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Fraser Steel helps U of M engineering students build Formula SAE racecar

Albertville, Minn. – Fraser Steel is contributing more than \$12,000 in design, engineering and fabrication support to this year's University of Minnesota's [Formula SAE®](#) race car design team. The support reflects the company's deep commitment to developing engineering talent in Minnesota and encouraging top students to go into manufacturing.

Fraser is one of two dozen local companies to sponsor the U of M team. It is providing extensive hands-on technical support, laser technology, and staff expertise. It also is the only sponsor to do hands-on training of team members on sophisticated plant equipment. In recognition of its significant contribution to the project, the car will sport the Fraser Steel insignia."

"Our facility is their facility," says Thomas Baxter Stephenson, president and COO of Fraser Steel and a U of M alumnus. "We've invited the team to use our state-of-the art equipment. We've made our engineering and design staff available to them. And we're on call to help them every step of the way."

For Stephenson, Fraser Steel's investment is more than a matter of college pride. "For manufacturing to thrive in this state, we need young people be excited about entering the field. We also need them to come out of school with practical, real-world experience. That's what the Formula SAE program is all about."

About the Formula SAE Competition

The Formula SAE competition is part of the [SAE International's Collegiate Design Series](#), a collection of educational competitions designed to challenge engineering students to demonstrate teamwork, think creatively, and apply textbook theory to real-world situations.

Formula SAE teams from across the globe spend up to a full year preparing to compete at sanctioned events held in two U.S. cities and four foreign countries.

To qualify for the events, each student team must design, build and test a small [Formula-style](#) race car. Formula cars are four-wheeled, open-pit, autocross vehicles that are built "by formula" to comply with a specific set of rules. They have a four-stroke piston engine and race at very high speeds.

Teams may enter their test vehicles in national competitions held each spring in California and Michigan. The Minnesota team will participate in the largest of these events, held May 12-14 at the [Michigan International Speedway](#) just west of Detroit. Last year, Austria's Technical University Graz took top honors in that competition.

Vehicles must be conceived, designed, fabricated and maintained by the student team members without direct involvement from professional engineers, racers, machinists or related professionals, according to [Formula SAE rules](#). Teams are not permitted to outsource any part of the design or construction, but they are encouraged to get specialized assistance from experts like Fraser Steel.

To give the students maximum flexibility, few restrictions are placed on the overall design. Cars are judged in a series of static and dynamic events, including technical inspection, cost, presentation of a business case, engineering

design, solo performance trials, and high-performance track endurance. The car that earns the most points wins the competition.

"The emphasis is on what goes into designing and building a great race car, not just on its performance on the track," says Luke Fraser, the U of M team's production liaison at Fraser Steel.

Engineering Students Benefit from Real-World Experience

"It's the opportunity to get real-world experience that's so valuable," says Evan Kearney, president of the U of M's Formula SAE team. "Building a prototype from start to finish balances the theoretical emphasis we get in the classroom."

That practical experience also makes U of M engineering graduates more attractive in the job market, a major advantage in this economic climate. "Companies refer to us as 'the farm team.' They look here first to hire because we have hands-on experience," says Kearney, a mechanical engineering junior.

"You have to understand the entire manufacturing process to design a high-performance car," observes David Lunde, an engineering graduate student and three-time Formula SAE participant. To make his point, Lunde brings out last year's presentation binder, a 4" tome which documents every specification the team used to design, cost and build the prototype.

"Building a race car from scratch represents a huge span of experience for someone coming right out of school," says Lunde, who serves as the sponsor liaison for the team. Most of the team's work will be done in "build cells" on the fourth floor of the university's Old Mechanical Engineering Building. The team also will work on-site at Fraser Steel's 55,000 sq. ft. design and fabrication facility to do precision tube cutting and laser welding. [\(see attached photo of the Frame Design Team on-site at Fraser Steel\)](#)

"Having access to Fraser's equipment saves us time, improves our accuracy, and relieves us of the burden of hand-filling holes, which adds weight and distracts from the car's aesthetics," says Lunde.

