

The ESD Association newsletter, published for everyone with an interest in the understanding and control of electrostatic discharge.



THRESHOLD™

Volume 24, No. 6

November/December 2008

In this issue

From the President

David E. Swenson, pages 3 & 4

ESD Association Awards, page 1 & 2

IEW Call for Presentations, page 5

Annual Report, page 4

ESDA News, page 7

ESD on Campus, page 9

ESDA Spotlight, page 11

Q&A, page 10 & 11

Standards Activity Update,
page 5 & 6

Calendar, page 12

www.esda.org

Now Available!

Proceedings of the 2008 EOS/ESD Symposium.

On disk in PDF format or
bound hard copies.

Price: \$90.00

Plus shipping and handling

To order, contact

ESD Association

7900 Turin Road, Building 3

Rome, NY 13440-2069

Tel: 319-339-6937, Fax: 315-339-6793

E-mail: info@esd.org

or visit the Association
web site www.esda.org

Award Winning Recognition!

Numerous individuals contribute to the success of the industry, organization or events. For those who go above and beyond, the ESD Association annually recognizes individuals who have made a lasting impact on the Association or on the ESD industry. These awards are presented at the annual EOS/ESD Symposium.



David Barber Memorial Award
Koen Verhaege

The David Barber Sr. Memorial Award is presented to an individual who has made a significant contribution to the development, organization, management and growth of the EOS/ESD Symposium. The candidate for this award is chosen by the Symposium Business Unit Manager and current General Chair, and is presented at the annual volunteer recognition event.



Industry Contribution Award
Celestica, Inc.

One of the premier companies that has led the way in the implementation of static control procedures, development of facility audit techniques and site certification to ANSI/ESD S20.20 is Celestica, Inc. In recognition of its commitment to the ESD industry and support of the ESD Association, Celestica, Inc. received the Association's Industry Contribution Award.



Founders Award
G. Theodore Dangelmayer

The Founders Award is presented to a member or former member of the ESD Association who was involved in the formation and growth of the ESD Association or the EOS/ESD Symposium.



Industry Pioneer Award
Robert Renninger

The ESD Association Industry Pioneer Award is presented to an individual whose contributions, vision and service helped to form, or significantly change, the industry.

continued p2

Association

*Award Winning
Recognition!* continued



**President's Award
Mike Chaine**

The President's award is presented in recognition of significant contributions, leadership and management that has enhanced ESDA operations and effectiveness in serving industry and the organization. The candidate is chosen by the ESDA President and is presented at the annual volunteer recognition event.



**Volunteer Award
Evan Grund**



2007 Symposium Outstanding Paper Award went to *CDM Peak Current Variations and Impact Upon CDM Performance Thresholds*. Agha Jahanzeb, Yen-Yi Lin, Steve Marum, Joe Schichl, Charvaka Duvvury, Texas Instruments.



**TPC Award
Kai Esmark**

The ESD Association Technical Program Committee award honors an individual for outstanding contribution to the Symposium Technical Program Committee.



**Volunteer Award
Jay Hamlin**



The Best Student Paper was awarded to *Reliability Aspects of Gate Oxide Under ESD Pulse Stress*. Adrien Ille, Université de Provence and Infineon Technologies; Wolfgang Stadler, Thomas Pompl, Harald Gosner, Tilo Brodbeck, Kai Esmark, Philipp Riess, David Alvarez, Infineon Technologies; Kiran Chatty, Robert Gauthier, IBM; Alain Bravaix, Université de Provence.

Symposium Paper Awards



General Chair's Plaque
A Symposium Bloop
(The plaque was missing)
Gianluca Boselli



The Best Paper Award awarded to *Harmful Voltage Overshoots Due to Turn-On Behaviour of ESD Protections During Fast Transients*. T. Smedes, N. Guitard, NXP Semiconductors.



A special recognition cites the best paper from the 2007 RCJ ESD Symposium-Japan. This year's Friendship Award was presented to *A Study of Advanced Technique on RC-Triggered NMOSFET Power Clamp*. H. Ishizuka, Y. Otsuka, H. Ikeda, K. Tanaka, Renesas Technology Corp.

DESCO Industries, Inc.

3651 Walnut Avenue, Chino, CA 91710

Tel: 909-627-8178 Fax: 909-627-7449 www.descoindustries.com

ESD CONTROL PRODUCTS: Charleswater, CMG, Desco, EMIT, Menda, ESD Systems.com, Protektive Pak, Semtronics, Statguard Flooring

3M

Electronic Solutions Division

Tel: 1-800-328-1368 www.3M.com/electronics

Manufacturer of static control permanent flooring, wrist/heel straps, static shielding bags & testing/monitoring equipment

From the President

ESDA activities....

