

PROGRAM (April 26, 2024)

**4th International Conference on
Impact Loading of Structures and Materials**
May 13–17, 2024, Freiburg, Germany



Organized by:

Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI

Local committee:

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Dr. Andreas Heine
Dr. Stefano Signetti
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Carla Liermann

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MONDAY MAY 13, 2024

17:30–21:00	Welcome Reception at Historisches Kaufhaus Place: Historisches Kaufhaus, Muensterplatz 24, 79098 Freiburg im Breisgau	
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TUESDAY MAY 14, 2024

Place: Historisches Kaufhaus, Kaisersaal		
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08:40–08:50	Welcome	Hiermaier S. (Germany)
08:50–09:00	Laudatory Speech – Honoring of Magnus Langseth	Hiermaier S. (Germany)
09:00–09:05	Organizational Remarks	Heine A. (Germany)

Session 1: Dynamic Behavior of Materials I Chair: Langseth M. (Norway)		
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09:05–09:45	Keynote	Unveiling the unseen: Exploring sub-surface dynamics under shock loading using real-time synchrotron X-ray imaging	Eakins D. (United Kingdom)
09:45–10:05	2069	Cross dependences of high strain rate and cryogenic temperatures on steel, aluminium and CFRP	Pernas-Sánchez J. (Spain)
10:05–10:25	2031	Modeling the dynamic behavior of armor steel with inverse optimization	Rietkerk R. (Germany)

10:25–10:55	<i>Coffee Break</i>	
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Session 2: Impact Loading I / Crashworthiness I Chair: Lu G. (Australia)		
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10:55–11:15	2081	Numerical simulation on the local damage of RC slabs subjected to projectile impact	Beppu M. (Japan)
11:15–11:35	2135	Ricochet of 7.62 small caliber projectiles on the ceramic targets - Experimental and numerical investigation	Fras T. (France)
11:35–11:55	2019	Low-velocity impact on thick-wall wound composites for the sizing of hydrogen storage tanks	Vinot M. (Germany)
11:55–12:15	2131	Numerical material modelling of compact bone validated through experimental impact tests	Giustina A. (Italy)
12:15–12:35	2045	Investigation of metallic lattice structure with strain rate dependent unit cell under crash	Patil S. (Germany)

12:35–13:45	<i>Lunch</i>	
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Session 3: Crashworthiness II Chair: Duddeck F. (Germany)			
13:45–14:05	2065	Assessment of kinetic energy absorption characteristics in additively manufactured TPMS structures - Investigation on sheet and skeletal gyroid topologies	Haugou G. (France)
14:05–14:25	2059	Rate insensitive energy absorption achieved for intermediate-velocity impacts via composite AA6061/PVC foam structures	Magliaro J. (Canada)
14:25–14:45	2076	Data-driven analysis and design of 3D-printed bio-inspired structure for crashworthiness	Zhu F. (United States of America)
14:45–15:05	2153	Designing a diatom-inspired material for protective helmets	Avalle M. (Italy)
15:05–15:25	2026	Experimental and numerical study of lithium-ion pouch cells batteries under quasi-static and dynamic loads	Lapostolle L. (Norway)
15:25–15:55	<i>Group Photo + Coffee Break</i>		
Session 4: Dynamic Behavior of Materials II Chair: Ruan D. (Australia)			
15:55–16:15	2084	A study on measuring the impact force wave in Taylor impact test by utilizing the PVD films	Gao C. (Japan)
16:15–16:35	2121	Dynamic compressive behaviour of shear thickening fluid-filled miura-ori metamaterials	Lu G. (Australia)
16:35–16:55	2151	Influence of strain rate and stress state on dynamic strain ageing of 5xxx aluminum alloys	Klitschke S. (Germany)
16:55–17:15	2116	Characterization and modelling of granular materials under impact and shock loading	Ruiz Ripoll M. L. (Germany)
17:15–17:35	2030	High-strain-rate mechanical response of pure titanium processed by multistage hydrostatic extrusion	Farbaniec L. (Poland)
Social Event and Dinner			
18:30–19:30	Guided City Walk - Impressions of Freiburg with subsequent transfer by tram to the dinner location - Brauerei Ganter (Brewery) Meeting Point: in front of Historisches Kaufhaus (conference location)		
19:30–22:00	Barbecue at the Ganter Brewery, Brauerei Ganter, Schwarzwaldstr. 43, 79117 Freiburg		

