

**QUICK
CALENDAR**

- 80th Symposium Abstract Deadline (June 15, 2009)
- Practical Shock Analysis & Design Course (May 18-22, 2009—Charleston, SC)
- FREE Summer Seminar & TAG Meeting (June 24-25, 2009—San Diego, CA)
- Mechanical Shock Test Techniques Course (July 13-17, 2009—Minneapolis, MN)

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APRIL 2009

CURRENT AWARENESS

79TH SHOCK AND VIBRATION SYMPOSIUM PROCEEDINGS UPDATE

SAVIAC is pleased to announce the proceedings from the 79th Shock and Vibration Symposium will be available in June 2009. As we work towards a more timely proceedings delivery over the next few years, we should acknowledge the strides made since the 76th symposium. Over the past four symposia (including the 79th), the delivery of proceedings has been 2 months better than the previous year. With the SAVIAC community's assistance, we can continue to advance the delivery of proceedings and the quantity of papers found on this publication. On the following pages, please review the submittals we have received thus far.

LIMITED PAPERS (listed by last name of primary author)

Antonides, Steven	Tailoring of MIL-STD 167-1 Qualification Levels
Barker, Craig	Leg Injury Predictions from a Mine Blast Event
Baylot, James	Simulation of Breach Experiments in a Pipe
Beliveau, Alain	Summary of the Mechanical Environment in Recent Full-Scale Hard Target Penetration Tests
de Bejar, Luis	Preventing Blast-induced Perforation of Metal Plates on an Elastic Foundation
Ehrgott, John	Optimization of Contact Explosive Charges to Form Cleared Openings Through Reinforced Concrete Walls
Foley, Jason	Overview of Mechanical Environments in the Fuze Survivability Protocol
Fordyce, David	Joint Live Fire Evaluation for Secondary Debris and Structural Response of Masonry and Concrete Walls
Foust, Bradley	Small Scale Tunnel Vulnerability Experiments
Hasselmann, Tim	Fast Running Model for the Residual Capacity of Damaged Steel Columns
Jepsen, Richard	Flight and Re-entry Test Simulation in Combined Acceleration, Vibration, and Spin Environments: Part II
Kieffer, Mitchell	Fragment Fly-Out Modeling For Refined Baseline Warhead Design
Lynch, David	External Blast Methodology Development for MUVES-S2
McEntire, Scott	Double Impact Drop Table Testing of the FMP2 Firing Set
Moxley, Rayment	Projectile Perforation Experiments of Baseline Cor-Tuf Panels
Moxley, Rayment	Small Scale Crater Tests in Ultra-High Performance Concrete: Field Experiment Results, Analysis, and Large-Scale Data Comparison
Moxley, Rayment	Modeling of Accumulated Damage in Urban Wall Structures Due to Direct Fire Effects of Small Arms and Medium Caliber Rounds
Nance, Douglas	Shock Wave Induced Combustion of an Organophosphorus Chemical
Nikodym, Lisa	Joint Rock Modeling with FLEX
Rath, Jonathan	High Energy Fluid Impacts into a Concrete/Soil Structure Part II: Analysis Using Numerical Simulation Codes
Rhett, Richard	Experiments to Investigate Damage to Very Thick RC Roof Slabs from Slightly Embedded Detonations
Rickman, Denis	Design and Evaluation of Linear, Explosively-Formed Fragment Charges

Released Papers (continued)

Limited Papers, continued

Rickman, Denis,	Optimization of Contact Explosive Charges to Remove Concrete from Reinforced Walls
Rickman, Denis,	Scale-Model Studies of Explosive Attacks on Water-Backed Earthen Embankments
Stultz, Kenneth,	Development and Implementation of an Empirical Airgun Loading Module
Stultz, Kenneth,	Application of Airgun Loading Modules to a Full Scale Target
Trombetta, Steven,	Personnel Effects of Rigid Body Response Due to Mine Blast
Wathugala, Wijie,	Fast Running Model for Predicting Survivability of Brick Walls Subjected to Internal and External Detonation of Cased Weapons
Whitman, Michael	COTS Hull Approved Enclosure Modified for Deck Mount Environments