David E. Swenson

I have used this column to describe the various business units that operate within the ESD Association. For this last issue of 2008, I would like to discuss two very special circumstances that had great impact and influence on the ESDA activities this year.

As you may have noticed, some recent press releases have announced that the ESDA and JEDEC have entered into an agreement (a Memorandum of Understanding – MOU) to allow us to work together to develop joint test method standards to benefit industry. We have tried to establish this relationship, off-and-on since 1998, but due to some extreme complexities in that process we could not come to an agreement until just recently. As of this writing, both organizations have approved an MOU to enter into a new phase of cooperation. As a first effort, a joint working group has been established to iron out the differences between JEDEC and ESDA test

methods for the human body model (HBM) component level tests.

For many years the electronic component industry and device test equipment industry have had to wrestle with different standardized test procedures that to the casual observer had miniscule differences. To the practitioners that build test equipment and to the component makers that have to do the tests, the differences are considered just about insurmountable. In 1998, the ESD Association and JEDEC started talking about harmonization of the human body model (HBM) component test methods. For valid reasons at the time, the two organizations could not come to an agreement on how to work together. As president of the ESD Association, I am very pleased that the two organizations have been able to work out agreements to jointly develop standardized test methods that support the industry overall and that will significantly reduce testing conflicts for the benefit of the solid-state industry. The HBM is the first test model that will be harmonized by a joint working group made up of representatives from the ESDA and JEDEC. Other models will be tackled upon completion of this first effort. We look forward to a long and productive relationship with JEDEC to support the best interests of the electronics industry. Please note that the level of cooperation between groups is unparalleled in the history of ESD related test methods and standards.

A second major issue also involved the ESD Association Standards Committee this year. We have been

developing standards and standardized test methods since 1982. We have never received a formal appeal on any document in this 26 year period. This year we received a set of appeals against two of our documents – one standard and one standardized test method that is in development. This was a very interesting process and it showed that our existing Standards Development Procedures work correctly and that anyone who takes issue with the document development process has a set of procedures to follow that allow due process.

The set of appeals had to do with the perception that the ESDA did not follow its own procedures. An effort was made to resolve the appeals but the attempt was not deemed sufficient by the appellant. A 3-member Appeals Panel was assembled (2 of the 3 had to be agreeable to the appellant) for review of the actual appeals and to conduct a hearing at which the appellant and the respondent (ESDA) had the opportunity to present their respective positions. The Appeal Panel met for 2 days in the Chicago area.

After hearing both sides of the appeals, the Panel met several times in teleconference and through e-mail to prepare their findings. The findings were then reported to the ESDA Standards Chairman, following the written procedures. The findings document then went to the Association Board of Directors for approval. After approval, the findings were sent to the appellant. The Appeals Panel found in favor of the

continued p4

From the President cont.

ESDA activities....continued

ESD Association regarding all four of the appeals, in essence stating that the evidence showed that the ESDA standards development process was followed and that the ESDA did all it could do to resolve the issues in a reasonable and responsible manner.

While the standards development process in meant to be open and we take great pains to keep it open, the documents that are produced do not require unanimous approval. A consensus is required and lack of domi-

nance by any one group is required. Each Working Group within the Standards organization is made up people interested in that particular subject matter. The Working Group Chair has the responsibility to make sure that all view-points are heard, discussion takes place and that a consensus is reached. Again, decisions about what goes into a document do not require unanimity.

It has been an interesting year, filled with successful events, unusual oc-

currences, great cooperation and commitment to serve the industry. Have a Wonderful Holiday Season and I personally look forward to working with you next year.



ANNUAL REPORT OF DIRECTORS EOS/ESD ASSOCIATION, INC.

The following is a summary of the financial position and operating results for the periods indicated:

	Jan-Aug. 1, 2008 (Un-audited)	2007 (Audited)	2006 (Audited)
Total Assets	\$982,649	\$1,059,203	\$1,051,812
Total Liabilities	(\$5,836)	(\$51,217)	(\$51,774)
Net Assets Unrestricted	\$976,813	\$1,007,986	\$1,000,038

	Jan-Aug. 1, 2008 (Un-audited)	2007 (Audited)
Operating Income	\$573,507	\$1,229,382
Functional Expenses	\$479,902	\$1,207,377
Increase (Decrease) Net Assets	\$93,605	\$22,005

*Note: The un-audited Jan-Aug. 1 does not include 2008 Symposium/Tutorial program expenses.

The following is the Association membership numbers for the periods Indicated. All membership lists are database stored at the Headquarters office that includes all address information.

	Jan-Aug. 1, 2008	2007	2006
Total Membership	1484	1549	1416

Submit Your Ideas To The Suggestion Box

As a member-driven organization, the ESDA needs and wants your input into our operations and programs. That's the idea behind the new Suggestion Box. We invite your suggestions about any aspect of the Association. We'll discuss them, evaluate them, and implement those that are deemed appropriate.

