

Table of Contents

VOLUME 1

INVITED SPEECHES

- IS01** **The Ballistics of Hornussen** 3
B. KNEUBÜHL
- IS02** **The History of Explosives in Switzerland** 9
B. BERGER

INTERIOR BALLISTICS

- IB01** **Insensitive High Energy Propellants for Advanced Gun Concepts** 17
A.W. HORST, P. BAKER, B. RICE, P. KASTE, J. COLBURN, J. HARE
- IB02** **Advanced Cartridge Design for the Term-KE Round** 25
J.A. CONDON, A.B. CRICKENBERGER, M.E. AMORUSO, S.L. GHAZI,
J.T. BARNES
- IB03** **High Performance Propulsion Design for Future Kinetic Energy
Ammunition** 33
U. JECK-PROSCH, K. RYF
- IB04** **Ballistic Shelf Life of Propellants for Medium and Small Caliber
Ammunition – Influence of Deterrent Diffusion and Nitrocellulose
Degradation** 41
B. VOGELSANGER, B. OSSOLA, U. SCHÄDELI, D. ANTENEN, K. RYF
- IB05** **Development and Validation of a Comprehensive Model of the Plasma Jet
Generated by an Electrothermal-chemical Igniter** 49
M.J. NUSCA, M.J. MCQUAID, W.R. ANDERSON
- IB06** **Comparison of 0D and 1D Interior Ballistics Modelling of High
Performance Direct Fire Guns** 57
C.R. WOODLEY
- IB07** **Two-phase Flow Model of Gun Interior Ballistics** 65
D. MICKOVIĆ, S. JARAMAZ

IB08	Interior Ballistic Principle of High/Low Pressure Chamber in Automatic Grenade Launchers.....	73
	S. JARAMAZ, D. MICKOVIĆ, Z. ZIVKOVIĆ, R. ĆURČIĆ	
IB09	Factors Effecting the Accuracy of Internal Ballistics, Including the Simulation of Propellant Motion.....	81
	M.D. POCOCK, J.J. O'NEILL, C.C. GUYOTT	
IB10	A Two-Dimensional Internal Ballistics Model for Modular Solid Propellant Charges.....	89
	P.S. DU TOIT	
IB11	Investigations for Modeling Consolidated Propellants.....	99
	C. BONNET, P. DELLA PIETA, C. REYNAUD	
IB12	Burning Characteristics of Foamed Polymer Bonded Propellants.....	107
	T.S. FISCHER, A. MESSMER	
IB13	The Analysis of Gun Pressure Instability.....	115
	A.K. MACPHERSON, A.J. BRACUTI, D.S. CHU, P.A. MACPHERSON	
IB14	Influence of Different Ignition Systems on the Interior Ballistics of an EI-Propellant.....	123
	A. STEINMANN, B. VOGELSANGER, U. SCHAEDELI, E. ROCHAT, G. GIUSTI	
IB15	A Leading-Detonation-Tube Ignitor and Its Firing Results in a High Loading Density Separated-loaded Gun.....	131
	X. ZHANG, W. ZHOU, Y. YUAN, D. YANG	
IB16	Functional Lifetime of Gun Propellants.....	139
	C.A. VAN DRIEL, W.P.C. DE KLERK	
IB17	Spheroidal Propellant Stabilizer Studies.....	147
	A.F. GONZALEZ, H. SHIMM	
IB18	Applicability of the Hydrogen Gas Erosion Theory to Conventional Gun Propellants.....	155
	H. ARISAWA, J. KIMURA	
IB19	Experimental Investigation of Heat Transfer in a 120 mm Gun Barrel Based on a Space Marching Finite Difference Algorithm for the Inverse Conduction Method.....	163
	D. BOISSON, G. LÉGERET, J.F. BARTHÉLÉMY	

