

# Formula Student Germany 2012

## Full Blue Racing

### Wednesday

Wednesday was the first full day of work on the car, now with mid-season updates (a differential for the first time ever, and a new composite rear plate), following Tuesday's long drive from Cambridge to Hockenheim. A very warm day meant work on the car was hot, but the team was focused on fixing everything ready for scrutineering. This year the scrutineering order was determined by the results of a time rules quiz, submitted earlier in the year.

We lined up in number 77 hoping to get into scrutineering before the day was out. This would allow the team to work out what needs changing during the day, then scrutineering, so allowing time to work through the night for another try in the morning. As a result the team worked hard on all the lock-wiring required and a re-assembly of the rear to fix a drive-shaft/ tripod problem that had occurred before leaving. This time a tripod bearing (a broken one replaced by Hertfordshire University, but slightly too big for our needs in the diff- 0.1mm) was replaced, and adjustments to the wishbones were required when the problem with the driveshaft being too short (encountered in Silverstone) resurfaced, this time using the diff.

After a hard day's work interrupted only by the panoramic photo we ended the day having finished everything on the scrutineering list, putting extra safeguards in to better ensure a smooth passage through. For instance, Nyloc nuts on the uprights were changed for K-nuts (many thanks to Strathclyde for helping us out with 16- they aren't cheap), to avoid failing scrutineering by putting Nylocs in a hot location (in this case opposite the brake disc).

Unfortunately the queue did not move through in time for us to reach scrutineering, and as a result we are booked in for first thing in the morning. The stories from teams of a demanding scrutineering session and tough standards in order to pass might slim the chances of passing first time but we have done everything we can in order to achieve this.

### Thursday

The Thursday of FSG12 was totally focused on getting the car through scrutineering as fast as possible. We arrived at the scrutineering area as soon as it opened and heading straight into the bay for technical inspection.

The team had worked hard during the previous night to get a car which would be able to run through the inspection first time. However, this ended up not being the case, those with dynamic passes returned with a long list of jobs including extra firewall segments, less play in steering, an altered pedal box arrangement and a 'see you tomorrow' from the scrutineer.

After a few hours hard work however, we successfully managed to turn the car around by 4pm giving us 2 1/2 hours to get through the scrutineering checks by the end of the day. The re-scrutineering was successful, as was the tilt test (barring an adjustment to prevent the rear wheel from picking up at 60 degrees), that lead us straight into the fuelling station and then to noise test.

Unfortunately a very small leakage of the fuel tank around the connection with the filler neck had

occurred, and our technical inspection sticker was removed. Too late to fix it and get back into scrutineering before it closed, we will have to return in the morning.

The rest of the evening was spent prepping for the static events on Friday, hoping for a much improved design & cost event score this time around.

### **Friday**

At the beginning of Friday, things were looking good for the team. First in the scrutineering queue, with the requested fix to the fuel system made we were very hopeful for a speedy ticket through and into the skid pan event.

The movement through technical inspection was swift, but we came into difficulty at the noise test being 2dB over the required 110dB. An adjustment (a redirection of the exhaust outlet) was made, but we did not have enough time to progress through noise before needing to be upstairs for the design & cost events.

The design event was first, and it was obvious that the result would be much improved compared to the UK event (where the car was in scrutineering during the design judging). Some of the new features, such as the pedal box and composite rear plate impressed the judges, but we suffered from not having some of the designers of certain systems present to justify their design choices.

The cost event kicked off to a very good start, with an exceptional presentation by the FBR business team, the judges commented that it was one of the best they'd seen. The brief was to consider the cost of the car (calculated using standard labour, fasteners and materials costs in the cost report) and calculate a way of reducing the unit cost by 25%, whilst increasing production by 50%. An additional in-depth design of an appropriate factory layout impressed the judges. The remainder of the cost event, working through the cost report for accuracy went fairly well- however there was an unavoidable points cost with some last minute changes not being reflected in the report. The team were praised for the style of presentation, with very much team involvement in the event.

