

DFMA[®]

BOOTHROYD DEWHURST



IMPLEMENTATION WORKSHOPS

DFMA® IMPLEMENTATION WORKSHOP

These hands-on workshops help teams quickly and effectively begin to use and implement DFMA Product Costing and Simplification. Starting with an introduction to the DFMA methodology and techniques, and concluding with analyses of your own products, it's a perfect method to begin integration of DFMA into your company's product development and cost reduction process.

WORKSHOP OBJECTIVES

- Understand how to implement DFMA as part of product development and cost reduction activities
- Understand how DFMA enables concurrent engineering and the associated cost, quality, and delivery benefits
- Understand DFMA principles and practices
- Hands-on experience using the DFMA software tools including:
 - DFA product design simplification enabling better, earlier design decision making
 - DFM cost estimating of part manufacturing options
 - Utilization and customization of the embedded libraries (i.e. process, parts, materials, operations, etc.)
 - Interpreting & communicating the elements of production costs
- Achieve measurable results from the workshop
- Realize immediate design improvements.

Who should attend?

DFMA Product Costing and Simplification workshops are intended to help organizations review a product's design in order to develop concepts for redesign that will achieve cost reductions or cost avoidance. Given their mission, companies choose to have different disciplines represented in the workshops. Typically a workshop has up to 24 attendees that are broken into teams of four people. On each of these teams are representatives from product design and manufacturing. Companies sometimes include representatives from purchasing, procurement, quality, service, assembly just to name a few additional disciplines.

Who is responsible for what?

Boothroyd Dewhurst, Inc. will supply all of the training materials and software to be used during the workshop. The client company will supply the venue, computers, and the products to be analyzed during the session.

What should be analyzed?

DFMA is typically applied to electro-mechanical products. Depending upon the length of the session and the types of products to be analyzed, differing amounts of product complexity can

be reviewed. A rough rule of thumb to follow is that a group of four working with DFMA can typically analyze an assembly (or sub-assembly of a larger assembly) with about 30 to 60 unique parts in a day. This time will allow for the creation of the benchmark analysis and the generation of at least one redesign concept with an eye to reducing the part count. In products that contain a large number of parts it's often worth devoting a group to analyze the manner in which several different sub-assemblies come together.

What is the analysis process?

The first part of the first day is dedicated to learning the principles of DFMA Product Costing and Simplification and preparing the teams for the analysis of their products during the workshop. After the principles are understood the groups turn their attention to generating a benchmark DFMA analysis. The completion of this first analysis will spawn many redesign ideas that can be grouped according to the level of risk & effort commonly referred to as "safe", "reach", and "stretch" concepts. These redesign concepts can then be compared to the baseline analysis to quantify the opportunity for the reduction of parts, assembly time, secondary operations, reorientations, and overall product cost.

What are the deliverables?

In the last hours of the workshop, each of the groups is expected to make a short presentation to the larger group reviewing the process they used to arrive at the DFMA redesign concepts and presenting the ideas that they generated. Discussions of the assembly time reductions, part count reductions, and overall potential for cost reduction are typically discussed. Hard copies of all the reports generated by the software during the workshop can be printed by the attendees at any time during the session. These reports serve as documentation of the ideas and the opportunity for simplification and cost reduction.

DFMA® THREE-DAY WORKSHOP AGENDA

This is the outline of a DFMA Implementation Workshop agenda using the Boothroyd Dewhurst software tools. This is only an outline; the agenda can easily be tailored to meet your specific needs.

Day One – DFA Product Simplification

- 08:00 - 10:00 Overview of DFMA
- 10:00 - 10:15 Break
- 10:15 - 12:00 Introduction to the DFA methodology & software basics
- 12:00 - 01:00 Lunch
- 01:00 - 04:30 DFA software analysis of your product

Day Two - DFM Concurrent Costing

- 08:00 - 08:30 Review Day One and answer any questions
- 08:30 - 10:30 Introduction to DFM Concurrent Costing & software basics
- 10:30 - 10:45 Break
- 10:45 - 12:00 DFMA analysis of your product
- 12:00 - 01:00 Lunch
- 01:00 - 04:30 Continue analysis of your product including brainstorming and redesign evaluation

Day Three

- 08:00 - 08:30 Review
- 08:30 - 03:00 Complete redesign development & analysis
- 03:00 - 04:30 Presentation of results and workshop wrap-up