IB20	Analysis of ETC or Classical Manometric Closed Vessel Tests with Coupling of Thermodynamic Equilibrium Calculations: Combustion Rate, Energy Losses	171
	J.M. LOMBARD, B. BASCHUNG, D. GRUNE, A. CARRIÈRE, P. ANDRÉ	
IB21	Variation in Enhanced Gas Generation Rates in Electrothermal-chemical Closed Chamber Studies	179
	M. TAYLOR, C.R. WOODLEY	
IB22	Plasma Ignition of Consolidated Propellants in a 60-mm ETC Gun	187
	A. KAY, J. RAUPP, D. MURA, D. STEINBACH, D. HENSEL, H. PETER	
IB23	Plasma Ignition and Combustion	195
	A. KOLECZKO, W. EHRHARD, H. SCHMID, S. KELZENBERG, N. EISENREICH	
IB24	Discussion on Emission Spectroscopy Measurements from a Dense Electrothermal Launcher Plasma	203
	B. LI, H. LI	

LAUNCH DYNAMICS

LD01	Sabot Discard Model for Conventional and Electromagnetic Launch Packages	213
	M.E. ERENGIL	
LD02	Experimental and Simulation Analysis of Setback in Gun Launch	223
	P. CHURCH, W. HUNTINGTON-THRESHER, C. HERDMAN	
LD03	Measurements of Muzzle Break Effectiveness	231
	E. SCHMIDT	
LD04	Transitional Motion of KE Projectile and Governing Factors on Jump ..	239
	S. SHOJI, K. HINO	
LD05	Numerical Simulation of Intermediate Ballistics for Gun and Rocket Systems	249
	A.V. ZIBAROV	
LD06	Multistage Method for Acceleration of Bodies by a Railgun	257
	V.M. FOMIN, B.V. POSTNIKOV, G.A. SAPOZHNIKOV, V.P. FOMICHEV	
LD07	Computation of Muzzle Flow Fields Using Unstructured Meshes	265
	A.B. CROWLEY, J. SZMELTER	

LD08	Modelling of Fume Extractors	273
	C.M. WOODLEY	
LD09	Modeling and Simulation of the Gas Charging and Discharging Processes on Gun Bore Evacuator	281
	Q.-X. PEI, R. FOO	
LD10	Numerical Analysis of the Propagating Blast Wave in a Firing Range ...	289
	K. SAKAMOTO, K. MATSUNAGA, J. FUKUSHIMA, A. TANAKA	
LD11	Intermediate Ballistics Unsteady Sabot Separation: Computations and Validations	197
	R. CAYZAC, E. CARETTE, T. ALZIARY DE ROQUEFORT	
LD12	Temperature and Heat Transfer at the Commencement of Rifling of a 155 mm Gun	307
	B. LAWTON	
LD13	Gun Barrel Erosion: Study of Thermally Insulating Layers	315
	P. FRANCO, H. PETER	
LD14	A Study on the Erosion Characteristics of the Micropulsed Plasma Nitrided Barrel of a Rifle	323
	D.-Y. CHUNG, H.J. KIM, H.N. KIM	
LD15	Friction and Wear Mechanism at High Sliding Speeds	333
	T. MATSUYAMA	
LD16	Increasing the In-Bore Velocity Measurements Resolution Using non “Fourier” Time-Frequency Analysis	341
	M.C. MATOS, P.L.M. OSÓRIO, J.G.T. RIBEIRO	
LD17	The Development of Composite Sabots for Kinetic Energy Projectiles ...	347
	B.P. BURNS, W.H. DRYSDALE, C.P.R. HOPPEL, T.A. BOGETTI	
LD18	Structural Analysis of a Kinetic Energy Projectile for Medium Caliber Gun	355
	K.K. PATHAK, M. JHA	
LD19	Joining Jacket and Core in Jacketed Steel/Tungsten Penetrators	363
	H. FANG, J. HÖLZLE, W. LANZ	
LD20	Soft Recovery of Large Calibre Flying Processors	373
	J. HÖLZLE	

LD21	New Materials for Large-Caliber Rotating Bands for High Charges. . . .	379
	M. SCHUPFER, K. STEINHOFF, R. RÖTHLISBERGER	
LD22	Methodology for Hardening Electronic Components for Gun Launch Survival	387
	M. BERMAN, S. WILKERSON, D. HOPKINS, G. GAZONAS, A. FRYDMAN, D. CARLUCCI	
LD23	Adiabatic Depressurisation of Vented Vessels	395
	P.M. LOCKING	
LD24	Solid Fuel Ramjet (SFRJ) Propulsion for Artillery Projectile Applications – Concept Development Overview	403
	R. OOSTHUIZEN, J.J. DU BUISSON, G.F. BOTHA	

