

SAE Mini-Baja Off-Road Race Car

2008-2009

Team C.O.B.R.A.

(Conestoga Off-road Baja Racing Association)



CONESTOGA
Connect Life and Learning

Submitted to

DENSO Foundation

April 30, 2009

Student Report

COBRA Mini-Baja Season Update

By: Jacob Botden, Cobra Team Captain

For our team, this year's SAE Mini-Baja vehicle project has spanned 8 months of design and build and already one competition. With the need for a new frame design this year, our vehicle actually started last school year in the hands of three Mechanical Engineering Technology Design and Analysis Students who created the initial design as their third year final project. This design provided the initial blueprint which was modified as the year went on to meet any current challenges. Although the finished vehicle may not always look exactly like what was initially created in CAD, the hundreds of hours of design work put in by these students provide the groundwork for a successful vehicle.

The MiniBaja team started this year with a well received awareness campaign throughout the school, gaining 7 new first year members and a much larger recognition inside the school. Around the same time, the team began planning and designing this year's vehicle.

To continue to build on the previous year's success, each year's design process begins by setting goals based on last year's deficiencies and any new ideas brought to the table. First we review the previously created design and plan what needs to be finished such as smaller elements like the braking system and body panels. This new plan also adapts the previous students' design proposals to a manufacturable reality considering our limited resources and materials on hand.

As soon as the material started arriving in early January, the main build stage began. Beginning in mid January and stretching to mid April, this is where the most significant portion of the team's time was spent. Initially the team worked to build the main frame using tools such as tube benders, notching machines and a TIG welder purchased using Denso grant money. With the base of the vehicle finished, its sub systems can be added on such as drive train and suspension. The addition of these subsystems brings the vehicle close to looking like a finished vehicle and culminated most of the design work done on the vehicle. Adapting these systems to work on our vehicle is always a major challenge and took up most of our design and troubleshooting time once the build was in progress.

By the start of April these systems were all installed and the finer work of placing a driver inside the car and determining the placement of the many smaller components such as the steering wheel and pedals began. This time was also when we were able to make sure many different students were involved, no matter what their program or area of interest. They were involved in the many smaller projects which branched off, such as

data acquisition systems, developing a cooling system for the transmission and other small projects.

With the build complete, the vehicle was tested and tuned in the school parking lot before being loaded up onto our newly purchased trailer and heading off to the Alabama SAE MiniBaja competition organized at the Auburn University NCAT test facility.

Results

The Conestoga College team is always improving and this year is no different. Thanks to our sponsors' continued support and an ever growing knowledge base, the team is able to improve each year, sometimes in leaps and bounds. This year we were able to improve by 19 positions in our overall standings when compared to last year's initial competition. The generous support of our sponsors allows us to develop and grow a better backbone of the team, making it more knowledgeable, productive and competitive.

2008 Illinois Overall Score

Rank	Car No.	School	Team Name
1	25	California State Poly Univ - Pomona	Bronco Racing
7	116	Ecole Polytechnique De Montreal	Mud bees
55	13	Conestoga College	Cobra

2009 Alabama Overall Score

Rank	Car No.	School	Team Name
1	10	Universite de Sherbrooke	Sherbrooke Racing Team
2	21	Ecole De Technologie Superieure	ETS Motorsports
36	76	Conestoga College	COBRA

Faculty Advisor Report

Conestoga's SAE Mini-Baja Team – 2008-2009 Season

With the generous support of the Denso Foundation and other sponsors, our team was able to design, build, and race their SAE Mini-Baja car in this year's competition in Opelika, Alabama. The construction process was a demanding one, as the Alabama competition took place the week prior to examination week here at our college. Fortunately the team was able to plan their course work well in advance, and at the same time put in the long hours necessary to complete the vehicle. We here at Conestoga are very pleased with the results, and proud of the continued improvements our team has shown over the last five years.



Denso Foundation provided a generous donation of \$15,000 (\$15,741 Cdn) to our team in response to our application for funds. In our application, the funding allocation was to be as follows:

Item / Expense - <i><u>Proposal</u></i>	Amount
Team Trailer	\$ 5500
Chassis Dynamometer equipment for drive-train efficiency evaluation	\$ 5000
Supplies and Equipment – Race season 2008/2009	\$ 4500
Total Requested Grant	\$ 15,000



Team Members – Left to Right: Jacob Tyler Royston, Dejan Doslo, David Krock, Simeon Folkema, Jim Hillier (Faculty Advisor), Nathan Henry, Andrew Thibodeau, Ian Hartman, Jacob Botden

Actual expenditures charged against the Denso Foundation grant funds are as follows:

Item / Expense - <i>Actual</i>	Amount
Team Trailer	\$ 6997
Lincoln TIG Welder	\$ 2193
Seed Money for 2008/2009 Season	\$ 5810
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Total Requested Grant	\$ 15,000

The team had initially planned to purchase a chassis dynamometer, but a local company made one available to us on long-term loan, which eliminated that need. In its place the team purchased a Lincoln Precision TIG225 welding machine and accessories. This welding machine received many hours of use in our team build area, and will be a valuable asset to the team for many years to come.

The trailer purchased is a fully enclosed tandem axle 7'-16' unit with ramp rear door. Students in our Advertising program on work study placement with Conestoga College this summer term will design the graphics for the trailer. Denso's name will be prominently displayed on the trailer.

The remainder of the funds was used as seed money for the 2008/2009 season, purchasing tires, wheels, radio gear, and other supplies directly related to the construction of the car.

Many thanks again to Denso Foundation for your generous support of our team. The funds provided will be an asset to the team for many years to come.

Yours truly,



Roger Enns, P.Eng
Professor, Conestoga College Institute of Technology and Advanced Learning.

