

Design Review Process Guidelines

Concept

The design process is structured to guide the team through the brainstorming, evaluation, calculation and documentation steps necessary to maintaining Cornell's high level of performance at competition. Three or more stages of design review can be used to move from concept to reality. The deadlines for each stage must be met or we will begin manufacture late and at a distinct disadvantage to our competitors. Additionally, they allow the faculty advisor and the team leaders to keep track of progress and design details and offer suggestions for refinement. The process is an important part of the systems engineering concept that drives successful development and it is a structure routinely followed in industry. At design reviews each sub team should work collectively to prepare a brief summary of the system and then each sub team will meet for reviews throughout the day.

Preliminary Review

This is an opportunity to obtain feedback on the various concepts you have been examining since beginning your research. These concepts should prove that you have successfully and completely defined the problem (calculations, tests...) you are trying to solve and have examined fundamentally different ways of solving it. The concepts should be developed to the point that you have component sketches and a beginning analysis of performance, cost, weight, packaging, fabrication, etc procedures. Intersections with the sub-systems should be outlined. Copy relevant pages from your notebook so that you are able to track your design and obtain help when necessary.

Secondary Review

The secondary review should focus on one, possibly two, designs that you are examining in detail and plan to use on the final project. The state of your analysis should be nearly complete and include all relevant diagrams and calculations. You should be relatively confident of the physics, etc, involved in your secondary design. In addition to showing a higher level of analysis of important aspects such as forces, stresses, heat, etc., you should have a solid idea a trade-offs analysis (i.e., cost vs. performance vs. weight) and present your opinions on what trade-offs seem best for a final design. Show consequences of how your system interacts with others and what interfaces are needed. You should also have begun entering you drawings into CAD and present any part drawings you have.

Final Review

This is the formal and final acceptance of your designs and the transition to manufacturing. Your parts should be fully modeled in CAD and assembly drawings should be generated as appropriate. Sheets that document your final calculations of part performance and safety considerations must accompany the relevant pages in your notebook. The level of detail of the final design should be adequate to allow any other team member to accurately fabricate and assemble your parts and attach them to the final project.

Conclusion

The design review process is rigorous. Cornell performs well at competitions when our teams create intelligently integrated designs that translate well to fabrication. Design reviews help keep the advisors and leaders informed and allow you a chance to get feedback on your ideas. System interaction, tradeoff, and manufacturing issues can be determined before the final project is built, when significant design changes eat into valuable testing time.