EXTERIOR BALLISTICS

EB01	Transonic Aerodynamic and Scaling Issues for Lattice Fin Projectiles Tested in a Ballistics Range	413
	G. ABATE, G. WINCHENBACH, W. HATHAWAY	
EB02	Flight Dynamics of a Projectile with High Drag Retarder Devices at Subsonic Velocities	421
	A. DUPUIS, W. HATHAWAY	
EB03	Flight Test Results of the Swedish-Dutch Solid Fuel Ramjet Propelled Projectile	429
	R.G. VERAAR, K. ANDERSSON	
EB04	Aeroelasticity of Very High L/D Bodies in Supersonic Flight: Numerical and Experimental Results	437
	S. HEDDADJ, R. CAYZAC, J. RENARD, M. GIRAUD	
EB05	A Simulation Technique for Analyzing Effect of GPS Receiver Characteristics on Performance of a Fire Direction System.	445
	P.T. ROJATKAR, S.V. GADE	
EB06	The Transition Ballistic Simulation Facility	455
	K. MATSUNAGA, K. SAKAMOTO, S. HISAJIMA	
EB07	Acceptance Criteria for Fire Prediction Accuracy	463
	P. A. KARSTEN	

EB08	On the Influence of Yaw and Yaw Rate (Magnitude and Orientation) on Dispersion	471
	W.J. ROSSOUW	
EB09	Diagnostic of the Behaviour of a Course-correction Ammunition During its Correction Phase	479
	A. ZILIANI, C. GRIGNON, C. TROUILLOT, C. JEANNIN	
EB10	The Influence of a Projectile Stability Subjected to Some Control Impulse Moments	489
	Z. WANG, E. WANG, L. WANG	
EB11	Aerodynamic Aspects of a Grid Finned Projectile at Subsonic and Supersonic Velocities.	495
	A. DUPUIS, C. BERNER	
EB12	Magnus Instabilites and Modeling for a 12.7 mm Projectile with Roll Damping Finlets From Free-Flight Tests at Mach 1.7	503
	A. DUPUIS, A. BERNIER, W. HATHAWAY	
EB13	Wind Tunnel Investigation of a High L/D Projectile with Grid Fin and Conventional Planar Control Surfaces.	511
	E.Y. FOURNIER	
EB14	Roll Producing Moment Prediction for Finned Projectiles.	521
	P. DENIS, P. CHAMPIGNY, R. CAYZAC	
EB15	Aerodynamic Wind-tunnel Test of a Ramjet Projectile	529
	F. DIONISIO, A. STOCKENSTRÖM	
EB16	Numerical Model for Analysis and Specification of a Ramjet Propelled Artillery Projectile.	537
	A. STOCKENSTRÖM	
EB17	Numerical Ricochet Calculations of Field Artillery Rounds	545
	T. JENSEN, O. DULLUM	

VOLUME 2

WARHEAD MECHANICS

WM01 Active Protection Against KE-Rounds and Shaped Charges at Short Distances	555
M. HELD	
WM02 Multiple Explosively Formed Penetrator (MEFP) Warhead Technology Development	563
R. FONG, W. NG, B. RICE, S. TANG	
WM03 Barnie: A Unitary Demolition Warhead	569
E.L. BAKER, A.S. DANIELS, K.W. NG, V.O. MARTIN, J.P. OROSZ	
WM04 Experimental and Numerical Studies of Annular Projectile Charges	575
J. MEISTER, F. HÄLLER	
WM05 Shaped Charge Warheads Containing Low Melt Energy Metal Liners ..	583
B. BOURNE, K.G. COWAN, J.P. CURTIS	
WM06 Comparing Alternate Approaches in the Scaling of Naturally Fragmenting Munitions	591
D.E GRADY, L.T. WILSON, D.R. REEDAL, L.D KUHNS, M.E. KIPP, J.W. BLACK	
WM07 Effect of Fragment Impact on Shaped Charge Functioning	599
P.Y. CHANTERET	
WM08 Breakup of Shaped-Charge Jets: Comparison Between Experimental and Numerical Data	607
M.D. RODRIGUEZ, V. JEANCLAUDE, J. PETIT, C. FRESSENGEAS	
WM09 Application of Overdriven Detonation of High Explosives to Shaped Charges	615
Z. LIU, S. ITOH, E. HITA, T. AWANO	
WM10 Relative Performance of Anti-air Missile Warheads	623
S. WAGGENER	
WM11 A Retrospective of the Past 50 Years of Warhead Research and Development – The Pre- and Present Computer Model Era	631
D.R. KENNEDY	

