

Formula Student Operation and Testing Recommendations

These recommendations are aimed at getting Formula Student teams to ask the right questions of themselves such that they can develop their own Formula Student Car operating procedures in order to minimise any risks. It should be noted that any form of Motor Sport can be dangerous and the testing and operating of any prototype car will always present significant risks which need to be managed carefully and even if these recommendations are followed there is no guarantee that participants safety will be ensured.

There are many aspects to running a Formula Student team. This includes manufacturing and development of the car at the University in question, and testing and competing with the car outside of the University environment. Formula Student strongly recommends that adequate training is given for all of these activities and that risk assessments are conducted to cover all of these areas. In all cases it is recommended that the **Faculty Advisor** should take an active role in developing these procedures and risk assessments. This document outlines some of the activities to be considered and an example risk assessment is presented in the appendix.

Operations at the University

It is strongly recommended that procedures should be in place for how the team is operated at the university and these should be approved by the faculty advisor. This should include but not be limited to the following:

- Handling the car
- Starting the Engine
- Dyno Testing
- Use of power tools
- Machining components

Testing the vehicle

In the Formula Student Rules the following is stated:

D10.11 Considerations When Testing Your Vehicle Teams are reminded that cars built according to the Formula SAE and Formula Student rules are not designed or intended for racing or use at high speed, or in confined areas where they might impact with solid objects, including safety barriers. Teams are advised to develop and run their vehicles on large, substantially open areas, and to do so only under similar speed and cornering conditions as they would face at official FSAE or FS events. It is further advised that all cars are checked by an official scrutineer - a list of all approved MSA scrutineers in the UK, who can be contacted, is available from the Operations Co-ordinator (Neil Carr-Jones, 01483 524400).

It is strongly recommended that procedures and risk assessments are in place and approved by the faculty advisor for driver training, test preparation, venue selections and any other activities involved with testing the vehicle. A summary of the expected operating procedures is as follows:

Procedure for Training and Briefings

Teams should ensure that all people attending any test are well briefed on:

- The operating procedures
- Any drivers should have received sufficient training on how the car operates
- Any drivers should know what to do in the event of the car malfunctioning including how to deactivate the car and exit the vehicle in an emergency.
- All team members should know what to do in the event of an emergency

Procedure for Pre-testing checks

Teams should have a detailed set of checks that should be performed before running any vehicle test. This should form a check list which includes but is not limited to the following areas of the car:

- Engine
- Chassis
- Suspension and Steering
- Brakes
- Wheels and Tyre
- Electrics
- Any required towing equipment
- Driver Safety Equipment
- Fire extinguishers

Procedure to be followed before the car is run or the engine is started:

- A responsible person should be nominated to run any test
- A suitable venue must be chosen for the test
- Shutdown of the engine
- Any safety Issues
- Emergency response procedure including who to contact
- Inspection of the vehicle before and during testing to the check list
- Fire extinguishers and how to use them and appropriate clothing
- Fuel, its storage and use

Procedure for Marshalling the test sessions:

- Define a safe distance to view the car from for fast and slow tests
- Fire extinguishers to be available and training to be given on their use
- A procedure for signalling the driver will be required

Driving procedures during the sessions

- Drivers must receive adequate training
- Drivers must wear all recommended safety equipment (helmet, overalls, gloves, shoes and seatbelts)
- The speed in the proximity of spectators must be adequately controlled
- Drivers must stop immediately if signalled to do so

Requirements for selecting the Test Venue:

- A large open area with no obstacles in the immediate test area
- Sufficient run-off area outside of the immediate test area to bring the car to a halt before contacting any obstacles in the event of a malfunction
- Wherever possible a recognised testing facility should be used which has on site emergency response teams

Additionally, teams are advised to look beyond the Formula Student and FSAE rules and consider compliance with the Health & Safety at Work Act, 1974 (Sections 2, 3, 4 and 7), the guidance from HSE on motor sport (HSG112, Paragraphs 19, 24 and 25) and the MSA "blue book" on motor sport safety. Links to these documents can be found here:

- Health & Safety at Work etc. Act, 1974: <http://www.legislation.gov.uk/ukpga/1974/37>
- HSG112: <http://www.hse.gov.uk/pubns/books/hsg112.htm>
- MSA Blue Book: <http://www.msauk.org/site/cms/contentCategoryView.asp?category=609>

Please note: safety and all other risks associated with a Formula Student Car are the responsibility of the individuals and the Universities that are designing, developing, testing, maintaining and operating the Formula Student Car. The Institution of Mechanical Engineers shall have no liability whatsoever in relation to any Formula Student Car (including, but not limited to, the design, development, testing, maintenance and operation of the Formula Student Car) except to the extent that any death or personal injury results from negligence by The Institution of Mechanical Engineers.

Appendix – Example Risk Assessment Form

Title of Activity / Project Formula Student	Assessor Name (must be faculty advisor)	Signature of assessor	Date of Assessment (when did you first carry out risk assessment?)
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1 IDENTIFY HAZARDS	2 WHO MIGHT BE AT HARM	3 EVALUATE THE RISK AND DECIDE ON PRECAUTIONS		4 RECORD YOUR FINDINGS AND IMPLEMENT THEM
Activity/Tasks Associated Hazards - Check manufacturers instructions - Check with trade associations - Check sector specific/University specific guidance/HSE guidance - If none the say "None"	Who might be at harm and how? - Say how the hazard could cause harm. - Who to; Students, School children, - - Visitors to workshop/lab, Staff (including: Cleaners/Security/Porters) - What type of injury? – lifting handling, slip trip, health effects? - If none then say "None"	What controls are currently available to minimise the hazard at present? - Are there Standard operating Procedures? Are there local rules in place? Are there any instructions for use of equipment? What safety briefings are given? Agreed levels of supervision, training, etc - If none then say "None"	Are there risks that are not adequately controlled? - What risks remain after the controls have been put in place? - If there are no residual risks then say "No"	List the actions required to reduce the remaining risks

Review Date for next Assessment

University Name