PREFACE

Chapter I, Overview of Concurrent Engineering

The essence of CE is the integration of product design and process planning into one common activity. Concurrent design helps improve the quality of early design decisions and has a tremendous impact on life-cycle cost of the product.

Concurrent Engineering examines the stages a product goes through during the design process. **Figure1.5** shows that product design and system design (including assemblies and production processes) and selling price are all worked out together. Notice that the selling price and production cost targets are known before the design details are developed. Also note that the product and process are the wings of the concurrent design oval.

With Concurrent Engineering, most design decisions are made early in the process by a design team comprised of experts in all facets of the product life cycle from marketing to maintenance. It may be that the most difficult part of the implementation of concurrent engineering is convincing upper management that change must be made.

Concurrent Engineering has quite a bit of potential to reduce the time to market, increase quality, and address the product from concept to disposal. It has just begun to be implemented in the United States after many years of practice in Japan and Europe. The challenge in coming years will be to keep up with the many complementary tools of CE.

Chapter II, Overview of DFA Package Software Program

This “Design for Assembly” software program is concerned with reducing the cost of a product through simplification of its design. The best way to achieve this cost reduction is first to reduce the number of individual parts that must be assembled and then to ensure that the remaining parts are easy to manufacture and assemble. The analysis technique is systematic in its approach and is a formalized step-by-step process. Manufacture and assembly costs are largely determined at the design stage. You should be aware of the nature of assembly processes and should always have found reasons for requiring separate parts, and hence higher assembly and part costs, rather than combining several parts into one manufactured item. You should always keep in mind that each combination of two parts into one will eliminate at least one assembly operation. Moreover, combined parts are usually much less expensive that the combined cost of the separate parts. Use of the program involves three important steps for each part in the assembly:

- A decision as to whether the part can be considered a candidate for elimination or for combination with other parts in the assembly:
- An estimation of the time taken to acquire, grasp, manipulate, and insert the part (assemble). If necessary, the time to acquire and replace the tool will be included.
- Documentation of additional assembly, manufacturing and tooling costs for the item.

Using this software program you examine the features of your design in a systematic way to obtain a DFA index. This index can be used to compare different designs. User-defined entries to the DFA index analysis process can also be used to track important parameters such as suppliers, lead times, quality levels and so on.

Chapter III, DFA Consideration of Easigard Post Assembly

In this chapter we consider one part, called Easigard Post that is produced by Medelec systems LTD. shown in **Drawing 3.1**, and we deeply study one subassembly of Easigard Post, called Jack Screw and each item of that assembly in order to reduce assembly time and cost by using DFA software package.

Objective of the thesis

It is important to decide at an early stage in design which type of assembly method is likely to be adopted, based on the method yielding the lowest costs. This section allows the designer to decide, from the values of basic product and company parameters (production volume, number of parts, etc.) which assembly method is likely to be the most economic.

For example, a product or assembly where only 1000 per year are required would obviously be assembled manually. For a product where several million per year are required**.** The purchase of special-purpose automation equipment (high-speed automatic assembly) would almost certainly provide excellent return on investment. Somewhere between these extremes is a range of annual production volumes for which robot assembly might be the best economic choice if the assembly were appropriately designed.

So, those who want to produce more in a certain time can think that only the way to reduce production time and cost is to change the system by purchasing high-speed machines.

Our aim is to prove that changing system is not only the way to reduce the production time and cost. It is also possible to reduce time and cost significantly by using software package and designing or redesigning assembly of product appropriately.