WM12 Time-Reversed, Flow-Reversed Ballistics Simulations: Do they Have Potential for Ballistics Design?.....	639
L. ZERNOW, E.J. CHAPYAK, R.P. GODWIN, D.R. SCHEFFLER	
WM13 TNT Blast Scaling for Small Charges.....	647
W.K.E. HUNTINGTON-THRESHER, I.G. CULLIS	
WM14 A Novel Approach to the Multidimensional Nature of Velocities of Fragments Originating from Convex Shaped Warheads	655
G.J.F. SMIT, F.J. MOSTERT, J.P. DU PLESSIS	
WM15 Fragmentation Properties of AerMet® 100 Steel in Two Material Conditions	663
L. CHHABILDAS, W. REINHART, L.T. WILSON, D.R. REEDAL, D.E. GRADY, J.W. BLACK	
WM16 Using a Numerical Fragmentation Model to Understand the Fracture and Fragmentation of Naturally Fragmenting Munitions of Differing Materials and Geometries	671
L.T. WILSON, D.R. REEDAL, L.D. KUHN, D.E. GRADY, M.E. KIPP	
WM17 Dual Mode Warhead Technology for Future Smart Munitions.....	679
D. BENDER, R. FONG, W. NG, B. RICE	
WM18 Steerable Hitiles Against TBM Warheads.....	685
M. HELD	
WM19 The Design of Small-Calibre Tandem Warhead against Tank With Reactive Armour.....	691
C. M. LING, Y.L. DONG, S.X. JUN, M.X. QING	
WM20 Application of Loose Powder Liner Shaped Charges to Avalanche Control .	697
C.A. WEICKERT, K.M. POWELL	
WM21 Lasers for AP-Mine Neutralisation	705
T. ROTHACHER, W. LÜTHY, H.P. WEBER	
WM22 A Reactive Mine Clearing Device: REMIC.....	713
M. MAJERUS, R. COLBERT, E. MOLENGRAFT, R. BROWN, D. PATEL	
WM23 The Measure of Jet “Goodness”.....	719
M.E. MAJERUS, R.M. COLBERT	
WM24 Some Improvements into Analytical Models of Shaped Charge Jet Formation	725
R. TREBINSKI	

WM25	Role of Texture in Spin Formed Cu Shaped-charge Liners	733
	A.J. SCHWARTZ, M.J. BUSCHE, R. BECKER, M. KUMAR, D.J. NIKKEL	
WM26	Predicted and Experimental Results of Shaped Charge Penetration with Liners of Measured Wall Thickness Variation	741
	F.J. MOSTERT, P.J. KÖNIG, K.D. WERNEYER	
WM27	The Design and Performance of Annular EFP's	749
	P. J. KÖNIG, F.J. MOSTERT	
WM28	Explosively Formed Penetrators (EFP) with Canted Fins	755
	D. BENDER, B. CHOUK, R. FONG, W. NG, B. RICE, E. VOLKMANN	
WM29	Analytical Code and Hydrocode Modelling and Experimental Characterisation of Shaped Charges Containing Conical Molybdenum Liners.....	763
	K.G. COWAN, B. BOURNE	
WM30	The Contribution to the Optimization of Detonation Wave Profile in the Shaped Charge Construction	773
	M. UGRČIĆ	
WM31	Variational Principle for Shaped Charge Jet Formation.....	781
	J. P. CURTIS	
WM32	The Effects of Finite Liner Acceleration on Shaped-Charge Jet Formation	789
	W.J. FLIS	
WM33	Investigation of Several Possibilities to Disturb the Jetting Process of 40 mm / 60° Charges.....	797
	C. VOUMARD, H. WISLER, G. BIERI	
WM34	Further Analytical Modelling of Shaped Charge Jet Break-up Phenomena	803
	K.G. COWAN, B. BOURNE	
WM35	Shaped Charge Jet Break-up Time Formula Confirmed	811
	E. HIRSCH, D. MORDEHAI	
WM36	Computer Simulation of Shaped Charge Jet Fragmentation.....	819
	H.E.V. KARLSSON	
WM37	Determination of Dynamic Tensile Strength of Metals from Jet Break-up Studies	827
	M. SINGH, M.S. BOLA, S. PRAKASH	

