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### **ANALYSIS OF CASTING DEFECTS**

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**This book helps foundrymen eliminate or minimize inherent casting problems, improve casting quality and reduce cleaning and finishing costs.**

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### **ANALYSIS OF CASTING DEFECTS**

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### **USE OF TRACER METHOD FOR CASTING DEFECT ANALYSIS**

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### **CASTING DEFECT ANALYSIS EXPERT SYSTEM**

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### **DEFECT ANALYSIS AND DATA COLLECTION SOFTWARE FOR AN IRON FOUNDRY**

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**Torrance Casting is an iron foundry located in La Crosse, Wisconsin. The foundry produces castings by melting raw materials into molten iron, which are then poured into molds created from compressed sand. While creating castings from molten iron is a considerably low tech endeavor, there are many opportunities to improve the efficiency of their business through computer software. The process of creating castings produces a large array of data that must be recorded for accounting, defect analysis and process control. Currently this data is recorded manually on paper forms and filed away for future reference. This manuscript describes the design and development of a software application for an iron foundry in process control, data collection, and defect identification. The application allows the foundry workers to replace current paper processes with a flexible interactive process to record data produced in the casting process. It also replaces manual data collection with intuitive graphical data entry screens. This data can later be easily analyzed to determine the cause of casting defects.**

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### **SCIENCE AND TECHNOLOGY OF CASTING PROCESSES**

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*BoD – Books on Demand* This book deals with various science and technology factors that need careful consideration in producing a casting. It consists of 11 chapters contributed by experts in their respective fields. The topics include simulation of continuous casting process, control of solidification of continuous castings, influence of mold flux in continuous casting, segregation in strip casting of steel, developments in shell and solid investment mold processes, innovative pressure control during filling of sand molds, fracture toughness specifically of castings, permanent molding of cast iron, wear resistant castings and improvement of accuracy in estimating graphite nodularity in ductile iron castings.

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## **PREDICTING AND VALIDATING MULTIPLE DEFECTS IN METAL CASTING PROCESSES USING AN INTEGRATED COMPUTATIONAL MATERIALS ENGINEERING APPROACH**

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Metal casting is a manufacturing process of solidifying molten metal in a mold to make a product with a desired shape. Based on its own unique fabrication benefits, it is one of the most widely used manufacturing processes to economically produce parts with complex geometries in modern industry, especially for transportation and heavy equipment industries where mass production is needed. However, various types of defects typically exist in the as-cast components during the casting processes, which may make it difficult for post-processing and limit the service life and further application of products. It becomes imperative to analyze the processes in actual manufacturing conditions to predict and prevent those casting defects. Since it can be quite time consuming and costly to assess the processes experimentally, a computer-aided approach is highly desirable for product development and process optimization. In recent decades, computer-aided engineering (CAE) techniques have been rapidly developed to simulate different casting processes, which have great benefits to tackle casting defects in a more practical and efficient way. This work focuses on using ProCAST®, a finite element analysis (FEA) software, together with other necessary simulation and modeling techniques, including Computer-Aided Design (CAD), Calculation of Phase Diagrams (CALPHAD) and Cellular Automaton (CA), to study relevant defects in actual metal casting foundries. Specifically, three different cases have been mainly investigated, including (i) veining defect caused by thermal cracking in resin-bonded silica sand molds/inserts for sand casting process; (ii) thermal fatigue cracking in H13 steel dies/inserts for high pressure die casting process; and (iii) Hydrogen-induced gas porosity in A356 castings for gravity casting process with permanent molds. For each case, CAD model was designed and FEA model was constructed with validated materials database based on CALPHAD simulation, experiment tests and/or literature references. Coupled calculations of heat transfer, fluid flow for mold filling, and/or stresses and strains were run to obtain thermal and structural data for subsequent defects analyses and

predictions. More importantly, key experiments at laboratory scale were designed and performed to reproduce those defects. Test results were employed to correlate and validate the predictions from simulation. The highlight of this dissertation is that an improved model and/or prediction criterion is proposed for each defect case and is dedicated to engineering applications, including (i) a statistics-based cracking criterion of resin-bonded silica sand molds or inserts in casting processes; (ii) a temperature-based fatigue life prediction criterion for thermally-induced cracking in H13 steel dies for die casting; and (iii) a coupled CA-FE model for location-specific prediction of gas porosity in A356 gravity castings with permanent molds. This research is aiming at demonstrating that the integration of different CAE techniques and key experimental validations can help tackle the defects in various casting processes in a time-efficient and cost-effective manner. The results and the approach may be of great benefits to casting engineers for defect assessments and design optimizations in different casting processes.

