cars is not only their gas mileage. Most cars are relatively small weighing in between 80-150

pounds, and they are not very big in length or width.

The SAE provides every competitor with a Briggs & Stratton single-cylinder four-cycle engine that the teams can modify however they choose.

There are really no other big regulations besides the car must have at least 3 wheels and the driver must face forwards.

The competition consists of 4 different parts. First, the car must pass the technical inspection before it can even do a run.

The technical inspection is just a test to make sure the car meets the required criteria and is safe enough to take a lap around the track.

If the team fails the inspection then

they have until the competition ends to pass it before they can take the car for a run.

After the inspection test is passed, the car can then take runs in the competition for best gas mileage. Each team gets as many runs as they can do in one day (usually up to eight) to try and get the best gas mileage.

The track is an oval track with banked turns on the ends. The car must make it around the 1.6 mile track 6 times for a run. The car must also maintain an average speed of 15 mph or it will get penalized.

Along with the runs, each team must also hand in a written design report and give an oral report. The oral report is 100 points of the competition. The written report is another 300 points.

Then the rest of the points is the best mpg number. Which ever team has the most points in the end will be crowned best supermileage car of the competition.

Colleges from all over the world take their cars into the competition to compete. So of course, Penn State Erie has an SAE club that participates yearly.

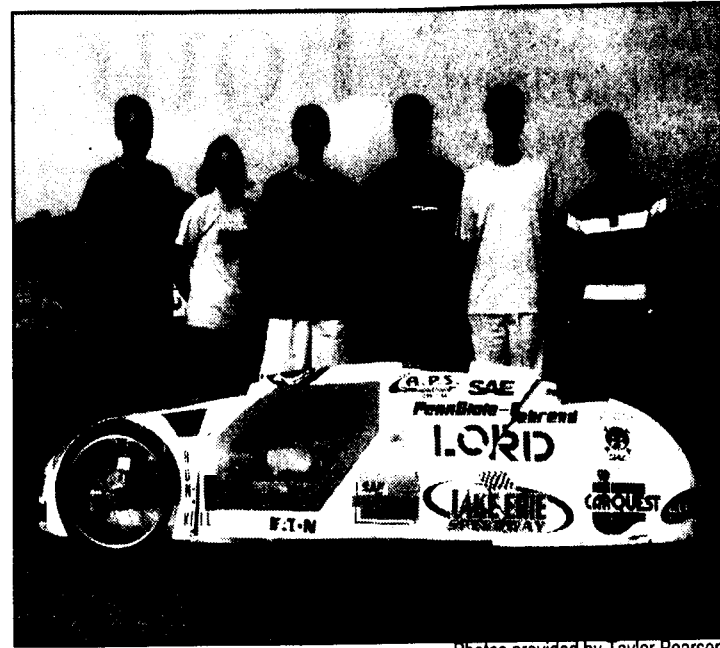
Taylor Pearson, and the secretary John Pearson earlier this week to find out what defined Behrend's car from everyone else's. "Last year was the best that Behrend has ever done, with a fuel mileage of 777mpg, breaking the old record of 630mpg."

Last year, the club tried to finish a new carbon fiber car, but they ran out of time and had to use the old car. However, after a year of designing it, they finally are progressing towards their new design.

This year their car is going to be made completely of carbon fiber with a frame made of house insulation wrapped in carbon fiber.

As opposed to their 170 pound fiber glass car they had last year, this car is going to be about 80-90 lbs.

This is going



Photos provided by Taylor Pearson

Above is last years team that went to Michigan to showcase their supermileage car.

to make a big difference in gas mileage because weight of the vehicle is a big factor in determining the gas mileage of the car.

Another change they made to improve weight is the type of starter motor and battery they are going to use.

They are switching from the 12 pound stock starter motor and lead acid battery they used last year, to a two pound model airplane motor and lithium battery for this year.

One modification they will have this year is a computer to install in the car. It is going to show the speed of the car and a u-

tomatically shut the car down when it reaches the max speed to let the car just coast until it needs more speed.

They are also programming the computer to calculate the drag force being exerted on the car so they can test how aerodynamic it is.

The computer screen is just a basic PSP screen to display the speed and other critical numbers.

The four main factors in determining the gas mileage is the weight of the vehicle, the efficiency of the engine, the rolling resistance of the tires, and the air drag force exerted.

The SAE club is working their hardest to minimize all of these and is aiming for a gas mileage of 1500, almost double of their car last year.

