

MATERIALS, TECHNOLOGIES AND WASTE TREATMENT



EDITED BY
PROF. TAKASHIGE OMATSU
PROF. LORENZO DONATI
PROF. DR. YURII OTROSH
PROF. JONG WAN HU

TTT TRANS TECH PUBLICATIONS

Materials, Technologies and Waste Treatment

Edited by
Prof. Takashige Omatsu
Prof. Lorenzo Donati
Prof. Dr. Yurii Otrosh
Prof. Jong Wan Hu

Materials, Technologies and Waste Treatment

Special topic volume with invited peer-reviewed papers only

Edited by

**Prof. Takashige Omatsu, Prof. Lorenzo Donati,
Prof. Dr. Yurii Otrosh and Prof. Jong Wan Hu**

■ *Scientific.Net* ■

Copyright © 2024 Trans Tech Publications Ltd, Switzerland

All rights reserved. No part of the contents of this publication may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

Trans Tech Publications Ltd
Seestrasse 24c
CH-8806 Baech
Switzerland
<https://www.scientific.net>

Volume 987 of
Key Engineering Materials
ISSN print 1013-9826
ISSN web 1662-9795

Full text available online at <https://www.scientific.net>

Distributed worldwide by

Trans Tech Publications Ltd
Seestrasse 24c
CH-8806 Baech
Switzerland

Phone: +41 (44) 922 10 22
e-mail: sales@scientific.net

Preface

This special edition presents cutting-edge research results and insights across areas: materials and processing technologies, waste treatment, and materials and technologies in construction.

The first chapter explores the latest advancements in the mechanics of materials and materials processing techniques. From the modelling of innovative metal extrusion technology to the analysis of materials' mechanical properties, the articles in this chapter investigate how modern technological solutions are pushing the boundaries of manufacturing performance and efficiency.

The second chapter addresses one of the most urgent environmental challenges today - the management and recycling of waste. The articles in this chapter examine novel technologies for using industrial and household waste in particular in the production of building materials, focusing on how sustainable engineering solutions can transform waste into valuable resources, showcasing strategies to reduce the ecological impact of waste and promote circular economies.

The latest third chapter to some extent is a logical continuation of the previous chapter and delves into the development of materials and technologies designed to enhance the safety, and durability of infrastructural objects. This chapter covers innovations that are shaping the future of construction, offering modern practical solutions.

This publication provides a comprehensive overview of technological development, highlighting the critical role that advanced materials and technologies play in addressing global challenges. This special edition will be an invaluable resource for researchers and engineers whose activity is related to machine building, construction and ecological safety.

Table of Contents

Preface

Chapter 1: Materials and Processing Technologies

Microstructure Evolution and FEM Prediction on AA6XXX Alloys M. Negrozio, R. Pelaccia, L. Donati, B. Reggiani and S. Di Donato	3
Recent Trends in Nitrogen Cooling Modelling of Extrusion Dies R. Pelaccia, M. Negrozio, S. Di Donato, L. Donati and B. Reggiani	11
Study of Direct Metal Extrusion by the Upper-Bound and Finite Volume Methods J.D. Bressan and M.M. Martins	23
Automated Optimum Extrusion Die Design and Profile Quality Control Based on Simulation I. Kniazkin, N. Biba, I. Kulakov, D. Alexey and S. Stebunov	31
Influence of Augmented Fixation to Dynamic Hip Screw on Trochanteric Lateral Wall N. Chantarapanich, S. Inglam and S. Wanchat	41
Digital Representation of Materials Testing Data for Semantic Web Analytics: Tensile Stress Relaxation Testing Use Case H.B. Nasrabadi and B. Skrotzki	47

Chapter 2: Waste Treatment

Characterization of Cocoa Waste Husks Charcoal from Suratthani Thailand as Potential Sources of High Valued Products N. Srirachya, S. Theput, A. Yasun, N. Saguansakbarammee, S. Thongnueaha and P. Nuchuay	55
Research on the Compressive Strength of Saltwater Mixing and Curing Cement Mortar Incorporating Blast Furnace Slag C.H. Wu, K.H. Chang, Z.Y. Luo and Y.C. Lee	61
Brownish Green Fired Clay Tiles Produced by Valorizing Green Glass Cullet and Sediment Soil W. Loetchantharangkun, A. Fugsang and U. Wangrakdiskul	67
Marble-Looking Fired Clay Tiles Produced by Utilizing Local Clay and Glass Cullet W. Loetchantharangkun, C. Pitipoomsuksan and U. Wangrakdiskul	75

Chapter 3: Materials and Technologies in Construction

Performance Based Seismic Evaluation of Four-Story School Building by Pushover Analysis Using the Metro Davao Earthquake Model R.A.C. Cabotaje and G.R. Bernardo	85
A Review of Three-Dimensional RGB Images and Drone Thermal Camera Images Merged for Building Information Modeling for Energy Audit J.C.P. Bajaro and A.D. Calderon	93
Assessment of Semi-Flexible Pavement Using Styrene-Butadiene Emulsion Modified Cement Grout T.M.C. Do and M.T. Nguyen	109