How do you submit a suggestion? Simple. Just send an e-mail to suggestionbox@esda.org or log on to the web site and click on the suggestion box icon on the home page.

We'll respond to your suggestions. When the suggestions and their potential implementation are of general interest to the membership, we'll publish them in Threshold.

Put your thinking caps on and submit those suggestions. It's your organization.



TREK, INC.

11601 Maple Ridge Road, Medina, NY 14103
Tel: 585-798-3140 Fax: 585-798-3106
www.trekinc.com

Designer and manufacturer of instrumentation and sensors for measuring surface voltage, ionizer performance, and surface resistivity

ACL Staticide

1960 E. Devon Avenue, Elk Grove Village, IL 60007
Tel: 847-981-9212 Fax: 847-981-9278
www.aclstaticide.com

Anti-static mats, topical anti-stats, floor finishes and coatings, static meters, cleanroom products

Association

Update on Standards Activity *by Christina Earl, Standards Administrator*

The ESD Association Standards Committee held their September 2008 Meeting Series at the Westin La Paloma Resort in Tucson, AZ, from September 4, 2008 through September 7, 2008.

Working Group 2.0—Garments.

The Garments committee completed a review of WIP2.1 and made many changes. After all of the changes are completed the document will be resubmitted to WG members for a last review. The goal is to submit a finished WIP document to the technical and administrative support (TAS) committee in November.

Working Group 3.0—Ionization.

The committee reviewed design refinements to the small CPM to assure interchangeability. The WG will increase plate spacing in an attempt to improve offset voltage correlation, will do one more set of tests with two standoffs, and will build a second set of test fixtures using a round plate of equivalent area to the 1" square plate. The WG reviewed and accepted changes in the body of the draft standard document based on the small CPM fixture. They discussed whether the document should be an STM or SP, how to best harmonize the document with S20.20, and the use of a square and round fixture. They will review the appendices at the February 2009 meeting series. WG members will be completing additional testing of increased plate spacing for offset voltages and round versus square plates

between meetings.

Working Group 5.1—(HBM) Device Testing.

An ADHOC meeting was held with members of WG5.1 and members of JEDEC. This meeting reviewed the gap analysis action items which identified the differences between STM5.1 and JESDE22-A114E HBM test standards. The meeting continued work on resolving technical differences identified in previous meetings between the two standards. Solid progress was made on merging the two documents and a writing committee has been formed to begin writing the merged document. The goal is to have a written draft by the end of 2008.

Working Group 5.2—(MM) Device Testing.

The committee reviewed their current document and made appropriate changes that resulted from Industry Review comments. The document has been approved by the WG and will be resubmitted to TAS for review. The goal of the WG is to have the document ready for STDCOM vote by mail in October, STDCOM vote to elevate to draft at February 2009 meeting series, Industry Review in March, and then a Full Standard in June 2009.

Working Group 5.3.1—(CDM) Device Testing.

The committee reviewed Industry Review comments for WIP5.3.1. Five changes were considered and four were approved. There was considerable discussion about

single and dual discharge procedures. There were four presentations given: 1) TI work / data comparing three discharge versus single discharge, 2) An update on CDM work from the Industry Council, 3) An update on CC-TLP measurement and comparison with CDM on products, and 4) A CDM Circuit Model update. The WG will be restarting the TR process with the data used to develop the current draft standard and will do a brief review of future ESDA / JEDEC CDM standard harmonization.

Working Group 5.4—(TLU) Device Testing.

The committee voted to move forward SP5.4-2004 "as is" for the ANSI five year review. Infineon presented data from testing on two different devices that had field failures and could be duplicated using a "latch-up" test method. The results showed a different "latch-up" event was causing the failures, however, it was not the TLU event specified in the SP. The presentation was in response to a question about the WG going dormant. It was decided that the WG will go dormant until a subcommittee writes a new work statement that focuses on latch-up issues in the main stream today.

Working Group 5.5—(TLP) Device Testing.

The committee reviewed round robin study issues including merge box data, RF probes versus needle probes, and 1.25 nanosecond data needs that are currently

continued p6

Wolfgang Warmbier

Untere Giesswiesen 21, D-78247 Hilzingen, Germany
Tel: 49-7731-86880 Fax: 49-7731-868846
www.warmbier.com • E-mail: wolfgang.warmbier@warmbier.com
ISO 9001:2000 certified for consulting, manufacturing and supply of static control materials and systems, ESD test Instrument calibration

Monroe Electronics

100 Housel Avenue, Lyndonville, NY 14098
Tel: 585-765-2254 Fax: 585-765-9330
E-mail: electrostatics@monroe-electronics.com
www.monroe-electronics.com
Full line manufacturer of static measurement equipment

Association

Update on Standards Activity continued

being analyzed. The study was to be complete enough to fulfill ASTM 691 requirements. Batch I & II was discussed about usage of through wafer via (TWV) and there was discussion regarding the role of metal on the round robin testing. Members of the WG will continue testing between meetings.