WEDNESDAY MAY 15, 2024

Place: Historisches Kaufhaus, Kaisersaal			
09:00–09:05		Organizational Remarks	Heine A. (Germany)
Session 5: Blast Loading I & Impact Loading II Chair: Riedel W. (Germany)			
09:05–09:45	Keynote	From detonation to structural/material response: experimental and modelling approaches	Langdon G. (United Kingdom)
09:45–10:05	2114	Predicting ricochet of hypervelocity impact on a thin plate	Gökstorp F. (Sweden)
10:05–10:25	2052	Quasi-static and dynamic flexural response of density-graded Voronoi honeycomb sandwich structures	Shim V. (Singapore)
10:25–10:55		<i>Coffee Break</i>	
Session 6: Blast Loading II Chair: Langdon G. (United Kingdom)			
10:55–11:15	2137	Modelling of reinforced concrete walls subjected to blast loads	Johnsson A. (Sweden)
11:15–11:35	2088	Optimization and experimental investigation of the blast response of additive manufactured sandwich structures with lattice core	Kappe K. (Germany)
11:35–11:55	2010	Blast response of fibre metal laminates	Guan Z. (United Arab Emirates)
11:55–12:15	2063	Blast protection with absorbing materials for industrial structures	Blanc L. (France)
12:15–12:35	2064	Damage identification by iFEM on marine structures subjected to air-blast loading	Bardiani J. (Italy)
12:35–13:40		<i>Lunch</i>	
Social Event and Dinner			
14:00–23:00		Conference Tour to Staufen im Breisgau Bus transfer from/to: Karlsplatz, Freiburg	

THURSDAY MAY 16, 2024

Place: Historisches Kaufhaus, Kaisersaal			
09:00–09:05		Organizational Remarks	Heine A. (Germany)
Session 7: Numerical Simulation Chair: Hiermaier S. (Germany)			
09:05–09:45	Keynote	Machine learning techniques for crash optimisation	Duddeck F. (Germany)
09:45–10:05	2138	The APOLLO Blastsimulator co-simulation-interface for blast-loading of structures	Klomfass A. (Germany)
10:05–10:25	2066	Modeling the fragmentation of concrete under high-dynamic loading	Grunwald C. (Germany)
10:25–10:55		<i>Coffee Break</i>	
Session 8: Impact Loading III Chair: Forquin P. (France)			
10:55–11:15	2159	Behaviour of double layered nuclear containment structure against rigid missile impact	Iqbal M. (India)
11:15–11:35	2130	Enhancing the ballistic performance of UHMWPE laminates through incorporation of nano-fillers	Santiago R. (United Arab Emirates)
11:35–11:55	2090	Ballistic resistance of 3D printed fiber reinforced composite	Ruan D. (Australia)
11:55–12:15	2071	An analytical model for high velocity impacts of soft materials	Lopez Puente J. (Spain)
12:15–12:35	2162	Impact testing of green concrete mixes	Huang T. (Singapore)
12:35–12:50		<i>Short walk to Fraunhofer EMI, Ernst-Zermelo-Str. 4, 79104 Freiburg</i>	

Place: Fraunhofer EMI

12:50–13:45

*Lunch***Session 9: Poster Session & Exhibition**

2004	Full-field transient response of ArmoX 440T panels to air-blast loading	Langdon G. (United Kingdom)
2011	Tensile properties of 3D printed continuous fiber reinforced composites at different strain rates	Ruan D. (Australia)
2051	Thermo-elastic stress heating measurements captured at the moment of tensile fracture by a cooled broadband infrared camera	Dumont A. (Canada)
2060	A comprehensive approach in optimization of hybrid panels for enhanced ballistic resistance	Santiago R. (United Arab Emirates)
2067	Elastic hyperbolic strips for confining vibrations	Lomazzi L. (Italy)
2073	Numerical and analytical modeling of a shaped charge jet penetration depth	Elek P. (Serbia)
2079	High-velocity impact damage caused by spherical and cube-shaped SS304 fragments on Steel 1006 targets: an experimental and numerical study	Dewangan M. (India)
2085	Numerical model of curved composite tiles under low velocity impact loading	Rezaei A.S. (Italy)
2094	Numerical investigation of counterintuitive behavior of blast-loaded composite plates	Shehu E. (Italy)
2100	Numerical study of the effect of lamination sequence and reinforcement by carbon nanotubes on the composite behavior under ballistic impacts	Nanema B.L.T. (Tunisia)
2101	Response of aluminum and carbon fiber-reinforced polymer plates to consecutive impact and blast loads	Chordiya Y. (India)
2107	Experimental and numerical evaluation of CNT reinforced Alumina/Cor-dura® composite system against oblique ballistic impacts	Goel M.D. (India)
2112	Physics-informed machine learning models applied to crashworthiness simulations	Bianchessi A. (Brazil)
2113	Impact characteristic and energy absorption of auxetic structure for crashworthiness applications	Ahmad Z. (Malaysia)
2122	Investigation into the permanent deformation on a plate generated by a mass impactor	Chen S. (Australia)
2127	A stochastic gradient based homogenisation theory for architected plates subjected to impact loading	Sarkar S. (India)
2132	Generic vehicle models for simulating impacts on security barriers	Markovic D. (Italy)
2136	Developing lightweight impact resistant panels using numerical tools	Guan Z. (United Arab Emirates)

