

# Conducting a Design Review

## 1 Introduction

Nearly all engineering designs should undergo some sort of Design Review process. The format of the review can be adjusted pending the size of the job, number of people involved and documentation required to be generated. From a simple second party design check to a series of staged meetings, simple ideals apply that ensure a smooth and comprehensive process.

The Design Review is an essential engineering tool for advocating or checking the suitability of a design concept or development. The review is commonly conducted by the party most proficient in the detail of a particular design element or system. Gathered at the meeting should be the relevant stakeholders required to objectively assess a proposed design for suitability and compliance with a number of particular design goals or criteria. A Design Review should be viewed as a design gate to be completed prior to the further progression or release of works.

Because of the format of the review and the number of people potentially involved, the process itself is an invaluable engineering quality tool designed to minimise the occurrence of design oversights or flaws. Since a number of people are usually involved in the execution of a Design Review, the onus is on the party conducting the review to have a suitable amount of preparatory work completed prior to the event. This preparatory work ensures the collective time of the group is not wasted while the facilitator is sourcing answers to potentially foreseeable questions.

In this example, a standard Design Review process is laid out in the format of a meeting between a multi-disciplinary gathering of stakeholders. This is a common format but not the only one to exist. It does serve to demonstrate the intent of such a review while providing some valuable prompts that could be adapted to various other formats.

## 2 Gathering the Right People

A good design review begins with an assembly of the necessary people. These are the people who have an interest in the design such as senior/lead engineers, management, subsystem designers, sales people, product managers, maintenance staff and so forth. A common practice is to gather a vast array of people for these meetings however you must be mindful of the overall cost this may have on the business.

- What disciplines/stakeholders exist?
- Who is best suited to be nominated to represent each of these disciplines/stakeholders?
- Do these people need to be present for the whole meeting?

## 3 Preparing for the Review

It is a good idea to outline an agenda for the Design Review to follow. This agenda may be formally issued to all attending parties to aid their own preparatory work or it may be simply used to help guide the facilitator toward topics of coverage. The effort needs to be tailored to match the complexity of the review needed. Items you may wish to prepare include:

- What is the design need?
- What are the design commercial requirements?
- What specifications or design constraints are applicable to the design? Constraints may be geometric, functional, environmental, infrastructure based etc.
- What are the design battery limits?
- What assumptions have been made in the formulation or execution of the design?
- What are the design risks?
- What design focuses have been addressed? These may include the cost of manufacture, lead times, ease of maintenance, efficiency gains and so forth.
- How and why was this particular design concept formulated?
- Provide a summary of the design. This may include statistics such as weight, lead time, cost, design life, operating conditions and more.
- What are the key features of the design and how do they tie into the design objectives?
- What are the design interfaces and how do they work?
- How was the design conducted and what standards were referenced? Are there any items of note that should be brought to the attention of those in the meeting?
- What documentation exists in order to demonstrate the compliance of the design with the Design Process?
- How is the design manufactured?
- How is the design tested?
- How is the design installed?
- How is the design operated?
- What are the design potential modes of failure?
- What safety features exist?
- How is the design maintained?
- How is the design overhauled?

These prompts are suggestions to help in formulating topics of coverage, they are by no means exhaustive. Each are intended to inform the meeting participants about the processes and considerations involved in developing the design.

Next you will need to decide on how to present all this information. Visual aids such as a projector, a Power Point presentation, 3D models and other graphics all help in achieving this. Meeting minutes should also be prepared with the intent of keeping track of all the feedback gathered from the group. For larger meetings a person other than the facilitator should be nominated to keep these minutes.

## **4 Design Review Meeting (DRM)**

The format of the DRM is that of a meeting. An agenda should be followed using the preparatory information collected prior to the event.

It is often helpful to progress through the agenda items viewing the presentation as a description of the entire design process from start to finish. Sometimes a conceptual run through of the sequencing of operations for a complex machine may aid in demonstrating the benefits of certain design features or safety systems. Such run throughs help familiarise others with the actual function of a design and also bring to light oversights in operational considerations or methodology.

Minutes and action items need to be taken over the course of the meeting. If you are adhering to a Design Process that involves the validation of each design requirement during a particular Design Review stage, these too will need to be assessed for close out. To close out the DRM, action items need to be established for all outstanding items. Timeframes are then nominated for each action item along with a reviewing party.