

Snow Won't Stop The Show

Winter Shock & Vibration Seminar A Success

NSWC/Crane employees proved that a little bit of snow wasn't going to stop them from participating in the 2nd SAVIAC Shock & Vibration Seminar. Despite a few inches that fell in the early morning hours of February 11 in Crane, IN, the Winter Shock & Vibration Seminar went ahead as planned and was a huge success.

13 instructors from different organizations around the country volunteered to give the 68 seminar attendees, mostly from the surrounding area, an information-packed day. Lectures on different areas of shock and vibration included "The Navy Shock Qualification Process," a compacted version of the Shock and Vibration Symposium Tutorial, "Random vs Sinusoidal Vibration," "NE/NASTRAN-

Technical Briefing on DDAM Analysis," and "Stress, Strain & Fracture: An Perspective of Low Cycle Fatigue Systems & Issues" to name a few.

The seminar was held at Club Lakeview, on the grounds of NSWC/Crane. The day began with a continental breakfast at the facility followed by an introduction to SAVIAC & the SAVIAC community. Lunch was also served on the grounds for the attendees.

SAVIAC would like to extend a huge Thank You to Allen Parkes, Jim Parsh, and Don Peckinpaugh, all of NSWC/Crane for all of their hard and dedicated work in helping this seminar become the success that it was.

SAVIAC will be holding another FREE Shock & Vibration Seminar at the Red Lion Hanlei hotel in San Diego, California on June 18th. This seminar is at the site of the upcoming 74th Shock & Vibration Symposium and will coincide with the June Program Committee Meeting.

Please contact Joel Leifer at (301) 596-0100 or by e-mail, joel.leifer@saviac.org if you would be interested in teaching a topic. Special interests for the upcoming seminar are aerospace and automotive topics. Please stay tuned to future newsletters and on our website, www.saviac.org, for updated schedules and information about the seminar. We hope to see you there!

IMAC XXI - Another Success

submitted by Pat Deuschle, SEM

IMAC-XXI drew more than 600 attendees to Kissimmee, Florida for three days of courses and four days of technical presentations and exhibits. There were 260+ presentations by professionals from around the world in early February 2003. Attendees commented that the technical presentations were very strong and they were able to apply the information directly to their current work.

The 2003 IMAC Exposition was well attended. Attendees were pleased to have the opportunity to speak with leaders in their fields regarding their product and service needs. Many people took advantage of the educational offerings before and during the conference. A new evening course was offered, Using Matlab, during the con-



IMAC-XXI Exhibits were well attended

ference and will be offered again before the 2004 IMAC.

The IMAC-XXI Keynote was presented on Monday, February 3, by Dr. Karen H. Brown of the National Institute of Standards and Technology. The title of her presentation was "Advancing Sensor Technologies Through Innovative R&D at the National

Institute of Standards and Technology."

The Honorary Session, "The Works of Professor Larry D. Mitchell, Virginia Polytechnic Institute and State University (retired)," on Wednesday, February 5 was well attended. Prof. Mitchell was very touched by the session and attendance.

At the Wednesday Awards Luncheon on February 5, Dr. Carlos E. Ventura, The University of British Columbia, was presented with the SEM D.J. DeMichele Award.

Mrs. Jo DeMichele, and son Bob DeMichele, presented the first D.J. DeMichele Student Scholarship award to Prasenjit Mohanty, Delft University of Technology.

Upcoming Shock & Vibration Seminar

SAVIAC invites you to attend a FREE seminar on Shock & Vibration. This seminar is an excellent opportunity for engineers of all experience levels desiring _____. The course will be held on Tuesday, June 18, 2003 at the Red Lion Hanalei in San Diego, CA, the site of the 2003 Shock & Vibration Symposium. This seminar will coincide with the June Program Committee Meeting. SAVIAC and the featured experts in their disciplines have organized this seminar to introduce you to the SAVIAC community, while providing a valuable educational experience. Be sure to check future newsletters and www.saviac.org for a complete agenda. If you would be interested in making a presentation, please contact Joel Leifer at **301.596.0100**, or by e-mail, joel.leifer@saviac.org.