Taylor and John aim for the car to be up and running by December and invite anyone of any year or major to come join them every Friday night at 6:30 to contribute to the making of the car.

The SAE will be leaving for Michigan in June for the competition.

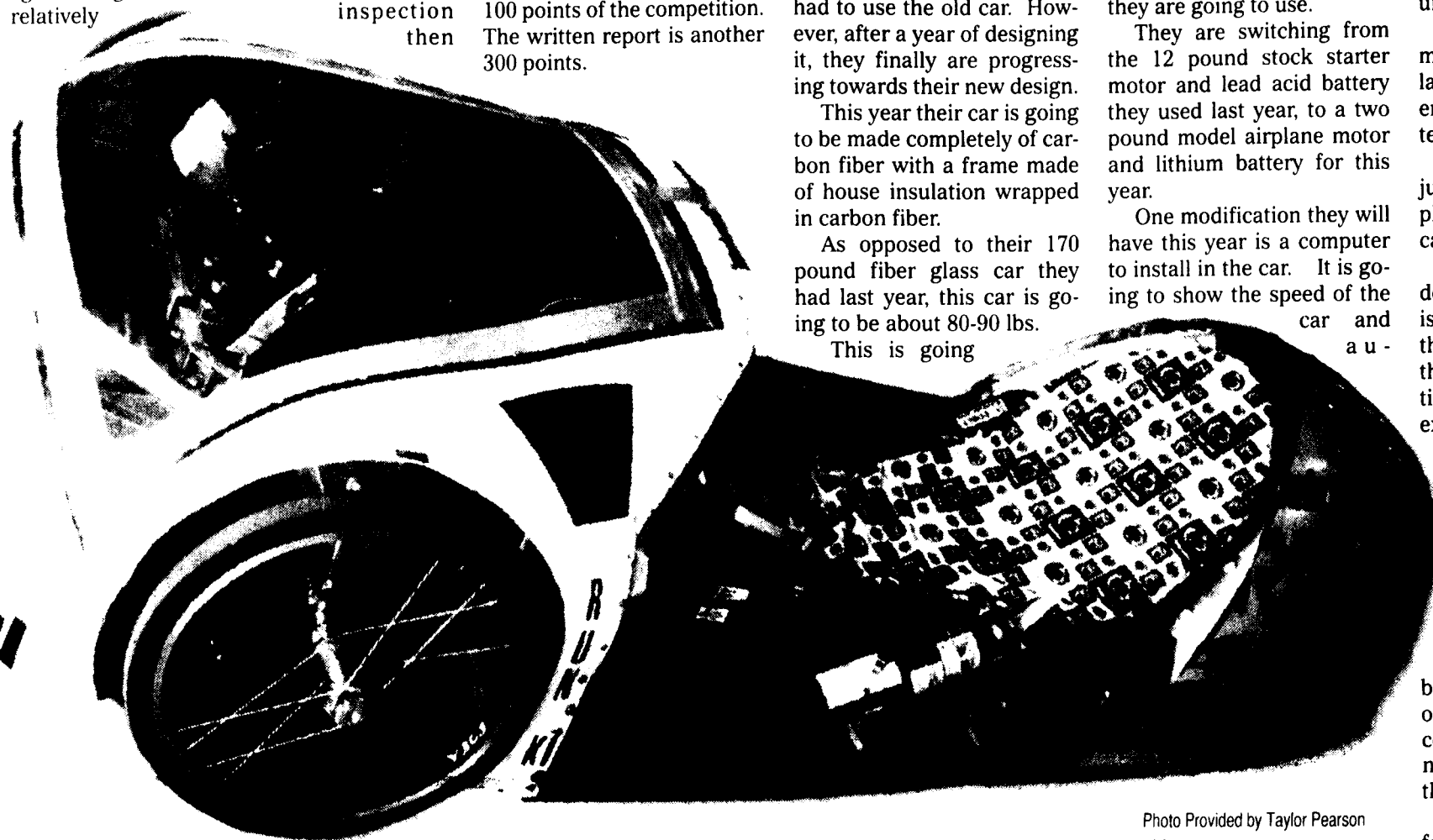


Photo Provided by Taylor Pearson

The supermileage car that the SAE made for last year's competition.

## Quote of the Week:

"Happiness does not come from doing easy work but from the afterglow of satisfaction that comes after the achievement of a difficult task that demanded our best."

Theodore Isaac Rubin

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## Artificial sniff research keen as canine

LOUIS ROBINSON  
engineering writer

Canines have one of the best senses of smell of all living creatures.

