



**5<sup>TH</sup> Philippine ESD Forum**  
**June 5, 2009 Friday @ SMX Mall of Asia**  
**ABOUT THE SPEAKERS AND THEIR PRESENTATIONS**

**AUTHORS:**

**Mr. Ray Nicanor M. Tag-at** ([raynicanor.tag-at@hitachigst.com](mailto:raynicanor.tag-at@hitachigst.com))

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MEE-ESD, HTME

Hitachi Global Storage Technologies Philippines Corp.

SEPZ, Laguna Technopark, Binan, Laguna

**TITLE OF PRESENTATION: *ON-CHIP EOS/ESD FULL-PROTECTION DEVICE FOR TMR HEADS***

**ABSTRACT:**

Tunneling Magneto Resistive (TMR) Head technology is one of the most ESD-sensitive devices today. ESD controls in manufacturing/assembly and testing lines must be at highest level than ever. However, having ESD controls in tooling/fixtures, workstation, and personnel are not enough. In recent years, ESD controls have been extended into semiconductor and electronic devices itself, the so-called On-chip ESD Protection. In TMR heads, the most common on-chip ESD protection is the shunting. The basic shunting method is done using Gold Wire soldered at the Reader Pads of the TMR heads. In case of an ESD event, the discharge transient current will be diverted to the shunt gold wire, rather than to the TMR sensor, as the shunt has the least resistance, thus protecting the TMR heads from the ESD transient current. This shunting method, however, does not guarantee full protection. During electrical testing, this shunting is being removed in order to perform the test. At this stage, the device is susceptible to electrical overstress (EOS), which is transient spike of the test signal that has similar failure signature to ESD. It is also susceptible to ESD during final assembly as the shunting wire is already removed. One of the solutions that offer full protection to TMR heads is to have an on-chip device that will shunt the transient current from ESD as well as protect the heads from EOS during testing. This shunting method is done using 2 semiconductor diodes, connected in parallel and in reverse order across the Reader Pads of TMR heads.

If an ESD or EOS voltage induced on either reader pads is huge enough to reach the threshold voltage of the diode, the diode will turn on and will act as a conductor. It will then shunt the reader pads. On the other hand, during testing or at normal operation of the TMR heads, since most of the test or input signal is less than the threshold voltage of the diode, the diode will remain off and will be in its insulative state, thus won't affect the signal. And since the diodes shunts will not be removed, it protects the TMR heads during testing, final assembly, and during normal operation.

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<sup>1</sup> US Patent Pending. Disclosure No. HSJ8-2006-0411

**ABOUT THE AUTHOR:**

Ray Nicanor M. Tag-at has a bachelor's degree in Electrical Engineering at Silliman University. He is currently working in Hitachi GST Phil., Corp. as a Unit Manager, spearheading the ESD Control Program of the company. He is a member and officer of the ASEMEP ESD Council (AEC), sharing his knowledge in ESD during some of the learning sessions. He has been writing technical papers in ESD internally for Hitachi GST and for the ASEMEP National Technical Symposium, where one of his papers won the Best Paper Award. He is a Certified ESD Engineer of the International Association of Radio and Telecommunications Engineers (INARTE).

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**AUTHOR:**

**Dr. Felicito S. Caluyo**

Dean, School of EE-ECE-COE  
Mapua Institute of Technology

**TITLE PRESENTATION: *ESD FUNDAMENTALS***

**ABSTRACT:**

This presentation provides discussions on the underlying theory which will be helpful in gaining a thorough knowledge of the fundamentals of Electrostatic Discharge. Theory helps explain natural phenomena and provides the foundation necessary to come up with correct and appropriate practices. The blend of theory and practice is necessary in generating innovative ideas and implementing robust and cost-effective ESD Control. Hopefully, the presentation will likewise serve as vehicle for gaining insights on the future directions that ESD will take.

**ABOUT THE AUTHOR:**



Graduate degrees: Ph. D. in Electronics (Communications Optiques et Microondes); Mention tres honorable avec felicitations du jury, Universite de Limoges, FRANCE. January, 1990; Diplome D'etudes Approfondies en Electronique (D.E.A.); (mention : Communications Optiques et Microondes); Universite de Limoges, FRANCE. June, 1986; Maitrise en Electronique et Communications, (mention : Communications Optiques et Microondes); Universite de Limoges, FRANCE. June, 1985, Master of Engineering (Electrical Engineering), U.P., Diliman, QC, 1977.



College degree: Bachelor of Science in Electrical Engineering, U.P., Diliman, QC, 1970.

