



Advanced Building Construction and Materials Handbook

Dr. Tanjina Nur, Ph.D.

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ADVANCED BUILDING CONSTRUCTION AND MATERIALS HANDBOOK



About the Editor

Dr. Tanjina Nur, Ph.D.

Tanjina finished her PhD in Civil and Environmental Engineering in 2014 from University of Technology Sydney (UTS). Now she is working as Post-Doctoral Researcher in the Centre for Technology in Water and Wastewater (CTWW) and published about eight International journal papers with 80 citations. Her research interest is wastewater treatment technology using adsorption process.

List of Contributors

J. M. P. Q. Delgado

CONSTRUCT-LFC, Civil Engineering Department, Faculty of Engineering, University of Porto, 4200-465 Porto, Portugal

Robert Cerný

Department of Materials Engineering and Chemistry, Faculty of Civil Engineering, Czech Technical University in Prague, Thákurova 7, 166 29 Prague 6, Czech Republic

A. G. Barbosa de Lima

Department of Mechanical Engineering, Federal University of Campina Grande, 58429-900 Campina Grande, PB, Brazil

A. S. Guimarães

CONSTRUCT-LFC, Civil Engineering Department, Faculty of Engineering, University of Porto, 4200-465 Porto, Portugal

Gonzalo Martínez-Barrera

Laboratorio de Investigación y Desarrollo de Materiales Avanzados (LIDMA), Facultad de Química, Universidad Autónoma del Estado de México, Km. 12 de la Carretera Toluca-Atlacomulco, 50200 San Cayetano, MEX, Mexico

Osman Gencel

Civil Engineering Department, Faculty of Engineering, Bartın University, 74100 Bartın, Turkey

João Marciano Laredo dos Reis

Theoretical and Applied Mechanics Laboratory (LMTA), Universidade Federal Fluminense, 24220 Rio de Janeiro, Brazil

Juan José del Coz Díaz

Departamento de Construcción, Universidad de Oviedo, 33204 Gijón, Spain

A. Váz Sá

Construction Technology, Quality and Management (GEQUALTEC), Faculdade de Engenharia da Universidade do Porto, Rua Dr. Roberto Frias s/n, 4200-465 Porto, Portugal

R. M. S. F. Almeida

Polytechnic Institute of Viseu-School of Technology & Management, Campus Politécnico de Repeses, 3504-510 Viseu, Portugal

Laboratory of Building Physics (LFC), Civil Engineering Department, Faculdade de Engenharia da Universidade do Porto, Rua Dr. Roberto Frias s/n, 4200-465 Porto, Portugal

H. Sousa

Construction Technology, Quality and Management (GEQUALTEC), Faculdade de Engenharia da Universidade do Porto, Rua Dr. Roberto Frias s/n, 4200-465 Porto, Portugal

J. M. P. Q. Delgado

Laboratory of Building Physics (LFC), Civil Engineering Department, Faculdade de Engenharia da Universidade do Porto, Rua Dr. Roberto Frias s/n, 4200-465 Porto, Portugal

Deuck-Mo Kim

Hanyang Experiment and Consulting, Hanyang University, ERICA Campus, Ansan 15588, Republic of Korea

Hwa-Sung Ryu

Hanyang Experiment and Consulting, Hanyang University, ERICA Campus, Ansan 15588, Republic of Korea

Sang-Heon Shin

Hanyang Experiment and Consulting, Hanyang University, ERICA Campus, Ansan 15588, Republic of Korea

Won-Jun Park

Department of Building System Engineering, Kangwon National University, Samcheok 25913, Republic of Korea

Desmond Opoku

Department of Architecture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Joshua Ayarkwa

Department of Building Technology, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Kofi Agyekum

Department of Building Technology, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Aiping Zhou

School of Civil Engineering, Nanjing Forestry University, Nanjing, Jiangsu 210037, China

Yuling Bian

School of Civil Engineering, Nanjing Forestry University, Nanjing, Jiangsu 210037, China
Wuxi Institute of Commerce, Wuxi, Jiangsu 214153, China

Henning von Daake

Building Materials and Construction Chemistry, Technische Universität Berlin, Berlin, Germany

Thomas Ballweg

Fraunhofer-Institute for Silicate Research ISC, Würzburg, Germany

Dietmar Stephan

Building Materials and Construction Chemistry, Technische Universität Berlin, Berlin, Germany

Mark Bediako

Council for Scientific and Industrial Research—Building and Road Research Institute, Materials Division, Kumasi, Ghana.

