



Do-It-Yourself Formula One

International student teams build their own racing cars
for Formula Student at the Hockenheimring



The UPBracing prototype racing at high speed.

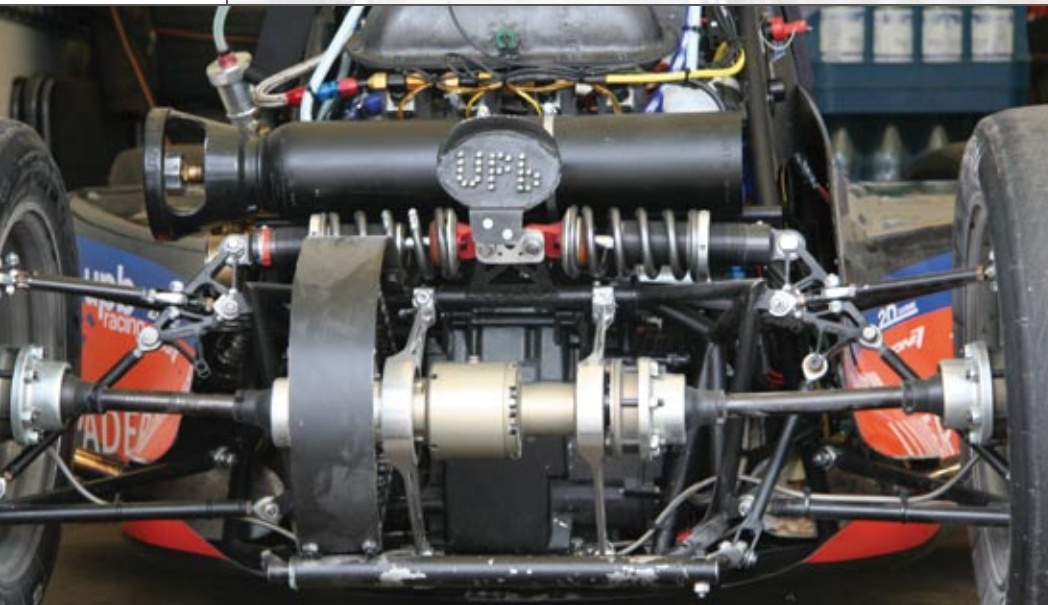
The tilt table test: Will all four wheels stay on the ground, and will no liquid leak out?

Each year, for a few days in August, students from all over the world meet at the Hockenheimring in Germany to race their self-designed, self-built cars on this traditional Formula One track. But with Formula Student, it's not just the team with the fastest vehicle that wins. The students also have to excel in production design, implementation practices, marketing activities, and other disciplines.

A Taste of Science and Technology

Students like Florian Meier and Ulrich Jahnke from the University of Paderborn, Germany, are already working on their third racing car for the competition – in addition to their university studies. Two years ago, when they decided to compete in Formula Student, they had no idea how the project would affect their careers. The idea behind the Formula Student competition is that an auto-

mobile manufacturer commissions the students to build a prototype for amateur racing drivers, designed for the production of several hundred vehicles a year. The vehicle must be inexpensive, reliable, and easy to run. It must also perform well in terms of accelerating, braking, and handling. Its market value is enhanced by other factors such as aesthetics, comfort, and the use of conventional, mass-produced parts. Moreover, it has to pass several



The rear of the racing car – the result of intensive assembly work.

official roadworthiness tests before being allowed on the racetrack. The best vehicle is chosen by a jury of experts from motorsports and the automotive industry (OEMs and suppliers). The jury appraises each design, each cost sheet, and each sales presentation, and compares them with those of competing teams. The UPBracing Team from Paderborn is currently developing its third model for Formula Student. The students are changing the basic frame of their racing car's body and optimizing the components.

The Association of German Engineers (VDI) started running Formula Student Germany in 2006 to show interested companies the quality of young engineers. The competition aims to give students a taste of scientific and technological issues through sports, and hopefully to attract much-needed people into engineering. dSPACE is sponsoring the UPBracing Team in the endeavor to get young people interested in technical and scientific subjects at university level.

Like a Small, Independent Company

Ulrich and Florian and their team are devising their own marketing campaigns, and once every six weeks they publish a newsletter reporting on upcoming events. Ulrich's marketing team has thought up a pro-

gram of incentives to ensure that all team members stick to the schedule. Everyone who completes their concepts, ideas, and activities punctually receives small advertising gifts. For larger projects, they sometimes get a new UPBracing jacket. Each team has to present itself like a small, independent company.

The team has even assigned sports students the task of devising the ideal work-out for the driver, to ensure optimum fitness for the gruelling race.

Interdisciplinary Cooperation

The project gives students from various subjects practical experience and also an insight into other fields and scientific disciplines. The business side of the UPBracing Team is taken care of by the IT, accountancy, press relations and marketing groups. On the technical side, there are groups working on the chassis, the body, the engine, the drivetrain, and the brakes. The students communicate via an internal forum on the UPBracing website or directly by e-mail and telephone.

Each group holds regular weekly meetings. Florian and Ulrich say that one of the things they have learned is how to organize themselves. For example, to avoid spending too much on travel, the team member who lives closest to the location



where something needs doing is the one who goes and does it. The UPBracing team has 35-40 active members, eight of them women. Florian sometimes finds it difficult to acquire new members. When students graduate and move away, they have to explain to younger students who are interested in Formula Student that participation in the project is voluntary and very time-consuming. The students' response to Formula Student is enthusiastic despite this.

