

PST

PreShipment Testing Newsletter

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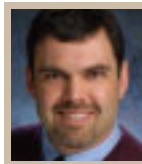
Developing a Random Vibration Profile Standard

Authored by Brian Wallin of Amgen, Inc., presented by Eric Joneson of Lansmont Corporation at the 2007 IAPRI Symposium in Windsor, UK



Brian Wallin
Amgen, Inc.

At Amgen, our mission is to serve every patient every time. We use scientific discovery and innovation to dramatically improve people's lives, by discovering, developing, and commercializing proteins, antibodies, and small molecules that can extend the reach of medicine. Following Amgen's core values, the same approach is applied to developing our packaging and testing standards.



Eric Joneson
Lansmont
Corporation

Amgen's engineers collaborated with Eric Joneson of Lansmont Corporation and

Professor S. Paul Singh, PhD. of Michigan State University to create Amgen vibration test standards. Data was collected from Amgen's transportation lanes, and through building random vibration profiles based on that data, Amgen will be able to better replicate its transportation environment in a lab. This paper follows Amgen's approach on the data collection, analysis of the data, creation of the profiles, and the application of the profiles.

MORE ON PAGE 20

This paper describes the collaboration of science, engineering, industry, academia, and consultants to develop testing profiles to meet your qualification needs. The test standards were developed based on the concept, if you can measure it, you can develop it. Confidence in testing for the distribution process is increased by applying the correct science to sufficient data.

National Transport Packaging Conference in the Philippines

In mid-November, the "First National Conference on Transport Packaging" was held in Iloilo City, Philippines. It was presented by the Packaging R&D Center of the Philippine Department of Science & Technology, and the Central Philippine University (CPU) School of Packaging. The Conference objective was to provide an understanding of the important role of transport packaging in industry, with the theme of "Increasing the Market Opportunity for Philippine Products through Efficient and Protective Transport Packaging".

Long-time ISTA member, former ISTA Director, and LeButt Award recipient Lejo Braña was instrumental in putting together arrangements and speakers for this conference. Lejo has been very involved with establishment of the CPU School of Packaging, and views the Conference and the School's

MORE ON PAGE 25

ISTA Technical Update

Test Procedure Revisions

A number of technical changes and editorial revisions to ISTA Test Procedures have been approved for 2008. New test versions will be published in the 2008 Resource Book, will be updated on the ISTA website and will be available for download/purchase in February 2008. As always, these changes can be tracked on the ISTA website at www.ista.org/Testing/ProcChanges.htm. Always be sure that you are using the most up-to-date test!

Technical Changes

These have been approved by the Technical Council at their October 31 meeting and subsequent ballot, and have also been accepted by the appropriate Test Series Groups. For complete details and background information on these changes, please contact Meredith Dougherty. The modifications are as follows:

- Conditions in the Temperature/Humidity tables of

MORE ON INSIDE FRONT COVER

REGISTER TODAY!
2008 International Transport Packaging Forum

March 17-20, Disney's Coronado Springs Resort, Orlando, Florida **pg. 14**

BECOME A SPONSOR
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Bill Noonan
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ISTA Technical Update

CONTINUED FROM FRONT COVER

Procedures 2A, 2B, 2C, 3A, 3E, 3F, 3H, 7A, 7B, and 7C are re-named to be more generic, and two new conditions have been added.

- Vibration spectra in Procedures 2C (Level 2), 3E, 3F, and 7C have been changed to the "Steel Spring Truck" spectrum of Procedure 3H.
- In Procedure 3A, the vibration top load round-up increment is reduced from 25 lbs. (11 kg.) to 5 lbs. (2.3 kg.).
- In Procedure 3A, the orientations and top loads when vibration testing unpackaged pails and certain other "irregulars" are modified to better correspond to actual field conditions and handling practices.

Editorial Revisions

These revisions to ISTA Test Procedures and Projects have been approved by the Technical Council and have been incorporated for 2008:

- Dates of last Technical and Editorial revisions are now indicated on all Procedures and Projects.
- Test Blocks are numbered for clarity and easier navigation. This was first done for Procedure 3A, and is now incorporated into all ISTA tests.
- The Test Report section of all Procedures and Projects has been clarified, and reference is made to Test Report Forms available from the ISTA website.
- In Procedure 3A, the amount of allowable overhang of the Vibration Top Load Apparatus has been increased for easier fabrication.
- Performance of the two vibration tests in Procedures 2A and 2B has been clarified: it is permissible to make one a fixed displacement test and one a random vibration test.

Revisions to "Guidelines for Selecting and Using ISTA Test Procedures and Projects"

This document, published in the Resource Book and available from the ISTA website, is referenced by most of the ISTA tests and is also an excellent general source of information about many aspects of testing and lab operations. It has been updated for 2008 in a number of areas, including:

- The description of Product Damage and Package Degradation has been expanded, to help address the continuing questions and comments ISTA receives on these issues.
- The information on temperature and humidity conditioning has been clarified regarding transition times between specified conditions, and to recommend the use of longer conditioning times in some situations.
- Detail has been added concerning the inspection of packaged-products during certification tests. Although permitted, it is not generally recommended.
- A discussion of the issue of "Alternative" methods for performance of some tests (e.g. shock, vibration) in the Procedures, and a caution that such alternate tests may not be equivalent.
- A short section has been added regarding the calibration of laboratory instruments.

Project 4AB Program Access - Free to ISTA Members Through 2008

Project 4AB, ISTA's web-based Enhanced Simulation test plan generator, was free to all ISTA members during 2007, via a link on the "Member Login" page of the ISTA website. This free access has been extended through 2008.

Non-members may contact ISTA members to have them demonstrate the program and/or produce a 4AB test plan.

Preshipment Testing is published quarterly by the International Safe Transit Association, 1400 Abbott Road, Suite 160, East Lansing, MI 48823-1900, (517) 333-3437. All inquires, address changes, and requests to receive this publication should be directed to that address. Articles written by outside authors do not necessarily reflect the view or position of the International Safe Transit Association (ISTA). Manuscripts are accepted at the approval of ISTA, which reserves the right to reject or edit. Advertising rates and other information available upon request.

4AB allows a user to specify a Distribution Sequence which matches their actual pattern of distribution. The program then uses current information on handling, transportation, and storage environments to configure a test plan which provides enhanced laboratory simulations.

Contact Bill Kipp at ISTA (bkipp@ista.org) if you have any questions or comments.

FedEx Tests Are First Of ISTA'S New 6-Series

For a number of years, the ISTA 6-Series of tests has been unused, "Reserved for... future expansion". Beginning in 2008 however, this Series will become "Member Performance Tests", protocols created by ISTA members to suit their own particular purposes and applications. The tests may be completely original, or may be modifications or variations of ISTA Procedures or Projects or other published and accepted tests. They will be reviewed, approved, and formally adopted by ISTA, and are made available either on a limited basis or generally, as determined by the originators.

The primary responsibility for creation, validation, and maintenance of 6-Series tests will rest with the originating members.

Typical uses for Member Performance Tests might be by large retailers to establish unique performance-based packaging requirements for their suppliers and vendors, or by carriers to reflect their particular conditions of distribution.

The first organization to take advantage of the ISTA 6-Series is FedEx. Procedure 6-FedEx-A is "FedEx Procedures for Testing Packaged Products Weighing Up to 150 lbs.", and Procedure 6-FedEx-B is "FedEx Procedures for Testing Packaged Products Weighing More Than 150 lbs." Access to these Procedures from the ISTA website will be via a link to the

FedEx site. ISTA will treat tests performed to these Procedures the same as any other ISTA test, and packaged-products may be Certified to these tests if all of the standard ISTA requirements are met.

Contact Meredith Dougherty (meredith@ista.org) if you would like

further information or are interested in applying for ISTA 6-Series approval/adoption.

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Putting the "I" in ISTA

The staff at ISTA continues to follow the goal of making the association membership more international in composition. Operating under the objective of "emphasizing the I for International" in our name, ISTA has recently been traveling the globe participating in conferences and educational events

Ed Church joined Bill Kipp in Mexico and was a speaker at the opening of the new Logistics Technology Center at the Tecnológico de Monterrey, Aguascalientes Campus.

See the articles on our ISTA-China Symposium on page 8 and the CPLP Corner for our recent Mexico Workshop.

In mid-November, Bill Kipp spoke five different times at the "First National Conference on Transport Packaging" held in Iloilo City, Philippines. The conference was presented by the Packaging R&D Center of the Philippine Department of Science & Technology, and the Central Philippine University (CPU) School of Packaging. See Bill's summary article on the front cover.

Also in November, Ed Church spent Thanksgiving week in Turkey, although he said he could not find any turkey to eat. Along with Dr. Paul Singh, ISTA's Vice President - Technical, Ed spoke at the 5th International Packaging Congress and Exhibition in Azmir. Other Keynote speakers included Keith Pearson, President of the World Packaging Organization from South

Africa and Dr. Gordon Robertson, a world famous consultant from Australia. Ed's presentation was entitled "New Technologies in Distribution Environmental Simulation Testing".

On the domestic front, Ed Church spoke in late September at the LogiPharm Conference in Philadelphia, with a presentation titled "Achieving Sustainable Packaging Requires both the 'Just Right' Package and the 'Just Right' Performance Test". In late October, Eric Joneson, ISTA Executive Vice President, gave a presentation on ISTA Project 4AB at the MSU Packaging Alumni Executive Update Seminar. The ISTA Board of Directors also met recently - on October 16, in Las Vegas during Pack Expo - Vegas

Things don't let up in 2008 either! Ed will be presenting at Cool Chain Europe 2008 in Brussels at the end of January; in late February at the 6th Cold Chain Management and Temperature Control Summit in Toronto; in mid-March at HealthPack 2008 in San Antonio; and of course he'll be a speaker at the 2008 International Transport Packaging Forum™ presented by ISTA this coming March. For full FORUM program details, visit the following website: www.transportpackagingforum.com

It's Time to Renew Your ISTA Membership Dues!