UNLIMITED PAPERS

(listed by last name of primary author)

Bateman, Vesta	Are All Pyroshock Simulations with Resonant Fixtures the Same?
Currano, Luke	A No-power Latching Acceleration Threshold Sensor for Monitoring Shock
Czaban, Jan	On the Shock Environment of the MIL-S-901 Medium Weight Shock Test Machine Undergoing Five Inch Table Travel
Czaban, Jan	On the Correlation Between the MIL-S-901 Shock Test Environment and the ANSI American National Standard, Shock Test Requirements for Equipment in a Rugged Shock
David, Thomas	Ranking MIL-S-901D Tests Using Modified Pseudo-Velocity Method
Dodson, Jacob	Transient Structural Health Monitoring Impact-Loaded Simple Structures
Dunbar, Timothy	Fully-Coupled CFD-FEA Simulation of Polymer Treated Steel Plates Subject to Close-Proximity UNDEX Loading
El-Domiaty, Khaled	Blast Uplift Evaluation of Reinforced Concrete Slabs Strengthened with Composite Materials
Fitz-Coy, Norman	Benefits and Challenges of Over-Actuated Excitation Systems
Graham, Paul	Fragility of Electric Motors Exposed to Nearby Explosive Blasts
Graham, Steven	Mechanical Properties of RTTC Brick
Gregory, Danny	Comparison of the Response of a Simple Structure to Single Axis And Multiple Axis Random Vibration Inputs
Hale, Michael	MIMO Testing Methodologies
Kelly, Gerard	Shock Pulse Shaping in a Small Velocity Amplifier
Lee, Julian	Deformation and rupture of thin steel plates due to cumulative loading from underwater shock and bubble collapse
Lou, Ken An,	Evaluation of Various Commercial Fasteners for Blast Protection Appliques
Mauer, Georg	Design and Finite Element Modeling for a Medium Payload High-Frequency Vibration Shaker
McNeill, Scott	Implementing the Fatigue Damage Spectrum and Fatigue Damage Equivalent Vibration Testing
Monson, Robert	Effective Heavyweight Shock Testing as a Precursor to Barge Testing
Park, Kidong	Application of Outrigger Dampers to Songdo NEATT
Peterson, William	Reliability Design of smart Projectiles for High-G Gunfire
Porter, Jesse	Ride Quality Analysis as Selection Criteria for Vibration Test Development
Riley, Mark	Failure Mode Transition in Air-backed Plates from Near Contact Underwater Explosions
Rogillio, Brendan	Achieving Unique SRS using a High Density Polyurethane Resonating Structure
Sherf, Zeev	Aspects of ODS FRF use on the conventional vibration testing line for the identification of modal characteristics
Sherf, Zeev	Experimental Modal Analysis of an Airborne Store performed on the Conventional Vibration Testing Line
Smallwood, David	Evaluation of a Six-DOF Electrodynamical Shaker System
Stojko, Stefan	Submarine Hull Impacts: Validation of Finite Element Models from Submarine Impact Trials
Swanson, George	Comprehensive Control of Pulse Width, Amplitude and Shape- Breaking New Ground in Shock Calibration

Released Papers, continued

Taylor, Douglas	Structural Control Using Hybrid Spring-Damper Isolator with Integral Gapping Function
van Aanhold, Johannes E.	Underwater Shock Response Analysis of a Floating Cylinder
Walter, Patrick	How High In Frequency Are Accelerometer Measurements Meaningful?
Wardlaw, Andrew	Target Loading from a Submerged Explosion
Winfrey, Nancy	Resonance Prevention of Accelerometers Using Multiple Layer Rigid Filters

If you have submitted a paper for inclusion into the proceedings disk and do not see your name in this listing, please contact us immediately.

