

WOODHEAD PUBLISHING SERIES IN CIVIL AND STRUCTURAL ENGINEERING



RECYCLED CONCRETE

TECHNOLOGIES AND PERFORMANCE



Edited by
VIVIAN W. Y. TAM
MAHFOOZ SOOMRO
ANA CATARINA JORGE EVANGELISTA

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List of contributors

Lara Carral Autonomous University of Aguascalientes, Aguascalientes, Ags., Mexico

Carlos Chastre CERIS, Department of Civil Engineering, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Caparica, Portugal

Wei Chen School of Civil Engineering and Architecture, Ningbo Technical University, Ningbo, Zhejiang Province, People's Republic of China

Jorge de Brito CERIS, Department of Civil Engineering, Architecture and Georesources, Instituto Superior Técnico, Universidade de Lisboa, Lisbon, Portugal

Ana Catarina Jorge Evangelista Engineering Institute of Technology, Perth, WA, Australia

Luís Evangelista CERIS, Department of Civil Engineering, Instituto Superior de Engenharia de Lisboa, Rua Conselheiro Emídio Navarro, Lisbon, Portugal

Karoline Figueiredo Programa de Engenharia Ambiental (PEA), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil

Fernando L. Gayarre University of Oviedo, Gijón/Xixón, Asturias, Spain

Assed Haddad Programa de Engenharia Ambiental (PEA), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil

Ruoyu Jin School of Built Environment and Architecture, London South Bank University, London, United Kingdom

Luiz Sarti Junior Universidade Federal de São Carlos (UFSCar), São Carlos, São Paulo, Brazil

Katarzyna Kalinowska Faculty of Civil and Environmental Engineering, Bialystok University of Technology, Poland

Ni Nyoman Kencanawati Civil Engineering, University of Mataram, Mataram, Indonesia

Nariman J. Khalil Department of Civil & Environmental Engineering, University of Balamand, Koura, Lebanon

Oleksandr Kovalchuk V.D.Glukhovsky Scientific Research Institute for Binders and Materials, Kyiv National University of Construction and Architecture, Kyiv, Ukraine

Pavel V. Krivenko V.D.Glukhovsky Scientific Research Institute for Binders and Materials, Kyiv National University of Construction and Architecture, Kyiv, Ukraine

Carlos López-Colina University of Oviedo, Gijón/Xixón, Asturias, Spain

Rebeca Martínez University of León, León, Spain

Takao Namihira Institute of Industrial Nano Materials, Kumamoto University, Japan

João Pacheco CERIS, C5Lab - Sustainable Construction Materials Association, Edifício Central Park, Linda a Velha, Portugal

Sheyla Serra Universidade Federal de São Carlos (UFSCar), São Carlos, São Paulo, Brazil

Miguel A. Serrano University of Oviedo, Gijón/Xixón, Asturias, Spain

Mitsuhiro Shigeishi Department of Civil and Environmental Engineering and Architecture, Kumamoto University, Japan

Carlos Soares Universidade Federal Fluminense (UFF), Niterói, Rio de Janeiro, Brazil

Mahfooz Soomro School of Engineering, Design and Built Environment, Western Sydney University, Penrith, NSW, Australia

Jesús M. Suárez University of Oviedo, Gijón/Xixón, Asturias, Spain

Vivian W.Y. Tam School of Engineering, Design and Built Environment, Western Sydney University, Penrith, NSW, Australia

Victoria Zozulynets V.D.Glukhovsky Scientific Research Institute for Binders and Materials, Kyiv National University of Construction and Architecture, Kyiv, Ukraine

Quality improvement of recycled aggregate

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Mahfooz Soomro¹, Vivian W.Y. Tam¹, Mitsuhiro Shigeishi²,
Ni Nyoman Kencanawati³, Takao Namihira⁴ and Katarzyna Kalinowska⁵

¹School of Engineering, Design and Built Environment, Western Sydney University, Penrith, NSW, Australia; ²Department of Civil and Environmental Engineering and Architecture, Kumamoto University, Japan; ³Civil Engineering, University of Mataram, Mataram, Indonesia; ⁴Institute of Industrial Nano Materials, Kumamoto University, Japan; ⁵Faculty of Civil and Environmental Engineering, Bialystock University of Technology, Poland

5.1 Introduction

By: Mahfooz Soomro and Vivian W.Y. Tam.

Construction industry is a major consumer of resources. Increasing activities in infrastructure development, renovation, urbanization and industrialization around the globe are the key drivers, which increase the demand for virgin aggregate consumption in construction projects and it is growing year on year.

Concrete is widely used as a basic material for construction and infrastructure. About 500 million tons of concrete were produced in Japan around 1990s. In recent years, around 35 million tons of demolished concrete are being generated every year. Due to the regulations in Japan, not a little concrete is illegally dumped or mixed with construction soil that is not properly treated as waste. At present, 95% of the concrete is recycled using cascade recycling and subsequently reused as a low-quality road subbase. Few advanced processing to reproduce high-quality recycled aggregate from demolished concrete are carried out at present. Soon, a substantial amount of concrete will reach its end of life from the construction undertaken during the economic growth of 1960 and 1970s, and the generation of demolished concrete is expected to rapidly increase and may create extremely serious environmental problems (Shima et al., 2005b).

The demolition of concrete structures produces a large amount of waste and most of it end-up in the landfills. It will lead to a potential problem of filling up the landfills soon because more of the old and dilapidated concrete structures need to be demolished (Azúa et al., 2019). The waste is also generated from the construction process. The construction sector in Europe generates 50% of the waste originating from the construction and demolition waste (CDW) of all the total waste. Until now, concrete and mortar are the most popular materials in the construction world. In addition, for every ton of material mined, on average more than 85% is wasted (Villoria-Sáez et al., 2020). CDW has become one of the major problems in the construction industry as it directly impacts the environment. It is estimated that around 35% of CDW ends up