

Design for Assembly (DFA) & Design for Manufacture (DFM)

You would use this approach as part of the design process for a new product to make it as easy to manufacture and assemble as possible, at the lowest cost and highest quality.

Projected performance gains



Improved

- Design
- Product
- Processes
- Quality

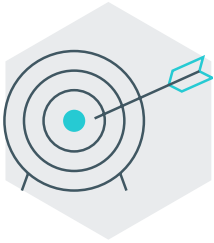


Reduced

- Cost
- Lead times
- Rework

What investment is needed to understand the concept?

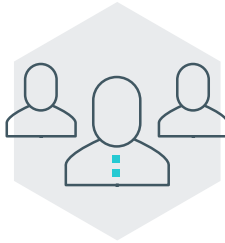
DIFFICULTY



Medium

Requires some reading around the subject and a structured approach.

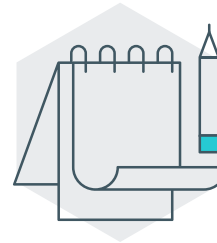
ACTIVITY



Team

Best results come from a team of Design Engineers and a team of people involved in design and assembly.

EQUIPMENT



None

No equipment is needed.

Explanation of the concept

The reason DFA and DFM are so important is that over 70% of the manufacturing cost of a product is set during the design phase. The remaining 30% is a function of the manufacturing process selected.

Design For Assembly (DFA)

DFA is a tool used to assist the design teams in the design of products that will transition to production at a minimum cost, focusing on the number of parts, handling and ease of assembly. Or in other words, “optimisation of the part/ product” and is concerned only with reducing product assembly cost.

Examples of DFA could include:

- Minimise part count
- Design parts with self-locating features
- Design parts with self-fastening features
- Minimise reorientation of parts during assembly
- Design parts for retrieval, handling & insertion
- Emphasise ‘top-down’ assemblies
- Standardise parts – minimum use of fasteners
- Use commercially available standard components
- Encourage modular design
- Design for a base part to locate other components
- Design for component symmetry for insertion


Design For Manufacture (DFM)


DFM is a tool used to select the most cost effective material and process to be used in the production in the early stages of product design. Or in other words, “optimisation of the manufacturing process” and is concerned with reducing overall part production cost.


Examples of DFM could include:


- Investigating new / alternative manufacturing processes
- Focusing on driving up the process yield / right 1st time
- Taking a balanced view of manufacturing cost and product quality
- Improving inherent process safety for the operator and product
- Designing a process with an inherently short leadtime
- Designing a process that allows different product variants to be made on the same machines without change-overs set-ups
- Make use of existing workforce skills

What action should I take?

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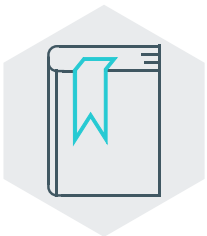
Consider DFA and DFM from the very start of a new product design activity.
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Use a small team of Design Engineers and Operators to come up with the best ideas.
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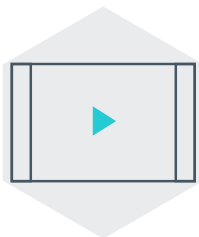
Try to make fact based decisions using data to improve the outcomes.
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Consider looking outside of your industry sector to see what other people do.

Recommended resources



Boothroyd. G., Dewhurst. P, and Knight. W.A. (2010) Product Design for Manufacture and Assembly (Manufacturing Engineering and Materials Processing), 3rd Edition. CRC Press. ISBN: 978-1420089271.



DFMA Overview: Youtube
<https://www.youtube.com/watch?v=C31RPvFw6k>

Glossary

Lead time: The time from receiving a customer order to delivering the product.

For more advice, case studies and additional factsheets visit: www.businessgrowthhub.com/manufacturing