CAD/CAM: FEATURES, APPLICATIONS AND MANAGEMENT

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CAD/CAM Specialist

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To Lelia for doing without while I was writing this, and
CAD managers everywhere who have to make it all work.

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Preface

Since this book is about obtaining value from computer-aided design (CAD) it should be useful to student or established professional alike. I have had several kinds of reader in mind: those who want to start their career with a good understanding of new techniques, someone who may be drawn to the prospect of managing a CAD system, the experienced engineer who has been asked to procure or manage a new system, and the senior manager or director considering its introduction. All have an interest in the profitable use of CAD.

CAD has matured. The early exaggerated sales claims have given way, not surprisingly, to a mixture of successful applications, expensive failures and reasonable run-of-the-mill usage. To many companies it is now a normal tool to be used by designers and it is as such that it should be included in engineering courses. I have therefore treated CAD as a tool. When you use a new tool you mainly want to know what it will and will not do, and to this end it is useful to know something of how it does the job. (A knowledge that a spanner is transmitting torque provides insight on what the flats of the nut are experiencing, for example.) You also need to know not just how to use it but how to use it efficiently, and to understand the different variants of the tool and to judge its quality. (Ring spanner, open-ended spanner or box spanner and is it strong enough?). Finally, all tools in professional use need proper management to prevent them changing from valuable aids into expensive liabilities due to errors, accidents or wear. (A worn spanner can damage nuts.)

The particular outlook adopted here has led to a greater range of topics than many previous books on the subject. For instance, data security procedures and some important and little-known material on long-term data storage has been included on account of the exceptional longevity of engineering designs. The management politics of procurement is also discussed since many technical people tend to be unaware of such issues.

The book starts with an account of the way computers do their job principally for the benefit of older engineers who have not had the opportunity of understanding the basics of digital computers. Some readers will wish to omit this chapter.

The second chapter discusses some of the terms that are bandied about and the value (and pitfalls!) of using CAD.

Following these introductory chapters we describe and discuss the various items of equipment to be found in a CAD installation.

Next follows a full presentation of the many functions offered by CAD software. An effort has been made to indicate the contribution a function

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makes to the successful exploitation of CAD to allow those selecting a system to make informed judgements on what is being offered by the various vendors they are considering. The section includes a chapter on the specialised electronic CAD systems. As transferability of CAD models between companies is going to become increasingly important, three chapters on standards have been provided. Finally, the all-important but often neglected facilities to aid the management of the system are discussed and the section concludes with another vital but neglected topic: software quality, reliability and robustness.

All this material is designed to provide a good technical background to evaluating and procuring a system but procurement involves management issues and these are covered in the chapters which follow.

Finally, having procured a system, it has to be managed well to achieve results, and so the book concludes with chapters on this important aspect.

The world abounds with ill-defined buzz-phrases and acronyms amongst which are CAD and CAM (Computer-aided manufacturing). It is therefore important to say at the outset how I will be interpreting them for the purposes of this book. I am assuming that the reader will be concerned with a commercially available "CAD/CAM" system intended for use by designers. Such a system often provides facilities for the geometry defined by the designer to be converted into control instructions for numerically controlled machine tools. This process is described and its relationship with manufacturing procedures is discussed but the detail of part programming machine tools is not covered on the grounds that it is usually the concern of manufacturing specialists. Designers need to know how their CAD models may be used to supply data to Manufacturing but they will not normally be involved in actually programming the machine tools.

Peter F Jones
January 1992

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