It's Time to Renew Your ISTA Membership Dues!

ISTA sent invoices for 2008 membership dues to all current members on November 1, 2007. The invoices are payable by January 31, 2008.

Payment of your annual dues will secure your member benefits for the year, including the use of the ISTA Certification Mark for our Shipper members and the promotion of your Certified Testing Lab for our lab members. Also included as a member benefit is access to the suite of ISTA testing procedures. All members who

have paid by January 31, 2008, will receive their 2008 Resource Book in February.

Paying dues is an easy process. We offer several different options for payment, including:

- Check
- Credit Card (online or by phone or fax; we accept VISA, MasterCard and American Express)
- Wire transfer

The quickest way to pay is online by credit card! To do this, the Member DELEGATE should follow these steps:

- Go to www.ista.org
- Click the blue Member Login button in the upper right hand corner of the web page.
- When prompted, enter your Username and Password. Forgot your password? There's a link on the login page to click - enter your email address and your login details will be automatically sent to you
- Click Pay Dues (on the menu to the right).
- Click Pay Now (If you would like to review the invoice, simply click the appropriate Invoice #).
- Select the method of payment (VISA, MasterCard or American Express).
- Enter credit card information.
- Click Finish.
- Print page as your receipt. An email confirmation will also be sent.

Members not in the United States also have the option of paying with a Wire Transfer. Our bank account information is as follows:

Capitol National Bank
200 Washington Square North
Lansing, MI 48933 USA
Account Number: 304-170-7
Routing Number: 072413450

If paying with a wire transfer, please be sure to indicate your MEMBER ID or

MORE ON PAGE 4



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knowing how much
is the trick.



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For questions, please contact Meredith Dougherty (517-333-3437 ext 217, or meredith@ista.org)

ISTA Offers Free FORUM Registrations to Students

ISTA understands the importance of our university packaging programs, and in an effort to get as many students educated by industry professionals as possible, we are announcing a program to help get students to the 2008 Transport Packaging Forum being held March 17-20, 2008, in Orlando Florida.

University packaging programs that are members of ISTA are being encouraged to select two (2) students from their program to receive free registration to the Forum. Travel and accommodation costs will be up to the student and/or the university. Additional students may attend for the nominal registration rate of \$500. We also offer an Educator rate for university employees of \$650.

Interested universities can contact Lisa Bonsignore (517-333-3437 ext 215 or lisa@ista.org) for full details and to register.

ISTA European Advisory Council Meets

The past September, a group of international packaging professionals met in London to discuss the new ISTA European Advisory Council. The meeting was attended by Ed Church, ISTA Executive Director, Greg Wood of STFI Packforsk UK Ltd and ISTA Executive VP-International, Juan Alcaraz - representing Susana Aucejo - of Itene, Jo Hemsley of SCA, Søren Østergaard of Danish Technological Institute, Sam Sheppard Fidler of Pira International and Thomas Trost STFI Packforsk.

The purpose of the meeting was to identify an action plan for ISTA-Europe, which will determine ways to promote ISTA membership, as well as adopting ISTA Test Procedures and training in

Europe. The Advisory Council identified seven groups of key players in the packaging supply chain, which they wish to target:

- Retailers
- Packaging Manufacturers
- Insurers
- Carriers
- Brand Owners
- Medical/Pharmaceutical Companies
- Test Houses

The Advisory Council then discussed relevant details for each group, including requirements each has and issues that concern their specific area of the supply chain. Also discussed were ways ISTA and ISTA Procedures could help these groups of key players improve and move forward in the future.

After much discussion, the Advisory Council agreed that Retailers and Packaging Manufacturers must be a priority target for Council action and that ISTA Staff in the USA would begin the process of contacting Carriers. It was determined that further contacts were needed within the Brand Owners group; it was also determined that the Council could progress with the Medical and Pharmaceutical Companies through speaking at various conferences (**see page X for details on ISTA's speaking engagements after this meeting**). At this time it was determined that Test Houses and Insurers will not be a priority until other work has been done in other areas.

Stay tuned for further details as the European Advisory Council gets to work on promoting ISTA and preshipment testing to the European region!

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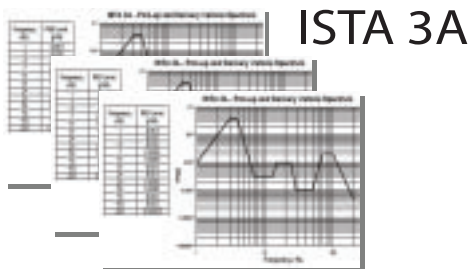
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LARRY RUTLEDGE

One, Two, Three Strikes you are Out!



Larry Rutledge, Manager of FedEx Package Test Lab, recently announced he was retiring after 25 years with FedEx in Memphis TN. Larry has been an active member of ISTA for more than 10 years.

A graduate of the University of Memphis, Larry has a diverse background that eventually led him into the Packaging Industry in 1989. After a tour of duty in Vietnam in 1970, Larry returned home to work on his Masters Degree and begin his career as a building systems designer for local architects and engineers. During the mid-70's energy crisis, Larry was the lead engineer on the design of the largest single application of a Solar Water Heater system built in the Mid South for the Memphis Veterans Hospital. Larry was later hired by Dobbs Houses, Inc., in 1978, to manage restaurant construction projects in Connecticut, Washington DC, Florida and Texas.

Finally, in 1982, FedEx hired Larry as a Project Engineer in their Properties and Facilities department. Larry began his FedEx career helping FedEx grow by providing operational facilities to support a rapidly growing company that was quickly reshaping the way the world conducted business. One of Larry's early FedEx assignments was opening up multiple World Service Centers for a Retail presence in major US markets to get closer to customers.

In 1984, Larry's career took another twist when he was recruited to be a Project Engineer for FedEx Ramp Plans and Programs. Larry's role was to find ways to improve service through the most efficient ways to load packages on aircraft and trucks that would allow destination operations to meet the company's 10:30 AM delivery commitment. Larry says, "This is where I learned about the importance of packaging. Each night for almost four years I would study how packages were unloaded, sorted and loaded in various sections of aircraft. Documents, small boxes, large boxes and eventually freight shipments all had to fit into designated aircraft cargo areas. I certainly saw my share of damaged packages as well as good packaging and poor packaging."

So in 1989 when a Manager's position for Packaging Design and Development became available, Larry applied for the job. "The name of the department, "Packaging Design and Development" reminded me what I had studied in college, an undergraduate degree in "Industrial Technology - Drafting and Design". Larry quickly found out there was a lot to learn about packaging and managing a packaging lab. "FedEx had the basic test equipment: Vibration Table, Drop Tester and a Slide Impact Tester. We also had invested in a Design Lab with a manual sample table and a CAD program." "ISTA was called NSTA and the only people I knew at NSTA was Al McKinlay and Ellis Murphy. I recall Al McKinlay trying numerous times to contact me to discuss how FedEx needed to be more involved in ISTA and for whatever reason it was not until probably late 90's before we met face-to-face."

Larry was recommended to be a member of the ISTA Board of Directors in 2002 and recently completed his fifth year on the Board where he served on the Education Committee and attended every meeting except one during this period. Larry recently stepped down as Chairman of the IoPP Transport Packaging Committee where he recently led the committee in creating the "Guide to Packaging Freight Shipments."

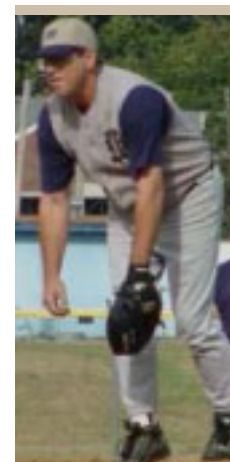
Despite his young age of 61, Larry recently spent a full week in Las Vegas playing Baseball in an "Over 50 National Tournament." "I have been actively playing baseball and softball since 1971. I stopped playing competitive Men's Fastpitch softball in 2003 after more than 31 years but I am still playing recreational adult men's baseball. Baseball has helped me stay in shape and maintain a young disposition." While playing in the Las Vegas tournament for his 3rd year out of last 4 years, Larry played double header games each day for 5 days on two different teams. Playing shortstop for the Pirates Over 50 & Over 60 division teams, Larry hit for a .515 batting average. On the last day of the tournament Larry had two doubles and a triple in the last game. "It helps (getting a triple) when all the other team players are over 50. That would never happen in my summer league where players are 25 -30 years younger."

Larry plans to continue playing as long as he is physically able to compete. The record for the oldest player in his Memphis league is 71 but Larry does not plan to break that record.

Larry said, "I may be retired from FedEx and taking some time off from ISTA Board position but I still plan to be involved in Packaging. I have too much invested and have learned too much to not share my experiences. I have been so blessed to be a part of such an important business. I want to give back to packaging at least a part of what packaging has provided me."

SPOTLIGHT on ISTA Member

by Meredith Dougherty
ISTA Director of Member Services



PST

Larry recently played baseball in an "Over 50 National Tournament."



Bill Kipp
ISTA Associate
Executive Director

Congratulations!

A total of 64 new CPLP Certificates were awarded since publication of the last PST Newsletter, 7 through self-study and 57 during Workshops held in China and Mexico. All were at the CPLP-Technician level. A list of recipients is on the next page. Congratulations to everyone!