University of Minnesota Team Gets More Competitive

The U of M team, comprised mostly of undergraduate mechanical engineering students, is one of 260 collegiate teams expected to participate in SAE International's annual Formula SAE competition in 2010. U of M will be paired against as many as 119 teams at the Michigan event.

"Last year, we had only 25 team members, and that wasn't enough to compete against the top-ranked Austrian teams or heavyweights like [the University of] Michigan or Wisconsin. This year, we have 50 recruits and expect 35-40 of them to actively participate," says Kearney.

The team also has expanded its advisory group, made up largely of alumni who are willing to provide technical assistance or access to resources. Don Horkheimer, a U of M alumnus and engineer at Honeywell Aerospace, serves as team's industrial advisor. Will Durfee, a professor in the [Mechanical Engineering Department](#), is its faculty advisor.

The team is doing everything in its power to gain a competitive advantage, according to Lunde. It began by identifying partners in August – well ahead of previous years. It is using new CAD/CAM software to streamline this year's design process. And it convened its three design teams (Engine, Powertrain and Controls, and Frame) as soon as classes began this fall.

U of M has entered a vehicle every other year since the early 1990s. Last year, it committed to producing a car every year – a reflection of its place among the nation's elite engineering schools, according to Lunde.

In 2008-09, the team built the entire car by hand. "We placed a respectable 29th in a field of 133 contenders. To move up in the rankings, we need access to better equipment, materials and resources. That's where allies like Fraser Steel come in," says Lunde.

The Value of Business Partnerships

Like most student groups at the University of Minnesota, the Formula SAE team does not receive financial underwriting from the university. Team members must raise the entire budget for the competition themselves – projected at \$30-50,000 per year.

U of M's budget puts it at a financial disadvantage compared to well-funded schools like University of Wisconsin-Madison, which won the 2007 Formula SAE event. University of Michigan, another top contender, is seeking to raise \$186,000 this year. It's not uncommon for international universities, which have cleaned up in the last few years, to have budgets that are five times greater than Minnesota's.

"In-kind support can level the playing field," says Luke Fraser, especially in a year when financial support is hard to come by.

About the Formula SAE Competition

Formula SAE is a student design competition organized by SAE International (formerly Society of Automotive Engineers). The concept behind Formula SAE is that a fictional manufacturing firm has contracted a design team to develop a small Formula-style race car. The prototype will be evaluated for its potential as a production item. The target market for the race car is the non-professional, weekend autocross racer, so it must have high performance in terms of acceleration, braking and handling. The race car also must be low cost, easy to maintain and reliable. Consideration is also given to marketability issues such as aesthetics, comfort, and use of common parts.

Each student team designs, builds and tests a prototype based on a series of rules designed to demonstrate creativity and engineering skills. The competition encompasses all aspects of the automotive industry including research, design, manufacturing, testing, developing, marketing, management and finances.

To ensure safety and fairness, teams must complete three stages of technical inspections before they are eligible to race. Volunteer judges, many representing the world's major auto companies, do the inspections.

The first Formula SAE competition was held in 1981 in Detroit, Mich. Over the last three decades, it has expanded to include a number of spin-off events. Official Formula SAE Series events now are held in Michigan and California. They are also sanctioned in Australia, Brazil, Italy, and the United Kingdom.

About Fraser Steel

Founded in 1970, Fraser Steel is a global specialist in the design and fabrication of precision tubular parts, components and welded assemblies for OEMs with exacting standards around the U.S. Fraser Steel's sophisticated concept-to-completion capabilities consistently achieve the precise tolerances, intricate profiles and specific finishes that customers demand. Unlike other metal manufacturers that dabble in tubing, Fraser Steel excels in tubular applications requiring resourceful design solutions, short turn times, close tolerances, high quality standards or cost efficiencies.

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