Modern Protective Structures * July 14-18, 2003

a Penn State engineering short course for engineers, architects, and safety and security managers
Catastrophic events such as the embassy bombings in Kenya and Tanzania, the destruction of the federal building in Oklahoma City, the attacks on the World Trade Center and the Pentagon, blasts in London's financial district, and explosions in petrochemical plants are becoming all-too-frequent occurrences. In today's world, knowledge of modern protective structures is vital.

The course gives engineers, architects, and safety and security managers practical background information relating to the performance and design requirements for hardened facilities. Comprehensive reviews and advanced research and development topics are designed to augment the technical capabilities of hardening and forensic engineers and scientists. In addition, a review of Blast Damage Assessment (BDA) issues provides forensic and rescue personnel with additional background information.

Additional features:

- Hands-on guided analysis and design activities
- Case-study, problem-solving approach
- Simulations and projects
- One-on-one contact with instructors for individual assistance
- Open computer lab sessions for extended analysis and problem solving

Take-aways:

- Computer disk with programs for analysis and design of protective structures
- Extensive design manual and reference materials

You will examine these topics:

- Fortification science and technology
- Analysis, design, assessment, and retrofit
- Industrial explosive safety
- Antiterrorist design
- Hazard sources
- Physical security
- Blast damage assessment

About the Instructor

Dr. Theodor Krauthammer, Penn State professor of civil engineering and director of the University's Protective Technology Center, is an internationally recognized researcher in enhanced structural performance and safety and has more than thirty years of experience in protective structures. He has served as a technical consultant to government and industry in the United States and abroad and is the former chairman of the American Concrete Institute (ACI) Committee 370 on Short Duration Dynamics and Vibratory Load Effects, a member of five technical committees of ACI, a member of the American Society of Civil Engineers (ASCE) Task Committee on Structural Design for Physical Security, and a member of the ASCE Committee on Shock and Vibratory Effects.

Continuing Education

Penn State is a Registered Provider with the AIA Continuing Education System. This program qualifies for 32 hours of Health, Safety, Welfare (HSW).

Fee and Registration

The fee covers all instruction, course materials, refreshment breaks, and lunches. Registrants are responsible for all other meals and lodging. The fee may be paid by check, money order, or purchase order (made payable to Penn State), or by major credit card (American Express, MasterCard, VISA, or Discover). An additional charge of \$30 will be added to all walk-in registrations.

To register, go to <http://www.cde.psu.edu/C&I/protectivestructures/> and complete the printable registration form, and return with fee to Penn State by June 24, 2002. Or complete and submit the online registration form. Fax registrations must be accompanied by credit card payment information. You may also register with your credit card by calling 814-863-5162 or 800-PSU-TODAY (778-8632; toll free within the United

About program content

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About registration

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E-mail: jrp1@outreach.psu.edu

States). You will be notified promptly of any cancellations or schedule or program changes. Conferences and Institutes will confirm your enrollment in the program and provide information on travel, accommodations, final registration, and parking.

Refunds

All cancellations must be received in writing by mail or fax. Full refunds will be made for cancellations received by June 21, 2002. Refund requests made after that time will not be honored, and the participant or sponsoring organization is responsible for the fee. Anyone who is registered but cannot attend may send a substitute.

University Policies

Access--Penn State encourages individuals with disabilities to participate in its programs and activities. If you anticipate needing special accommodations or have questions about the physical access provided, please contact the conference planner at 814-863-5100 before your visit.

Cancellation--The University may cancel or postpone any course or activity because of insufficient enrollment or other unforeseen circumstances. If a program is canceled or postponed, the University will refund registration fees but cannot be held responsible for any other related costs, charges, or expenses, including cancellation/change charges assessed by airlines or travel agencies.

For More Information

Call For Papers

74th Shock and Vibration Symposium

October 27-31, 2003
Red Lion Hanalei Hotel
San Diego, CA

Planning for the 74th Shock and Vibration Symposium is underway, with the selection of NSWC/Crane and SPAWAR as the Government Featured Organizations, Endevco as the Commercial Featured Organization, and the Red Lion Hanalei Hotel in San Diego as the location.

The Shock & Vibration Symposium is the oldest continuously held meeting dealing specifically with the structural dynamic behavior of air, sea, space, and ground vehicles and structures. 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.