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## **INTERNATIONAL ATLAS OF CASTING DEFECTS**

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### **SHAPE CASTING**

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#### **7TH INTERNATIONAL SYMPOSIUM CELEBRATING PROF. JOHN CAMPBELL'S 80TH BIRTHDAY**

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*Springer* This book contains a collection of papers on the science, engineering, and technology of shape casting, with contributions from researchers worldwide. Among the topics that are addressed are the structure-property-performance relationships, modeling of casting processes, and the effect of casting defects on the mechanical properties of cast alloys.

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## **DATA-DRIVEN OPTIMIZATION OF MANUFACTURING PROCESSES**

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*IGI Global* All machining process are dependent on a number of inherent process parameters. It is of the utmost importance to find suitable combinations to all the process parameters so that the desired output response is optimized. While doing so may be nearly impossible or too expensive by carrying out experiments at all possible combinations, it may be done quickly and efficiently by using computational intelligence techniques. Due to the versatile nature of computational intelligence techniques, they can be used at different phases of the machining process design and optimization process. While powerful machine-learning methods like gene expression programming (GEP), artificial neural network (ANN), support vector regression (SVM), and more can be used at an early phase of the design and optimization process to act as predictive models for the actual experiments, other metaheuristics-based methods like cuckoo search, ant colony optimization, particle swarm optimization, and others can be used to optimize these predictive models to find the optimal

process parameter combination. These machining and optimization processes are the future of manufacturing. **Data-Driven Optimization of Manufacturing Processes** contains the latest research on the application of state-of-the-art computational intelligence techniques from both predictive modeling and optimization viewpoint in both soft computing approaches and machining processes. The chapters provide solutions applicable to machining or manufacturing process problems and for optimizing the problems involved in other areas of mechanical, civil, and electrical engineering, making it a valuable reference tool. This book is addressed to engineers, scientists, practitioners, stakeholders, researchers, academicians, and students interested in the potential of recently developed powerful computational intelligence techniques towards improving the performance of machining processes.

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## **DEFECT ANALYSIS ON INVESTMENT CASTING**

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### **A CASE STUDY**

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## **CASTING DESIGN AND PERFORMANCE**

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*ASM International*

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## **ICCAP 2021**

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### **PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE ON COMBINATORIAL AND OPTIMIZATION, ICCAP 2021, DECEMBER 7-8 2021, CHENNAI, INDIA**

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*European Alliance for Innovation* This proceeding constitutes the thoroughly refereed proceedings of the 1st International Conference on Combinatorial and Optimization, ICCAP 2021, December 7-8, 2021. This event was organized by the group of Professors in Chennai. The Conference aims to provide the opportunities for informal conversations, have proven to be of great interest to other scientists and analysts employing these mathematical sciences in their professional work in business, industry, and government. The Conference continues to promote better understanding of the roles of modern applied mathematics, combinatorics, and computer science to acquaint the investigator in each of these areas with the various techniques and algorithms which are available to assist in his or her research. We selected 257 papers were carefully reviewed and selected from 741 submissions. The presentations covered multiple research fields like Computer Science, Artificial Intelligence, internet technology, smart health care etc., brought the discussion on how to shape optimization methods around human and social needs.

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## **EFFECTS OF CORE AGGREGATES ON WHITE IRON CASTING DEFECTS**

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## **PROCEEDINGS OF THE NATIONAL CONFERENCE ON INVESTMENT CASTING**

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### **NCIC 2003**

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*Allied Publishers* Contributed papers presented at the conference held at Central Mechanical Engineering Research Institute, Durgapur.

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### **STAINLESS STEEL CASTINGS**

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*ASTM International*

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### **SHAPE CASTING**

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### **7TH INTERNATIONAL SYMPOSIUM CELEBRATING PROF. JOHN CAMPBELL'S 80TH BIRTHDAY**

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*Springer* This book contains a collection of papers on the science, engineering, and technology of shape casting, with contributions from researchers worldwide. Among the topics that are addressed are the structure-property-performance relationships, modeling of casting processes, and the effect of casting defects on the mechanical properties of cast alloys.