A complete list of active CPLPs is maintained on the ISTA website, www.ista.org, under *Certification... Certification for People*.

China Symposium Workshop

In the last issue of the PST Newsletter, we reported the 7 people who earned CPLP-Technologist certificates at September's China Symposium workshop. Their names are now also posted on the ISTA website. But it took more time to tabulate the results from the larger Technician class, and we couldn't meet the newsletter deadline. So they're now in this issue's list.

Since the first China Symposium in 2005, attendance at the accompanying CPLP workshops has steadily grown, and another class is tentatively scheduled for March. This will be entirely administered and presented by ISTA-China. Watch for future announcements.



Han Xueshan of ISTA-China teaching the CPLP-Technician Workshop.

Fall Workshop in Aguascalientes, Mexico

A CPLP Technician Workshop was held October 19-20 in Mexico, in conjunction with the opening of the new Logistics Technology Center at the Tecnológico de Monterrey, Aguascalientes Campus. The class was presented in English with simultaneous Spanish translation, and additional discussions and clarifications were conducted in Spanish. Translation was also available during the exam. Certificates were awarded to 18 participants, as shown in the list.

As an added bonus, the class was invited to visit the nearby testing laboratory of Flextronics Manufacturing, to see demonstrations of equipment in operation and the performance of typical tests. Flextronics has a very complete lab with shock, vibration, drop, inclined-impact, compression, and material test capabilities.

Many thanks to Benjamin Arellano of Tecnológico de Monterrey for making all the arrangements, and for technical support in Spanish; thanks also to Javier Ochoa of Flextronics for the lab visit and demonstrations.

Spring Workshop at the 2008 Transport Packaging Forum

A CPLP Workshop will be held the day before the start of ISTA's annual Transport Packaging Forum (see the Forum article elsewhere in this newsletter). The Technician class will be held on March 16 from 8 a.m. to 12:30 p.m., and the Technologist class will be held from 1:00 to 5:30 p.m. Exams will be given the next morning. Registration is \$695 per class, with discounts for a person taking both sessions and for multiple people from the same organization. Visit the Forum website at www.transportpackagingforum.com and click on "Events" for more information.

Congratulations to all the new CPLPs! A complete list of all CPLP recipients is on the ISTA website at www.ista.org.

Certification... Certification for People.



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Michael Willard	Pira
Brett Dempsey	Logitech
Andy Popa	Detroit Diesel Corporation
Tyler Horwath	UPS Customer Solutions
James M. Moody	Georgia Pacific LLC
Tom Merchant	Georgia - Pacific Innovation Institute

ISTA-CHINA SYMPOSIUM WORKSHOP CPLP Technicians

Luo Jianyou	Qingdao Haier Fengxai Paper Products Co., Ltd.
Wang Liqing	Orbis Corporation (Shanghai).
Sharon Keung	CMA Industrial Development Foundation Ltd.
Ding Liya	CMA Industrial Development Foundation Ltd.
Geng Tao	SGS-CST Standards Tech. Services Co., Ltd., Shanghai
Wu Min	Jiansu Metrology Institute
Lai Chaozhong	TUV-SUD China
Gu Zhenggang	SEVEN (Tianjin) Industrial Co.,Ltd.
Li Lin	CPRTC
Jiang Nengke	New Zealand Methven Co., Ltd. Shanghai Office
Yu Ruihua	IBM China Procurement Company
Yu Wenbao	Suzhou KingPack Tech. Development Co., Ltd.
Zhou Jian	Shanghai General Motors
Zhou Dezhi	Wuxi Qiancheng Wood Packaging Co., Ltd.
Fa Haoyong	HIGHLY Group
Zhang Yingzhuang	Guangzhuo Colgate-Palmolive Co., Ltd.
Wu Yongxing	Guangzhuo Colgate-Palmolive Co., Ltd.
Liu Fen	Colgate Sanxiao Co., Ltd.
Yin Hua	Andrew Telecom (China) Co., Ltd
Qiu Xiaodong	Andrew Telecom (China) Co., Ltd
Zhang Jian	Schneider-Electric China Investment Co., Ltd.
Shao Chen	Tianjin Focuschain Package Co., Ltd.
Li Chongyue	Personal
Yang Xuesong	Logitech (Suzhou) Co., Ltd
Yao Peiyuan	Logitech (Suzhou) Co., Ltd
Dai Gensheng	Logitech (Suzhou) Co., Ltd
Li Hu	Nefab Packaging Engineering
Fang Liuhua	Nefab Packaging Engineering
Mei Qiaoling	Nefab Packaging Engineering (Shenzhen)
Li Yunpeng	Nefab Packaging Engineering (Shanghai)
Li Chunfei	Nefab Packaging Engineering (Wuxi)
Chen Bei	Nefab Packaging Engineering
Cai Gang	Huawei Technologies Co., Ltd.
Zhang Hong	Bureau Veritas Consumer Products Services (Shanghai)

Liu Shenqiang	Bureau Veritas Consumer Products Services (Shanghai)
Ung Thanh Van	Bureau Veritas Consumer Products Services
Nguyen Hoang Duong	Bureau Veritas Consumer Products Services
Lalit Mohan Gupta	Package Design Research & Test Lab (India)
Shen Bo	Orbis Corporation (Shanghai)

MEXICO WORKSHOP CPLP Technicians

Rossy Coss y León Pérez	IndusPac
Maria Dolores Dominguez Reyna	Ariadna Rojas Reyna
Javier Ochoa Valencia	Flextronics Mfg. Aguascalientes
Marco Tulio Villegas Bolanos	IndusPac
Jose de Jesús Muñoz Maldonado	Amcors de Mexico
Sandra Marcela Pérez Leal	lextronics Mfg. Aguascalientes
Benjamin Gaspar Nunez	lextronics Mfg. Aguascalientes
Ricardo Montoya Guzman	Autoliv Mexico
Mayra Martinez Castilla	Siemens
Agustin Tovar Coss	Servicios Integrdles y Acobodos (Grupo Vitro)
Ricardo Salcedo Salgado	Mabe Tecnologia y Proyectos
Elvira Olay Romero	Autoliv Mexico
Joel Muzquiz Moreno	San Luis Rassini
L.A. Liliana Pérez Lara	Formas Impresas de Mexico
Luis Arturo Guterrez Osorio	ITESM Campus Aguascalientes
Ariadna Marybel Rojas Reyna	Ariadna Rojas Reyna
Ricardo Garza Chaúl	Vidrio Plano
Marcela E. Ortiz Arredondo	ITESM Campus Aguascalientes

HERE ARE SOME INTERESTING QUESTIONS



Meredith Dougherty
ISTA Director
of Member
Services

DO YOU HAVE A QUESTION?

PLEASE ASK!

Someone else may have the same question and we'd be more than happy to provide you with an answer!

If we can't answer it, we'll find someone who can!

Question:

Are ramp times included in ISTA's profiles for atmospheric conditioning?

Answer:

In all of the ISTA Procedures with atmospheric conditioning, including Procedure 7D, ramp times are NOT included in any thermal profiles. The times listed are requirements for the dwell times at each condition.

Question:

Several ISTA Procedures list a one or more exceptions for testing based on package configuration.

How do you define a "definite skid bottom", which is one of the exceptions often used?

Answer:

"Definite skid bottom" means a pallet or skid such that the package is specifically designed to be handled with a fork lift.

Question:

Is there a difference between "Compression Testing" and "Compression Conditioning"?

Answer:

"Compression conditioning" is not a compression performance test, in other words it is not intended to result in a pass or fail as with compression testing. It is also not intended as a predictor of warehouse or vehicle stacking capability – the maximum force to be applied is only 750 lbs (3300 N) for even the largest and heaviest of packaged-products. Instead, its purpose is to condition the specimen prior to performing vibration and shock/impact tests. It might be compared to atmospheric (temperature and humidity) pre-conditioning before a test series.

PST

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Test-O-Pac Industries

Test-O-Pac Industries, Inc. was founded by packaging engineer Dave Long in 1977. At the time, their main customers were Atari (computer and game division) and Rohm. In 1989 the nature of the company (the one that would be intimately familiar with the manufacturing techniques of packaging cushion materials) encompassed all aspects of packaging design, manufacturing and testing. From this effort grew an organization that offers the entire spectrum of value added testing services to a wide range of clients, including component manufacturers, aerospace, energy, automotive, and electronics industries.

In 2001, their Transit Damage Prevention portfolio gave Test-O-Pac Industries access to the Test Services business. Managed essentially as independent testing laboratory, the Test-O-Pac Charter is to "serve our customers by providing the climatic, dynamic and mechanical stimuli necessary to exercise their products, be it components, modules, and equipment or entire systems." As a result, much of their business is custom in nature.

Test-O-Pac currently has 6 employees, with the key players being Sam Sohal, Marik Hoefling, Jas Singh and Miguel Garcia. The company's President, Sam Sohal, PE, studied packaging dynamics with Herb Schueneman (founder of Westpack and currently Adjunct Professor and Instructor at San Jose State University), and finished his degree in Packaging Engineering at SJSU. Sam had his first chance to set up a complete ISTA 1A lab as a packaging designer at Great Western Foam Corporation, working as a protective foam designer for the electronic industries.

Although the word "test" is prominent in the company name, Test-O-Pac offers a wide range of services.

Package Design: By using custom materials when designing packages for customers the selection of materials is based on calculations of gross weight and usage of square inches of material that come into contact with the unit. They also work towards a reduction of the amount of material, using only the minimum amount to achieve the maximum deflection.

Package Testing: Testing performed at Test-O-Pac ensures optimum energy absorption and modification. The desired acceleration level of achievement is verified. Additionally, an engineering service is provided to aid customers in redesigning and/or their products and packages rugged enough to survive the harsh environments of shipping, distribution and transportation.

