

Three View Drawing Excellence

What the Design Judges are REALLY Looking For...

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Over the years, the Design Judges have been disappointed with the poor quality of the drawings submitted with FSAE Design Reports. We collectively made a point of showing students each year what we didn't like about their drawings, and we showed examples of what we did like. However, the student competitors seemed to be in a slump, and the quality of drawings did not really improve from year to year.

In 2010 we came up with the idea of enticing competitors into better drawings with an Award. The Chief Design Judge Best Three View Drawing Award was created. The prize for this Award are ribbons for the top three places, and Bosch Automotive Handbooks for the top ten places. We also make a point of publishing the top drawings at the competition, so that every student competitor can see what it was we are really looking for in a good, high quality three view drawing.

We use a small, select group of Design Judges to look over all drawings submitted with your Design reports. As it is when you gather any group of diverse people together, there are sometimes differences of opinion (yes, even with Design Judges!). In order to make the drawing judging process go a little smoother we developed judging guidelines. This helped bring our opinions into a unified, harmonious decision.

In order to create an open, transparent judging standard for this Award, we then published the drawing judging guidelines. (They are included with the Award listing on the SAE website.) The following year drawing quality improved dramatically. We publish (and offer a little reward), you read, you improve your drawings, and everyone benefits. A win-win for everyone!

Drawing skill is important to your career. You could be the best engineer in the world, but if you cannot convey your ideas as a good drawing, you will not get far. Hopefully, these guidelines will allow you to learn to create excellent drawings for Formula SAE competitions and beyond!

The Best Three View Drawing Award has been such a spectacular success, it has been decided to publish the drawing judging guidelines, and make them available year-round on the website. So... what follows is the Gold Standard of Three View Drawing Guidelines.

Three View Drawings Judging Criteria (What do we really look at)

The drawings:

- ✓ Must be line drawings. No shaded, photorealistic, rendered images, or photos allowed.
- ✓ Must be on three separate pages (per the rules).
- ✓ Should include some basic dimensions (OAL, Width, Track Width, Wheelbase, Height, etc., just to name a few).
- ✓ Should include a title block, however a **school name** and **car number** on each page will be acceptable. Car names or school mascot names are not helpful, and should not appear.

We evaluate the drawings both 'on-screen' and as printed B&W images. We do not print the drawings in color. The best drawings are (B&W) plotted 34" x 22" (86cm x 56cm) so that we may *really* pick out the fine details.

After establishing a baseline qualification (see above), we then start getting really picky...

We look for:

- ✓ Razor sharp lines. Any signs of raster we rank from a little zig-zaggy, to horribly zig-zagged... Any raster will probably eliminate you from the top ten simply because there are usually more than ten teams who submit good drawings with no raster at all...
- ✓ Proper use of different line weights to enhance 'view-ability'. All good drawings use different line weights to some extent...
- ✓ Were the finer details of the drawing easy to see, or were they just a black blob of ink (blotchy looking)?
- ✓ Did the team remove 2 wheels, some (or all) bodywork, or wings to make suspension & brake part details viewable? The best drawings we see usually have the tire outline, half the body, or wings drawn as a dashed outline. That represents that they exist, but allows us to 'see through' them to the important details hidden behind.
- ✓ Did teams with composite tubs get resourceful in showing the mechanical details of their car? A difficult drawing task on a 'tub' car... but a few 'tub teams' usually do an excellent job.
- ✓ Were all parts of the car drawn, or are there 'missing' parts? We pay particularly close attention to missing (as in: "I didn't have time to draw THAT part") vs. 'parts purposefully removed' for drawing clarification.
- ✓ Was the drawing clean, elegant and simple, or 'messy', and 'over-complicated' looking?
- ✓ Did the drawing include scaled up 'detail views' of intricate areas? A definite plus... (as long as you have room on the page without sacrificing detail (or size) of the primary view.
- ✓ Sensible use of and location of key dimensions.
- ✓ Sensible precision level of the dimensions? Is the overall length of the car listed as $\pm 0.005"$ (0.13mm), or something more realistically attainable?
- ✓ Sensible use of leader line descriptions of key features. Do not point to the dampers and tell us it's a 'damper'. Instead, tell us it's a '5 way adjustable, flouroelastic, glow in the dark, (or whatever) damper'.
- ✓ A ground plane drawn for the car to 'sit' on.
- ✓ Proper scaling. Is the drawing as big as it (reasonably) could be on the page? Is the drawing centered on the page?
- ✓ Shaded backgrounds we view as a detraction, which usually makes the drawing more difficult to view.
- ✓ Side, Top & End views, NOT 'sectional views', as if you cut the car in half and you are viewing that half from the inside out...

When in doubt we take a step back, look at the drawing and ask ourselves: How much detail can I pick out of this drawing without having to read the text of the Design report? Simply stated: The more detail we can see, the better the drawing.