Presentations in the following subject areas are welcomed:

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

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 May 30, 2003. You are encouraged to submit online at www.saviac.org, click on 74th 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 June 26, 2003. The full paper presentations must meet the following standards: They must be previously unpublished and unrepresented, 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 is October 17, 2003.

Questions should be directed to Joel Leifer, 301.596.0100 or joel.leifer@saviac.org.

ABSTRACT SUBMITTAL FORM

74TH SHOCK & VIBRATION SYMPOSIUM

SAN DIEGO, CA

OCTOBER 27-30, 2003

Unclassified Title: _____

Sponsor: _____

(Note: It is the author's responsibility to obtain authorization from the Sponsor to present/publish. This abstract will be published on the SAVIAC Web Site and in the Abstract Volume.)

Presentation:	<input type="checkbox"/> Full Paper (15-min talk, 5-min discussion)
	<input type="checkbox"/> Short Topic (10-min talk, no discussion)
Classification:	<input type="checkbox"/> Unclassified/Unlimited Distribution
	<input type="checkbox"/> Confidential
	<input type="checkbox"/> Unclassified/Limited Distribution
	<input type="checkbox"/> Secret

Principal Author: _____

Affiliation: _____

Mailing Address: _____

Phone Number: _____ Fax Number: _____ E-mail: _____

Has this work been published or presented elsewhere? _____ If yes, where? _____

What is the approximate date of the initiation of this work? _____

Choose one subject area:	<input type="checkbox"/> Pyroshock	<input type="checkbox"/> Vibration	<input type="checkbox"/> UNDEX	<input type="checkbox"/> Ballistics
	<input type="checkbox"/> Acoustics	<input type="checkbox"/> Human	<input type="checkbox"/> Blast	<input type="checkbox"/> Other: _____
Choose one application area:	<input type="checkbox"/> Test Methods	<input type="checkbox"/> Test Applications	<input type="checkbox"/> Test Facilities	
	<input type="checkbox"/> Num. Applications	<input type="checkbox"/> Num. Methods		
	<input type="checkbox"/> Other: _____			

We would prefer that you submit your abstract on-line via our web site <http://www.saviac.org>. If you do not have web access, please type your abstract (unclassified/unlimited only, 300 words or less, no equations or graphics) on a blank sheet and submit it with this form to:

SAVIAC/HI-TEST Labs, Inc.
Attn: Joel Leifer
5136 Celestial Way
Columbia, MD 21044
301 596-0100
FAX (301) 596-6400

Abstracts are due April 30, 2003 !!

Vibration and Shock Testing, Measurement, Analysis and Calibration, also ESS, HASS and HALT : An Excerpt Part III

The following is part III of a IV-part excerpt from Chapter 29 (of 31) of Wayne Tustin's forthcoming text "Vibration and Shock Testing, Measurement, Analysis and Calibration, also ESS, HASS and HALT". Parts I and II may be read in the January and February 2003, respectively, editions of Current Awareness. Wayne describes the book as "A minimal-mathematics introduction," and says it "has applications in the fields of aeronautical, automotive, seismic and shipboard testing". Adjacent chapters are 28 "Measuring and Quantifying Mechanical Shock" and 30 "Mechanical Shock Testing". Further details are available from tustin@equipment-reliability.com.

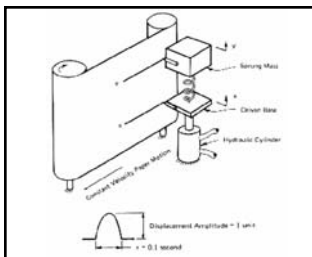
Chapter 29 is entitled "SRS - The Shock Response Spectrum". This month we bring you sections 29.6 "Understanding the SRS" and 29.7 "The maximax spectrum". Next month, we will bring you section 29.8 "Electronic SRS analysis".

Chapter 29 SRS - the Shock Response Spectrum

29.6 Understanding the SRS
29.7 The maximax spectrum

29.6 Understanding the SRS

Imagine that the mechanical recording system of Figure 29-14 is one of that series of SDoF systems. Also imagine that we are creating a series of half-sine motions, using an imaginary electrohydraulic shaker (refer to Chapter 13). We will specify x , the motion of the driven base and we will predict the response motion y of the sprung mass to that input. Visualize that both drive and response mass are constrained so they can only move vertically.



