

Synopsis of Lecture to RAeS Loughborough Branch on 22 Feb 2011

Formula Student by Scot Layton, Department of Aeronautical and Automotive Engineering, Loughborough University

Scot Layton is the Faculty Advisor for Formula Student Activities.

The aim of Formula Student is to maximise the involvement of students in the design, building and racing of a small race car. The car must be affordable to the weekend race series user (hence \$20K UPC max.) and must be able to accommodate the 5th percentile female and the 95th percentile male. Its engine capacity must not exceed 600cc (for this reason it is common to use a motorcycle engine). Its size/wheelbase are constrained by the need to be able to transport it in a Ford Transit van. In addition it must incorporate a roll hoop not less than one inch above the tallest driver's helmet.

There are 471 university based Formula Student teams spread all over the world and each team comprises approximately 25 students. Students participating in Formula Student gain both practical engineering and management experience both of which are valuable assets to potential employers. They also gain experience in setting up sponsorship deals with industry and liaising with industry.

The 10 separate Formula Student competitions are spread across the world. The most prestigious competitions tend to be in Germany and the UK. Loughborough University competes in the UK, Germany and Austria.

Cars are contested against each other in a series of Static and Dynamic Events as follows (scores shown in brackets):

Static Events –

a) Business Plan (75 points) – The aim here is to “sell” the vehicle to the judges. The business aspects of both design and prototype production are to be covered within the Business Plan.

b) Cost (100 points) – Here the contestants must prove that the UPC is less than \$20K.

c) Design (150 points) – The Team must present the vehicle concept to the judges who are experts in various aspects of design (brakes, chassis construction, etc.). Innovation scores highly.

Dynamic Events –

a) Acceleration (75 points) – Car is timed over 75 m from a standing start. 4 runs max., up to two drivers. First run used to “get heat into the tyres”. Average time 3.9 sec..

b) Skid Pad (50 points) – Car to be driven against the clock round a figure of eight circuit. Points lost for hitting bollards.

c) Sprint (150 points) – Car is to be driven against the clock round a chicane type course.

d) Endurance (400 points – 300 against the clock and 100 for fuel economy)) – Same course as for Sprint. Total distance to be covered – 22 km.



The Loughborough University 2010 Entry

Teams are not allowed to participate in the Dynamic Events until their cars have been passed by the Scrutineers. This entails a full inspection of each car in order to ensure that it has been correctly constructed. Particular points of concern here are the standard of welded joints, correct braking, the ability to accommodate the 95th percentile driver (he must be able to get out of the

vehicle in 5 sec.). A number of cars fail the Scrutineers' examinations. The Scrutineers' examinations are followed by a Tilt Test (no fluid/fuel leaks permitted), a Noise Test (110 dB max.) and a Brake Test (both wheels on one axle must lock at the same time).

The Loughborough University team has now accumulated 9 years' worth of development experience. Their aims for the future are to reduce the mass of the car by using either aluminium honeycombe or carbon fibre construction and to improve fuel economy whilst maintaining engine power output.