Session 9: Poster Session & Exhibition		
2141	Response of auxetic tubes under internal blast loading	Zhang J. (Australia)
2145	Magnetic pulse disassembly of laminate structures	Lagain B. (France)
2149	Arena trials: Experimental characterization of fragmentation of an airborne ammunition	Pirotais O. (France)
2151	Influence of strain rate and stress state on dynamic strain ageing of 5xxx aluminum alloys	Klitschke S. (Germany)
2154	The effect of manufacturing process to the axial crushing behavior of double-hat multi-corner crash box	Jusuf A. (Indonesia)
2155	Experimental & numerical study on hybrid aluminum/GFRP hexagonal crash box under quasi-static axial compression	Putra I.S. (Indonesia)
2156	Characterization of mechanical properties of aluminum foam at high strain rate using SHPB test	Gunawan L. (Indonesia)
2157	Theoretical, numerical and experimental parametric crushing analysis of multi-corner column	Dirgantara T. (Indonesia)
2160	Numerical studies on ballistic resistance of reinforced and prestressed concrete targets	Kamran K. (India)
15:10–15:25	<i>Short Walk to Historisches Kaufhaus</i>	
Place: Historisches Kaufhaus, Kaisersaal		
15:25–15:55	<i>Coffee Break</i>	
Session 10: Defense and Industrial Applications		
Chair: Heine A. (Germany)		
15:55–16:35	Keynote	Challenges in applying ballistic and blast modelling to a forensic application: the Malaysian airlines MH17 incident
16:35–16:55	2072	Modelling and simulation of the pellet shattering process for the ITER disruption mitigation system
16:55–17:15	2087	Energy absorption of 3D-printed cellular structures for impact-resistant aircraft wing leading edge
17:15–17:35	2035	Effect of field ageing on the performance of a DYNEEMA-based ballistic protection
Social Event and Dinner		
19:00–23:00	Conference Dinner with welcome aperitif Location: Restaurant Dattler, Am Schlossberg 1, 79104 Freiburg	

FRIDAY MAY 17, 2024

Place: Historisches Kaufhaus, Kaisersaal			
09:00–09:05		Organizational Remarks	Heine A. (Germany)
Session 11: Impact Loading IV Chair: Fras T. (France)			
09:05–09:45	Keynote	Development of an integrated approach to improve the understanding of key material parameters that govern the ballistic performance of armour ceramics	Forquin P. (France)
09:45–10:05	2068	Usage of microtomography based representation of damaged ceramic plate for FEM impact simulations	Francart C. (France)
10:05–10:25	2163	Atomistic simulations of hypervelocity impacts: The tungsten case	Fraile García A. (Spain)
10:25–10:55		<i>Coffee Break</i>	
Session 12: Dynamic Behavior of Materials III Chair: Shim V. (Singapore)			
10:55–11:15	2075	Compression testing at strain rates of the order of 50,000 1/s	Gilat A. (United States of America)
11:15–11:35	2158	Friction influence on crashworthiness	Alves M. (Brazil)
11:35–11:55	2067	Elastic hyperbolic strips for confining vibrations	Lomazzi L. (Italy)
11:55–12:15	2134	Application of neural networks for the quantification of cracks in transparent armor materials	Bauer S. (Germany)
12:15–12:35	2129	Impact of elevated loading rates on fracture toughness in the ductile to brittle transition region	Tlatlik J. (Germany)
12:35–12:40		End of scientific program and closing remarks	
12:40–13:45		<i>Lunch at Historisches Kaufhaus</i>	
13:45		<i>End of Conference</i>	