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### **RELATIONSHIP BETWEEN SOLIDIFICATION PARAMETERS AND CASTING DEFECTS**

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### **ADVANCES IN INTERDISCIPLINARY RESEARCH IN ENGINEERING AND BUSINESS MANAGEMENT**

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*Springer Nature* The volume contains latest research on software reliability assessment, testing, quality management, inventory management, mathematical modeling, analysis using soft computing techniques and management analytics. It links researcher and practitioner perspectives from different branches of engineering and management, and from around the world for a bird's eye view on the topics. The interdisciplinarity of engineering and management research is widely recognized and considered to be the most appropriate and significant in the fast changing dynamics of today's times. With insights from the volume, companies looking to drive decision making are provided actionable insight on each level and for every role using key indicators, to generate mobile-enabled scorecards, time-series based analysis using charts, and dashboards. At the same time, the book provides scholars with a platform to derive maximum utility in the area by subscribing to the idea of managing business through performance and business analytics.

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### **MODELING FOR CASTING AND SOLIDIFICATION PROCESSING**

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*CRC Press* This text seeks to provide a comprehensive technical foundation and practical examples for casting process modelling technology. It

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highlights fundamental theory for solidification and useful applications for industrial production. It also details shape and ingot castings, semi-solid metalworking, and spray forming.

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## COMPREHENSIVE MATERIALS PROCESSING

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*Newnes* **Comprehensive Materials Processing** provides students and professionals with a one-stop resource consolidating and enhancing the literature of the materials processing and manufacturing universe. It provides authoritative analysis of all processes, technologies, and techniques for converting industrial materials from a raw state into finished parts or products. Assisting scientists and engineers in the selection, design, and use of materials, whether in the lab or in industry, it matches the adaptive complexity of emergent materials and processing technologies. Extensive traditional article-level academic discussion of core theories and applications is supplemented by applied case studies and advanced multimedia features. Coverage encompasses the general categories of solidification, powder, deposition, and deformation processing, and includes discussion on plant and tool design, analysis and characterization of processing techniques, high-temperatures studies, and the influence of process scale on component characteristics and behavior. Authored and reviewed by world-class academic and industrial specialists in each subject field Practical tools such as integrated case studies, user-defined process schemata, and multimedia modeling and functionality Maximizes research efficiency by collating the most important and established information in one place with integrated applets linking to relevant outside sources

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## FOUNDRY TECHNOLOGY

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*Butterworth-Heinemann* **Introduction; Liquid Metals and the Gating of Castings; Solidification 1 -- Crystallization and the development of cast structure; Solidification 2 -- the Feeding of Castings; The Moulding Material -- Properties, Preparation and Testing; Defects in Castings; Quality Assessment and Control; Casting Design; Production Techniques 1 -- the Manufacture of Sand Castings; Mould Production; Melting and Casting; Finishing Operations; Production Techniques 2 -- Shell, Investment and Die Casting Techniques; Production Techniques 3 -- Further Casting techniques; Environmental Protection, Health and Safety; Appendix; Index.**

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## CASTING PROCESSES AND MODELLING OF METALLIC MATERIALS

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*BoD - Books on Demand* **This book, Casting Processes and Modelling of Metallic Materials, explores the various casting and modelling activities related to metallic alloy systems. The book provides results of research work conducted by experts from all over the globe to add to the research community in the era of the casting process and modelling. The book was edited by two experts in the field of materials science and modelling, Dr.**

Abdallah and Dr. Aldoumani, whom both have several publications in peer-reviewed journals, worldwide conferences, and scientific books. The book introduces the casting processes and then discusses the various issues and possible solutions. Over the past years, various models have been proposed and utilized to predict the performance of castings. Some of these models proved to be accurate whereas others failed to predict the casting performance. The strength of any predictive tool depends on the employment of physically meaningful parameters that replicate the real-life conditions. This has been illustrated in the current book with such predictive models and finite element (FE) modelling to illustrate the behaviour of castings in real-life conditions.