Product Reliability and Environmental Testing: Test-O-Pac Industries provides a broad diversity of product reliability and environmental testing services for electronic, mechanical and electromechanical equipment such as power supplies, disk drives, personal computers, military and aerospace ordnances, radar systems, shipboard test sets and similar items. Services range from test design, test plan generation, and actual testing to data compilation, reduction and analysis.

Climatic and dynamic testing is provided in a variety of controlled environments including temperature, humidity, altitude, vacuum, acceleration, vibration, shock, saline atmosphere and pressure.

Product Testing: Test-O-Pac encounters a myriad of different products, requiring that a wide variety of equipment be available as well as competent personnel to run it. Furthermore, a great deal of flexibility is required in order to meet and respond to the multiplicity of the customer's needs, including:

- Product Testing - to customer's, MIL-SPECs, or commercial/ industrial requirements.
- Design Verification Testing
- Product Evaluation
- Qualification Testing
- Reliability Testing
- Engineering Evaluation
- Environmental Stress Screening
- Production Testing - Extension of Customer's back end facility
- Test Program/Program Plan Development
- Engineering Consultation

Due to a specialized nature, most of the testing done by Test-O-Pac is subject to change and is developed for the specific requirements of the customer. The Engineers pride themselves in their ability to respond to a customer's many needs by virtue of technical skills and the advanced equipment and technology they possess.

In 1977 the Test-O-Pac Industries facility was 1200 square feet; today they have grown to a 10,000 square feet. New equipment includes triple-chamber Thermal Shock machine, 64-cubic feet chamber that provides altitude profiles as well as temperature and humidity, a 20,000 lbf electro-dynamic shaker, a 7-bearing hydrostatic guided horizontal table for precision vibration testing and digital vibration controller for shock response spectra measurements and analyses.

One of the innovative advances in technology Test-O-Pac has taken on is the use of video to assist as evidence that an item was inspected and/or tested. Using video as evidence to showcase and assess learning is not a new idea; it's been used in the legal system for many years as convincing evidence on the issue of identity. What's new, however, is the notion that video as evidence can be shared with much larger audiences via the Internet. Video as evidence is catching on because it offers several potential benefits to everyone involved in testing activity, both directly and indirectly.

In addition to their ISTA Certification, which was originally obtained in 1978, Test-O-Pac has several other certifications currently pending, including: ISO 9001-2000, A2LA and DSCC

Test-O-Pac is located in San Jose, California. They can be reached at 408-436-1117, or on the web at <http://www.testopac.net>

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Int'l Maritime Dangerous Goods (IMDG)

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Regulated Medical Waste / ASTM D-4169
NMFC Item 180 & 181

ADDITIONAL SERVICES

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TAPPI / ASTM
Customized Test Development
Package Redesign

AFFILIATIONS

ISTA
TAPPI
IOPP

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	Members	Non-Members		Members	Non-Members
Procedure 1A	84	139	Procedure 3A:		
Procedure 1B	9	3	-standard	9	36
Procedure 1C	2	0	-small	1	0
Procedure 1D	7	0	-flat	14	1
Procedure 1E	6	13	-elongated	19	5
Procedure 1G	0	2	Procedure 3E	1	1
Procedure 1H	1	3	Procedure 3F	0	0
			Procedure 3H	0	0
Procedure 2A	4	25			
Procedure 2B	2	1	Project 7A	0	0
Procedure 2C	0	0	Procedure 7B	0	0
Procedure 2D	0	3	Procedure 7C	0	0
Procedure 2E	0	0	Procedure 7D	0	0
			LTL Item 180	3	n/a
			ASTM D4169	3	n/a

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UPCOMING industry events

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WestPack

Anaheim, CA

<http://www.devicelink.com/expo/wpack08/>

FEBRUARY 2-6, 2008

NMFTA National Meeting

Fort Lauderdale, FL

<http://www.nmfta.org/CalendarofEvents/Meetings/tabid/96/Default.aspx>

FEBRUARY 15-16-17, 2008

11th International Molded Fibre Product Seminar

Cape Canaveral Radisson Resort in Cape

Canaveral Florida USA,

The International Molded Fibre Association

(IMFA) <http://www.impepa.org/>

MARCH 17-20, 2008

2008 International Transport Packaging Forum

Orlando, FL

<http://www.transportpackagingforum.com>

MAY 18-21

National Postal Forum

Anaheim, CA

<http://www.npf.org/>



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Reserve Your Exhibit Space!

The FORUM is the premier event in the transport packaging industry. The Exhibitor Reception and Breakfast with Exhibitors presents an opportunity for your company to make new contacts and reinforce previous relationships. Exhibiting your products and services at the FORUM will be a powerful, cost-effective and convenient way to target the transport packaging industry.

Time frame	Sun Mar 16	Mon March 17	Tues March 18	Wed March 19	Thurs March 20
7:30 - 8:00		Forum Registration 8:00 - 5:00	Continental Breakfast 7:30 - 8:00	Continental Breakfast 7:30 - 8:00	
8:00	ISTA CPLP Workshop Technician Course 8:00 - 12:30	ISTA CPLP Workshop Exam 8:00 - 12:00	Welcome to the FORUM and Networking Activity Sustainability Issues in Distribution Packaging Operations Sealed Air Global Trends and How They Affect the Rail Industry TransSystems' Ports and Maritime Market Sector Fun for the Family & Guests 9:00 - 10:30	Managing a Packaging Engineering Team: Tips, Tools and Tradeoffs, Part 2 Hewlett-Packard NMFTA Past, Present & Future...How Will Recent Changes Affect Your Business? ABF Freight Systems, Inc. & NMFTA New Considerations for Random Vibration Testing of Packaged-Products ISTA Dynamics of SMALLS! MSU School of Packaging	Breakfast with the Exhibitors 8:00 - 9:30
10:00 - 10:30			Break 10:00 - 10:30	Break 10:00 - 10:30	Forum Highlights 9:30 - 9:45 Stability Evaluation and Comparison of Stretch Hooding versus Stretch Wrap Unit Loads Center for Unit Load Design at Virginia Tech
10:30		ISTA Educational Foundation Golf Outing Disney's Lake Buena Vista Golf Course 10:00 - 2:30	Laboratory Practices for Optimal Thermal Gel Design and Specification DDL, Inc. & TCP Reliable, Inc. Air Transport Vibration Study Lansmont Corporation New Frontiers in Usability Testing MSU School of Packaging	Wal-Mart and Sustainable Packaging in 2008 Sam's Club A Model for Carbon Management in Transportation IBM Corporation Vibration Testing 101 The Hershey Company	Developing New Temperature Profiles for US Parcel Shipping Lanes ISTA Distribution Testing of Works of Art Pira International Packaging Material Cost Trends FedEx End of Forum Wrap Up 11:45 - 12:00
12:00 - 1:00			Lunch 12:00 - 1:00	Lunch 12:00 - 1:30	
1:00	ISTA CPLP Workshop Technologist Course 1:00 - 5:30		Packaging Myths III: Compression, Stacking, Top Load Dennis Young & Associates Stories from the Field Packnomics, LLC Medical Device Packaging: Overcoming the Global Challenges C.R. Bard, Inc.	Getting it Right for the Customer, But at What Price? Bush Brothers & Co. Universal Principles of Transit Packaging Throughout History MSU School of Packaging	
2:30 - 2:45			Break 2:30 - 2:45	Break 2:30 - 2:45	
2:45			The Importance of Focused Test Method Development Pira International Is ISTA 3A Really That Good? UPS Consumer Solutions Measurement and Analysis of Temperature and Pressure in High Altitude Air Shipments CalPoly	Temperature and Air Change Rates in Freight Containers During Transport Federal Institute for Materials Research & Testing Will the REAL Random Vibration Spectrum Please Stand Up? San Jose State Univ.	
3:45 - 4:00		All About the FORUM and ISTA 3:45 - 4:45		ISTA Update 3:45 - 4:45	
4:00					
5:30		St. Patrick's Day Celebration			
Evening Events		Meet & Greet 5:00 - 6:30 Volleyball Tournament 6:00 - 8:00	FORUM Welcome Night 6:00 - 8:30	Exhibitors Reception 6:00 - 9:00	

BECOME A SPONSOR of the Sam's Club Test Procedure Development Program



ISTA, with the cooperation of Wal-Mart Stores, Inc. is entering into an innovative program with the development of preshipment

packaged-product performance tests based upon the Sam's Club distribution environments. We're offering an exclusive opportunity for interested partners and companies to become Program Sponsors for this important project.

With the introduction of the Wal-Mart Sustainable Packaging Initiative, ISTA began discussions with Wal-Mart about supplier development of packaged-products by using performance tests based upon the Wal-Mart distribution environment. In order to meet the objectives of Sustainable Packaging, Wal-Mart partners must have a clear understanding of what distribution

hazards are present and at what levels of intensity they occur.

By developing custom performance tests, it will allow companies to design protective packages that don't under- or over-package; ideally suited for this unique distribution environment.

Exclusive Benefits to Sam's Club Sponsors:

- Participation in the Test Protocol Validation phase utilizing your company's products.
- A live session to review, first-hand, the results of the analysis of the data collection presented by the project experts and attended by Wal-Mart representatives.
- Participation in a symposium to provide expertise in the development of packaging to meet Wal-Mart sustainability goals.
- Participation in a Webinar during the validation phase of the program.

• Opportunity to showcase case studies of successful efforts toward sustainable packaging.

• One free attendee registration to ISTA's 2008 Transport Packaging Forum.