WM38 Coupled Map Lattice Model of Jet Breakup..... 835
R.W. MINICH, A.J. SCHWARTZ, E.L. BAKER

**WM39 The Indeterminacy of the Outgoing Flow of Two Impinging Asymmetric
Jets..... 843**
S. MILLER, R. CEDER

WM40 Electromagnetic Control of the Shaped-charge Effect..... 851
G. SHVETSOV, A. MATROSOV, S. FEDOROV, A. BABKIN, S. LADOV

WM41 Aero Stripping from a Water Jet 859
D.J. VAVRICK

WM42 Photoinstrumentation for Warhead Characterisation..... 867
R. CAMPBELL, C.R. WILKINSON

**WM43 A Practical Method to Determine Poisson's Ratio and Bulk Modulus of Solid
Explosive Materials as a Function of Pressure and Temperature 875**
R. KAESER, P. JAGGI

VULNERABILITY MODELING AND WOUND BALLISTICS

**VM01 The Development of a Physical Model of Non-Penetrating Ballistic
Injury..... 885**
L. CANNON, W. TAM

**VM02 Advanced Multiple Impact Endgame Model Against Ballistic Missile
Payloads 889**
R. LLOYD

**VM03 Assessment of Shaped Charge Jet Mitigation, and the Development of a
Hydrocode, Analytical Model Link 897**
W.K.E. HUNTINGTON-THRESHER, J.P. CURTIS, P.R. GREENWOOD,
P. MOSS, J. SMETHURST

VM04 Analysis of Active Protection Systems: When ATHENA Meets ARENA ... 905
P. WEY, V. FLECK, P.-Y. CHANTERET

**VM05 Numerical Modeling of a Simplified Surrogate Leg Subject to an
Anti-Personnel Blast Mine 913**
J. MOTUZ, D.S. CRONIN, M. WORSWICK, D. BOURGET, K. WILLIAMS,
G. PAGEAU

VM06	Numerical Head and Composite Helmet Models to Predict Blunt Trauma. .	921
	J. VAN HOOFF, D.S. CRONIN, M.J. WORSWICK, K.V. WILLIAMS, D. NANDLALL	
VM07	The Testing of the Tank Fire Control Systems Accuracy	929
	V. CECH, J. JEVICKÝ, S. ROLC	
VM08	Methodology for Predicting Ballistic Shock Response of the Future Ground Combat Vehicle	937
	A. FRYDMAN, T. LI, M. BERMAN, E. DALTON, B. LOPER	
VM09	Major Issues Affecting Characterisation and Modeling of Behind-armour Debris	945
	Y. BAILLARGEON, M. SZYMCZAK, A.S. DINOVITZER, T. BROWN, B. XU	
VM10	Digitization of Witness Pack Plates	953
	C.J.M. VAN DER WULP, J.H. MEULMAN, J.L. VEROLME	
VM11	Lightweight Passive Armour for Infantry Carrier Vehicle	961
	R.W.O. KWOK, F.U. DEISENROTH	
VM12	Lightweight Transparent Armour Systems for Combat Eyewear	969
	P.M. KELLY	
VM13	Non-KKV End Game Kinematic Plan of Anti Tactical Ballistic Missile with Target Coverage.	977
	L.-M. CHAO	
VM14	Defeating Active Defense Systems by Double-firing of Missiles.	985
	M. HELD	
VM15	A Comparative Evaluation of Personnel Incapacitation Methodologies. .	993
	G. ROMANCZUK, E.G. DAVIES, E.W. CROW, D.N. NEADES	
VM16	Behind Armour Blunt Trauma for Ballistic Impacts on Rigid Body Armour	1003
	D.S. CRONIN, M.J. WORSWICK, A.V. ENNIS, D. BOURGET, K.V. WILLIAMS, G. PAGEAU	
VM17	Soap and Gelatine for Simulating Human Body Tissue: An Experimental and Numerical Evaluation.	1011
	M. PIRLOT, G. DYCKMANS, I. BASTIN	
VM18	Sphere Penetration into Gelatine and Board	1019
	G. WIJK, Å. COLLIN, R. AMIREE	