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## **METAL CASTING**

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### **COMPUTER-AIDED DESIGN AND ANALYSIS**

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*PHI Learning Pvt. Ltd.* This book presents a scientific approach to metal casting design and analysis supported by software tools. Unlike other books in metal casting focused only on the process know-how, this book uncovers the know-why as well. Besides serving the needs of students of mechanical, production and metallurgical engineering, this book is equally meant to benefit practicing engineers involved or interested in casting development, including product designers, toolmakers, foundry engineers, supply chain managers, engineering consultants, researchers, and software developers. The theory discussed in the book is applicable to all types of castings: ferrous and non-ferrous, produced in sand and metal moulds. By gaining a better understanding of the theory and logic involved through creating, analysing and optimizing virtual castings, the readers will learn how to: Design process-friendly cast products, leading to shorter development time Manufacture assured quality castings, leading to fewer rejections and 'surprises' Manage material and energy utilization, leading to higher yield and lower costs.

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### **METALLURGY OF FAILURE ANALYSIS**

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*McGraw Hill Professional* Complete Investigative Toolkit for Metal Failure-Design or Process Whether the problem is corrosion on the working surfaces of valuable or life-essential machinery, breakdowns in linchpin equipment, or life-threatening faults in air- or spacecraft, the causes must be found so that future disasters may be prevented. Metallurgy of Failure Analysis puts the tools for finding the answers in your hands. A complete guide to all types of metal failure, both design and process, it features: coverage of faults due to casting, forging, welding, machining, and heat treatment; analysis of the concepts and mechanisms of fatigue, stress corrosion, hydrogen embrittlement, and more; remedial measure for corrosion, overload, fatigue, and wear; investigative procedures including destructive, nondestructive, and fractographic analysis.

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## **QUALITY AND RELIABILITY ENGINEERING: RECENT TRENDS AND FUTURE DIRECTIONS**

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*Allied Publishers* International conference supported by Indian Statistical Institute, held at Bangalore, 20-22 December, 2011; selected papers.

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## **HANDBOOK OF PRODUCTION OF DUCTILE IRON**

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### **THROUGH CASE STUDIES AND PRACTICAL TIPS**

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*LAP Lambert Academic Publishing* "Handbook of Production of Ductile Iron through Case Studies & Practical Tips." This Handbook is for reference for the Practicing Foundry Engineers and workers to solve their troubleshooting during Production of Ductile Iron Castings as per global specifications. This Handbook is giving Case Studies and Practical Tips during five main stages 1. Selection of raw materials 2. Melting of metal in Induction Furnace to give good metallurgical quality of metal. 3. Magnesium Treatment Processes 4. Actual Magnesium Treatment- Mechanism of Nodule formation 5. Inoculation Processes- Purpose of this stage. 6. Concept of Hardenability and various Heat Treatments given to Ductile Iron 7. Compacted Graphite Cast Iron 8. Metallographic Analysis 9. Casting Defect Analysis through case studies. 10. More than 100 Tables. Please note that each chapter contains number of actual case studies solved by the author and Questions & Answers.

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## **ADVANCED HIGH-STRENGTH STEELS**

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### **SCIENCE, TECHNOLOGY, AND APPLICATIONS**

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*ASM International* Examines the types, microstructures and attributes of AHSS Also reviews the current and future applications, the benefits, trends and environmental and sustainability issues.

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## **AMBIENT COMMUNICATIONS AND COMPUTER SYSTEMS**

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### **RACCCS-2018**

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*Springer* This book includes high-quality, peer-reviewed papers from the International Conference on Recent Advancement in Computer, Communication and Computational Sciences (RACCCS-2018), held at Aryabhata College of Engineering & Research Center, Ajmer, India on August 10-11, 2018, presenting the latest developments and technical solutions in computational sciences. Networking and communication are the backbone of data science, data- and knowledge engineering, which have a wide scope for implementation in engineering sciences. This book offers insights that reflect the advances in these fields from upcoming researchers and leading academicians across the globe. Covering a variety of topics, such as intelligent hardware and software design, advanced

communications, intelligent computing technologies, advanced software engineering, the web and informatics, and intelligent image processing, it helps those in the computer industry and academia use the advances in next-generation communication and computational technology to shape real-world applications.

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## **CFD MODELING AND SIMULATION IN MATERIALS PROCESSING 2016**

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*Springer*

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## **ADVANCED ENGINEERING OPTIMIZATION THROUGH INTELLIGENT TECHNIQUES**

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## **SELECT PROCEEDINGS OF AEOTIT 2018**

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*Springer* This book comprises select peer-reviewed papers presented at the International Conference on Advanced Engineering Optimization Through Intelligent Techniques (AEOTIT) 2018. The book combines contributions from academics and industry professionals, and covers advanced optimization techniques across all major engineering disciplines like mechanical, manufacturing, civil, automobile, electrical, chemical, computer and electronics engineering. Different optimization techniques and algorithms such as genetic algorithm (GA), differential evolution (DE), simulated annealing (SA), particle swarm optimization (PSO), artificial bee colony (ABC) algorithm, artificial immune algorithm (AIA), teaching-learning-based optimization (TLBO) algorithm and many other latest meta-heuristic techniques and their applications are discussed. This book will serve as a valuable reference for students, researchers and practitioners and help them in solving a wide range of optimization problems.

