Implement design reviews the right way

Design reviews are perhaps one of the oldest known techniques for debugging designs to keep errors from getting downstream. At the same time, they are also one of the most misapplied tools commonly utilized by development professionals.

Common stumbling blocks.
One major area of misapplication results when users confuse project and/or program reviews with design reviews. Design reviews focus exclusively on the design of the product. The purpose of design reviews is to review the overall design, or a specific aspect of a design, during any point in the development of a new or existing product. Discussions about project schedule, development cost, staffing, and other project-related issues should not be discussed in design review meetings...only design issues.

Design-review techniques are also misapplied when the team members get together without external reviewers to examine the design of the product on which they are currently working. Robust design-review processes will always involve independent teams of reviewers meeting with the members of the team designing the product.

Further, design reviews often occur after the fact. Models, breadboards, and prototypes are built, and the design is then reviewed. Design reviews should be "reviews of design" and not "reviews of as-built." The whole idea is to get the bugs out on paper before you build.

Finally, the multi-faceted nature of the technique can complicate the review process. Best practices typically involve several flavors of design reviews. The population of formal reviews for a given development effort will contain early requirements, specification, and architecture reviews; focused serviceability, manufacturability, and reliability reviews; and comprehensive feature-function-performance reviews. Numerous informal reviews will take place. Depending on the complexity of the product, these review techniques may be applied at a component, subassembly, subsystem, and/or system level. Many companies often create poorly constructed design review processes that fail to add value.

Benefits. Design reviews are a proven approach that will improve the "product development hygiene" in your company and pay significant benefits. In addition to contributing to higher quality products and improved reliability, design reviews alone have reduced time-to-market by 50%.

Two companies, in quite different industries, provide good examples. Analog Devices applies design-review techniques to ensure that integrated-circuit test requirements have been designed into the design. Adding additional test points at the last minute often increases die size and therefore product cost. Savings are also realized by reducing the complexity of probe cards and final test jigs, fixtures, and software. Raytheon, while also applying design-review techniques at the component and/or subassembly level, uses the technique to ensure robustness at the architecture or system engineering level. Early verification of the architecture reduces the risk of identifying a major design change later that will ripple throughout the complicated and highly integrated systems.

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