• Opportunities to network with 'key' leaders involved in sustainable packaging initiatives at various events such as the 2008 Forum, the Symposium and the Live data analysis session.

Your financial support will allow ISTA to measure and observe the Sam's Club distribution environment, analyze the data, develop packaged-product test procedures and provide Sam's Club suppliers with technical and educational support.

Corporate Sponsorship is \$10,000. To become a sponsor or to learn more, go to <http://www.ista.org/SamsClubProject.htm> or contact Ed Church, ISTA Executive Director at 517-333-3437.

PST



7 Tests Vital to Package Validation

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American Packaging Corp. Gives RIT \$1 Million to Fund Packaging Center

R·I·T



A \$1 million gift from Rochester-based American Packaging Corp. will fund the expansion of Rochester Institute of Technology's Center for Integrated Plastics. The center will be renamed the American Packaging Center for Plastics & Packaging Innovation.

The center, which operates as part of RIT's Department of Manufacturing and Mechanical Engineering Technology/Packaging Science, is slated to move into the College of Applied Science and Technology's new Engineering Technology building when it opens early next year.

"The generous support we have received from American Packaging Corp. will enable us to equip our center with state-of-the art equipment, top-notch faculty and staff and the ability to provide our students with timely insight into new packaging-related technologies," says Tom Voss, program chair of RIT's packaging science program.

American Packaging Corp.'s support will also help establish a center director and create opportunities for increased graduate assistant positions that will

focus on unique flexible packaging challenges.

"All of us at APC are extremely excited about the opportunity to join hands with RIT's packaging science program. We are impressed by the momentum that the university has within our industry and believe that the combined energy and talent of our two excellent organizations will achieve truly outstanding successes in innovation," says American Packaging CEO and owner Peter Schottland.

RIT is an active member of ISTA. They currently have an ISTA Certified laboratory and will be exhibiting at the 2008 Transport Packaging Forum.

Sealed Air Acquires Dow Chemical's Ethafoam™ Business

Sealed Air

Sealed Air Corporation announced that it has completed the acquisition of certain assets relating to The Dow Chemical Company's ETHAFOAM™ and related polyethylene foam product lines, further accelerating sales and expanding its global presence in specialty materials.

The assets, located primarily in North America and Europe, include a license to process technology, customer contracts, trademarks, and certain production and process equipment sold under the ETHAFOAM™, SYNERGY™, EQUIFOAM™, and ENVISION™ trademarks. In addition, Sealed Air has acquired the rights to the LAMDEX™ trademark. ETHAFOAM™ is a polyethylene foam packaging and specialty brand used in a wide variety of applications, such as transportation, construction, military/defense, automotive and sports & leisure.

As part of the agreement, Dow will supply ETHAFOAM™ and related products to Sealed Air for a period of up to 18 months, at which time Sealed Air

will commence manufacturing of the products at its own facilities. Financial terms of the transaction were not disclosed. Sealed Air does not expect the transaction to be material to its consolidated financial position or results of operations.

Ciba Acquires Lansmont's Testing Services Group



Pira International, a UK-based provider of Ciba® Expert Services and supplier of transit and distribution testing and business solutions to the packaging, paper, printing and publishing industries, has expanded its global testing services through the acquisition of the US-based Lansmont Corporation's Testing Services Group.

Lansmont's Testing Services Group delivers quality solutions for companies seeking to reduce product / package container costs, improve performance and quality, identify specific environment distribution dynamics and address specific package concerns. Through its three strategically located Service Centers located in Lansing, MI, Sunnyvale, CA, and Huntington Beach, CA, the Testing Services Group offers professional measurement, testing, simulation, and consulting services. The newly acquired organization will operate as an affiliate of Pira International, conducting business under the Pira name.

"This acquisition broadens Ciba Expert Services geographic reach and provides a platform to expand Pira's services into the US market. It fits well with our strategy of building on our core competencies and to further develop the total Ciba Expert Services portfolio

which includes regulatory consulting, environmental management, safety and materials testing, business intelligence, events and training," says Adrian Knott, Global Head, Ciba Expert Services.

Lansmont's equipment and instrument business will continue to operate under Lansmont's ownership and is not part of this transaction.

Merger of TCP Reliable with DDL Establishes New Tier Packaging Engineering Firm



TCP Reliable, a thermal packaging solutions manufacturer and DDL, the leading package testing services firm have announced a merger, making the combined company the leading packaging engineering group specializing in the medical device and biopharmaceutical industries. DDL and TCP will continue to operate their testing and manufacturing separately with DDL as a wholly owned subsidiary of TCP Reliable.

"The true benefit of this merger for our clients is access to a wider array of services custom suited to their growing needs," states Patrick Nolan, COO of DDL. "Particularly, our clients will be able to confidently consolidate both their testing and manufacturing objectives."

This powerful new collaboration between packaging testing pioneers DDL, specializing in medical device testing and TCP, a full service temperature controlled packaging manufacturer, will answer the growing needs of both firms client bases.

"The TCP and DDL combination offers the most complete range of distribution packaging engineering services and solutions to the fast growing medical device and the biopharmaceutical

segments of the health care industry" states Maurice Barakat, President and CEO of TCP Reliable. "Our increased technical depth and size will allow us to provide coast to coast service in meeting the requirements of the most demanding players in the health care industry through our six company owned sites in the US and Canada".

Ralph L. Rupert Named Center Director

Rupert a natural fit to continue the legacy of retiring director, Marshall White

With the impending retirement of Dr. Marshall "Mark" White, founder and

MORE ON PAGE 18



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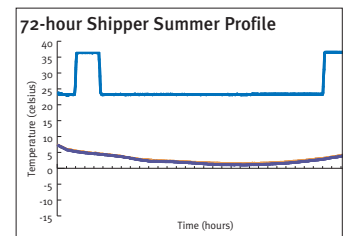
By combining Phase 5 Thermal Control Panels (TCP) with the Pre-Qualified Shipper, a Total Shipper System is provided capable of maintaining the 2°C to 8°C range over 72 hours. This Pre-Qualified Shipper System eliminates the time consuming and costly process of validating your shipping package. Engineered in our ISTA certified lab, the Shipper System conforms to the most demanding shipping environments.

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The TCP Phase 5 Panels can be easily interconnected to provide a small, lightweight footprint. These innovative panels won both the Ameristar and Worldstar awards for design excellence. Variable carton sizes let you tailor the shipper profile to reduce the overall size of the package. Freight costs can be reduced by as much as 50%!

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director of the Center for Unit Load Design, the center and the department of wood science and forest products at Virginia Tech announce that Ralph L. Rupert will assume the directorship.

Rupert joined the center in 1999 and has been instrumental in supporting the center's mission of developing technologies to support systems based design. In addition to directorship duties, Rupert's continuing responsibilities at the center include managing all center testing/evaluations and teaching continuing education courses.

Prior to joining the center, Rupert worked in plastics for several years before taking a job with Weyerhaeuser in northern Illinois where he managed the containerboard division test lab. He continues to teach classes at

Weyerhaeuser. Originally from Ohio, he holds a degree in chemical engineering from the University of

Akron. His goal for the center is to continue to expand and apply systems based design across the industry – a concept that fits well with current corporate environmental sustainability initiatives. The transition in directorship should be flawless with Rupert's strong working relationship with current director, Dr. Mark White.

Dr. White will retire after 31 years of dedication to the department, center, and pallet and container industry. Dr. White will continue his affiliation with the center and department on a part-time basis through undergraduate instruction, service on graduate and research committees, and in a continued advisory role to the center. In his new role as CEO of White & CO., a Blacksburg based consulting company that will specialize in packaging and pallet design solutions that optimize supply chain performance, he will use the extensive testing and research services of the Center for Unit Load

Design. "I am pleased that Ralph Rupert has been selected to direct the activities of the Center for Unit Load Design," affirms White. "Ralph brings continuity to the transition, while recognizing the importance and opportunities associated with industry and academia collaboration. I am confident that under Ralph's direction, and with the support of industry and the university, the center will flourish in the future."

New Company: Coastal Container Corporation




A team of veteran leaders in West Michigan's container and packaging industry have launched a new company-Coastal Container Corporation-that will set a new standard for quality, value and innovation in the packaging industry.

Though the company's goals are ambitious, it has launched with the talent, experience and resources to achieve them, said Brent Patterson, company president and CEO.


"We are combining decades of container manufacturing experience and state-of-the-art systems with the largest, best-equipped container facility in our marketplace," Patterson said. "We have made a long-term commitment of excellence to our customers and to our employees."

Coastal Container will design and manufacture custom corrugated packaging, and assist customers with inventory management of the container products they use. The company is headquartered in the former Sligh Furniture building at 1201 Industrial Ave. in Holland, which it purchased earlier this year. The building offers 235,000 square feet of manufacturing space, which Coastal Container has reconfigured to accommodate best-practices container manufacturing and



Package Test Equipment

Vertical/Horizontal Shakers



Drop Tester

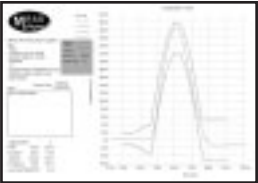
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processing. Planned investment in the facility is \$10 million.

"We have literally started from scratch in the creation of our company, which allowed us to incorporate best practices in every step of our processes," Patterson said. "We don't have any bad habits to correct, and that creates big competitive advantages for us in quality, cost and efficiency."

Coastal Container has already hired 25 employees, many of whom are seasoned veterans of the packaging industry. Patterson, 44, is the former president of Holland-based Shoreline Container, which he led successfully for 21 years before selling his interests over a year ago. His father, William Patterson, founded Shoreline in 1962 and will serve Coastal Container in a consulting role. Total employment in the company is expected to grow to 75 by the end of 2008.