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## **INDUSTRY 4.0 AND ADVANCED MANUFACTURING**

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## **PROCEEDINGS OF I-4AM 2019**

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*Springer Nature* This book presents selected papers from the 1st International Conference on Industry 4.0 and Advanced Manufacturing held at the Indian Institute of Science, Bangalore and includes deliberations from stakeholders in manufacturing and Industry 4.0 on the nature, needs, challenges, opportunities, problems, and solutions in these transformational areas. Special emphasis is placed on exploring avenues for creating a vision of, and enablers for, sustainable, affordable, and human-centric Industry 4.0. The book showcases cutting edge practice, research, and educational innovation in this crucial and rapidly evolving area. This book will be useful to researchers in academia and industry, and will also be useful to policymakers involved in creating ecosystems for implementation of Industry 4.0.

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## **PRECISION FORMING TECHNOLOGY OF LARGE SUPERALLOY CASTINGS FOR AIRCRAFT ENGINES**

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*Springer Nature* This book describes systematically the theory and technology of the precision forming of large, complex and thin-walled superalloy castings for aircraft engines, covering all the important basic aspects of the manufacturing process, including process design, wax pattern, ceramic molds, casting and solidification, heat treatment, repair casting and dimension precision control. The correlation of casting defects, structural characteristics and performance of castings is revealed through a range of tests. It also discusses the latest technologies and advances in this field - such as imaging the solidification process by means of synchrotron radiography, 3D computerized tomography and reconstruction of microporosity defects, analysis and diagnosis of error sources for dimension over-tolerance and adjusted pressure casting technology - which are of particular interest. Providing essential insights, the book offers a valuable guide to the design and manufacture of superalloy casting parts for aircraft engines.

## **ANALYSIS OF A CASTING FRACTURE AND IDENTIFICATION OF FATIGUE FROM TIRE TRACK MARKINGS**

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Knuckle connectors on railcars are required to sustain thousands of cyclic stress events. Manufacturers continue to develop, test, and improve the life of these castings, which are now designed to exceed 400,000 cycles when subjected to tests involving cumulative cyclic sinusoidal load range settings varying between 6800 and 127,000 kgf at room temperature. This paper addressed real-world difficulties of differentiating between component failures due to overload and casting defects, and those that result from fatigue damage. Fatigue fractures in castings are rarely planar and comprise areas where solidification kinetics are different, and locations where porosity or large inclusions are present. The cumulative effect these factors have on fracture is to generate a rough topography, which may exhibit no beachmarks or other outward sign by which a fatigue fracture is commonly recognized. In this paper, an advantage was gained over a field failure because the fracture was produced in a laboratory test. Cycles to failure was recorded and details of the applied cyclic stress were also known. The difficulty regarding scanning electron microscope (SEM) analysis was that classic fatigue features normally visible to the naked eye, such as beachmarks, thumbnail initiation sites and planar areas, were not evident on the fracture face. In addition to documentation of numerous defect features on the fracture surface, SEM analysis revealed a rare but proof-positive form of evidence for propagation of the early stages of fracture by fatigue. The feature has been described in the literature as "tire tracks," alluding to their similarity to ATV tire impressions or Lunar Rover tracks on the moon. A brief review of earlier literature examples of tire track features is provided, and the generally accepted mechanism for

their formation is assessed.

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## **ADVANCES IN MATERIALS RESEARCH**

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### **SELECT PROCEEDINGS OF ICAMR 2019**

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*Springer Nature* This book comprises select peer-reviewed proceedings of the International Conference on Advances in Materials Research (ICAMR 2019). The contents cover latest research in materials and their applications relevant to composites, metals, alloys, polymers, energy and phase change. The indigenous properties of materials including mechanical, electrical, thermal, optical, chemical and biological functions are discussed. The book also elaborates the properties and performance enhancement and/or deterioration in order of the modifications in atomic particles and structure. This book will be useful for both students and professionals interested in the development and applications of advanced materials.

