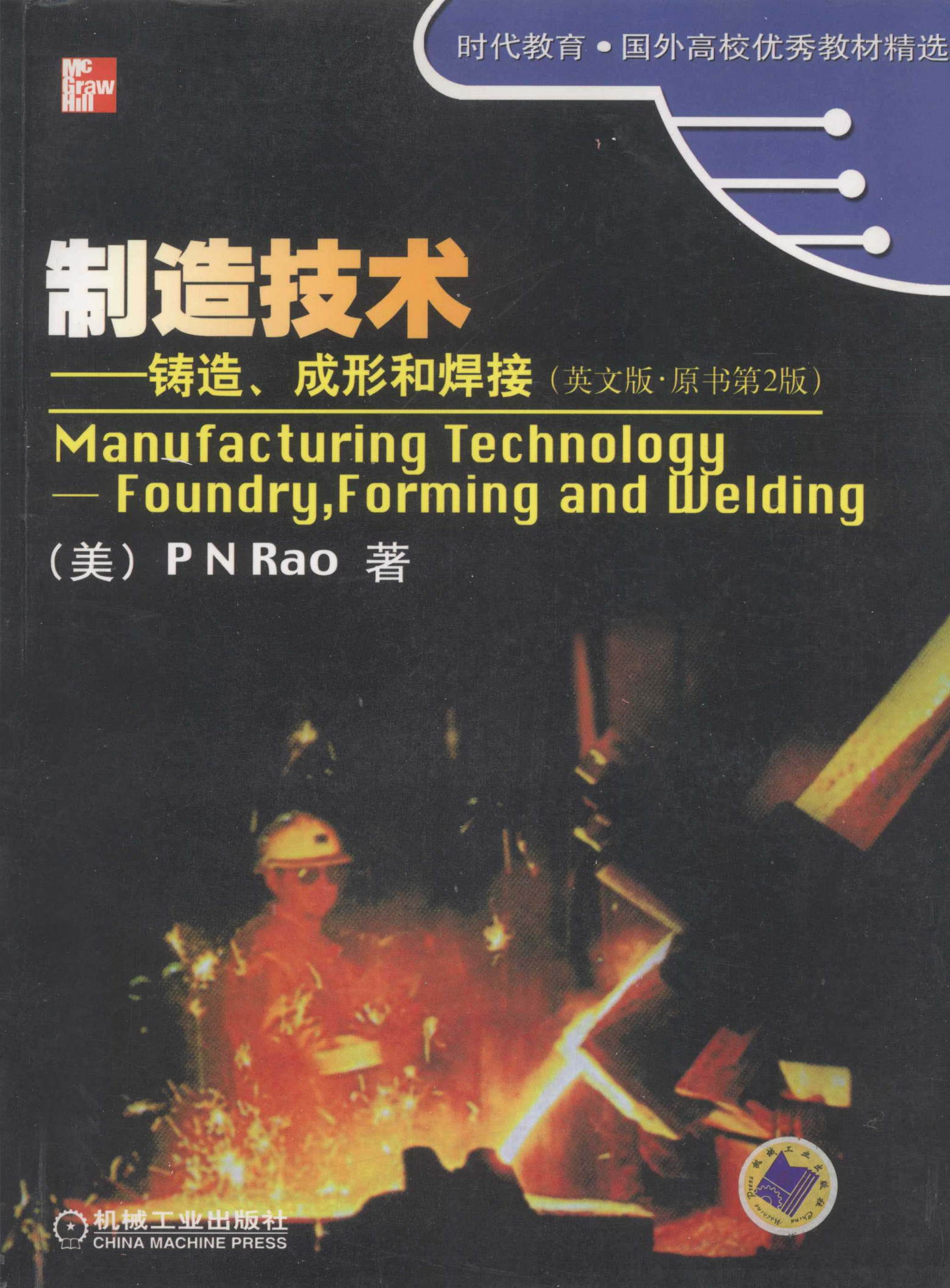
时代教育·国外高校优秀教材精选

制造技术

——铸造、成形和焊接（英文版·原书第2版）

Manufacturing Technology — Foundry, Forming and Welding

（美）P N Rao 著



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引进国外优秀原版教材，在有条件的学校推动开展英语授课或双语教学，自然也引进了先进的教学思想和教学方法，这对提高我国自编教材的水平，加强学生的英语实际应用能力，使我国的高等教育尽快与国际接轨，必将起到积极的推动作用。

为了做好教材的引进工作，机械工业出版社特别成立了由著名专家组成的国外高校优秀教材审定委员会。这些专家对实施双语教学做了深入细致的调查研究，对引进原版教材提出许多建设性意见，并慎重地对每一本将要引进的原版教材一审再审，精选再精选，确认教材本身的质量水平，以及权威性和先进性，以期所引进的原版教材能适应我国学生的外语水平和学习特点。在引进工作中，审定委员会还结合我国高校教学课程体系的设置和要求，对原版教材的教学思想和方法的先进性、科学性严格把关。同时尽量考虑原版教材的系统性和经济性。

这套教材出版后，我们将根据各高校的双语教学计划，举办原版教材的教师培训，及时地将其推荐给各高校选用。希望高校师生在使用教材后及时反馈意见和建议，使我们更好地为教学改革服务。