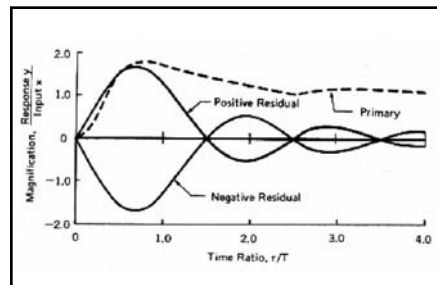
29-14
Imaginary
mechanical
recorder

Note, in Figure 29-14, the x and the y recording pens. They will both be plotting displacements, but we would get the same y results from these x inputs if both were plotting velocity or if both were plotting acceleration.

In the figures to follow, we will horizontally plot the ratio of time duration divided by natural period T of our SDoF system. As the natural frequency f_n of our system increases, T decreases, so that t/T increases.

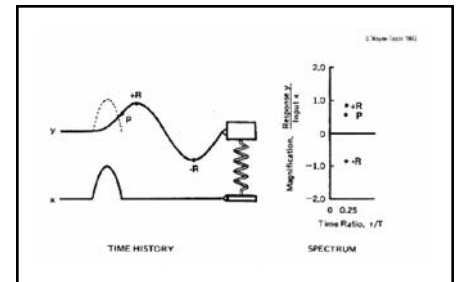
As an example, if our f_n were 40 Hz, T would be $1/40$ or 0.025 second. If pulse duration t were also 0.025 second, the response would be plotted at 1.0 on the t/T scale. Out at 3.5 on the t/T scale would be the response of a stiffer 140 Hz f_n system.

While today the term SRS nearly always refers to the maximax spectrum, we must first introduce other shock response spectra. These are (1) the primary (sometimes called initial) spectrum - the peak response which occurs during the pulse, also (2) the residual spectrum - the peak response after the shock has ended. Sometimes (2) is defined as either positive residual (peak upward response) or negative residual (peak downward response). OK now. The maximax spectrum is an envelope of either spectrum (primary or positive residual), whichever is greater, at each t/T ratio along the horizontal axis. The primary and residual spectra are identified in Figure 29-15, which we will develop, along with the



29-15 Three components of maximax SRS
maximax spectrum.

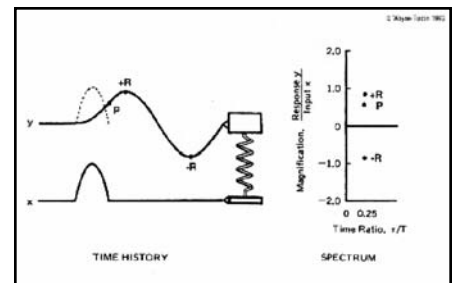
OK. Let's get to work, developing the several SRS of Figure 29-15. We will vary the system's natural frequency f_n . We will commence at 2.5 Hz ($T = 0.4$ sec) and then increase spring stiffness. Look ahead at Figure 29-16 to see time histories of input "x" and of response "y". Remember that pulse duration $t = 0.1$ second in all figures. The first three points of our SRS lie in the spectrum at abscissa $t/T = 0.1$ sec/0.4 sec = 0.25. The points are P (primary - the peak response during the pulse), +R (positive residual - the peak positive response after the pulse has ended) and -R (negative residual - the peak negative response after the pulse has ended). Since $+R > P$, R is



29-16 $t/T = 0.1/0.4 = 0.25$

also a point on the maximax spectrum. Now (Figure 29-17) we change f_n to 10 Hz. Now t and T are both 0.1 sec, and the SRS values P, +R and -R all lie at the abscissa value $t/T = 1$.

Note that the primary response P is greater than the positive residual



29-17 $t/T = 0.1/0.1 = 1$

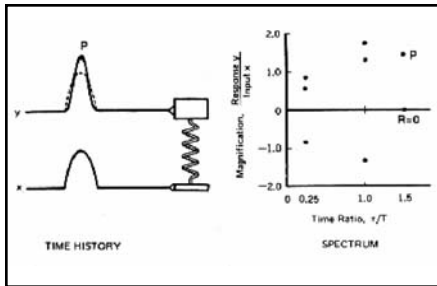
response +R. Therefore P is also a point on the maximax spectrum.