Last year, 64 student teams from Germany and other countries took their racing vehicles to the Hockenheimring to compete for victory in the eight disciplines of Formula Student Germany 2008. The organizers say that the advertised places had all been taken within six minutes on the first day of registration. 35 German universities and 29 international teams participated, including ones from the USA, Australia, Canada, and Japan. Florian and Ulrich say you

have to enjoy designing and building things and be prepared to invest time. And they add that you learn an enormous amount that will be useful in your future career. "The major strengths that are really needed in motorsports are quality, flexibility, speed and innovation. Formula Student offers upcoming generations of engineers an opportunity to prove their interdisciplinary skills, their commitment to teamwork, and the know-how for understanding complex issues. These are the very requirements that we want our young graduate employees to meet," says Thomas Casey, CEO of HEGGEMANN autosport.

The students already had numerous contacts with potential employers and have become very self-confident in their dealings with the CEOs of major companies. They feel they are

being taken seriously and are proud of their project. This opinion is shared by Hubertus Benteler from the Benteler Group, the main sponsor for the UPBracing team: "The success of a company always partly depends on its employees' dedication, their team spirit, and their ability to think outside the box," he says. "Someone taking part in Formula Student has proven that he or she has understood what it's all about, from the idea and the financing through to the production of a product. We're happy to invest in people like that, because they get things moving!"

More than 70 International Teams Who Help Each Other

In addition to networking with potential employers, students also sharpen their social skills by working in a team. Formula Student therefore includes a Fairness Award. With

Expert Opinions

"Interdisciplinary skills, commitment to teamwork, and the know-how for understanding complex issues are the very requirements that we want our young graduate employees to meet," says Thomas Casey, CEO of HEGGEMANN autosport. HEGGEMANN specializes in high-performance engineering. The company is an expert in all aspects of vehicles and as a supplier covers all the classic production and service domains involved in motorsports.

Hubertus Benteler from Benteler AG adds: "The success of a company always depends in part on its employees' dedication, their team spirit, and their ability to think outside the box." The Benteler Group is one of the world's largest independent automotive suppliers and is internationally active in automotive technology, steel/tubing and commercial business.

The UPBracing team from the University of Paderborn.



more than 70 international teams, the competition organizers place great importance on mutual help. There is great solidarity between the teams competing on the track. Obviously, everyone wants to win and hopes their car will be the fastest, but despite this, people help each other wherever they can. One example of this was when the car made by the University of Bayreuth had a faulty brake pedal which meant that the team would not be able to go to the starting line. The UPBracing team from Paderborn

searched through its inventory and provided the parts for the brake pedal. The Delft/Holland team even turns up to each race with a complete truck full of equipment so they can help teams who get stuck. That earned them the Team Supporter Award. Ulrich and Florian are obviously hoping that their racing car will be the fastest at Formula Student 2009, and that the University of Paderborn will continue to back their project. Other international teams have large assembly shops to work in. The UPBracing Team will soon

have more space too. Talks with the University of Paderborn about relocating from their 38-m² room to a proper workshop facility are already underway. ■

The Vehicle's Technical Data

Acceleration:
From 0 to 100 km/h in 4.4 seconds

Top speed: 180 km/h

Power: 72 HP

Weight: 250 kg

Noise test: One of four official roadworthiness tests that the car had to pass to be allowed on the track.





Interview

Florian Meier, 23, studies Commercial Engineering, and Ulrich Jahnke, 25, studies Engineering Informatics. Both are active members of the UPB-racing team at the University of Paderborn.

You joined the Formula Student project two years ago. What motivated you?

Florian: We can actually put some of the things into action that the University just gives us the theory for. Our team produces real results. Who would have thought so: We made a racing car all by ourselves, and we're driving it on a real Formula One track!

What was the biggest challenge?

Ulrich: At the beginning, it was difficult to find sponsors, because of course no one had heard of the project. Now we've actually managed to build our own racing car for Formula Student, and this year Hubertus Benteler from Benteler AG visited Silverstone personally to see our ambition for himself.

What are you learning from the project?

Florian: Good teamwork – you're not struggling for personal success like at the university, you're working towards a shared goal, and you really have to get along with all the members of the project.

Ulrich: Personally, I learn more from the project than I do from all the lectures dealing with a specific subject. When I've been involved in developing a component myself, I don't have to do any studying when I sit an exam on the subject later!

How have you benefited from teamwork?

Florian: I communicate much better than I used to. I think the amount of talking I do everyday has increased

from 5,000 to 15,000 words. I even had to change my cell phone contract, so I now have 1000 free minutes. *(laughs)*

How did you acquire the know-how?

Florian: First we studied a lot of background literature. Then we sat down at the computer and took the plunge – with our brains on overdrive until the component we were aiming at came into being, at least visually. The whole team is constantly passing on knowledge, and new members also bring in new ideas.

Are there also difficulties?

Ulrich: It would be good if the university would recognize our work by giving us credits. Even so, by investing time in the project you learn an enormous amount for the future and for starting out on a career.

Were you able to use your contacts with companies yet?

Florian: The project is a good advertisement for us. Some team members have received definite offers for internships for producing examination theses. And we're really self-confident now. Self-marketing is a big thing for us – suddenly I'm giving lectures in front of all the engineers at our sponsors! *(tugs at his shirt and grins)*

What was your best moment so far with Formula Student?

Florian: One time the top team from Stuttgart was in the lead in a race, the car kept gaining in one lap after another, then suddenly a chain broke and the car just stopped dead not far from the finishing line. The audience was horrified. Then someone stood up and started clapping, and the entire audience joined in – it really gave me goose bumps.