**VM19 A Computer Program to Assess the Effectiveness of Shotgun Ammunition
against Wildfowl and other Quarry 1027**
D.W. LEEMING

VM20 Creams for Protection Against Skin Burns in Explosions..... 1035
M.R. WILLIAMS, L.J. DUNNE, B. PEARCE, B. LAWTON

VOLUME 3

TERMINAL BALLISTICS

- TB01 Whipple Shields Against Shaped Charge Jets 1045**
A.S. VLASOV, E.L. ZILBERBRAND, A.A. KOZHUSHKO, A.I. KOZACHUK,
G.S. PUGACHEV, A.B. SINANI
- TB02 General Overview of Capability in the Simulation of Shaped Charges
Penetrating Soil/Concrete Targets 1053**
P. CHURCH, R. CORNISH, I. CULLIS, R. WHEELER
- TB03 Analytical Model to Optimize the Passive Reactive Cassettes 1061**
M. BRAND, M. MAYSELESS, R. GENUSSOV
- TB04 Approximating the Ballistic Penetration Function of a Jet in a
Multi-Cassette Target by the Use of Neural Networks..... 1069**
E. GRUSS, E. HIRSCH
- TB05 Sensitivity of ERA-boxes Initiated by Shaped Charge Jets 1077**
A. KOCH, F. HÄLLER
- TB06 A Numerical Investigation of Top-Attack Submunition Impact on Steel
Target 1083**
M. JHA, P.K. ROY
- TB07 Protective Power of Thick Composite Layers Against Medium-Caliber
Long-Rod Penetrators 1091**
H.-J. ERNST, T. WOLF, W.F. UNCKENBOLD
- TB08 The effect of matrix type on the ballistic and mechanical performance of
E-glass composite armour 1099**
W. WONG, I. HORSFALL, S.M. CHAMPION, C.H. WATSON
- TB09 Size Scaling in Ballistic Limit Velocities for Small Fragments Perforating
Thin Plates..... 1107**
E.J. O'CONNOR, J.D. YATTEAU, P.T. DZWILEWSKI, S.R. FORD,
J.W. BLACK
- TB10 Reference Correlations for Tungsten Long Rods Striking Semi-infinite Steel
Targets 1115**
R. SUBRAMANIAN, S.J. BLESS

TB11	Oblique Plate Perforation by Slender Rod Projectiles.....	1123
	D. GEE	
TB12	Tungsten into Steel Penetration Including Velocity, L/D, and Impact Inclination Effects	1133
	J.D. WALKER, C.E. ANDERSON, D.L. GOODLIN	
TB13	On the Behaviour of Long-Rod Penetrators Undergoing Lateral Accelerations	1141
	H.F. LEHR, E. WOLLMANN, W. LANZ, K. STERZELMEIER	
TB14	Penetration Comparison of L/D=20 and 30 Mono-bloc Penetrators with L/D=40 Jacketed Penetrators in Different Target Materials	1151
	H.-J. ERNST, W. LANZ, T. WOLF	
TB15	Definition and Uses of Rha Equivalences for Medium Caliber Targets. .	1159
	T. FARRAND, L. MAGNESS, M. BURKINS	
TB16	Analytical Model of Long Rod Interaction with Spaced-plate Targets . .	1167
	S. CHOCRON, C.E. ANDERSON, J. D. WALKER	
TB17	Penetration of AP Projectiles into Spaced Ceramic Targets	1175
	Y. PARTOM, C.E. ANDERSON, D. YAZIV	
TB18	Behavior and Performance of Amorphous and Nanocrystalline Metals in Ballistic Impacts.	1183
	L. MAGNESS, L. KECSKES, M. CHUNG, D. KAPOOR, F. BIANCIANELLO, S. RIDDER	
TB19	Kinetic Energy Projectiles: Development History, State of the Art, Trends.....	1191
	W. LANZ, W. ODERMATT, G. WEIHRAUCH	
TB20	Kinetic Energy KE Ammunition for Medium Calibre Weapon Systems . .	1199
	P. LENZIN	
TB21	Multirole APFSDS-T Expanding the Traditional Terminal Ballistics for Medium Calibre Applications	1207
	J.G. HASSLID	
TB22	Penetration Mechanics of Extending Hemicylindrical Rods	1215
	D.L. LITTLEFIELD, W.G. REINECKE	
TB23	Evaluation of Replica Scale Jacketed Penetrators for Tank Ammunition. .	1223
	G.J.J.M. PESKES, W. LANZ	