Working Group 5.6—(HMM) Device Testing. The committee reviewed and adjudicated the TAS committee comments on WIP5.6. The earliest publication date would be after the June 2009 meeting series. It was decided that the SP and TR documents will be released simultaneously.

Working Group 7.0—Flooring. The committee reviewed and adjudicated the TAS committee comments on TR7.0. It was decided to add another chart for clarification and then the document will be resubmitted to TAS for approval.

Working Group 9.0—Footwear. The committee reviewed SP9.2 to determine if the document should be re-designated as a STM. The WG made changes to the scope, purpose, and body of the document. The compliance verification section was removed as it is already referenced in TR53. The old round robin data was given to the statistician for review to determine if any further work is needed.

Working Group 10.0—Handlers. WG members explained the rationale for the new target and the test procedure

with inconsistent results. There were two presentations: Data analysis of combining two WG members' test results, the differences, and how they became closer at the 500 / 1000 volt levels; and a review of the University of Michigan rotary E Field Probe report of the visit to Universal Instruments. Instrumentation to duplicate the testing with both the old and new targets was brought into the meeting. As a result the test procedure will be better defined and some set up issues will be uncovered.

Working Group 11.0—Packaging. The committee presented and reviewed the round robin data for WIP11.14 – Volume Resistance. Data shows some variation between labs based on the amount of resistance measured. It was decided to compare instruction using calibration resistors. The WG will begin the ANSI 5 year review of STM11.13 – Two Point Resistance.

Working Group 13.0—Hand Tools. The committee reviewed data from five labs involved in a round robin. A problem was noted with the selection of measurement equipment based on whether soldering irons were used in a low or high frequency environment. The scope of the STM will be modified to alert high frequency environment users that an annex referencing the problem will be written. The revisions will be drafted and reviewed at the February 2009 meeting series.

Working Group 14.0—Simulators. The committee discussed 14.1 and its ANSI five year review and will submit changes to TAS by December 2008. The purpose and scope for 14.3 was revised on the work statement to match the document; both were resubmitted to TAS. Most of the meeting was spent reviewing the draft of 14.4. The goal is to have 14.4 finished in November after further testing of TLP tester is completed.

Working Group 15.0—Gloves. The committee reviewed and adjudicated the TAS committee comments on the work statement and WIP15.2. There is a lot of work still to be done to the document before being resubmitted to TAS.

Working Group 16.0—Workstations. The committee reviewed the TAS committee comments for SP16.1. The goal is to make additional changes and resubmit to TAS before February 2009 meeting series.

Working Group 53.0—Compliance Verification. The committee will be writing a section on hand tools for TR53 and will be reviewing it before the February 2009 meeting series. The group will submit the document with two new sections and hope to finish in June. The working group will also be making a change in the garment section of the document.

Static Solutions Inc.

331 Boston Post Rd.-East, Marlboro, MA 01752 USA

Tel: 508-480-0700 Fax: 508-485-3353 www.staticsolutions.com

Worldwide manufacturer of patented ESD Cleanroom products, including Ohm-Stat™ combination/resistivity meters, Ohm-Shield™ coatings/floor finishes/paints, Ohm-Cide™ EPA cleaners, Stat-o-Flex™ Class Zero wriststrap, and Ultimat™ Class Zero out-gassing rubber.

Proline

10 Avco Rd., Haverhill, MA 01835

Tel: 800-739-9067 Fax: 978-374-4885

www.1proline.com E-mail: Bench@1proline.com
Manufactures ESD modular and ergonomic workstations

Association

ESD Association News**ESD ASSOCIATION ELECTS BOARD MEMBERS AND OFFICERS FOR 2009**

Election results were reported during the annual ESD Association business meeting luncheon at the 2008 EOS/ESD Symposium, in Tucson, AZ.

Elected to the Board of Directors, by the members of the ESD Association, for a three-year term from January 1, 2009, to December 31, 2011, were Gianluca

Boselli, Texas Instruments; Tom Larson, Trek Inc.; Michelle McSwain, TW Clean Inc. and Steven H. Voldman, Steven H. Voldman, LLC.

The Board of Directors also elected its officers for a one-year term of January 1, 2009, to December 31, 2009. The following officers were elected: David

E. Swenson, Affinity Static Control Consulting, LLC, President; Donn Bellmore, Universal Instruments Corporation, Senior Vice President; and Leo G. Henry, ESD-TLP Consulting, Vice President.