Let us now (Figure 29-18) change f_n to 15 Hz ($T = 1/15 = 0.0667$ sec so that $t/T = 0.1/0.0667 = 1.5$).

continued on page 6

continued from page 5

Here we have a primary SRS value for P, but response SRS + R and - R are both zero! Shock pulse energy is either KE (proportional to mv^2) or potential energy PE (proportional to x^2) or a combination of KE and PE. Here the mass comes to rest ($x = 0$) when the pulse ends (PE = 0). No



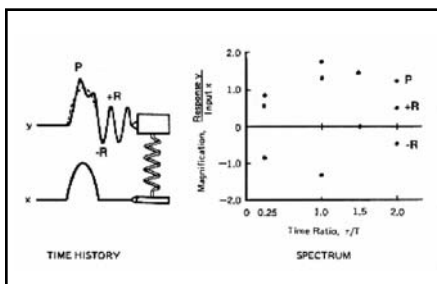
29-18 $t/T = 0.1/0.0667 = 1.5$

energy, so no motion! This "hole in the response spectrum" phenomenon occurs at t/T values of 1.5, 2.5, 3.5, etc. for a half sine pulse; at these t/T values P is also the maximax value.

It also occurs for other symmetrical pulses

square
rectangular
triangular,
haversine and
trapezoidal

(although at other t/T values). It does not occur with non-symmetrical saw-tooth pulses, which for this reason are

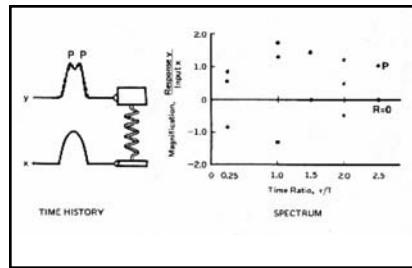


29-19 $t/T = 0.1/0.05 = 2$

often highly valued for shock testing.

In preparing Figure 29-19, we have changed f_n to 20 Hz ($T = 1/20 = 0.05$ sec so that $t/T = 0.1/0.05 = 2$). The result is P, + R and - R.

In preparing Figure 29-20, we have changed f_n to 25 Hz ($T = 1/25 = 0.04$ sec so that $t/T = 0.1/0.04 = 2.5$). Here

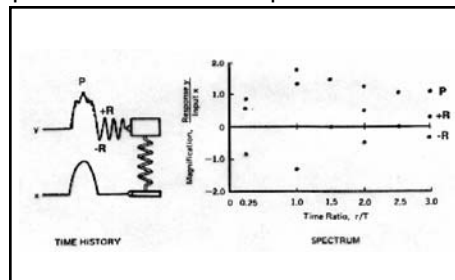


29-20 $t/T = 0.1/0.04 = 2.5$

we again have a primary SRS value for P, but response SRS + R and - R are both zero. Thus P is also the maximax value.

To get Figure 29-21, we have changed f_n to 30 Hz. T is now 0.0333 second, so we plot the responses at $t/T = 3$. P is on the primary spectrum. + R is on the positive residual spectrum. - R is on the negative residual spectrum.

P is the largest of the three and thus is part of the maximax spectrum.



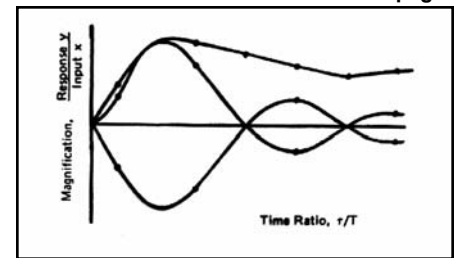
29-21 $t/T = 0.1/0.033 = 3$

Note that the primary response, and thus the maximax response both "level off" at about unity, at higher and higher f_n s.

29.7 The maximax spectrum

With additional measurements, using f_n s that fill the gaps between previous measurements, the spectra of Figure 29-22 appear. At each t/T ratio, using a pencil, lightly circle the point you think is greatest.