SAVIAC will begin assembling the proceedings disk during the month of April. If you did not submit your paper by April 15, 2009, please submit it at your earliest convenience. There may still be time to make the release date. In addition, papers not published on the disk from the 79th Shock and Vibration Symposium will be published next year on the disk with the 80th Shock and Vibration Symposium papers.

Should you have any questions about the proceedings process or submitting a paper, please contact:
 Drew Perkins, Program Manager, drew.perkins@saviac.org, or
 Ashley Shumaker, Program and Event Coordinator, ashley.shumaker@saviac.org.
 (434) 581-3041

SAVIAC Bids Farewell to Mr. Allan Piersol



Allan G. Piersol, 78, of Woodland Hills, CA died peacefully at his home on March 1, 2009 from a courageous battle with lung cancer.

Piersol was an engineering consultant in the field of mechanical shock, vibration, and aeroacoustics for over fifty years, and an interna-

tionally recognized expert in the analysis of random signals, digital data processing, and evaluation of statistical data. His textbook titled *Random Data*, coauthored with his close friend and associate Julius Bendat, has been translated into four languages and will soon be released in its fourth edition. He was also coauthor or contributor to twelve books as well as over 100 technical papers, many of which were sponsored by the U.S Air Force or various NASA centers. He received a special NASA award for his participation in assessing the Space Shuttle certification program prior to first flight.

In addition, Piersol was coeditor of Harris' *Shock and Vibration Handbook*, which is due for release in the sixth

edition with his new coeditor Tom Paez. Allan was also coauthor of the *Institute of Environmental Sciences and Technology's Handbook of Dynamic Data Acquisition and Analysis*, now in its second edition, and a recipient of both the Irwin Vigness and Ed Szymkowiak Awards from the IEST.

Although Allan was a paid consultant as head of the Piersol Engineering Company, he provided free technical information and advice to hundreds of engineers and scientists who called him from throughout the world. He served as an adjunct lecturer in the Mechanical Engineering Department of the University of Southern California and was a guest lecturer at many universities and symposia worldwide. Allan also taught short courses in over 25 countries, usually with Bendat, as well as the Shock and Vibration Symposium for many years. He was a Fellow of both the Acoustical Society of America and the IEST, and a Life Member of the American Society of Mechanical Engineers.

Allan is survived by his wife of fifty years, Teresia, his three children and their spouses, and five grandchildren.

Director's Remarks

Professor Ted Krauthammer Selected as New Editor-In-Chief of the Journal of Critical Technology

It gives me great pleasure to announce that Professor Theodore Krauthammer has been selected as the new Editor-In-Chief of the SAVIAC-sponsored Journal of Critical Technology in Shock and Vibration, also known as the JCT. Professor takes over from the Interim Editor Professor Hossein Haj-Hariri of the University of Virginia (UVA). The JCT was founded by Professor Walt Pilkey of UVA who was the Editor-In-Chief until his death in 2007. Professor Haj-Hariri was helped with the JCT in the interim by Mrs. Barbara Pilkey, who was also instrumental to Walt during the JCT's founding.

Dr. Krauthammer is the Goldsby Professor of Civil Engineering at the University of Florida, and Director of the Center for Infrastructure Protection and Physical Security (CIPPS). He obtained his Ph.D. in Civil Engineering from the University of Illinois at Urbana-Champaign. His main research and technical activities are directed at structural behavior under severe dynamic loads, including considerations of both survivability and fragility aspects of facilities subjected to blast, shock impact, and vibrations. His work has included the development of design recommendations for enhancing structural performance, physical security and safety of buildings, facilities and systems. Additionally, he has been involved in the response, safety, and physical security assessment of buildings and facilities before and after abnormal loading events. His research has been supported by various government agencies in the USA and several other countries.

Dr. Krauthammer is a Fellow of the American Concrete Institute (ACI), a member of the American Society of Civil Engineers (ASCE), and a member of the American Institute of Steel Construction (AISC). He serves on ten technical committees of ASCE, ACI, and AISC.