A number of innovations are built into the Coastal Container facility, including:

- More than 2500 square feet of space to accommodate product development and testing, which will incorporate a broad range of sophisticated testing equipment.
- Double the number of receiving and shipping docks-including a custom-built indoor receiving facility-to facilitate weather-protected, just-in-time delivery of materials and finished goods.
- Plant-wide humidity control systems to maintain precise levels of relative humidity during dry winter months.
- Total bar-code control of all incoming materials and outgoing

finished goods.

- Straight-line manufacturing layout that allows for reduced product and material handling, storage and damage.
- A bio-fuel heating system that can cleanly and efficiently burn wood and even dust that is generated in the manufacturing process, collected by high vacuum systems and circulated back into the burner.

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Developing a Random Vibration Profile Standard

CONTINUED FROM FRONT COVER

Data Collection

Amgen's data collection efforts focused on collecting data from air ride trucks and airplanes. These are the two modes of transportation Amgen uses most frequently. Truck data was gathered by attaching four vibration data

loggers to two trucks just behind the rear axle (Figure 1 - Air Ride Truck Data Collection). The two trucks chosen are the two main trucks Amgen uses to transport Amgen products. Data collection took place continuously over 30 days anywhere the trucks traveled.

Over the 30 days Amgen collected data on different road conditions, East Coast vs. West Coast, different trailer load conditions, and different truck velocities.

Airplane data was gathered using a different approach, based on FAA regulations. The preferred method to collect data was to attach vibration data loggers directly to an airplane to gather the best possible vibration data, similar to the approach used on the trucks. Based on the regulations, Amgen determined the best approach to collect data would be to attach the vibration data loggers to an LD3 shipping container (Figure 2 -- Airplane Data Collection). This shipping container was selected because the containers are secured directly to the airplane. To determine exactly when the airplane was in the air, Amgen included pressure loggers with the airplane shipments to assist with data analysis.

Vibration Profile Development Method

Following the collection of the vibration data Amgen had to determine a method to analyze the data and create the Amgen profiles. Amgen followed the vibration simulation of truck transport environment method developed and published by the Consortium of Distribution Packaging Research [1]. This method required the creation of two random vibration profiles, a high 30% and a low 70% profile, based on the data gathered. Amgen took a more stringent approach by creating a high 20% and low 80% profile. The two profiles are created to complete one test. The high 20% profile is used to increase the confidence in testing, by testing at a higher level for a portion of a test, using more of the higher level data gathered that is muted out by averaging.

Data Analysis - Truck Data

The first truck profile created was the low 80% profile, which Amgen named the *Amgen Low Intensity Air Ride Truck Random Vibration Profile*. This profile was created following the industry approach for profile development, using the average of all the data that is within scope of the profile [2].



Figure 1. Air Ride Truck Data Collection.

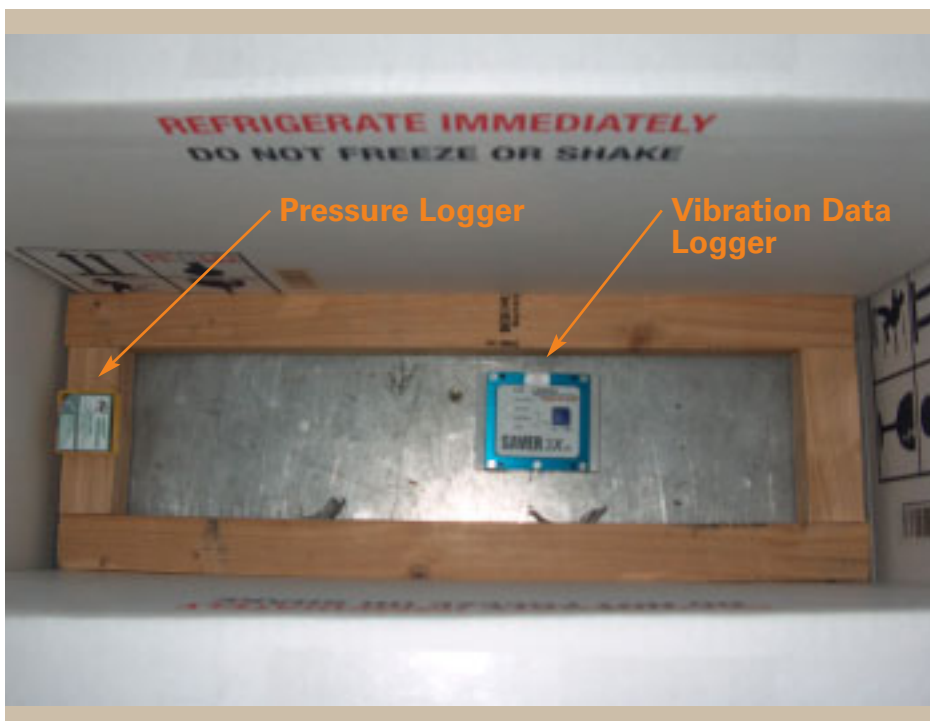


Figure 2. Airplane Data Collection.

First, the data was filtered to remove any out of scope data. Data below 0.04 Grms was filtered out to remove any digital noise that may have been recorded and all non-vibration events were also filtered out. The remaining data after filtering was the data that was averaged to create the *Amgen Low Intensity Air Ride Truck Random Vibration Profile*. Amgen applied a "smoothing" process to the profile that was created. Without the "smoothing" process the *Amgen Low Intensity Air Ride Truck Random Vibration Profile* would have about 400 breakpoints to program into a vibration table. The "smoothing" process finds trends in the data that make up a vibration profile and eliminating the data points between the first and last point in a trend. At the end of the "smoothing" process the profile has the same shape, but in Amgen's case only has 32 breakpoints to program into a vibration table verses the 400 before the smoothing process. Chart 1 - *Amgen Low Intensity Air Ride Truck Random Vibration Profile Smoothing* shows how the smoothed profile with 32 breakpoints compares to the raw data, and the un-smoothed profile.

Once the Amgen Low Intensity Air Ride Truck Random Vibration Profile was created, Amgen created the high 20% profile, which Amgen named the Amgen High Intensity Air Ride Truck Random Vibration Profile. The creation of the Amgen High Intensity Air Ride Truck Random Vibration Profile required the data be analyzed differently then the low profile.

First, Amgen determined what Grms level the upper 20% of all the data collected was at or above. Amgen determined that the upper 20% of the data collected was greater than or equal to 0.167 Grms using Microsoft Excel's Rank & Percentile function. Based on this data, Amgen was ready to filter the truck vibration data again to remove any out of scope data.

All data less than or equal to 0.167 Grms was filtered out to remove any out of scope data and all non vibration data was also filtered out. The remaining data, after filtering, represents the

upper 20th% of all the vibration data gathered. This data is averaged to create the *Amgen High Intensity Air Ride Truck Random Vibration Profile*. The same smoothing process, as before, was applied to the *Amgen High Intensity Air Ride Truck Random*

Vibration Profile.

The resulting profiles using the 80-20 method are shown in Chart 2 - *Amgen High and Low Intensity Air Ride Truck Random Vibration Profiles*.

Amgen only created random vibration

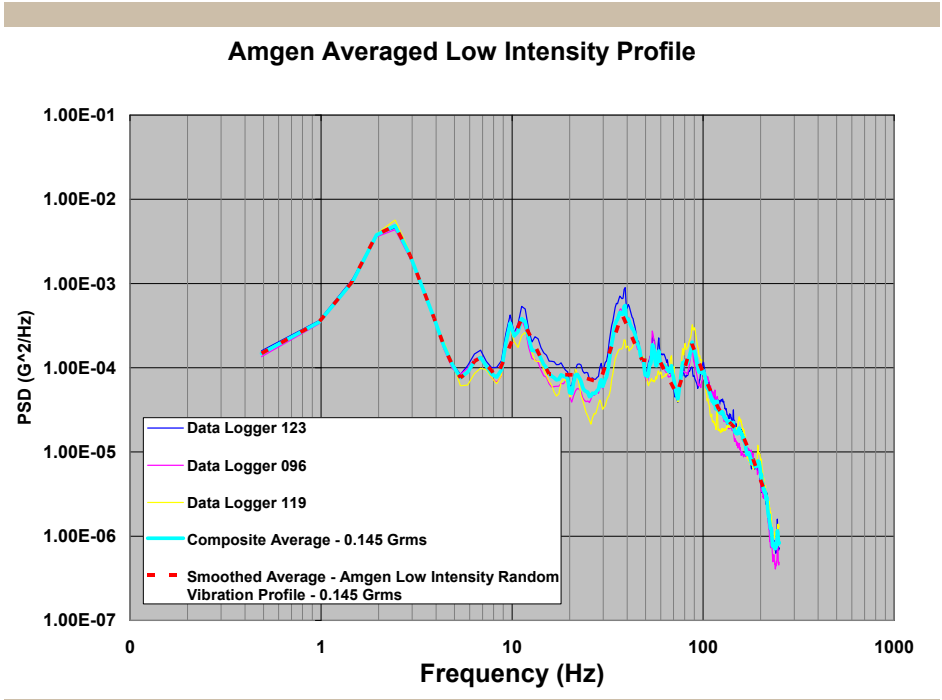


Chart 1. Amgen Low Intensity Air Ride Truck Random Vibration Profile Smoothing.