Augustine Osei Frimpong

Council for Scientific and Industrial Research—Building and Road Research Institute, Materials Division, Kumasi, Ghana.

Francesca Giglio

Department of Architecture and Territory, University of Mediterranean Studies, Reggio, Italy

Samir Dziri

Groupe RaMsEs, Institut Pluridisciplinaire Hubert Curien (IPHC), Université de Strasbourg, Strasbourg, France

Abdellatif Nachab

Groupe RaMsEs, Institut Pluridisciplinaire Hubert Curien (IPHC), Université de Strasbourg, Strasbourg, France

Abdelmjid Nourreddine

Groupe RaMsEs, Institut Pluridisciplinaire Hubert Curien (IPHC), Université de Strasbourg, Strasbourg, France

Addil Sellam

Groupe RaMsEs, Institut Pluridisciplinaire Hubert Curien (IPHC), Université de Strasbourg, Strasbourg, France

Dominique Gelus

Groupe RaMsEs, Institut Pluridisciplinaire Hubert Curien (IPHC), Université de Strasbourg, Strasbourg, France

Liang Xia

Department of Architecture and Built Environment, University of Nottingham Ningbo China, Ningbo, China

Tong Yang

Department of Architecture and Built Environment, University of Nottingham Ningbo China, Ningbo, China

Yue Chan

School of Mathematical Sciences, University of Nottingham Ningbo China, Ningbo, China

Llewellyn Tang

Department of Architecture and Built Environment, University of Nottingham Ningbo China, Ningbo, China

Yung-Tsang Chen

Department of Civil Engineering, University of Nottingham Ningbo China, Ningbo, China

Gilbert Ganga

Ecole Nationale Supérieure Polytechnique (ENSP), Université Marien Ngouabi, Brazzaville, Congo

Timothee Nsongo

Faculté des Sciences et Techniques, Université Marien Ngouabi, Brazzaville, Congo

Hilaire Elenga

Faculté des Sciences et Techniques, Université Marien Ngouabi, Brazzaville, Congo

Bernard Mabiala

Ecole Nationale Supérieure Polytechnique (ENSP), Université Marien Ngouabi, Brazzaville, Congo

Thomas Tamo Tatsiete

Ecole Nationale Supérieure Polytechnique (ENSP), Université de Yaoundé I, Yaoundé, Cameroun

Nzonzolo

Ecole Nationale Supérieure Polytechnique (ENSP), Université Marien Ngouabi, Brazzaville, Congo

Anthony Torres

Department of Engineering Technology, Texas State University, San Marcos, TX, USA

Alex Burkhart

Department of Engineering Technology, Texas State University, San Marcos, TX, USA

Osama A. B. Hassan

Department of Science and Technology, Linköping University, Norrköping, Sweden

Petra Jonsson

Petra Jonsson, Lindbäcks bygg, Piteå, Sweden

Byung-Wan Jo

Department of Civil and Environmental Engineering, Hanyang University, Seoul 133791, Republic of Korea

Sumit Chakraborty

Department of Civil and Environmental Engineering, Hanyang University, Seoul 133791, Republic of Korea

Ki Heon Kim

Department of Civil and Environmental Engineering, Hanyang University, Seoul
133791, Republic of Korea

Yun Sung Lee

Department of Civil and Environmental Engineering, Hanyang University, Seoul
133791, Republic of Korea

Mridul Garg

Environmental Science & Technology Division, CSIR-Central Building Research Institute, Roorkee 247 667, India

Aakanksha Pundir

Environmental Science & Technology Division, CSIR-Central Building Research Institute, Roorkee 247 667, India

N. Nalanth

Anna University Chennai, Tamil Nadu, India

P. Vincent Venkatesan

Department of Civil Engineering, Mepco Schlenk Engineering College, Tamil Nadu, India