Dr. Krauthammer is chair of the ASCE/SEI Committee of Blast, Shock, and Impact Effects, and he was the founding Chair of ACI Committee 370 on Short Duration Dynamics and Vibratory Load Effects. Dr. Krauthammer has written more than 390 research publications, and has been invited to lecture in the USA and abroad. He has been a consultant to industry and governments in the USA and abroad.

Paper submission instructions for Journal are contained in the back cover page for the JCT, or Professor Krauthammer can be contacted at email: tedk@ufl.edu. Manuscripts previously sent to UVA will be forward via Mrs. Pilkey to Professor Krauthammer.

Dr. Bob Welch
SAVIAC Director

CALL FOR PAPERS



**80th
Symposium**

**80th Shock and Vibration Symposium
October 25-29, 2009
Paradise Point Resort & Spa—San Diego, CA.**

Planning of the 80th Shock and Vibration Symposium is underway, with the selection of the Paradise Point Resort & Spa in San Diego, CA.

The Shock & Vibration Symposium is the oldest US Government sponsored forum dealing specifically with the shock and vibratory response of air, sea, space, and ground vehicles and structures and blast effects. The Symposium was established as a mechanism for the exchange of information among Government activities, private industry, and academia on current work and new developments. Presentations on work in progress are encouraged. Separate sessions are held for presentation of classified or limited-distribution material.

The following is a list of suggested subject areas (other subject areas are welcome):

901D Case Studies	Environmental Databases	Seismic Shock
Active Vibration Control	Finite Element Analysis	Pyrotechnic Shock
Ballistic Shock	Fluid-Structure Interaction	Shock Characterization
Biodynamics	Ground Shock	Shock Hardening
Blast Design	Impact/Penetration Mechanics	Shock Qualification by Extension
Combined Environments	Instrumentation	Shock Test/Equipment Failure Modes
Computational Structural Dynamics	Isolation Systems	Simulation Methods
COTS	Large Structures	Specifications and Standards
Crash Dynamics	Live Fire Testing	System Identification
Damage Identification Damping	Machinery Diagnostics	Test Criteria
Data Analysis	Machinery Vibration	Test Tailoring
Dynamic Analysis Methods	Material Dynamic Properties	Underwater Shock Testing
Dynamic Measurement	Modal Analysis and Testing	Vibroacoustics
Dynamic Scale Modeling	Product Announcement/Facility Description	
Dynamic Testing		

If you have a specific group of papers or presentations, consider submitting them together as a dedicated session for the 79th symposium.

Two categories of presentations will be accepted: full papers, suitable for publication in the Symposium Proceedings; and short discussion topics, consisting of viewgraphs with no written paper. Full papers will have a 15 minute technical presentation time plus 5 minutes for questions, while short discussion topics will have a 10 minute presentation time with no question period.

Presentations will be accepted on the basis of their abstracts, which must be submitted by June 15, 2009. You are encouraged to submit online at www.saviac.org, click on 80th S&V Symposium Abstract Submittal. The Program Committee will review the abstracts during the June Program Committee meeting and authors will be notified of acceptance by July 15, 2009 (for on-time submittals). The full paper presentations must meet the following standards: They must be previously unpublished, must be appropriate to community interests and must not be overtly commercial, except for papers in the Product/Facility Session. Standards for short discussion topics are similar except that they may include previously presented or published material.

The Proceedings will be published on CD-ROM.

The paper due-date (for the proceedings) is February 28, 2010.

Questions should be directed to Drew Perkins, 434-581-3041, or drew.perkins@saviac.org.

PRACTICAL SHOCK ANALYSIS AND DESIGN COURSE

2009 Schedule and Locations

May 18-22	(Charleston, SC)
August 17-21	(San Diego, CA)
October 5-9	(Princeton, NJ)

About the Course

At the first Shock and Vibration Symposium in 1947, mechanical shock was defined as "a sudden and violent change in the state of motion of the component parts or particles of a body or medium resulting from the sudden application of a relatively large external force, such as a blow or impact." Since then the specific words used have changed somewhat but the meaning remains the same. Most analysts treat shock as a transient vibration. No matter how it is described or what source produced it, the effects of mechanical shock on structures and equipment create major design problems for a wide variety of systems.