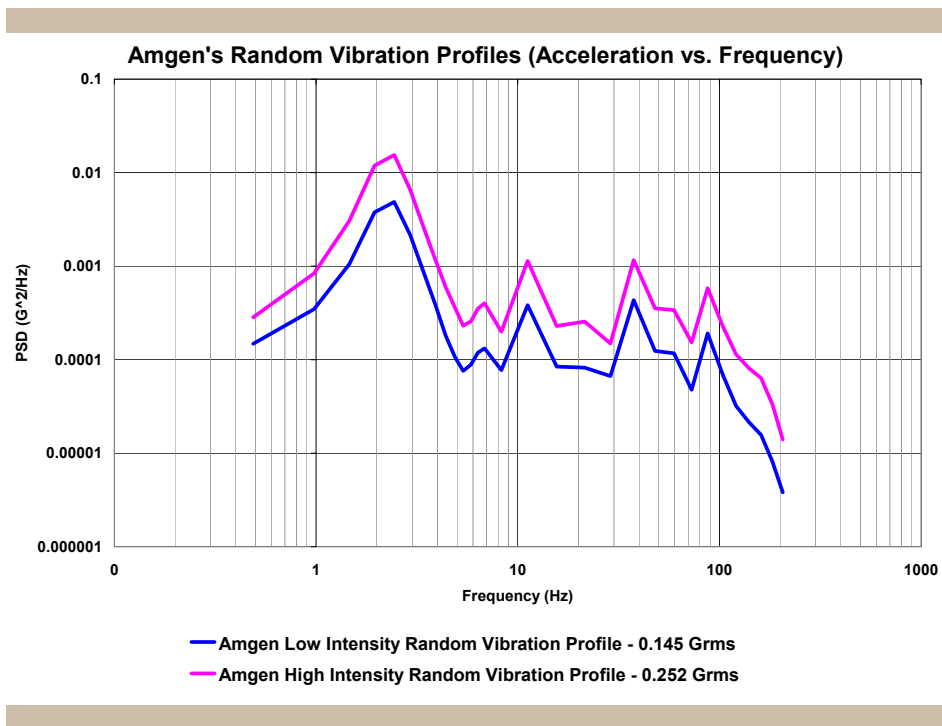


Chart 2. Amgen High and Low Intensity Air Ride Truck Random Vibration Profiles.

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Developing a Random Vibration Profile Standard

CONTINUED FROM PAGE 21

profiles for an air ride truck. Using the data gathered from this study, Amgen compared their data to ISTA's data for an air ride truck in test procedure 3H. Based on this comparison of the data Amgen determined it has a high level of

confidence in ISTA's profiles. Amgen adopted the ISTA Over-the-Road Truck profile, and the ISTA Pick-up and Delivery Truck profile from the ISTA 3A test procedure [3]. Amgen chose not to develop its own profiles for these

transport modes because of our high confidence in the ISTA profiles.

Data Analysis - Airplane Data

The airplane data collected by Amgen was not consistent with prior profiles and validated why Amgen must collect its own data. When compared to the ASTM air profiles, the Amgen data demonstrates lower amounts of vibration (Chart 3 - Amgen Air Data vs. Amgen Truck and ASTM Data). Due to the low energy level Amgen's first approach with the airplane data was to not create an airplane profile. The final strategy determined was to replicate actual shipments in a laboratory as closely as possible, which required the creation of Amgen airplane profiles.

The Amgen airplane random vibration profiles were created following the same data analysis methods used to create the Amgen High and Low Intensity Air Ride Truck Random Vibration Profiles, but the airplane profile required different data filtering techniques.

The first step in data analysis was to determine what was causing the large spike in the data at 125 Hz (Chart 3 - Amgen Air Data vs. Amgen Truck and ASTM Data). The theory was that this was caused by the resonant frequency of the LD3 container. This theory was proved correct once Amgen performed a resonance search on the container. Based on this data Amgen was able to remove the spike in the data since this was not an input from the airplane. If Amgen were required to simulate a shipment in an LD3 container we would perform our testing with product in an LD3 container on the vibration table.

Next the data was filtered to create the low 80% profile, which Amgen named the Amgen Low Intensity Airplane Random Vibration Profile. The data gathered using the pressure logger included in the shipping container allowed the vibration data to be filtered using the known date and time when the airplane was in the air. This filtering method removed the vibration data collected while the LD3 container was in transport to and from the airport, handling at the airport, and idle time

Amgen Air Data Compared to Amgen Global Random Vibration Profiles

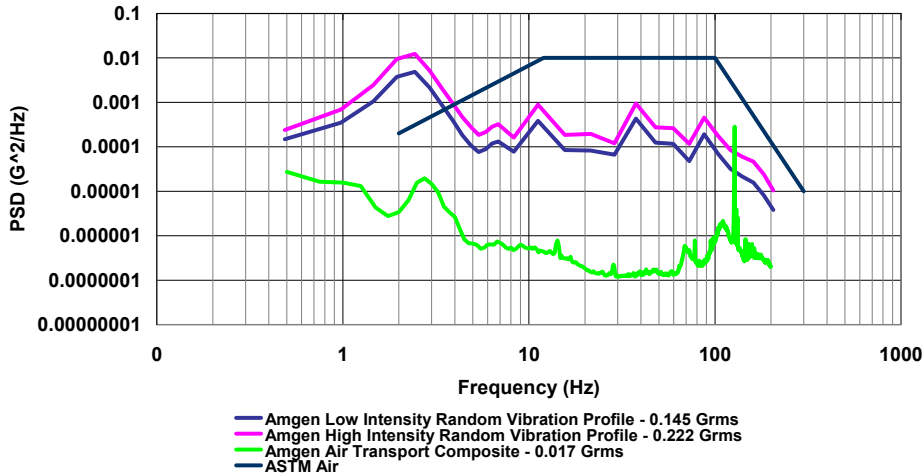


Chart 3. Amgen Air Data vs. Amgen Truck and ASTM Data.

Amgen Air Data Compared to Amgen Random Vibration Profiles

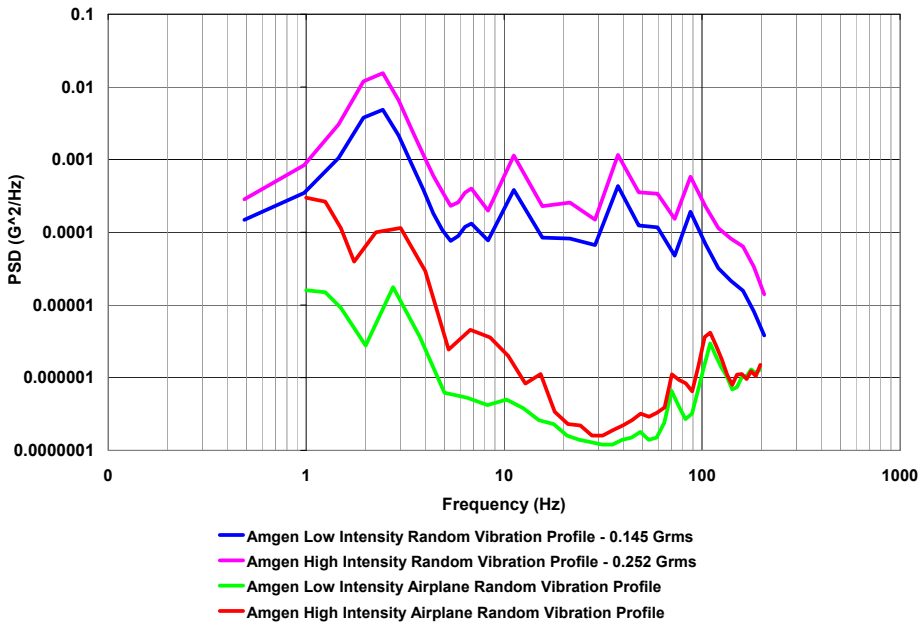


Chart 4. Amgen High and Low Intensity Airplane Random Vibration Profiles.

while the container was sitting in customs. Finally all non-vibration data was also filtered out. The resulting data was then averaged and smoothed following the same approach used for the truck profiles to create the Amgen Low Intensity Airplane Random Vibration Profile.

To create the high 20% profile, which Amgen named the Amgen High Intensity Airplane Random Vibration Profile the data was analyzed following the same approach used for the Amgen High Intensity Air Ride Truck Random Vibration Profile data analysis. The data was analyzed to determine the Grms level that the upper 20% of the data was at or above. The data showed that the upper 20% of the data was greater than or equal to 0.0305 Grms. The Amgen High Intensity Airplane Random Vibration Profile was then created using the average of the data that remained after it was filtered using the data and time filter, removing all non-vibration data and removing all data less than or equal to 0.0305 Grms. The resulting profiles are shown in Chart 4 - Amgen High and Low Intensity Airplane Random Vibration Profiles.

Accelerating Profiles

Current industry practice is to perform accelerated testing. All industry profiles are accelerated profiles where the rule of thumb is to never accelerate to more than a 1:5 ratio. Profiles are accelerated using the following formula [4].

$$I_T = I_O(T_O/T_T)^5$$

Where
 I_T = the test intensity in G_{rms} (the overall intensity of the PSD profile)
 I_O = the original intensity (overall G_{rms} of the original profile)
 T_O = time duration of the original profile
 T_T = the test time

Amgen does not accelerate its random vibration profiles, and executes test durations 1:1 with expected transportation time. Amgen studies have shown our laboratory test data does not match actual shipment data when accelerated testing is performed. Amgen is not stating that accelerated testing is incorrect or there is an error in

From	To	Transportation Mode	Travel Duration	Amgen Vibration Profile
SITE 1 → SITE 2				
Site 1	Site 2	Air Ride Truck	29 h 15 min	Low Intensity Air Ride Truck Profile 24 hr High Intensity Air Ride Truck Profile 6 hr
SITE 2 → SITE 3				
Site 2	Stop 1	Air Ride Truck	42 min	Low Intensity Airplane Profile 5 hr High Intensity Airplane Profile 1 hr
Stop 1	Stop 2	Airplane	6 h 9 min	
Stop 2	Site 3	Leaf Spring Truck	33 min	
SITE 3 → SITE 4				
Site 3	Stop 1	Leaf Spring Truck	33 min	Over-the-Road Random Vibration Profile 1 hr
Stop 1	Stop 2	Airplane	8 h 2 min	
Stop 2	Site 3	Air Ride Truck	90 min	Low Intensity Air Ride Truck Profile 2.5 hr High Intensity Air Ride Truck Profile .5 hr

Table 1. Amgen Worst Case Transportation Lane.

the formula, but based on the data collection it does not work for Amgen products. This is an example of why engineers need to do their due diligence to understand where industry profiles come from, what do they mean, and how do they apply to their business.