ESD ASSOCIATION AWARDS RESEARCH GRANT

The ESD Association is pleased to announce the recipient of the 2008 research grant. This year's grant is awarded to Professor Elyse Rosenbaum, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign for the research grant proposal entitled, "Die-Level Testing Methodologies to Enable Fundamental Studies of EOS/ESD

Reliability". The research work on this project is scheduled for October 1st 2008 through September 30th 2009.

The 2008 research grant award is for \$10,000. The award is granted to an academic professor or researcher who may wish to conduct exploratory work in the field of ESD. The outcome of the research should advance the fundamental understanding of ESD

knowledge. The work could be any field of ESD including device/design, materials, test methods, or factory control methods. The researchers are required to first publish the outcome of the work at the ESD Symposium before submitting to any professional journal.

ESD ASSOCIATION AND JEDEC ANNOUNCE COLLABORATION ON STANDARDS DEVELOPMENT FOR UNIFIED ELECTROSTATIC DISCHARGE TEST METHODS

JEDEC Solid State Technology Association and the ESD Association today announced that they have entered into a Memorandum of Understanding (MOU) agreement for the development of joint standards and publications in the field of device electrostatic discharge (ESD) sensitivity testing. JEDEC and the ESD Association believe that this MOU is in the best interest of their organizations, their membership, and the industry. Under the agreement, the ESD Association and JEDEC will form a Joint Task Force for the standardization work in which volunteers from the ESD Association and JEDEC member companies will participate.

Electrostatic discharge can significantly impair the reliability and operation of solid state devices, and test methodologies are becoming ever more critical to the industry as technology advances and device complexity increases. Both JEDEC and ESDA believe this combined effort to develop unified test methods for ESD will be welcome news to an industry confused by the various ESD test standards currently available.

"This historic collaboration between the ESDA and JEDEC paves the way for the development of harmonized test methods for ESD, which will ultimately reduce uncertainty about test standards among manufacturers and suppliers in

the solid state industry," said David E. Swenson, President of ESD Association.

Nick Lycoudes, Chairman of the JEDEC JC-14 Committee on Quality and Reliability added, "JEDEC and the ESD Association recognize that the proliferation of standards in the field of ESD device sensitivity testing has left component manufacturers unsure of which method to use. By joining forces, we will be able to offer the industry comprehensive, next generation standards in the field of ESD device sensitivity testing and alleviate unnecessary confusion."

Molded Fiber Glass Tray Co.

6175 US Highway 6, Linesville, PA 16424

Tel: 800-458-6050 Fax: 814-683-4504 E-mail: info@mfgtray.com
Manufacturer of static dissipative and conductive trays and containers for static protection of sensitive parts.

TOPLINE-ELME

7331A Garden Grove Blvd., Garden Grove, CA 92841

Tel: 800-776-9888 E-mail: info@ESD.TV www.ESD.TV
Full line ESD products including shoes, garments, chairs, brushes, mats, gloves. Maximum comfort.

Symposium

Symposium... for The First Time

by Terry Finn

Having spent several months preparing for the EOS/ESD Symposium, I was sure I understood what it was all about. I did not.

From the time I arrived in Tucson I was in awe at the coordination of volunteers and staff that made the event come together. Booths, signs and displays appear, filled with directions, registration information and sales materials. Meeting and tutorial rooms were filled with rows of chairs and tables covered

was amazed by how far the organization reaches with attendees from more than 30 countries across the globe. Everyone was eager to attend the tutorials, technical sessions and workshops, many of which had standing room only.

In the exhibit hall the large crates erupted as they were transformed into rows of exhibit booths.

The seasoned exhibitors, seeming to have the largest displays, worked with practiced experience to erect their corner of the room. Seven exhibitors have exhibited at every Symposium since the first one in 1979. They include 3M, ACL/STATICIDE, Conductive Containers, Desco, Electro-Tech Systems, ITW Richmond, and ITW Simco. There were also many first time exhibitors who had an equally impressive display. They include: C Nano Technology, California Micro Devices, Dur-A-Flex,

Estatec, Grund Technical Solutions, Ins Con Tech, Megalin Source International, Mentor Graphics, Nanocyl, Offray Specialty Narrow Fabrics, Petra Coatings, Synopsis, TLP Solutions, and Toyota Tsusho America.

The hall filled with people as the welcome reception started with exhibitors giving their best perfor-



We found the association to be very pleasant and welcoming. The attendees were extremely knowledgeable and eager to speak with us. It was a well run event.