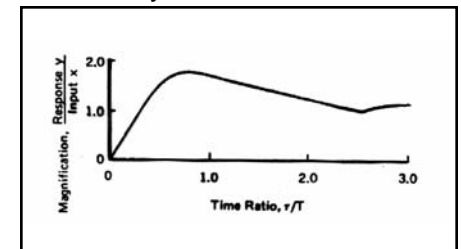
Today, almost all writers represent an SRS only by its maximax values, as in Figure 29-23 for the 0.1 second half sine pulse we have been considering. Observe that maximax SRS is equal to primary SRS beyond $t/T = 0.5$. The reason is that the most severe responses of stiff, high f_n systems occur during a shock pulse, not after the pulse.



29-22 Three Spectra

A justification for only considering maximax SRS is that maximum displacement is usually most critical when malfunction or structural fracture is involved.

However, you should consider the



29-23 Maximax spectrum, = 0.1 sec half sine

residual spectrum in situations where fatigue failure might occur.

I'm emphasizing the maximax spectrum because it is the one most often cited in the literature and in testing specifications. At various t/T ratios it is the largest of the three (primary, + residual, - residual) responses.

It is the spectrum most commonly defined as shock response spectrum (or SRS), a plot of maximum responses of SDOF systems vs. their natural frequencies, as they respond to an applied shock.

We have been discussing relative response displacements with defined input displacements. The same relative velocity response SRS would come from defined input velocities. The same acceleration response SRS would come from defined input accelerations. None of the figures would change.

However, if we were to commence with a defined (as in a test specification) input acceleration, that will change our relative displacement and velocity responses.

Industry News

IEST Publishes High-Intensity Acoustics Testing RP

IEST, the Institute of Environmental Sciences and Technology, announces the release of a new High-Intensity Acoustics Testing Recommended Practice (RP) as the latest addition to its Design, Test, and Evaluation and Product Reliability RP publications. IEST-RP-DTE040.1 High-Intensity Acoustics Testing was developed by IEST Working Group WG-DTE040 and is available exclusively from IEST.

The High-Intensity Acoustics Testing RP focuses on high-intensity acoustics testing (HIAT) within reverberant chambers. A direct field acoustic test is also described. This RP is a high-level guide for practicing engineers and engineering managers for planning and executing an acoustic test program. The user's knowledge in acoustics and general hardware testing is medium to high.

This document gives a brief overview of the acoustic environment encountered in aeronautical and aerospace systems. The RP advances the simulation that can be achieved in a HIAT chamber.

Also included are test philosophy, descriptions of a few typical test facilities, and discussion of test articles for various tests. Information is shared on test specifications under different conditions, the requirements of instrumentation and data processing, and the procedures of test operation.

The High-Intensity Acoustics Testing RP is limited to high-intensity acoustics testing (HIAT) of aeronautical and aerospace systems within hard-wall reverberant chambers. The criteria for deciding when HIAT should or should not be performed are beyond the scope of this RP.

IEST is an international professional organization serving members and the industries they represent through education and the development of recom-

mended practices and standards. Industries served are design, test and evaluation of commercial and military equipment; contamination control in electronics manufacturing and pharmaceutical processes; and product reliability issues associated with commercial and military system. IEST was founded in 1953.

To order this new Recommended Practice or any other IEST publications, or for more information, visit the IEST website at www.iest.org. You may also e-mail the IEST Publication Sales Coordinator at publication-sales@iest.org, fax to the attention of the Publication Sales Coordinator at (847) 255-1699, or call (847) 255-1561.

Data Translation Announces More Power and Precision Than Ever Before for Real-Time Measurements

Data Translation, Inc. [NASDAQ: DATX], a leader in the design, manufacture and marketing of high-performance data acquisition, imaging and machine vision products, today announced the DT9841 Fulcrum II Series. By combining the accuracy of Texas Instruments' (TI) floating-point TMS3206711 digital signal processor (DSP) with the speed of two 24-bit sigma-delta A/D and D/A converters on a standard 6U card that communicates to the host via USB 2.0, the DT9841 is an intelligent data acquisition system for processing measurements that require the highest performance in real-time.

