

FSAE Design Judging

A Student Guide for Understanding the Process

During Design Judging your team will be interviewed. The design judges have already seen your vehicle's resume in the form of your design report. This has allowed the judges ample time to preview the strengths and weaknesses of your design. More importantly, it has provided some insight into your design approaches, decision making ability, organization, test and development programs, and vehicle features that you consider worthy of notice. With this information the judges will tailor questions specific to your design goals as well as cover the basics of sound engineering design.

Your vehicle is the most visual end result of your efforts. You must have one in order to be judged. However, your vehicle is only a part of what will be judged.

Engineering knowledge and understanding are the not-so-visual results of your efforts. The judges will be asking questions to determine your depth of knowledge, and intimate understanding of your design. A team that appears with a competitive vehicle will score low if they cannot answer the judges' questions. Those teams who demonstrate a thorough knowledge and understanding and present an impressive car will receive high scores.

The judges want to know *how* you developed your vehicle. What were the goals? Do your goals make sense? Was there a consistent design philosophy or methodology? Do you understand the functional requirements of your vehicle's components and systems? Do you understand the laws of physics behind their operation, the materials from which they were constructed, and the manufacturing processes used? Why was this system chosen over others? What was your test program for validating your design? How did your theory compare to actual results? What changes were required after testing?

If it is on the car, be prepared for in-depth questioning. If the person who designed something graduated or is otherwise not present during Design Judging, that does not excuse the team from fully understanding that item. The explanation: "it worked well last year" does not demonstrate adequate depth of knowledge on the subject. You will receive little to no points for answers like these.

There is no specific "perfect vehicle" that the judges are looking for. In fact, one of the things most judges enjoy most about FSAE is the great variety of vehicle designs. The answers you supply depend entirely on how you defined your car's design, and performance goals. As long as those goals make sense within the framework of the rules, you will score Design points.

FSAE First Round Design Judging – “The Fundamentals Round”

During the first round of Design Judging the judges will concentrate on the fundamentals that apply to *all* vehicles. Fundamentals are things that are absolutely required to make the car accelerate, decelerate, corner, and comply with the rules. Advanced features found on some cars, such as traction control, anti-lock braking, wings, and other more advanced items, might be analyzed after the fundamentals are covered in the first round. These systems will be looked at much more closely in the following rounds. You *must* have the aforementioned fundamentals mastered, as demonstrated by their presentation and proper responses to the judges, before you can be considered for advancement to the next round. The well prepared team brings *all* of their documentation (notes, pictures, spreadsheets, broken developmental parts, etc., etc.), on all aspects of their design, to the first round, just in case a judge finds time to ask more detailed questions. The old Boy Scout motto: 'Be Prepared' applies here.

First round design judging (interview) time will be utilized as follows. (Times are approximate)

Setup (3 minutes)

Keep an eye on the judges and set up as soon as directed. The car must first be presented on the ground with all body panels and wheels in place allowing the judges a view of the complete vehicle. Story boards are strongly encouraged. Bring notebooks and/or computers for when additional backup information is required. If you made a calculation, you should be able to present it within 60 seconds or less. Display of parts failures, alternate designs, and tested pieces are very useful and demonstrate your development process. Be prepared to put the car on stands, remove a front and rear wheel, remove body panels, and adjust the pedal positions allowing a judge to sit in the car upon request. Setup should take three minutes or less. Additional time here reduces your effective judging time. Be quick. Use your time efficiently.

Introduction (At your team's discretion) (1-4 minutes)

You will have a short amount of time to initially present your vehicle to the judges. This is your opportunity to list your goals, point out features of which you are particularly proud, emphasize your testing and development efforts, and cover what makes your vehicle, your vehicle. You will not go into details here. Some teams also use this opportunity to introduce who designed which major systems, if these people are not otherwise easily identifiable.

Questioning (25-28 minutes)

Your team will now break up and meet with judges inspecting specific sub-systems of the vehicle. These judges will determine which teams advance to the next round. In doing so they will cover many areas and each to the depth allowed within the time available. Do your best to see that exceptional features are not missed. Also, be understanding if the judge needs to switch to another subject.

You need to have at least one "expert" for every vehicle system that you consider to be important. FSAE is an educational process and we like to see that knowledge spread over many students. It greatly hinders the judging process if the same person has to answer questions for all of the major systems. Having more people who can properly answer questions helps your score. If you think of this judging experience as a multi-channel transfer of data, that is exactly what it is. Engaging at least one knowledgeable student per judge is ideal for maximum knowledge transfer.

You may be asked at any time to show calculations, photos, or other documentation to back up your claims. Be able to present these quickly to keep the process flowing. The design process often starts with hand-written calculations and sketches. Do not be afraid to show them. You must be able to answer basic questions without reference material.

If you are not the best person to answer a question, it is perfectly acceptable to point the judge to the person who can. It is also much better to say "I do not know" than to try to fool an expert.

Specific areas into which the judges will be questioning are not provided in advance since the judges are there to cover the entire car and will adjust their questions, to some extent, to the areas that you believe are important, and that you have demonstrated expertise in. This is why they need to know your design goals. You may still be asked questions that you do not want to hear. However, you can minimize that and help the judges to understand your vehicle by stating these goals.

Only team members are allowed in the judging area. Advisors may stand nearby outside the area. Allow room for the judges to move freely about the car and visual aids. Students who will be answering questions need to be immediately accessible. Those on the team who will not be answering questions can

be in the area but you may consider having them a step behind. Anyone on the team can be asked a question. Advisors and mentors may listen in, but cannot answer questions from the judges or from the students during judging. Video and audio recording of the design judging are not allowed. Other teams are not allowed to watch your Design Judging. It is the team's responsibility to protect the area.

During the second round more judges will look at your car with the ability and time to go deeper into more focused areas. The first round is more about making sure that this team has covered all of the basics.

At the conclusion of first round judging, it is to your advantage to leave photos of your vehicle with the judges. FSAE rule C5.14 specifically allows you to do this. Most judges find it extremely helpful to have photos of your car at the end of the day when they are making final decisions about which teams are going on to second round judging.

Scoring and Display Removal (13 minutes)

Leave the vehicle in place while the judges meet, decide scores, and put together their written comments for the teams. They sometimes need to refer back to the car or other work when discussing these details. Leave the judges alone during this time and remove everything once instructed. Like setting up, removal must be quick so that the next team can get started.

Feedback

Feedback to the students will be provided in two forms. There will be written notes from each judge. These will be brief since their primary concern in the short time available is scoring.

For more information we *strongly* encourage the students to bring their car and team back to the judging area for verbal feedback. You will usually be able to speak with different judges who are experts in different areas. Of the entire design judging process, the students find this the most educational.

Teams may receive feedback *after* they have completed all of their rounds of design judging. One reason that this feedback is so good is that it can be a two-way discussion between the team and a judge or with several judges. Video and audio recording of the feedback is up to the discretion of the individual judge. Please, ask before recording.

Feedback will not be provided during the judging rounds. Time is limited and the judges are there to ask questions, not to provide answers, especially when a team may be advancing to the next judging round.