Darleen Ringenbach from Dur-A-Flex • 95 Goodwin St. • East Hartford CT 06108 • 800-253-3539



"The show was a great success for Grund Technical Solutions. It was important to get the word out that there is a new equipment manufacturer for device testing. While it was the first ESDA Symposium for GTS, for many of the team it was a return visit and they were glad to be back!"

Roger Watkins from Grund Technical Solutions, LLC 510.453.2617 www.GrundTech.com

with beverage containers, note pads and pens. Electronic equipment, copiers, projectors and power strips were always right where they were needed. Signs were placed on stands in front of every room and entrance and seemed to change for each event without any one even noticing.

As the attendees started to arrive I

mance, showing new test equipment and control products to attentive viewers. The ESD Symposium is truly the world's most prestigious gathering of ESD companies and control experts.

During my first EOS/ESD Symposium I met and worked with many wonderful people, who all shared a common interest. Whether you were a first timer like me or a 30 year veteran it could not have been a more impressive event. I was inspired by all of the volunteers and staff whose dedication and hard work made this event so successful.



MicroStat Laboratories/River's Edge Technical Service

3612 3rd Pl. NW, Rochester, MN 55901

Tel: 507-292-0230 Fax: 507-292-0698 www.microstatlabs.com

ESD materials testing laboratory, ESD & contamination control auditing, consulting • S20.20 program development

SIMCO Electronics

Worldwide Headquarters

1178 Bordeaux Drive, Sunnyvale, CA 94089

Tel: 800-432-2351 • sales@simco.com/www.simco.com
Accredited ESD testing, auditing, evaluation & training. Calibration and repair of ESD testing equipment.

ESD On Campus

Singapore, Singapore!

Nanyang Technical University To National University of Singapore

By Steven H. Voldman



ESD on Campus visited Singapore for the first time, where a lecture was provided to the two top technical universities in Singapore; Nanyang Technical University (NTU) and National University of Singapore (NUS). Both NTU and NUS are fairly close to each other. The campuses, although different, have a similar feel.

Nanyang Technical University (NTU) is placed in a wooded area with significant foliage and growth making it feel like a Singaporean garden. Within this setting the engineering buildings are integrated - a white concrete look with suspended open air walkways connecting the buildings. The host of the ESD on Campus visit was Professor Kin Leong Pey (aka K.L. Pey) who actively does research in the reliability

of semiconductors. At the talk, Prof Xin Zhou and other faculty attended as well as approximately 40 students, primarily graduate students.

At National University of Singapore (NUS), the host faculty member was Professor Wong Wai Kin (or Professor Wai Kin Wong). In this visit, we were able to meet with Professor Daniel Chan who is very active in semiconductor reliability and failure mechanisms. Professor Wai Kin Wong's area at NUS focuses on failure analysis techniques, new failure analysis tools and diagnostics for evaluation of nano-technology. Nano-technology is the key focus and the use of future tools to explore semiconductor devices.

The ESD on Campus lecture at NUS had of over 80 engineering students in attendance. Professor W.K. Chim and other faculty were present to listen. Professor W.K. Chim's focus is on photoemission techniques for failure analysis. In Singapore, a key focus of research is failure mechanisms from semiconductors to ESD events. This is not a surprise, since the International Physical Failure Analysis (IPFA) Symposium is held in Singapore, and is staffed with both NTU and NUS faculty. As a result, Singapore is interested in ESD failure mechanisms.

*Dr. Steven Voldman, IEEE Fellow
ESD on Campus Program Manager*

Tech Wear, Inc.

2205 Faraday Ave., Suite B, Carlsbad, CA 92008

Tel: 760-438-7788 Fax: 760-438-6868

Email: kay@techwear.com www.techwear.com

Industry leader in static control garments, including groundable cleanroom garment systems.

Dur-A-Flex Inc.

95 Goodwin St., East Hartford, CT 06108

Tel: 800-253-3539 www.dur-a-flex.com

With over 40 years of experience and innovation. Dur-A-Flex manufactures epoxy, urethane and acrylic seamless flooring and wall systems for commercial, industrial and institutional applications.

Q & A Column

EPA Versus Class 0 level Definition

Q. Could you please help me to understand the relation between EPA & Class 0 level definitions. I understood that there is not a direct relation: - EPAs are areas where we can handle any type of Electrostatic Device Sensitivity (ESDS). In general an EPA is prepared to handle components with 100 V of sensitivity. Class 0 is a sensitivity classification only applied for devices (250 V or less).

Is there any classification for EPAs? I mean, example; EPA class xx is prepared to support ESDS with yyy V of sensitivity.

