

1. Record Nr.	UNINA9910299675603321
Autore	Pepe Marco
Titolo	A Conceptual Model for Designing Recycled Aggregate Concrete for Structural Applications // by Marco Pepe
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2015
ISBN	3-319-26473-7
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (178 p.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	620.13
Soggetti	Building materials Mechanics Mechanics, Applied Physics Building Materials Solid Mechanics Structural Materials Numerical and Computational Physics, Simulation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"Doctoral Thesis accepted by University of Salerno, Italy"--Title page.
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Parts of this thesis have been published in the following journal articles; Supervisor's Foreword; Acknowledgments; Contents; Symbols and Abbreviations; About the Author; 1 Introduction; 1.1 Motivation; 1.2 Main Contributions; 1.3 Thesis Outline; References; 2 Concrete Industry: Waste Generation and Environmental Concerns; 2.1 Construction and Demolition Waste; 2.2 Concrete and Construction Industry: Aggregates Sources; 2.3 Concrete and Construction Industry: Cement Production; References; 3 Regulatory Environment and Guidelines for RACs; 3.1 The Italian Code for Constructions 3.2 RILEM Recommendations3.3 DAfStb Guidelines and DIN Standards; 3.4 British Standards; 3.5 Buildings Department of the Hong Kong; 3.6 American Concrete Institute; 3.7 Cement Concrete and Aggregates Australia; 3.8 Main Conclusions Drawn from Existing Regulations and Standards; References; 4 Recycled Concrete Aggregates; 4.1 State of

the Art for Recycled Concrete Aggregates (RCAs); 4.1.1 Processing Procedures; 4.1.2 Attached Mortar Evaluation; 4.1.3 Engineering Properties of RCAs; 4.2 Physical and Mechanical Characterisation of RCAs; 4.2.1 Attached Mortar Content
 4.2.2 Porosity, Water Absorption and Particle Density
 4.2.3 Mechanical Strength; 4.2.4 Bond Strength Between Aggregates and Cement Paste; 4.3 Alternative Processing Procedures for RCAs; References; 5 Recycled Aggregate Concretes; 5.1 Basic Aspects About Concrete Mix Design and Technology; 5.1.1 The Role of Aggregates in Concrete Mixture; 5.1.2 Portland Cement; 5.1.3 Influence of Moisture Content and w/c Ratio; 5.1.4 Curing Conditions; 5.2 State of the Art for Recycled Aggregate Concrete (RAC); 5.2.1 Workability; 5.2.2 Compressive Strength; 5.2.3 Static Modulus of Elasticity
 5.2.4 Tensile and Flexural Strength
 5.2.5 Drying Shrinkage; 5.3 Experimental Activities; 5.3.1 Influence of Alternative Processing Procedures on RCAs; 5.3.2 Influence of the Initial Moisture Condition of RCAs; 5.3.3 Influence of the Aggregate Replacement and Water to Cement Ratios; References; 6 Insights into the Influence of Cement Replacement in Recycled Aggregate Concrete; 6.1 Fly Ash in Recycled Aggregate Concrete; 6.1.1 Workability; 6.1.2 Compressive Strength; 6.1.3 Alkali-Silica Reaction; 6.1.4 Carbonation Depth; 6.1.5 Chloride Ion Penetration Resistance; 6.2 Experimental Activities
 6.2.1 Mix Composition and Experimental Programme
 6.2.2 Analysis of the Results; 6.3 Empirical Relationships for Compressive Strength of RAC+Fly Ash; 6.4 Conclusions; References; 7 Predicting the Mechanical Properties of RAC; 7.1 Compressible Packing Model; 7.1.1 Theoretical Formulation; 7.1.2 Application; 7.2 Lattice Model; 7.2.1 Theoretical Formulation; 7.2.2 Application; 7.3 A Proposed Conceptual Model for RACs; 7.3.1 Hydration Model; 7.3.2 Proposed Formulations for Predicting the Strength of RAC; 7.3.3 Model Validation; References; 8 Mix Design Formulation for RAC
 8.1 Conceptual Model Flow Chart

Sommario/riassunto

This book reports on the physical and mechanical characterization of Recycled Aggregate Concrete (RAC), produced through a partial-to-total replacement of ordinary aggregates with what have been dubbed Recycled Concrete Aggregates (RCAs). It proposes a theoretical framework for understanding the relationships between RCAs and RCA, and for predicting the resulting behavior of RAC. The book demonstrates that in the case of RAC two additional parameters have to be taken into account than with ordinary aggregates, due to the composite nature and higher porosity of RCAs. By extending Abrams' Law for Recycled Aggregate Concrete, it represents a first step in the formulation of a general model for predicting the properties of RAC. The theoretical approach presented here addresses an important gap in the literature and is expected to stimulate new research on the use of this more sustainable form of concrete in structural applications.