TB24	Replica Scale Modelling of Long Rod Tank Penetrators.....	1231
	A.M. DIEDEREN, J.C. HOENEVELD	
TB25	High Velocity Jacketed Long Rod Projectiles Hitting Oblique Steel Plates	1241
	O. ANDERSSON, J. OTTOSSON	
TB26	The Penetration Process of Long Rods into Thin Metallic Targets at High Obliquity	1249
	D. YAZIV, M. MAYSELESS, Y. REIFEN	
TB27	Oblique Penetration in Ceramic Targets.....	1257
	D. YAZIV, S. CHOCRON, C.E. ANDERSON, D.J. GROSCH	
TB28	The Influence of Penetrator Geometry and Impact Velocity on the Formation of Crater Volume in Semi-Infinite Targets.....	1265
	N.J. LYNCH, R. SUBRAMANIAN, S. BROWN, J. ALSTON	
TB29	Observations on the Ratio of Impact Energy to Crater Volume (E/V) in Semi-infinite Targets.....	1273
	R. SUBRAMANIAN, S. SATAPATHY, D. LITTLEFIELD	
TB30	Cavity Shape Evolution During Penetration of Yawed Long Rods.....	1281
	S.S. SATAPATHY	
TB31	Instrumented Small Scale Rod Penetration Studies: the Effect of Pitch ..	1289
	W.G. PROUD, N. LYNCH, A. MARSH, J.E. FIELD	
TB32	A Parameter that Combines the Effects of Bend and Angle of Attack on Penetration Degradation of Long Rods.....	1297
	J.M. CAMPOS, W.G. REINECKE, S. BLESS	
TB33	The Effects of Stress Pulse Characteristics on the Defeat of Armour Piercing Projectiles	1305
	I.M. PICKUP, A.K. BARKER, B.J. JAMES, C. COTTENOT, H. ORSINI	
TB34	Penetration Efficiency of Tungsten Penetrators Into Glass Fiber Reinforced Resin/Steel Composites as a Function of Aspect Ratio and Impact Velocity.	1313
	S. LAMPERT, R. JEANQUARTIER, B. LEHMANN	
TB35	Shock Reduction Power of Different Materials in Plate Targets.....	1321
	H. KAUFMANN, T. ROTHACHER, G. RUBIN, R. MEIER	
TB36	Cavity Expansion Theory Applied to Penetration of Targets with Pre-drilled Cavities.....	1329
	J.A. TELAND	

TB37	Development and Validation of a Dwell Model	1337
	P. CHURCH, B. GOLDTHORPE, I. CULLIS, D. ROSENFELD	
TB38	Glass Ceramic Armour Systems for Light Armour Applications	1345
	I. HORSFALL	
TB39	Ballistic Resistance and Impact Behaviour of Al₂O₃-Al Ceramic Metal Composites	1353
	E. STRASSBURGER, B. LEXOW, O. BEFFORT, R. JEANQUARTIER	
TB40	Dynamic Fragmentation of Alumina with Additions of Niobia and Silica under Impact	1361
	L.H.L. LOURO, A.V. GOMES, C.R.C. COSTA	
TB41	Influence of Liners on the Debris Cloud Expansion Behind Single-plate Targets Perforated by Rod Projectiles	1369
	K. WEBER, K. KLEINSCHNITGER, T. BEHNER, V. HOHLER	
TB42	Mass Efficiency of Aramid Composites Depending on Mass and Impact Velocity of Cylindrical Steel Fragments	1377
	R. JEANQUARTIER, S. LAMPERT	
TB43	Numerical Fragmentation Modeling and Comparisons to Experimental Data	1385
	E.S. HERTEL, M.E. KIPP	
TB44	Fragment Impact on Bi-Layered Light Armours Experimental Analysis, Material modeling and Numerical Studies	1393
	W. RIEDEL, E. STRASSBURGER, B. LEXOW, H. NAHME, K. THOMA	
TB45	Penetration Analysis of Ceramic Armor with Composite Material Backing.	1401
	M. RAVID, S.R. BODNER, I.S. CHOCRON	
TB46	Ballistic Limit of Fabrics with Resin.	1409
	J.D. WALKER	
TB47	Finite Element Design Model for Ballistic Response of Woven Fabrics ...	1415
	J.W. SIMONS, D.C. ERLICH, D.A. SHOCKEY	
TB48	Numerical Simulations of Dynamic X-Ray Imaging Experiments of 7.62-mm APM2 Projectiles Penetrating B4C	1423
	C.E. ANDERSON, W.A. GOOCH	
TB49	Perforation of Spaced Glass Systems by the 7.62 mm Nato Ball Round. ...	1431
	P.J. HAZELL, S.A. ARMSTRONG	