The Fulcrum II Series builds on the success of the company's Fulcrum I technology in which customers used ISA PCs in embedded applications for vibration, signal analysis, and test and measurement. The Fulcrum I Series also used a TI DSP, the TI C40 .

"The Fulcrum II Series boards offered from Data Translation add high-performance analog circuitry with peripheral-rich C6711 DSPs giving our cus-

tomers a complete off-the-shelf, real-time test and measurement system," said Martin Burgos, C67x™ product marketing manager, TI. "Customers can accelerate their time to market by combining C6711 DSPs with high-performance analog circuitry into their designs."

To learn more about TI's real-time eXpressDSP™ Software and Development Tools and receive free evaluation tools, visit www.dspvillage.ti.com/ordercd7.

Conference Announcements

For a summary of upcoming conferences for 2003, visit www.saviac.org/upcoming_events.htm

Homeland Security Solutions Conference and Exhibition: Systems Solutions for Counter-Terrorism

April 23-24, 2003

Baltimore, MD

The Homeland Security Solutions conference and Exhibition is for systems applications buyers and manufacturers who are intimately connected with efforts to bolster homeland security to prevent and respond to attacks from foreign and domestic terrorists.

The Homeland Security Solutions show will provide a forum for those who make and buy homeland security systems and solutions in the government and private sector.

Featuring suppliers, distributors, and manufacturers of homeland security solutions and technology for government and private security, the event will address the needs of industries such as nuclear, power, and water treatment plants, railroads, airports, bridges, government buildings, stadiums, shopping malls, office buildings, tourism, and ports of entry. The products and services featured will center on technologies to detect, prevent, and to respond to terrorist attacks and will include sensors, biometrics, information processing, image recognition and matching. For more information, visit www.HomelandSecuritySolutionsShow.com.

Noise-Con 2003 Conference and Exposition

Institute of Noise Control Engineering

June 23-25, 2003

Cleveland, Ohio

The Institute of Noise Control Engineering announces the Noise-Con 2003 Conference and Exposition, to be held June 23-25, 2003 at the Renaissance Cleveland Hotel, Cleveland, OH. The exposition will be held in conjunction with the NOISE-CON 2003 Congress where 400 to 600 persons are expected to attend. Attendees will include engineers, technicians and managers interested in noise control products, services, and instrumentation. Areas include transportation noise, material properties, industrial noise control, environmental acoustics, architectural acoustics and building noise, HVAC noise, and product noise. For further information about the conference or the exhibit please contact: Richard Peppin, Exposition Manager at (401) 290.7726 or by e-mail at PeppinR@asme.org.

21st International Symposium on Ballistics

April 19-23, 2004

Adelaide Convention Centre
Australia

This is an invitation to academics, commercial organisations, defense research institutions and military organisations to attend and/or offer papers in the following fields: Interior ballistics; launch dynamics; exterior ballistics; projectile and warhead technologies; terminal ballistics; vulnerability and lethality; modelling and simulation; wound ballistics. More information and a Call for Papers can be found at the website: [\[itics.com/ballistics2004/21ibsflyer.pdf\]\(http://itics.com/ballistics2004/21ibsflyer.pdf\).](http://www.geoc-</p>
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Abstracts are due: 30 May 2003

There will be an Exhibition running in conjunction with the meeting for companies and organizations to display equipment and information related to the field of ballistics. Display or marketing of weaponry, however, will not be permitted. Contact Sonya A l t s c h w a g e r : ballistics@sapmea.asn.au for more information about Sponsorship or the Exhibition.

2003 Structures Congress and Exposition

May 29-31, 2003

The Westin Seattle
Seattle WA

The theme "Engineering Smarter" sets the tone for the 2003 Structures Congress & Exposition. The meeting has been designed to greatly increase participation of practicing engineers while retaining strong interest among academics and researchers. The program will engage practicing engineers and researchers in discussions on how to make better use of existing materials and structural concepts as well as developing new methods and materials. For additional information contact: Charles W. Roeder, Chairman, Structures Congress 2003, Phone: 206/543-6199 Fax: 206/543-1543; e-mail: croeder@u.washington.edu or Jacquelyn Quash, Administrator, ASCE Conferences, Phone: 703-295-6307 Toll Free: 800-548-2723 x6307; e-mail: jquash@asce.org

