

## Design for Reliability (DfR)

Doug Lehr, P.E.

This is the 5<sup>th</sup> in a series of articles on Critical Equipment design for offshore completions.

<b>1 Fundamentals</b>
<b>2 TRL</b>
<b>3 Materials</b>
<b>4 TempDeration</b>
<b>5 DfR</b>
<b>6 Using Industry Stds</b>
<b>7 FS &amp; ASME DRLFs</b>
<b>8 M &amp; S</b>
<b>9 FMEA</b>
<b>10 Lab Test Programs</b>

You are an engineering manager overseeing product development. For the new offshore product developed by your team, you want to know:

- If the final design margins comply with company standards
- If the thin-wall components are susceptible to Bauschinger Effect
- Which load factors were used for the ASME section 8 analysis.

And there may be other questions, such as:

- Were FMEAs conducted?
- Was a [Basis of Design](#) created for the product?
- Who conducted the [design risk assessments](#)?

These questions relate to design risk management, and possibly regulatory compliance. With the right program, de-risking activities can be identified, executed, and

documented for maximum value during product development.

In the best programs, de-risking activities are assessed by a Subject Matter Expert (SME) who is not affiliated with the design team. In [Quality and Reliability in Oilfield Equipment](#), we learned that these are attributes of a competent OEM DfR program. And a DfR program provides value in other ways:

- De-risking activities can be selected based on project [TRL](#); this ensures that the volume of de-risking activities is appropriate for the technology-application combination.
- De-risking activities [begin in the conceptual stage](#), enabling mitigations to be implemented when most cost-effective.
- De-risking activities are conducted throughout the project, which minimizes reliability issues during commercialization.

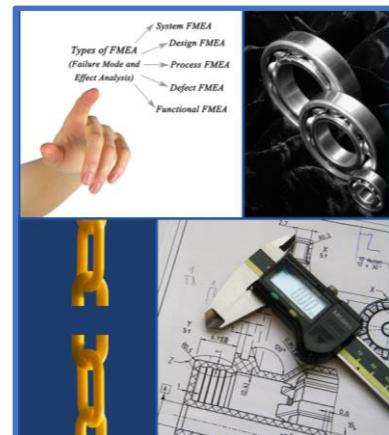


Figure 1 DfR enables de-risking during product development.

If the OEM practices Design for Reliability, the manager's questions can be answered *during*, rather than after, development. This means fewer surprises at commercialization time.

**TRUTH #1: DfR programs enable design de-risking during product development.**

**TRUTH #2: DfR programs minimize reliability issues during commercialization.**

[\*\*Integrис Technology Services LLC\*\*](#) can develop a Design for Reliability program for your engineering team. Send your inquiry to [info@integrис-llc.com](mailto:info@integrис-llc.com).

Copyright © (2021) Integrис Technology Services LLC

(713) 449-2246 | [info@integrис-llc.com](mailto:info@integrис-llc.com) | [integrис-llc.com](http://integrис-llc.com) | The Woodlands, Texas USA 77381