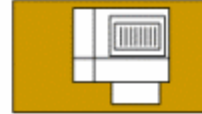
Client Workshop Coordinator Checklist

- Reserve hotel or meeting room. An off-site location is preferable so that outside distractions will be minimized.
- Reserve computers and printers (see "System Requirements" for details).
- If needed and not already completed, acquire signed Non-Disclosure Agreement (NDA)
- Invite participants. Each team of four should represent a cross-section of product development responsibilities. Ideally, at least one design engineer and one manufacturing engineer should be included in each group. Invite respective management personnel to attend the first presentation on the first day and at 3:00 p.m. on the last day or when the leader plans for team presentations of redesigns of the product. For management personnel who are not in the workshop, this will provide a good perspective of potential results, and demonstrate management support to the workshop participants.
- Inform BDI a minimum of three weeks before workshop date where workshop materials are to be mailed, the proper billing address, and the P.O. number. Workshops or consulting sessions canceled with less than two weeks notice from originally scheduled dates will result in a 20% fee (\$500 minimum) which can be used as a credit for future workshops.
- Inform workshop leader of the workshop and hotel location. Recommended workshop hours are 8:00 a.m. to 4:30 p.m. The leader will arrive one hour early the first day to set-up.
- At least one week prior to the workshop, discuss with the workshop facilitator the projects planned for the workshop including attributes such as part count, assembly complexity, part manufacturing specifications, etc.
- Several days prior to the workshop, install the trial DFMA software on computers to be used during the workshop.

Flip Chart & Markers

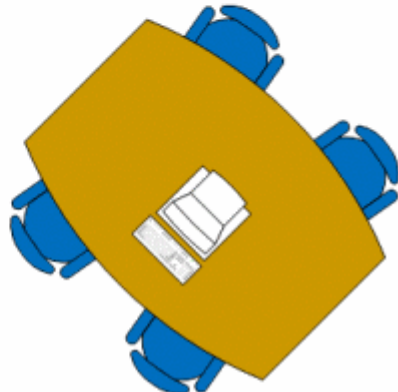
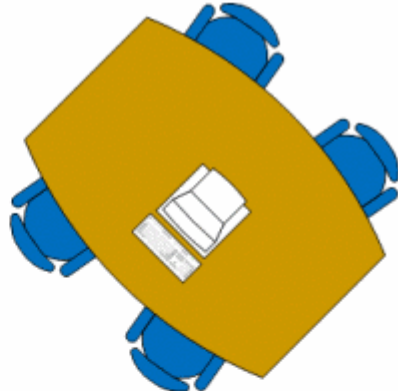
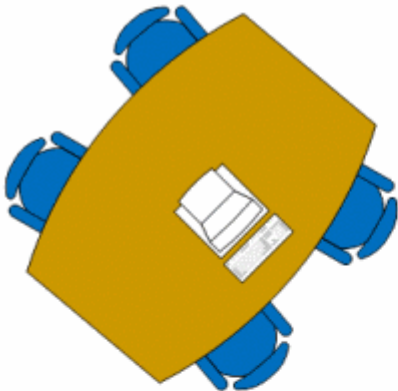
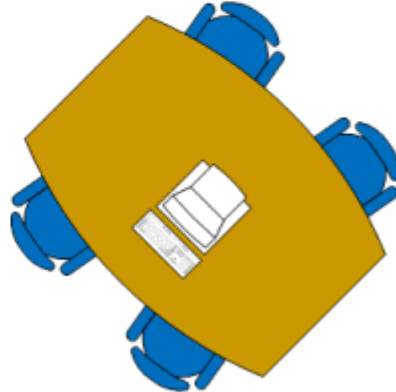


Projection Screen



Networked Printer

Digital Projector



Workshop Product Selection

The following guidelines are suggested to assist you in the selection of products that will be analyzed during Boothroyd Dewhurst, Inc. DFMA Workshops. Design information that should be available during the workshop is also suggested.

DFA Product Simplification

For the DFA Product Simplification portion of the workshop, a product or a sub-assembly of a product should have the following characteristics and the information listed here should be readily available to the workshop participants:

- Products or sub-assemblies should have a unique part count in the 30 – 60 range.
- The product should ideally be of a size that can be handled without mechanical assistance. (Not always possible ... if not possible consider having assistance available so the teams can manipulate the assembly)
- If available, a bill of materials (BOM) for the current design, ideally with part costs, in Excel or as a text file
- Assembly instructions, an assembly drawing, or something from which the team can determine the assembly sequence
- Any special tools required to assemble or disassemble the product
- Current assembly labor rate (\$/hour)

Design for Manufacture (Concurrent Costing®)

For parts that will be analyzed with DFM Concurrent Costing during the workshop, you should have the following information available for the teams:

- Detailed drawings of the component (if available)
- CAD model of the component (if available)
- The current process and material combination by which the parts are made
- Lists of any secondary operations that are carried out after the primary manufacturing process (including specific secondary machining and finishing operations)
- Possible alternative process-material combinations for the production of the part

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