

# **12th International Scientific Conference Civil Engineering Design and Construction (DCB 2022)**

IOP Conference Series: Materials Science and Engineering  
Volume 1276

Online  
7 – 10 September 2022

ISBN: 978-1-7138-6983-2  
ISSN: 1757-8981

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 3.0 International Licence.  
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2023)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

Preface	
Peer Review Statement	
Analysis and Characterization of Modern and Ancient Mortars.....	1
<i>V Stoyanov, B Kostova, B Dumanov</i>	
End-Of-Life Options for Ceramic Masonry Units – Environmental and Performance-Based Perspective.....	10
<i>Yana D Kancheva, Roumiana A Zaharieva</i>	
Impact of Recycled Aggregate Properties on Concrete Performance.....	20
<i>R Zaharieva, G Dimitrov</i>	
Effect of Coarse Aggregate Characteristics on the Permeability Properties of Pervious Concrete .....	30
<i>M Daukšys, A Dunauskas, S Juočiūnas</i>	
Thermal Investigation on High Temperature Treatment of Cement Mortars with High Content of Marble Powder .....	40
<i>V Stoyanov, V Petkova, B Kostova, T Kaljuvee</i>	
Influence of the Concrete Strength Class and the Span/Depth Ratio on the Sustainability of Reinforced Concrete Beam Slabs .....	49
<i>T Chardakova, M Traykova</i>	
Dynamic Analysis of Structures Using MATLAB .....	59
<i>J Melcer, V Valašková</i>	
Assessment of the Effects of Strong Earthquakes on the City of Plovdiv .....	69
<i>D Stefanov, D Solakov, J Milkov</i>	
Formulation of Parameter Limit Values for the Operation of a Large Concrete Gravity Dam.....	79
<i>O K Todorov, S S Petkova, D S Kisliakov</i>	
Modified Anderson-Bjork’s Method for Solving Non-Linear Equations in Structural Mechanics .....	89
<i>N Ganchovski, A Traykov</i>	
Capacity of Axially Loaded RC Columns with Arbitrary Cross Sections to Eurocode 2.....	100
<i>M. Traykova, N. Ganchovski, A. Traykov</i>	
Analysis of a Column with Variable, Arbitrary Shaped Cross Section, Including Initial Imperfections, Geometric and Material Nonlinearity.....	112
<i>A. Traykov, N. Ganchovski</i>	
Determination of the Natural Frequencies and Periods of a Body with a Fixed Point .....	124
<i>T Todorov</i>	
Bearing Capacity of Surface-Strengthened Concrete Beam Elements. Parametric Analysis. ....	132
<i>A Yanakieva, G Nikolova, A Baltov</i>	
Seismic Response of Embedded Retaining Wall for Excavation Support.....	142
<i>L Mihova, M Topalska</i>	

Comparison Analysis of Bearing Capacity of Arch Bridges, Where the Influence of the Stability is Taken into Account.....	152
<i>A K Jiponov</i>	
Inspection, Structural Analysis, and Assessment of the Existing Condition of the Tunnel Beneath the National Palace of Culture, Sofia, Bulgaria.....	161
<i>A K Jiponov</i>	
Helicopter Service of Hospital Building.....	171
<i>S Tsvetkov</i>	
Stability Behaviour of Concrete Arch Bridge Structures in Relation to the Load Direction Out of the Arch's Plane.....	181
<i>V T Nikolov</i>	
Service Condition of Several Pedestrian Cable-Supported Bridges in the Rhodopi Mountain of Bulgaria .....	188
<i>S D Ivanov, L D Georgiev</i>	
Composite Girders of Classes 1 and 2 with Partial Plasticization .....	196
<i>Encho Dulevski</i>	
On the Need to Include Prestressed Steel Structures in the Standard EN 1993. Load-Bearing Capacity of Steel Tensioners According to the Rules of EN 1993 .....	202
<i>T Georgiev</i>	
Numerical Modeling of Mechanical Behavior of a Reinf Orced Concrete Column-Short Corbel Assembly Strengthened by Bonding a CFRF .....	209
<i>V Stankov, I Ivanova, J Assih, D Dontchev</i>	
Study of the Behavior of a Experimental Reinforced Concrete Slab at Different Stages of Loading from the Production of the Reinforced Concrete Slab Over it.....	219
<i>S Bakardzhiev</i>	
Monitoring of Road Infrastructure Operation Indicators Using Mobile Laser Scanning .....	228
<i>E Ivanova, S Gospodinov, D Boyadzhieva</i>	
Water Tanks - Checks of Tensile Internal Forces in the Walls of Cylindrical Tanks .....	235
<i>S Tsvetkov</i>	
The Septemvri-Dobrinishte Narrow-Gauge Railway Line – a Unique Project for Balkans.....	245
<i>M. G. Lepoev</i>	

**Author Index**