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## **METAL CASTING: PRINCIPLES AND PRACTICE**

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*New Age International* In This Book, The Topics/Syllabus Adequately Cover Metal Casting Subject In The Courses Of Mechanical, Production And Metallurgy Branches For B.E., B.Tech. As Well As Production And Industrial Metallurgy For M.Tech. With His Direct Experience In Metal Casting Industry And Teaching Academics The Author Attempts To Bridge The Gap Existing Between Essential Theory In Books And Vital Practical Applications In Industry. It Contains All The Molding Processes Normally Used With Details Of Ingredient Testing, Different Stages Of Casting Production Essential Theory Of Gating And Riser, As Well As Finishing, Inspection And Quality Control. Over 80 Line Sketches Facilitate Easy Understanding. Information Given Through Over 20 Tables Help Easy Comprehension, Comparison And Remembrance. Exhaustive Examples Of Specific Components Normally Made By Casting Process Help To Build Confidence When Entering Industry. Over 200 Technical Books And Research Papers Upto May 1996 Are Referred. Examples Of Working Computer Programs Given, Form The Basis For Modern Practice-Oriented Projects In Final Year. For Practising Engineers, Managers And Entrepreneurs, This Book Provides Useful Theory And Practical Aspects On Foundry Management. Exhaustive Treatment Of Critical Gating & Riser With Many Industry Examples, Practical Solutions To Melting Problems, Casting Defects Analysis Through Cause-Effect Diagrams Will Be Very Useful. Essential Information. On Energy Conservation And Environmental Pollution Control Is Also Given In The Last Chapter.

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## **CFD MODELING AND SIMULATION IN MATERIALS PROCESSING**

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*John Wiley & Sons* Proceedings of a symposium sponsored by Association for Iron and Steel Technology and the Process Technology and Modeling

Committee of the Extraction and Processing Division and the Solidification Committee of the Materials Processing and Manufacturing Division of TMS (The Minerals, Metals & Materials Society) Held during the TMS 2012 Annual Meeting & Exhibition Orlando, Florida, USA, March 11-15, 2012

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## **EFFECT OF GEOMETRY ON QUALITY OF CASTING IN GRAVITY CASTING PROCESS**

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*LAP Lambert Academic Publishing* As in any Casting process, Gravity die casting process has a significant rejection due to defective casting process. There are many factors which affects these defects in the component. One of the main reasons is the improper design of the component itself. If the component geometry is properly studied and analyzed, it can effectively reduce the defects arising in the casting of a component. Design For Manufacturability (DFM) during the component design stage eliminates the need for tool correction and re-tooling at the later stage of product life cycle which will indirectly increase the cost of the end product. The main objective of this research work is to study the geometry of the Gravity Casting Part, understand the defect pattern using Non destructive testing and thermal analysis and relate the geometry parameters to the induced defect in the casting. The idea is also to prepare a set of recommendation as a tool for Design for Manufacturability for Gravity Casting Process.

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## **ADVANCES IN MATERIAL SCIENCES AND ENGINEERING**

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*Springer Nature* This book presents selected papers from the 4th International Conference on Mechanical, Manufacturing and Plant Engineering (ICMMPE 2018), which was held in Melaka, Malaysia from the 14th to the 15th of November 2018. The proceedings discuss genuine problems concerning joining technologies that are at the heart of various manufacturing sectors. In addition, they present the outcomes of experimental and numerical works addressing current problems in soldering, arc welding and solid-state joining technologies.

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## **INNOVATION, COMMUNICATION AND ENGINEERING**

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*CRC Press* This volume represents the proceedings of the 2013 International Conference on Innovation, Communication and Engineering (ICICE 2013). This conference was organized by the China University of Petroleum (Huadong/East China) and the Taiwanese Institute of Knowledge Innovation, and was held in Qingdao, Shandong, P.R. China, October 26 - November 1, 2013. The conference received 653 submitted papers from 10 countries, of which 214 papers were selected by the committees to be presented at ICICE 2013. The conference provided a unified communication platform for researchers in a wide range of fields from information technology, communication science, and applied mathematics, to computer science, advanced material science, design and engineering. This volume enables interdisciplinary collaboration between science and engineering

**technologists in academia and industry as well as networking internationally. Consists of a book of abstracts (260 pp.) and a USB flash card with full papers (912 pp.).**