

Table of Contents

Preface

Chapter 1: Assessment of Structures Responses to Dynamic Loads

Post-Tensioned Reinforced Concrete Columns under Impact Loading G. Taheri, P. Máca, T. Schubert, N. Unger, S. Scheerer, B. Beckmann and S. Marx	3
Modelling Vehicular Impact for Threat-Dependent Progressive Collapse Assessments G. Montalbetti, A.S. Cao and A. Frangi	11
Investigation into the Effects of Blockage and Frangible Tunnel Sections on Blast Pressure Profiles A. Jose, C. Taggart and J. Adams	25
Experimental Investigation of Energy Absorption in 3D-Printed Polymeric Axial Members under High and Low-Speed Impact R.R. Swaish, M.A. Sadiq, A.S. Jaber and W. Ahmed	31
Preliminary Study on Design, Manufacture and Finite Element Analysis of the Absorbing Liner for Motorcycle Helmet H.L.Y. Zong and S.K. Subramaniyan	41
Experimental Study of the Behaviour of Sla Sandwich Panels with Different Micro Lattice Structures under Repeated Loading K. Aslantas and W. Ahmed	51
Experimental Study on Falling Debris Impact: A Basis for Pancake-Type Progressive Collapse Assessment E. Zeinali, F. Kiakojouri and V. De Biagi	59
Design and Development of an Interchangeable Clamp for Tensile Testing of UHMWPE Composites with 3D DIC A.R. Aziz, N. Kakur, H. Ramos and R. Santiago	67

Chapter 2: Behaviour of Structures at High Strain Rates

Behavior of Ice under Impact and Explosion Load M.Y. Orlov, V.P. Glazyrin and T.V. Fazylov	77
Dynamic Response of BFRP Bars Subjected to Impact Loading at High Strain Rates Z. Elnassar, M. Alkhader and F. Abed	87
Experimental Study on Structural Behavior of GFRP-Concrete-Steel Double-Skin Tubular Column under Near-Field Blast Load J. Yu, Y.H. Geng and X.W. Feng	93
Protection of Steel and Aluminum Foam Sandwich Structure with Polyurea and Stiffeners under Blast H. Sharma, K. Saini, S.P. Singh and V. Matsagar	101
Effect of Partial Composite Action on Performance of Precast Concrete Sandwich Wall Panels under Blast Load L. Gaur, B. Zaveri and J. Mandal	111
Damage Evaluation of UHPC Column Subjected to Contact Explosion R. Kumar Mishra and A. Ponnalagu	117

Chapter 3: Analysis and Simulation of Ballistic Impact

High Velocity Impact Studies of Ceramic/UHMWPE Composite Ballistic Plate Configurations R. Alameri, N. Kakur, R. Savioli, A.R. Aziz, N. Nikos and R. Santiago	127
Multiple Impact Behaviour of Nanoparticle Strengthened Ultra-High Molecular Weight Polyethylene Composite Ballistic Helmet M.D. Umbharatwala, M.D. Goel, M. Maeder and S. Marburg	135

Enhanced Penetration through Two-Stage Double-Blunt Projectile S. Alhosani, A. Husain and S.H. Khan	147
Ballistic Penetration Resistance of Reinforced and Non-Reinforced Concrete under High-Velocity Gas-Gun Impact H. Ramos, F.R. de Souza, N. Nikos, O.B. Nabila, R. Savioli, F.d.A. Silva and R. Santiago	155

Chapter 4: Design of Blast and Impact-Resistant Structures

Validation of an Automatic Lattice Generation Framework and Comparative Analysis of Lattice-based Metamaterials for Impact Protection S. Annunziata, E. Shehu, L. Lomazzi and A. Manes	167
Modeling of Confined Explosions: An Uncoupled Eulerian-Lagrangian Approach for Blast Wave Propagation and Structural Assessment E. Shehu, L. Lomazzi and A. Manes	177
Comparison of ALE, LBE, and the Idealized Triangular Loading Method for Evaluating an EDST Blast Loading on a Laboratory-Scale RC Column W. Ben Kraiem, M. Ben Rhouma, B. Belkassem and D. Lecompte	185
Energy-Based Monitoring Technique for Progressive Collapse Prevention in Complex Structures L. Abbracciavento and V. De Biagi	195

Chapter 5: Innovative Impact-Resistance Materials

The Low Velocity Impact Properties of Multiaxial Three Dimensional (3D) Woven Composites M. Korkmaz, A.R. Labanieh, X. Legrand and F. Boussu	205
Hybrid Metallic and Composite Armoring Solution for Blast Protected Vehicles I. Benmessaoud, H. Vanmaele, P. Guillou-Keredan, S. Lemercier, X. Legrand and F. Boussu	211
Enhanced Anchorage Techniques for Smooth Surfaced Nitinol-SMA Rebars M. Basha, A. Issa and A. Bediwy	221
Experimental Analysis and Numerical Modeling of Energy Absorption Capability and High Deformation Response in 3D-Printed Multilayer Panels H. Alhefeiti, A. El Hassan, K. Harib, W. Ahmed, F.K.S. Al Jahwari and K. Aslantas	227

Chapter 6: Impact Analysis and Protection from Natural Disaster

Impact Response of Glass Façade to Wind Borne Debris: A Numerical Study D. Ambade, M.D. Goel and L.M. Gupta	239
Impact Resistance Study of a Protective Sabo Soil-Cement Structure Using a Weight Dropping Device T. Horiguchi and K. Ichiro	249
Effects of Eccentric Impacts and Corrosion on the Structural Behaviour of Retaining Wire Ring Nets F. Pimpinella, M. Marchelli and V. De Biagi	257
Performance Evaluation of a 4-m-high Conventional Rockfall Protection Fence M. Komuro, T. Kawarai, T. Nakamura and N. Kishi	265