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序

本书与 P N Rao 编著的《Manufacturing Technology — Metal Cutting and Machine Tools》构成完整的机械制造基础知识，都属于机械制造最基本的内容，是机械制造工程及自动化学科领域学生的必备知识。不论是按大学科培养计划还是专业培养计划中都有相应的课程与其相对应，在机械工程及其自动化的大学科培养计划中有“工程材料及成形技术”和“机械制造技术基础”两本教材与它相对应，而按专业培养计划中有“金属工艺学”或“机械制造基础”与之相对应，所以本书的内容几乎涉及到工科院校的每个学生。在国内出版的各种类型的“工程材料及成型技术”、“机械制造技术基础”、“金属工艺学”及“机械制造基础”教材都较多，但没有一本英文教材。采用此套书作为教材或教学参考书，或者作为机械工程的专业外语教材，有利于进行双语教学及促使学生掌握机械工程领域内最基本的相关英语专业词汇与术语。

本书内容相当于工程材料及成型技术、金属工艺学或机械制造基础的热加工部分，包括工程材料及其性能（含金属材料及热处理）、金属铸造生产过程（包括砂型铸造及特种铸造）、金属成形过程（热煅、冷冲及轧拉挤）和焊接生产四大部分，共 29 章。每章后都附有习题及参考书，便于学生复习检查。

本书可作为工程材料及成形技术和金属工艺学（热加工部分）或机械制造基础（热加工部分）的教材或参考书，亦可作为相关专业的专业外语教材。也可供从事机械制造的工程技术人员学习参考。

赵汝嘉
西安交通大学机械工程学院

Preface to the Second Edition

The first edition of the book has received excellent reception from the teachers and students of engineering colleges. Originally the book was intended to comprehend analytical and design aspects of various manufacturing processes such that the students are able to correlate the conceptual subject details learnt in the classroom with their real-life applications. The success of the first edition broadly testifies to the acceptance of this concept by the teaching community.

Almost ten years have passed since the publication of the first edition of the book. In the intervening period, I had the good fortune of receiving plenty of suggestions from the users of the book in the form of new topics to be included and improvements, in a number of ways, to further expand the scope of the book. I tried to incorporate as many of them as possible, but some had to be deliberately omitted to conserve the flow of the material in the book and to maintain its reasonable size.

I wish to express my sincere thanks to the MARA Institute of Technology, Shah Alam, Malaysia where I am currently deputed on an assignment, for providing the necessary facilities and environment for undertaking the revision work.

I would welcome further suggestions regarding the coverage in the book, and would be happy to incorporate the suggested improvements in future editions to make the book more suitable to the changing curriculum needs of the subject, manufacturing technology.

P N Rao

Preface to the First Edition

This new book on manufacturing technology relates to its practice with as much of scientific aspects as possible. The study of manufacturing processes forms a core subject area for a majority of engineering students. In particular, this is an essential subject for all mechanical engineering students. But it is my experience that often the subject is taught with greater emphasis on the descriptive aspect rather than from a scientific and practical viewpoint. As a result, a fresh engineering graduate, on entering a manufacturing unit would be at a loss as to the means of correlating what he learned and what is required in practice. With this in mind, an attempt has been made to bring in as much of practice as possible into this book to make it more useful for engineering students.

This book is the outgrowth of material used by me for teaching two undergraduate courses relating to manufacturing processes. Whenever a process is described, the practical information, such as specifications, operating parameters and designing for the process, have all been highlighted. Each process is supplemented with simple illustrations, numerical calculations for the design process and a discussion of the results so obtained. A large number of well-labelled illustrations are provided to give the necessary insight into the process and its design.

After an introductory chapter, a short chapter is given to provide the necessary details of engineering properties as related to manufacturing processes. Three chapters have been devoted to the essential details of ferrous and nonferrous materials along with their heat treatment methods.

Another 11 chapters have been devoted to the technology of casting processes, wherein the sand casting process has been extensively dealt with from the technological viewpoint. In a concise form the available knowledge relating to the pattern, gating, risering and product design has been presented in these chapters. It is expected that an engineering student should be able to do a complete sand casting design from the information provided in this book.

Six chapters are devoted to the technological aspects related to metal forming processes, such as rolling, forging, extrusion and sheet metal operations. A good number of design examples as well as design exercises are provided wherever necessary.

Lastly, the welding and allied processes are covered in eight chapters, again giving a good amount of practical information. The emphasis is more on the commercial welding processes such as arc welding as well as the modern developments in welding processes.

SI units have been used throughout the book without exception. Countries all over the world have adopted these units because of the unambiguous representation of the various quantities. Hence it is imperative that engineering education should be done in SI units so that change-over takes place at the earliest and with least resistance. A brief introduction to SI units as related to the measurements used in this book has been provided in the appendix along with the essential data related to conversions from British or fps units to SI units.

References are provided at the end of each chapter which should be useful for those interested in studying further into the specific aspects. Also, a list of Indian Standards that are relevant for the subject under discussion has been provided at the end of each chapter. This information together with the numerous tables that are provided should help the practising engineer as well in the proper utilisation of the manufacturing processes.

I wish to express my sincere gratitude to Prof. U R K Rao, Prof. N K Tewari and Mr S Swaminathan who have provided constant encouragement to undertake this type of productive activity over a period of time. I am particularly thankful to Mr S Swaminathan and Prof U R K Rao for having taken the pains to review major portions of the manuscript and for giving useful suggestions for improvements. It is a pleasure to express heart-felt gratitude to my family members who have borne long hours of inconvenience during the preparation of the manuscript. I am indebted to the authorities of Indian Institute of Technology, New Delhi, for having allowed me to undertake this activity and provided the necessary facilities. Lastly, I wish to acknowledge the contributions made by many of my students over the past years during the teaching of the courses which enriched the book in many forms.

I am open to criticism and suggestions regarding the coverage in the book, and would welcome any helpful suggestions for improvement in future editions.

P N Rao

教师反馈表

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Contents

part C

METAL FORMING PROCESSES

part D

METAL FABRICATION PROCESSES