A. That is a very good question and one that comes up frequently in discussions in the industry today.

Device sensitivity classifications are for device characterization only. The test models used are intended to represent what happens to a component when stressed in a specific way. The HBM (human body model) represents a charged person touching a grounded part. The MM (machine model) represents a component contacting a charged - isolated conductive item in a process, and the CDM (charged device model) represents a component becoming charged in a process and then contacting a grounded conductive surface. Field Induced CDM is also a consideration - representing a component being grounded in the presence of an electrical field from a close proximity charged item. All of

these things can happen within a process, so understanding the sensitivity to each model is important.

The industry is trying to make the connection between the device test models and the factory control level needed. Class "0" parts have an HBM sensitivity of 250 volts or less as you mention. What this means in the factory is that human handling activities need to be controlled to less than 250 volts. Is there a perfect correlation between device test level and the human voltage spec? No, but what the industry is attempting to do is to control the human factors to as low a level as possible in order to reduce the associated risk to components.

A typical wrist strap system, worn properly with a 1 megohm resistor, will keep personnel grounded at a resistance of between 1 megohm and 35 megohms. At 1 megohm to ground, a person can only generate a few volts on their body even with rapid movement. At 10 megohms to ground a person may generate something like 20-30 volts with rapid movement. At 35 megohms to ground, a person may be able to generate close to 100 volts with rapid movement (such as running in place). You can see a graph of this in the ESD Technology Roadmap available at the ESDA web site (www.esda.org). A properly designed and implemented floor and footwear system will give similar results.

In the modern factory, most of the component handling is done by machine. In automated assembly, all of the conductive parts of the equipment must be grounded in order to avoid MM type damage. It is becoming better understood in the industry that a part designed with 1000 volts HBM protection will have at least 30 volts MM protection automatically (rule of thumb by the Industry Council on Device Stress Level Testing - see White Paper also on the ESDA web site). Isolated conductors must be avoided in any automated handler, but simple point to point resistance measurements will locate isolated conductors in machines.

CDM and Field Induced CDM are major concerns in the industry. Component stress levels to CDM are being discussed at great length in the industry right now. The size of the component package has a lot to do with the stress level - the same actual chip in two different packages will have different stress levels. What needs to be avoided here is the charging of the part in the process. Packaging, including tape and reel, trays, tubes, bags and boxes need to be evaluated for charge generation to avoid undo charging of components. The handling system needs to be evaluated so that every charge generating interaction can be kept to a minimum. Here it can get complicated. S20.20 has a requirement that all process

continued p11

California Micro Devices Corp.

490 N. McCarthy Blvd. #100 • Milpitas, CA 95035
Tel: 800-325-4966 Fax: 408-263-7846
www.cmd.com

Leading supplier of application specific analog and mixed signal semiconductor products, protection devices

Winifred Int'l Technology Ltd.

399 Cailun Road, Pudong New Area, Shanghai, China
www.winifred-hk.com • e-mail: steve@winifred-hk.com
Leading supplier for ESD and contamination control products, wrist straps, rubber mats, test equipment, packaging products, clean gloves, garments, chairs, and ionizers.

Q & A Column

EPA Definition versus Class 0 definition continued

essential insulators in the EPA be <2000 volts at 1 inch measurement (the spacing from most electrical field measurement instruments to the item being measured is 1 inch). If the item has an electrical field measurement of >2000 volts at 1 inch, the item has to be kept 12 inches away from any unprotected components or the charge on the item reduced in some way to bring it below 2000 volts at 1 inch.

With all this in mind, a proper EPA will control voltage on personnel to <100 volts (proper grounding), equipment to <30 volts (proper grounding), Field Induced CDM to <100 volts (removal of insulators and control of charge on process essential insulators), and CDM to <100 volts by controlling charge generation on the parts themselves.

So is there a relationship between device test levels and EPA? Of course there is. Is it a perfect correlation? No, but the industry is working on it.

ESDA Spotlight



José D. Sancho
Sr. Quality Engineer
NASA-GSFC (HTSI)

José is Presently working as a Honeywell TSI Contractor at NASA-GSFC. He is a Senior Quality Engineer for Workmanship Standards and manages the ESD Control Program at GSFC. Some of José's previous experience includes: Sr. Materials Engineer for Hughes

Networks Systems, senior designer of HP microwave transmitters for Westinghouse Electric Corp. and Comtech Systems. While in the US Army José served as a Spanish and Indonesian translator. He is a graduate from Purdue University (BSEE).

José is currently participating in the Ionization (WG-3), Handtools (WG-13), Compliance Verification (WG-53), Workstations (WG-16), and Packaging (WG 11) workgroups. He also helps with the setup of the conference rooms.

When asked to describe how being a volunteer with the ESDA has contributed to both his professional and personal growth, José said:

"The work as a volunteer at the ESDA has greatly contributed to my understanding of standards development. It has helped me to

improved on the quality of the work at my job and increased my knowledge on ESD. Being a volunteer on the workgroups has given me the opportunity to meet new and wonderful friends."

