

# Preface

The primary goal of this book is to cover, as much as possible, the state-of-the-art development in the domain of computer-aided fixture design and planning. The text concentrates on key issues central to the development of computer-integrated manufacturing, such as fixture design automation, fixture clamping layout synthesis, clamping intensity optimisation, workpiece-fixture interaction, intelligent fixtures which are integrated with processing equipment or machine tools, Internet-enabled fixture design and modular fixture database management.

This book is intended to be a reference text for academics, manufacturing and industrial engineers. It may also be used as a text for engineering graduate students in the discipline.

The organisation of the book is arranged in a topical manner. It begins with a concise presentation of the generic principles of fixture design in Chapter 1. Chapter 2 discusses the concept of integrated computer-aided fixture design system. It presents a 3D CAD-based system which is able to produce automated, interference-free fixture design and assembly solutions. Chapters 3 and 4 cover the framework and methodology to determine a viable clamping layout in terms of optimal clamping points, positive clamping actuation sequence, and minimal sustainable clamping intensities.

The dynamic interaction between a workpiece and its fixture plays a crucial role in fashioning the finished accuracy of a part. Experimental investigation presented in Chapter 5 provides an insight into the workpiece stability and the inherent dynamic nature of the workpiece-fixture system. The book then details the architecture of an intelligent fixturing system in Chapter 6, which is capable of tool path compensation and on-the-fly moderation of fixturing parameters so as to minimize workpiece displacement and distortion.

Chapter 7 presents a fixture element database management system which is essential to the automation of fixture design process. It is followed by a description of an Internet-based interactive fixture design system in Chapter 8. This system promotes the concept of collaborative design in a distributed manufacturing environment.

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Dr Ken Whybrew  
Professor Amitabha Bhattacharyya  
Professor Inyong Ham

Dr Ken Whybrew was the co-author of a first book “Advanced Fixture Design for FMS” written together with AYC N and ASK. Prof Bhattacharyya provided an unpublished manuscript written with Prof Ham to AYC N many years ago and some materials of this manuscript are presented in Chapter 1.

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