They have been used by police for years to help sniff out drugs, bombs, other people, butts and so on.

The canine nose can sniff out odors up to concentrations of parts per trillion level.

However, to train a dog to sniff out such stuff is time consuming and can be expensive. Not to mention some of the environments are too dangerous of situations to put dogs in anyway.

Have you ever wondered if humans will ever be able to smell the range of odors that canines do? Well, so did a few researchers at Penn State.

So much so, that a research development team got together to attempt to build a mechanical nose that closely resembles one of a dogs'.

Eric Patterson, a senior research associate at Penn State's applied research lab and an associate professor of mechanical engineering, decided to study the dog's sense of smell more in depth.

He looked at the fundamental fluid mechanics and odorant transport of canines that gives them this strong sense of smell.

"When a dog sniffs, odorant-laden air passes through the nasal vestibule and then through a labyrinth of exquisite complexity," said Patterson.

"This is nature's solution to packing a large surface area in a small volume-crucial for

delivering odors to millions of olfactory receptors."

Brent Craven, an ARL research associate, helped Patterson out by creating a computational fluid dynamics model based on the equations of fluid motion and high-resolution magnetic resonance imaging (MRI) of an actual dog's airway.

"One key finding," Patterson said, "was the explanation of how odors were transported to the olfactory region within the nasal cavity, the air flow over the mucous-coated receptors is remarkably smooth, which maximizes efficient transport of odorants to the receptors."

As a result of Craven's and Patterson's work, a team was chosen this past summer to participate in RealNose, a multi-institutional project

sponsored by the Defense Advanced Research Projects Agency (DARPA) whose objective is to build a mechanical nose that very closely simulates that of a dog.

DARPA planned out four main elements of the research project that the team will follow.

The first phase involves developing an odorant-intake system that incorporates the earlier air flow and odorant transport that the human nose does not exhibit.

The second phase involves developing an odorant detection system that incorporates canine olfactory receptors that will be engineered from actual canine cells.

Patterson expects this to be the most challenging part of the project.

"Work needs to be done

to identify the receptors that respond to individual chemicals" Patterson explains, "and then these receptors must be expressed in sufficient numbers to be used in an actual sensor."

The project is a typical DARPA hard project with high risk and high payoff.

It is going to take a lot of time and effort but results in the end could be optimal.

It would be able to sniff out drugs, explosives, chemical and biological weapons, and even certain types of cancer.

"This is the realm of discovery and unsolved problems," Craven said, "plus there are practical applications that could positively impact all of our lives."

## Mechanical Engineering club visits LORD

CHRIS HENLEY  
engineering writer

LORD Corporation has facilities here in Erie, Saegertown, and around the world in Germany, Japan, and Brazil. Yet the plants located in Erie are special.

It was here in Erie where it all began in 1924 Hugh Lord and six employees, made up the newly founded LORD Manufacturing Company.

In 1927, General Electric became LORD's first customer by purchasing LORD mounts for their trolley cars. From 1924 to the present, LORD has continued to ex-

pand and create new products like those seen in the new OBS building.

The new state-of-the-art chemistry labs were made possible by the donation Behrend received from LORD Corporation this past summer.

Of course, this is not the only role LORD plays within Behrend. Behrend is one of the top 50 engineering schools in the nation and LORD is right in Behrend's back yard.

Every year, new graduates being poured out of this campus into the job market and some of them have degrees in

*"Will what I learn in the classroom or lab really going to be applicable to my future career?"*

-MATTHEW ADAMS  
PRESIDENT MECHANICAL ENGINEERING CLUB

engineering, chemistry, and physics.

Logically LORD appears as a potential job opportunity for these new graduates. Not only do they offer employment opportunities to Beh-

rend graduates, they offer internships as well in which Behrend students readily participate.

Recently, Matthew Adams, a student and President of the Mechanical Engineering Club, toured the engineering lab at LORD's Grandview Boulevard facility.

At this location, they develop and test components used in aircraft applications. While on the tour, Adams says they were able to see their various testing rigs in action.

According to Adams, what is being taught in the classroom is valuable in an actual career setting.

On top of viewing test rigs, Adams, and the other students touring the engineering lab, received a presentation pertaining to what LORD does and various concepts that they have learned and how they use them for real applications.

As a company that continues to expand and develop new products, LORD Corporation strives for continuing to be a worldwide leader in its two core businesses, mechanical and chemical products.

If you're curious to find out more of what LORD does visit their website at [www.lord.com](http://www.lord.com).