Married with two daughters and seven grandsons, José enjoys traveling, photography and fishing.



Your Listing Can Appear Here

Contact ESD Association for details
7900 Turin Road, Building 3, Rome, NY 13440-2069
Tel: 315-339-6937 Fax: 315-339-6793
info@esda.org

Your Listing Can Appear Here

Contact ESD Association for details
7900 Turin Road, Building 3, Rome, NY 13440-2069
Tel: 315-339-6937 Fax: 315-339-6793
info@esda.org

Calendar

October 21, 2008

Online Course:
Automated Handling
[http://www.esda.org/documents/
OnlineAutomatedHandlingOct21.pdf](http://www.esda.org/documents/OnlineAutomatedHandlingOct21.pdf)

November 12, 2008

Online Course:
Auditing Techniques for Class 0
Devices
[http://www.esda.org/documents/
AdvancedAuditing_Nov12-2008.pdf](http://www.esda.org/documents/AdvancedAuditing_Nov12-2008.pdf)

December 3-6, 2008

ESD Association Meeting Series,
ESDA , Rome, NY

Local Chapters

ASEMEP ESD Council
Makati City, Philippines
E-mail: rmartinez@pycontech.com

Asociación ESD de Mexico
Guadalajara, Jalisco, Mexico
Website: www.esdmexico.com

North Central Chapter
*Minnesota, Western Wisconsin, Iowa,
North and South Dakota*
Website: <http://www.esdnorthcentral.org>

Northeast Chapter
Wilmington, MA
Web Site: <http://www.nechapter-esda.org>

Silicon Valley EOS/ESD Society
San Jose, CA
Web Site: <http://www.esdsiva.org>

Southwest Chapter
*Arizona, California, Colorado, New
Mexico, Nevada and Utah*
Website: <http://www.southwestesd.com>

Texas Chapter
Web Site: [www.Centxesdassoc.
homestead.com](http://www.Centxesdassoc.homestead.com)

Indian Chapter
Jayanagar, Bangalore, India
E-mail: mail@2nteknics.co.in

Threshold

Threshold™ is published six times a year by the ESD Association, a not-for-profit corporation. It strives for the advancement of theory and practice of electrical overstress avoidance and of allied arts and sciences and the maintenance of a high professional standing among its members and others.

©Copyright 2008, ESD Association, Rome, NY

Threshold™ Publication Schedule

<u>Issue</u>	<u>Deadlines</u>
January/February	Nov. 19
March/April	Feb. 1
May/June	April 1
July/August	June 1
September/October	Aug. 1
November/December	Oct. 1

Threshold Institutional Listings

Space in the Threshold Institutional Listings, which appear at the bottom of newsletter pages, can be purchased for \$600.00 for six consecutive issues. Larger contributions are welcome. No agency fee is granted for soliciting such contributions. Inquiries, or contributions made payable to the ESD Association, should be sent to:

ESD Association, 7900 Turin Rd., Bldg. 3, Rome, NY 13440-2069 Tel: (315) 339-6937, Fax: (315) 339-6793, e-mail: info@esda.org.

Newsletter Staff
Board of Directors Sponsor
Craig Zander
Prostat Corporation
Tel: 952-426-2611
E-mail: czander@prostatcorp.com

Editor
Terry Finn
ESD Association
7900 Turin Road, Bldg. 3, Rome, NY 13440
Tel: 315-339-6937 Fax: 315-339-6793
E-mail: info@esda.org

Associate Editors
Development
David E. Swenson, President
Affinity Static Control Consulting, LLC

Production Design and Test
Steve Voldman, Steve H. Voldman LLC
Leo G. Henry, ESD/TLP Consultants

Technology
Charvaka Duvvury, Texas Instruments

Editorial Advisory Board
Board of Directors Sponsor
Craig Zander, Prostat Corporation

President
David E. Swenson,
Affinity Static Control Consulting, LLC

Sr. Vice President
Donn Bellmore, Universal Instruments

Vice President
Leo G. Henry, ESD/TLP Consultants

Treasurer
Donn Pritchard, Monroe Electronics

Human Resources
Arnie Steinman, MKS, Ion Systems

Additional Editorial Assistance
Marti Farris, Intel Corporation

ESD Association Headquarters Staff
Lisa, Pimpinella, Operations Manager
Carrie Fragapane, Administrative Assistant
Christina Earl, Standards Administrator
Karen Macri, Administrative Assistant
Terry Finn, Marketing Administrator

7900 Turin Road, Bldg. 3, Rome, NY 13440-2069
Tel: (315) 339-6937 • Fax: (315) 339-6793
E-mail: info@esda.org • Web: www.esda.org