Check your 2003 SAVIAC calendar for upcoming events

There are only a limited number of 2003 calendars left! To receive your FREE copy e-mail

Lauren at lauren.yancey@saviac.org

Be sure to include your name and address

Short Course Announcements

Modern Protective Structures Course

The Pennsylvania State University

July 14-18, 2003

Penn State's course on Modern Protective Structures is aimed at addressing a broad range of technical issues dealing with mitigating the severe loading effects associated with blast, shock, and impact. Registration brochures and the web site will be available in late-January, www.outreach.psu.edu/C&I/ProtectiveStructure. For information about content: Ted Krauthammer, Director, Protective Technology Center & Professor, Civil and Environmental Engineering, Tel: (814) 865-3102; Fax: (814) 865-9630 E-Mail: tedk@psu.edu, URL: <http://www.ptc.psu.edu>. For information about registration: Janet Patterson Senior Conference Planner, Conferences & Institutes, The Pennsylvania State University, 225

Penn Stater, University Park, PA 16802 USA, Tel: (814) 863-5123, Fax: (814) 863-5190, E-Mail: jrp1@outreach.psu.edu

More details on this course can be found on page 2 of this newsletter.

Fundamentals of Vibration Testing and other related subjects

Equipment Reliability Institute

Huntsville, Alabama, April 8-10, 2003

Mississauga, Ontario, Canada, April 30 - May 2, 2003

Bohemia, New York, May 13-15, 2003

"Fundamentals of Vibration Testing and other related subjects" will focus on basic understanding of vibration and shock, on dynamic measurements in field and test lab, and on vibration and shock testing, as well as on HALT, ESS and HASS (highly accelerated life testing, environmental stress screening and highly accelerated stress screening).

continued from page 4

Most measurements today are taken with accelerometers. We usually divide those measurements by 386 in/sec² or by 9.8 m/s² so our results are in g units.

How should designers use the maximum spectrum? They design their hardware so that its various f_{ns} occur where the SRS is weak, where the potential for damage is least.

The preceding SRS explanation was written by George M. Hieber and Wayne Tustin. It was sponsored and reproduced by Spectral Dynamics, at that time a division of Scientific-Atlanta. It later was divided between the March 1974 and the April 1975 issues of Sound & Vibration magazine.

Don't expect to find the abscissa time ratio t/T in current literature or shock testing specifications. Allan G. Piersol points out the difficulty in defining duration T for "real world" complex shocks. The abscissa on SRS plots is now defined simply as the undamped natural frequencies of the SDoF systems. That is,

$$f_n = 1/\tau.$$

Currently most authors (using SRS plots) show acceleration in g vs. frequency in hertz (Hz), the various frequencies contained in their shock pulses.

Be sure to read next month's issue of Current Awareness for Part IV, the conclusion of Wayne Tustin's excerpt.

Would you
like to
comment on
this article?

E-mail your comments to admin@saviac.org and, if appropriate, SAVIAC will publish them in an upcoming issue of Current Awareness. Please include Tustin Excerpt in the subject line of your e-mail.

IMAC continued from page 1

Dr. Rush Robinett, Sandia National Laboratories gave the luncheon address, "Flexible Robotic Manipulator R&D (From Lab Experiments to Automated Crane Ships) and Engineered Collectives (From Swarms of Mobile Robots to Networks of Cyber Agents)."

A number of exhibitors provided a great deal of support to IMAC by sponsoring a Dessert Break on Wednesday, February 5. Thank you to Data Physics Corporation, m+p international inc., The Modal Shop, Inc., Nicolet Instrument Technologies, and Vibrant Technology, Inc.

If you were not able to attend this year's IMAC, be sure to submit your technical paper to the 2004 IMAC, which will be located in Dearborn, Michigan USA, January 26 - 29, 2004 (see information online, www.sem.org).



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IMAC XXI-Another Success
74th Shock & Vibration Call for Papers
74th Abstract Submittal Form
Vibration and Shock Testing, Measurement,
Analysis and Calibration, also ESS,
HASS and HALT": An Excerpt, Part III
Industry News
Conference/Symposia Announcements
Short Course Announcements***

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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