A15 – TEN TIPS FOR BETTER DESIGN FROM FORENSIC EXPERIENCE

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It is said that learning from our mistakes is a helpful way to improve our design skills. Learning from the mistakes of others can be almost as helpful and is a lot less expensive. When mistakes occur there is a natural tendency to try and minimize their negative effects and the extent to which the details are made public, but this limits the opportunity for everyone else to learn how to avoid making the same mistake in the future. The continuous development of codes and standards based on past experience is an effective approach to assist in the process of "learning from the mistakes of others". For example, the more or less universal adoption of boiler and pressure vessel codes has almost eliminated the type of pressure shell explosion that was commonplace a century ago. Another way to learn from other people's mistakes is for those involved in failure investigations to describe what went wrong in such a way that a lesson can be learned, even without making all the details public. Forensic engineers, who work on investigations where legal issues come into play, see an enormous variety of failure situations and have access to a rich source of learning material. However, they are often so constrained by confidentiality and legal issues that too much of the story is masked or skewed for anyone to learn much from it. Fortunately in an oral presentation it is possible to show more of the story simply through pictures, and thus the lessons can be learned without the need for a formal written document.

In this presentation a series of illustrative case examples have been selected to highlight **ten tips for better design** from forensic experience:

1. Verify task and design specifications
2. Negotiate for team and money
3. Communicate clearly and often
4. Check on reality of all analysis
5. Address weak spots in concept
6. Minimize system complexity
7. Make the design function clear
8. Check system safety in context
9. Beware of any under-designing
10. Treat detail design meticulously!

These tips emphasize through practical experience the need for a systematic approach to engineering design in industry, and the way in which it can benefit a design engineering team.

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