This course will provide a comprehensive treatment of practical shock design and analysis with special emphasis on applications related to the design of ship structures and equipment for shock loads produced by underwater explosions.

Participants in this course will have an opportunity to increase their knowledge and understanding of the analytical and experimental tools that are available for shock design and qualification particularly with respect to requirements that are imposed for shipboard equipment. The lectures will provide a basic review of vibration and shock theory and will present the analytical and experimental methodology in the context of particular design applications. Analytical lectures will emphasize the physical significance of the results. Examples and case histories will be used as illustrations of design approaches; workshop problems that involve class participation will be used to advantage throughout the course. Class members will be encouraged to propose real design problems. The instructors will provide guidance for solutions or the problems may be used as class exercises.

Although this course is aimed primarily at shock design applications on ships, the analysis and design techniques presented are equally applicable to problems related to design for seismic loads or blast induced ground shock. Thus, engineers in these related areas may find the course to be useful. For all who participate, the course will provide a comprehensive coverage of shock design practice and a solid basis for further exploration of shock technology.

Instructors

Dr. Rudolph J. Scavuzzo, Mr. Henry Pusey, Mr. G. D.Hill, Mr. Jeffery Morris

Course Topics

Review of Basic Vibration Theory	Introduction to Mechanical Shock	Shock Measurement
Underwater Shock Phenomena	Multi-Degree-of-Freedom Systems	Navy Shock Qualification Process
Shock Qualifications by Test	Shock Qualification by DDAM	Shock Qualification by Extension
2-Dimensional Normal Mode Theory	Practical Design Considerations	Special Design and Analysis Tools
3-Dimensional Normal Mode Theory	Optimum Foundation Design	Use of Finite Element Analysis-DDAM
General Problem Solving Workshop		Review and Wrap-up Sessions

Course Registration

The Registration Fee is \$1500 per student. The registration is transferable to any person in the same organization. The fee includes a comprehensive set of course notes, a text book entitled Naval Shock Analysis and Design by Rudolph J. Scavuzzo and Henry C. Pusey, a Certificate of completion worth 3 CEUs, as well as a Continental Breakfast, Lunch and coffee breaks daily. A Registration Form may be printed out from the SAVIAC Web Site or may be requested from Sallie or Henry Pusey. As SAVIAC Technical Services Manager, Henry Pusey will arrange for the scheduling, management and presentation of all courses. All completed registration forms should be faxed or mailed to Sallie Pusey at the address given below.

For registration information contact:

Sallie Pusey, Course Registrar	Tel: (540) 678-8677
1877 Rosser Lane	Fax: (540) 678-8799
Winchester, VA 22601	email: saviac@comcast.net

NOTE: Registrants will be provided details about the course location and hotel(s) as soon as the course is firmly scheduled.

MECHANICAL SHOCK TEST TECHNIQUES & DATA ANALYSIS2009 Schedule and Locations

March 30-April 3	(Hampton, VA)
July 13-17	(Minneapolis, MN)
September 21-25	(Huntsville, AL)

About the Course

Mechanical Shock may be defined as a sudden change in velocity and is a major design consideration for a wide variety of systems and their components. The structural response to mechanical shock must be measured and characterized during the engineering development of these systems so that they will survive all environments during their service lifetime. These environments may include (but are not limited to): handling and transportation shocks, shocks during system delivery to a target, use impact shocks and shock originating from an explosive or pyrotechnic event. These different shock environments have quite a velocity change range from about 1 meter per second to 51 meters per second (40 - 2000 ips). Conversely acceleration magnitudes range from 4 g's in earthquakes to 200,000 g's in differentiated LDV measured pyroshocks.