Following the design & cost events, we headed to the scrutineering bay to re-try noise. This time round we passed, and headed straight to brake with a couple of hours before the skid-pan closed. We were hoping for a very quick passage through brake, after passing so easily at FSUK, however it was not to be. Some air had got into the braking system between the two events, and despite spending a long time trying to bleed and re-bleed the brakes we were unable to pass the brake test before skid pan had closed.

After some time working out the problem, and advice from other teams, reverse bleeding the brakes managed to remove a trapped air bubble and the brakes were much harder. Tomorrow we hope to get through brake test first thing, and start notching up the dynamic points.

### **Saturday**

The focus of Saturday was to pass the brake test as soon as possible and head straight out into acceleration and autocross events.

With the brakes issues fixed, the car passed the brake test easily, only a ride height issue (arising when the corner weights were corrected), slowing progress. We were easily in time for the acceleration event, and completed runs with both of the two allowed drivers.

The best time beat expectations, 4.522 seconds resulting in a respectable mid-field position, with another 43.49 points on the board- our best ever score in a dynamic event (and the first time we managed to compete in the Acceleration event at any competition). This placed us above some big names in the competition, including Brunel and the reigning champions Global Formula Racing.

Following the acceleration event we were straight over to the test track to get in some much needed testing time & driver training before the autocross event. The rules state you must use 4 different drivers at the competition so driver experience across the events is a big problem for a team like ours without any professional or amateur racers.

We entered the autocross event near the start of the queue, scoring a first ('banker') run of 127.40s followed by a second run of 101.35s without any cones being knocked over. With the car clearly able to perform well, and the learning curve for drivers clearly so sharp we were feeling very optimistic for our 3 and 4th runs out. However the queue for the 2nd driver run was long and after an hour or so waiting it soon became clear that, like many teams, we were not going to get out again before the session ended. In hindsight we had spent too long at the test track before joining the first autocross queue.

The rest of Saturday was spent with more time on the test track followed by giving the car a complete check over in preparation for the endurance run the following day. By the evening, with all checks complete we decided that in order to give it our best showing the following day we would respray the car white again. The bodywork paintwork had been causing difficulty ever since Silverstone, the white picking up dirt very easily and the paint used made it very difficult to remove and clean it up again.

### **Sunday**

Sunday morning was hot, and the teams sent out in reverse order from the autocross competition the day before. We were 13th out. After a couple of days of successful dynamic competition, some testing and driver training we were very hopeful going into endurance. The car had not had any reliability problems up to this point so we had the opportunity of scoring well in the event that typically 1/2 to 2/3 of the teams fail to finish.

As per the regulations we had to use drivers not used in competition up to that point. This meant this was our driver's first competitive drive out at a Formula Student event. The experience of the UK event (where the FBR12 was crashed on the first lap) led us to the conclusion that the first couple of laps should be taken carefully until the driver gets the feel of the car before driving more confidently, and starting to chalk up some competitive times.

We went out about 20 minutes into the event, but by the end of the first lap we were summoned in to the pits. This cautious driving style had erroneously led the track marshals to believe there was a technical problem with the car. Unsatisfied with a verbal OK from the driver they instructed the car to be turned off so they could perform a full check around the car before allowing it to re-enter the track.

After a couple of minutes checking, no fault could be found with the car and thus we were allowed to resume racing. However on the attempted re-start, the engine would not fire. There had been no evidence of a problem like this during either competition until now. The engine was cranked

repeatedly for a couple of minutes up until the point the battery finally died. Massively disappointed the team were forced to retire, again after only one lap, and again without any failure of the car out on track. Later, as an experiment the car was cranked- and fired up easily, it is thus unknown why the engine refused to start at such a critical point earlier on.

After the results were published it was clear that we had scored our best ever result at a Formula Student competition at FSG12. It was a bitter-sweet result, like Silverstone, not for the fault of the car it could have so easily been much better.