TB50	The Development of the Glass Laminates Resistant to the Small Arms Fire	1439
	J. BUCHAR, S. ROLC, J. VOLDRICH, M. LAZAR, M. STAREK	
TB51	Model of the Wood Response to the High Velocity of Loading.....	1447
	J. BUCHAR, S. ROLC, J. LISY, J. SCHWANGMEIER	
TB52	Terminal Ballistics of EFPs – A Numerical Comparative Study Between Hollow and Solid Simulants	1455
	F. RONDOT	
TB53	An Experimental Investigation of Interface Defeat at Extended Interaction Time	1463
	P. LUNDBERG, R. RENSTRÖM, L. HOLMBERG	
TB54	Cutoff Velocity in Precision Shaped Charge Jets.....	1471
	D. BOEKA, S. HANCOCK, N. OUYE	
TB55	Performances and Behaviour of WCu-pseudo-alloy Shaped Charges With a Simple Model for Calculating the Stand-off Curve	1479
	C. VOUMARD, H.-P. RODUNER, W. SANTSCHI, H. WISLER	
TB56	A Computational Method of Fast Simulating Full-physics Process of Shaped Charge	1487
	Z. FAN, X. CHEN, Z. YU, Y. HANG, Z. DONG, Q. FENG	
TB57	Numerical Simulation of the Performance of Tandem Warheads.....	1493
	N. HEIDER, S. HIERMAIER	
TB58	Study of Spin-compensated Shaped Charges.....	1501
	A. KOCH, P. JAGGI, W. JAUN, F. HÄLLER	
TB59	Jet Perturbation by HE Target.....	1509
	P. POULSEN, R. M. KUKLO	
TB60	Evaluation of High Explosive Parameters for Reactive Armour.....	1515
	W. LANZ, H.R. BIRCHER, D. WYSSSEN, G. BIERI, M.K. ROLLI	
TB61	Combination of Inert and Energetic Materials in Reactive Armor Against Shaped Charge Jets.....	1523
	A. HOLZWARTH, K. WEIMANN	
TB62	Interaction Between a Metallic Reactive Armor and an Armored Fighting Vehicle (AFV) Structure: Modelling Spallation	1531
	X. DEPRINCE, B. BETTENCOURT	

TB63	Numerical Simulation of Shape Charge Jet Interaction with Multilayered Target	1539
	K. JACH, M. MROCZKOWSKI, R. ŚWIERCZYŃSKI	
TB64	A 3D Modelling Study of the Influence of Side Wall Collision on Long Stand-Off Jet Penetration	1545
	R. CORNISH	
TB65	Effect of Multiple and Delayed Jet Impact and Penetration on Concrete Target Borehole Diameter	1553
	M.J. MURPHY, D.W. BAUM, S.C. SIMONSON	
TB66	Hydrocode Modelling of High-velocity Jet Penetration into Sand	1561
	A.D. RESNYANSKY, A. E. WILDEGGER-GAISSMAIER	
TB67	The Effect of Obliquity and Conductivity on the Current Distributions Within an Electric Armour	1569
	D. J. R. SWATTON, D.C. PACK, J. BROWN, P.C. ENDERSBY, P.R. RATCLIFF	
TB68	Taylor Impact Experiments of Electrified Copper and Aluminium Cylinders	1577
	P. BARTKOWSKI, M. KEELE, W. BRUCHEY	