M. S. Ravikumar

Department of Civil Engineering, Noorul Islam University, Tamil Nadu, India

Preface

This aim of this book is to give details idea about advanced research on building construction and materials. Firstly, we try to start with advances in building technologies and novel technologies and applications for construction materials. Then we move on numerical analysis of the plastering mortars with phase change materials and properties of calcium acetate manufactured with etching waste solution and limestone sludge as a cementitious admixture. We also presents factors inhibiting the use of bamboo in building construction in Ghana and experimental study on the flexural performance of parallel strand bamboo beams In the middle part of the book, we describe controlled release of construction chemicals by encapsulation and alternative binders for increased sustainable construction in Ghana as a guide for building professionals. Then we try to find out the use of materials from biomass as construction materials and experimental and simulated effective dose for some building materials in France. We also focus on the optimisation of direct expansion (DX) cooling coils aiming to building energy efficiency and effect of incorporation of chips and wood dust mahogany on mechanical and acoustic behaviour of brick clay. At the end, we try to develop sustainable high strength concrete mixtures using local materials and recycled concrete an alternative construction material for the exterior walls of passive house. Effectiveness of the top-down nanotechnology in the production of ultrafine cement and utilization of brine sludge in non-structural building components are also described. Lastly, we give an evaluation of the fresh and hardened properties of steel fibre reinforced self-compacting concrete using recycled aggregates as a replacement material.

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INTRODUCTION

Construction is the process of constructing a building or infrastructure. Construction differs from manufacturing in that manufacturing typically involves mass production of similar items without a designated purchaser, while construction typically takes place on location for a known client. Construction as an industry comprises six to nine percent of the gross domestic product of developed countries. Construction starts with planning, design, and financing; and continues until the project is built and ready for use.

Large-scale construction requires collaboration across multiple disciplines. An architect normally manages the job, and a construction manager, design engineer, construction engineer or project manager supervises it. For the successful execution of a project, effective planning is essential. Those involved with the design and execution of the infrastructure in question must consider zoning requirements, the environmental impact of the job, the successful scheduling, budgeting, construction-site safety, availability and transportation of building materials, logistics, inconvenience to the public caused by construction delays and bidding, etc.

Best Building and Construction Materials

Choosing the right building and construction materials for your project involves more than simply placing an order with a local building supply firm. There are several key factors that must be considered in order to make the best choices for complying with local building codes and making sure the structure meets all appropriate safety standards. In addition, factors such as price, quality, and whether to make use of reclaimed or recycled building and construction materials is also important to consider.

One of the best ways to begin your search for the ideal building materials is to consider the scope of your building project. Work with contractors who are familiar with local building codes and have some idea of what type of materials are considered safe for use in certain types of projects. This will help you narrow the scope of possible materials and also pick up a few clues as to what to look for in each of those material types. Making sure you select materials that are in compliance with local building codes will save a lot of money later on.



Also allow for your personal preferences in terms of the type of building and construction materials selected. If the idea is to make use of salvaged materials and other forms of green building supplies, identify which types can be used in your construction project. Along with being environmentally friendly, reclaimed or recycled materials that meet local specifications are often available at a fraction of the cost of new materials. When it comes to finding green building supplies, check at demolition sites, salvage yards, and other venues in which older building and construction materials may be housed. There is a good chance you can find quality doors and door frames, support beams, masonry items, and a wide range of other materials that would be ideal for your project. While in some cases you may have to arrange transport of the materials to your building site, the overall cost should still be less than ordering new materials.



Price is also a consideration when you are selecting the right building and construction materials for a project. The idea is to secure the most practical materials for the lowest cost possible, which in turn means there is less potential for running over budget on the project. Don't sacrifice quality in order to save money, since this could mean failing to pass building inspections later on and result in actually increasing the overall costs. Do some comparison shopping and find the best deals on the right materials, and the final result will be construction that is strong, secure and in full compliance with local codes, all without spending money unnecessarily.

Types of Raw Materials for Construction

Raw materials for construction are used to make various structures, and each material offers different advantages and uses. Brick is one of the common raw materials for