

# *Product Design for Manufacture and Assembly*

*Third Edition*



Geoffrey Boothroyd  
Peter Dewhurst  
Winston A. Knight

มหาวิทยาลัยเทคโนโลยีราชมงคลพระนคร

ห้องสมุดสาขาพระนครเหนือ



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สำหรับเพื่อการศึกษาและการอ้างอิงเท่านั้น

# 1

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## Introduction

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### 1.1 What Is Design for Manufacture and Assembly?

In this chapter we shall assume that “to manufacture” refers to the manufacturing of the individual component parts of a product or assembly and “to assemble” refers to the addition or joining of parts to form the completed product. Hence, the term “design for manufacture” (or DFM) means the design for the ease of manufacture of the collection of parts that form the product after assembly and “design for assembly” (or DFA) means the design of the product for the ease of assembly. Design for manufacture and assembly (DFMA) is a combination of DFA and DFM.

DFMA is used for three main activities:

1. As the basis for concurrent engineering studies to provide guidance to the design team in simplifying the product structure to reduce manufacturing and assembly costs, and to quantify the improvements.
2. As a benchmarking tool to study competitors’ products and quantify manufacturing and assembly difficulties.
3. As a should-cost tool to help control costs and to help negotiate suppliers contracts.

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### 1.2 History

For many years, “design for ease of manufacture,” also referred to as “manufacturability” or “producibility,” has been considered important. However, until the 1970s no quantitative measures of the manufacturability of a product and its component parts were readily available to the designer without waiting for supplier estimates.

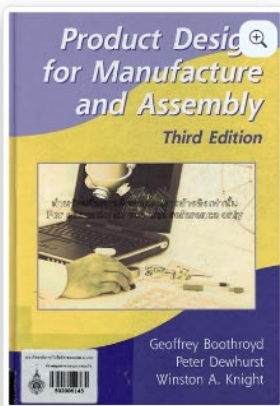
That designers should give more attention to possible manufacturing problems has been advocated for many years. A competent designer should be familiar with manufacturing processes to avoid adding unnecessarily to manufacturing costs during design. Traditionally, it was expected that engineering students should take “shop” courses which gave some familiarity with manufacturing processes. Unfortunately, in the 1960s, shop courses disappeared from university curricula in the United States; they were not considered suitable for academic credit. Now, engineering graduates joining design departments often have little knowledge of manufacturing processes.

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