This course will provide a comprehensive treatment of mechanical shock test techniques and data analysis for shocks from 100 g's to 200,000 g's. Mechanical shock instrumentation from low frequency techniques for underwater explosions (digitally filtered at 250 Hz as required by the US Navy) to high frequency techniques for ballistic shock will be reviewed in detail along with the techniques and data analyses to evaluate the instrumentation measuring these shocks.

Mechanical shock test techniques from package testing to conventional mechanical shock machines to pyroshock simulations and Hopkinson bar techniques will be presented. Design procedures for mechanical shock equipment will be discussed in detail. Where possible, theoretical bases for mechanical shock test techniques are provided. Mechanical shock data analysis and interpretation will be a major focus of all presentations and discussions and will include shock data examination and editing as well as interpolation, trend removal, and integration with Matlab.

Instructors

Dr. Vesta Bateman, Dr. Howard Gaberson, Mr. Jeffery Morris

Course Topics**Course Registration**

Introduction to Mechanical Shock	Data Acquisition System Calibration/Use	Accelerometer, MEMS, and Materials
Mechanical Shock Measurement	Matlab Data Analysis	Evaluations
Mechanical Shock Instrumentation	Conventional Shock Testing Machines for	Hopkinson Bar Theory
Certification of Shock Instrumentation/ Measurement Devices	Components and Full Scale Systems	Hopkinson Bar Certifications
Time Domain Shock Specifications	Underwater Explosion Testing	Hopkinson Bar Materials and Configurations
Frequency Domain Shock Specifications	Navy Mechanical Shock Machines	Commercial Laser Doppler Vibrometer use and Certification
Shock Analysis using the Acceleration Shock Response Spectrum	Pyroshock Testing and Simulation	Uncertainty Analysis
Revolutionary Treatment of Pyroshock with the Pseudo Velocity Shock Spectrum	Full-Scale Pyroshock Tests and Simulations	Review and Wrap-up Sessions
	Component Pyroshock Simulations Including Apparatus and Fixture Design	

The Registration Fee is \$1500 per student. The registration is transferable to any person in the same organization. The fee includes a comprehensive set of course notes, a compilation of papers by Instructors Bateman and Gaberson, a text book entitled *Shock Data Analysis* by Rudolph J. Scavuzzo and Henry C. Pusey, a Certificate of completion worth 3 CEUs, as well as a Continental Breakfast, Lunch and coffee breaks daily. A Registration Form may be printed out from the SAVIAC Web Site or may be requested from Sallie Pusey, SAVIAC Course Registrar (Contact Information below). A Registration Form (available mid-Dec '07) may be printed out from the SAVIAC Web Site or may be requested from Sallie or Henry Pusey. As SAVIAC Technical Services Manager, Henry Pusey will arrange for the scheduling, management, and presentation of all courses. All completed registration forms should be faxed or mailed to Sallie Pusey at the address given below.

For registration information contact:

Sallie Pusey, Course Registrar
1877 Rosser Lane
Winchester, VA 22601

Tel: (540) 678-8677
Fax: (540) 678-8799
email: saviac@comcast.net

NOTE: Registrants will be provided details about the course location and hotel(s) as soon as the course is firmly scheduled.

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**A LOOK INSIDE THE APRIL 2009
CURRENT AWARENESS**



**79th Shock and Vibration Symposium
Proceedings Update**

A Final Farewell to Mr. Allan Piersol

**Journal of Critical Technology Welcomes Professor
Ted Krauthammer as Editor-In-Chief**

**SAVIAC Director Wins 2008 ERDC Researcher of the
Year Award**

Course Announcements

- SAVIAC's Practical Shock Analysis & Design
- SAVIAC's Mechanical Shock Test Techniques & Data Analysis

80th Symposium—Call for Papers

The Current Awareness newsletter is published by the Shock and Vibration Information Analysis Center, which is operated by HI-Test Laboratories, Inc., under contract to the U.S. Army Engineer Research and Development Center.

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