Applying the Profiles

Amgen's laboratory testing strategy is to replicate the transportation environment as closely as possible to actual shipments. To do this Amgen must understand and characterize the transportation lanes used for shipments. This was done by recording ship from and to locations, transportation modes used within each lane, and travel duration. This data can then be used to include several lanes together to create a worst case test transportation lane. This worst case lane will be used to test all of Amgen's products. An example of this is shown in Table 1 - Amgen Worst Case

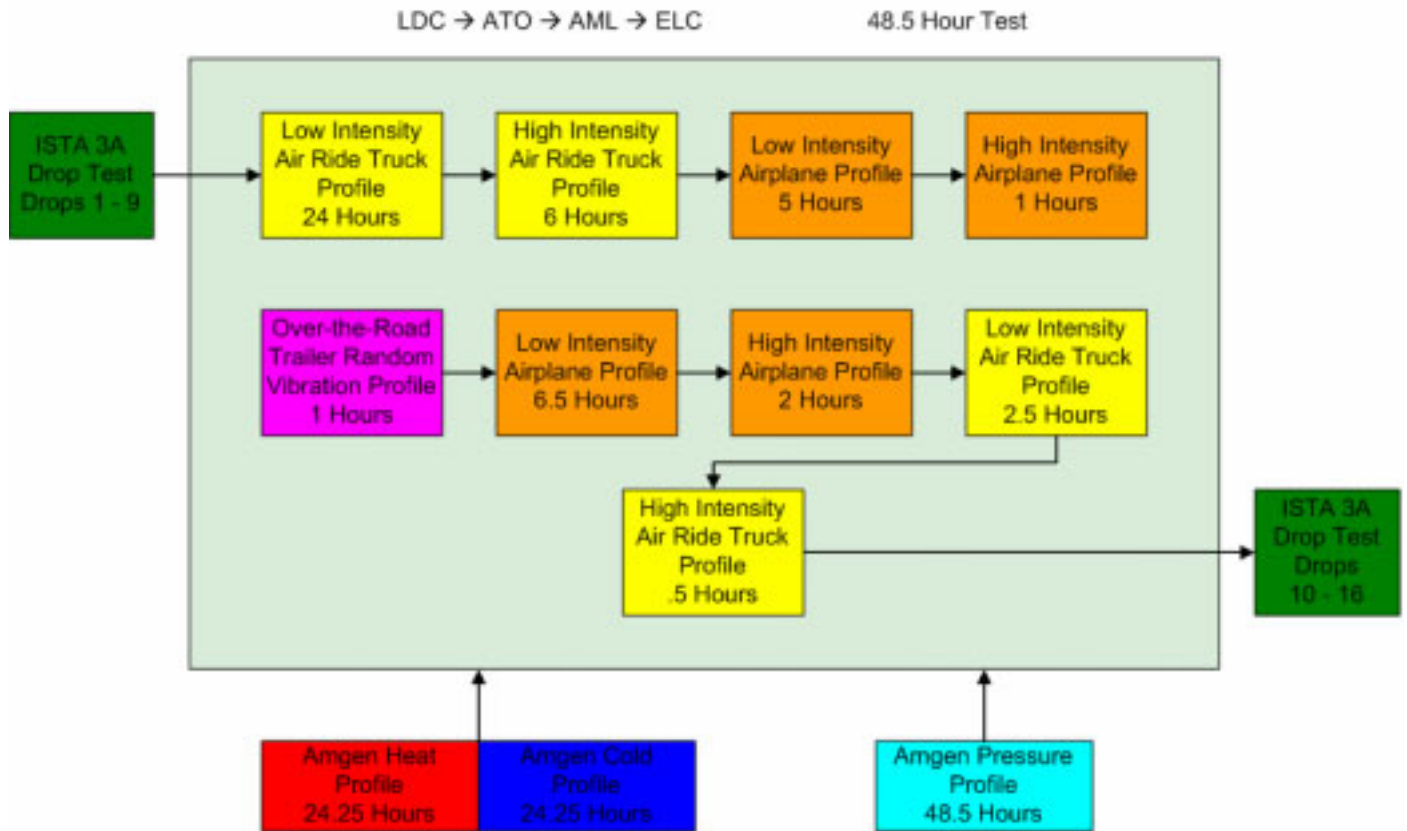
Transportation Lane. Also included in the table is how Amgen will apply the Amgen random vibration profiles to each leg of this transport lane.

To characterize travel duration Amgen is only interested in the duration that any particular mode of transportation is moving during shipping. For example if Amgen were to ship a package by small parcel overnight, it may take 24 hours to arrive at its destination, but actual in motion travel time was only eight hours. It is those eight hours that are shown in travel duration, and that is the duration that Amgen tests to.

A test simulating the series of lanes shown in Table 1 - Amgen Worst Case Transport Lane is shown in Figure 3 - Amgen Test Plan. The test would be a 48.5 hour test and cycle through all of the Amgen random vibration profiles in the order they would be experienced during an actual shipment. Amgen also has the capability of applying the Amgen heat and cold profile and pressure profile at the same time the vibration profiles are being run to simulate the transportation environment more

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Amgen Transport Validation Lifecycle Planning Operational Qualification Test Sequence



closely. This profile combination further increases the confidence that our lab tests produce the same results as actual shipments.

Conclusion

The collaboration of science, engineering, industry, academia and consultants helps companies build test standards that will increase the confidence in the laboratory tests being run. Collecting data on your distribution environment will help you understand your distribution environment and how to better replicate it through the laboratory testing you do. Not all distribution environments are the same, therefore it is important that engineers do their own research before using accepted industry standard profiles.

Acknowledgments

I would like to thank Don Wilson Sr. Manager Engineering, Dave Thatcher Sr. Manager Engineering, Andy Stephan Sr. Specialist Quality Systems, and Gary Hutchinson Director Transportation for their support. I would also like to thank Eric Joneson of Lansmont Corporation and Professor S. Paul Singh, PhD. of Michigan State University for their knowledge and expertise in helping develop Amgen's random vibration profiles.

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3. International Safe Transit Association (ISTA) Resource Book 2006, Test Procedure 3A.
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Transport Packaging Conference in the Philippines

CONTINUED FROM FRONT COVER

participation as a significant developmental event. Over 100 people attended, and there were speakers from the Packaging R&D Center, from CPU, and from industry in the U.S., the Philippines, and Japan.

Bill Kipp of ISTA spoke on Transport Packaging Fundamentals, Testing of



Grounds and Main Church at Central Philippine University.



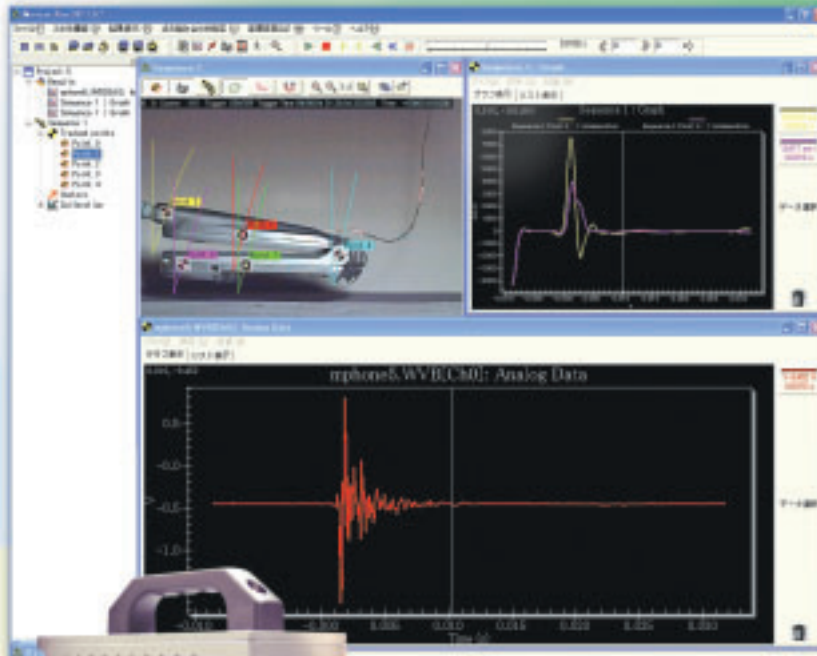

Brian Tudor of Williams-Sonoma at the Philippine Transport Packaging Conference.

Packaged-Products, and Package Marking and Coding. Bryan Williams of Lansmont presented Worldwide Distribution Practices, Effective Package Designs, and Laboratory Simulation. Bill Rehring of TOPS Engineering explained and demonstrated Supply Chain Applications of Design Software, and

Brian Tudor of Williams-Sonoma shared his knowledge and experiences with Furniture Packaging for the U.S. Market.

After the Conference, attendees were given a guided tour of the beautiful CPU campus.

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