Fellowships/Scholarships : Visiting Research Fellow, September - November, 1981; Michigan Technological University, Houghton, Michigan, U.S.A & Ferris State College, Big Rapids Michigan, U.S.A.; French Government scholar, September 1983 - January 1990 Royan, Grenoble, Limoges, FRANCE, Exchange Scientist, JSPS (Japan Society for the Promotion of Science), November to December, 1991 at the TIT(Tokyo Institute of Technology), Tokyo, Japan; Visiting Research Fellow, AIDAB (Australian International Assistance Bureau), February - May, 1994; University of New South Wales, Sydney, Australia, Exchange Scientist, JSPS (Japan Society for the Promotion of Science), November to December, 1996 at the TIT (Tokyo Institute of Technology), Tokyo, Japan; Visiting Research Fellow, Science Policy Research Unit, University of Sussex, Brighton, UK, October- December, 1997. Area of Study: Management of Technology and Innovation.

Books written : Computer Programming in BASIC, (w/ Elizabeth F. Cervantes & Domingo L. Uy), DLSU, 1980; Introduction to numerical methods, (with Dr. Alberto Campos and Dr. Aida L. Velasco), DLSU, 1981

Professional Examination: Assistant Electrical Engineering Board Examination, January - February, 1971; Rating: 86.3 %

Professional Organizations: Lifetime Member IIEE, Philippines

Previous Work Experience: Instructor, Institute of Technology, FEU, Manila, 1973-1975; Non-destructive Testing Supervisor, AMES Enterprises, Paranaque, Metro Manila 1971-1973; Electrical Design Engineer, RN Ferrer & Associates, Padcom, Pasig, Metro Manila, 1977-1979; Professor, College of Engineering, De La Salle University, 1975-2006.

Other Special Trainings abroad : Standard-cell Based IC design Using Multi Project Reticle Implementation Method, 21-26 April, 1991, Bandung, Indonesia, sponsored by ASEAN Sub-committee on Miroelectronics and Computers, ASEAN Australia Economic Cooperation Program; Semiconductor Device Fabrication, Toulouse, France, 1985.

Completed Research Projects : "PLD based Electronic Load Controller for Microhydroelectric Power Plant". URCO funded Research Project, March 2004; Induction Generator Circuit controller for a 2-kWatt micro hydroelectric power plant; Computer-Aided analysis of linear and non-linear dc circuits; Asymmetrical multimode-to-singlemode optical fiber coupler; 500-watt solar conversion system; I have supervised undergraduate student theses on Electronic load controllers for microhydroelectric power plant, Solar energy conversion systems; I have supervised graduate students who have completed advanced degrees, more than 30 groups of BSECE students for their theses, more than 30 Masters degrees in ECE, 2 PhD degrees in ECE.



Community Involvement: Volunteer for Microhydro-electric Power Plant Community Outreach program for Abra, Baranggays Duldulao, Lat-ey, Gacab, in Malibcong, September, 1995; Dulao, once in 1996, twice in 1997; Gacab, once in May 1999; Gacab, February, 2000; Gacab, May, 2000; Trainor for out-of-school youths in Lumban, Laguna and in Rio Tuba, Palawan, 1992; Chairman of the Board of Directors, Manila Leonians Multipurpose Cooperative, 1992-1999; Accreditor for PAASCU (Philippine Accrediting Association of Schools Colleges and Universities) and (PACUCOA) Philippine Association of Colleges and Universities Commission on Accreditation; CHED COD/COE Assessor; Chair, CHED Technical Committee for ECE (TCECE)

Awards: James J. Meany award given by PAASCU, October 22, 2004; SEIPI Outstanding Mentor Awardee for Engineering University, 1999. Award given by ASEMEP-SETC; Outstanding Faculty, College of Engineering, DLSU, 1994.

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**AUTHOR:**

**Mr. Yeo Chee Keong, Benson**

ESD Control Division Assistant Manager; Technical Support  
DOU YEE Enterprises (S) Pte Ltd

**TITLE OF PRESENTATION:**

***IONIZATION TECHNIQUES FOR COST EFFECTIVE CLEAN ROOM MANUFACTURING***

**ABSTRACT:**

There such development in the field of Ionization since the last few years. However there are much misunderstandings on the part of users in terms of applications, technologies, measurements, abilities and the effect of Ionization in manufacturing. In this presentation, the objective is to highlight the different aspects of Ionization applications, Ionization technologies and Ionizer selection. Identifying the common pit falls users made in the selection of ionizers, users can have more confidence in choosing the right Ionizer for their applications resulting in not just huge cost savings, but also robust quality manufacturing processes in clean room.

**ABOUT THE AUTHOR:**

Benson Yeo is in ESD Control for more than 12 Years. He was involved in the establishment of MKS (Matsushita Kotobuki Singapore) Corporate ESD Control Program; taking the ESD Control Program from one Department to the Corporate level. Involved with all kind of ESD/Clean Room Materials, Equipments & Manufacturing Processes, he spearheaded the ESD Control against one of the most challenging ESD Control Program field, the Hard Disk Manufacturing environment. The AMR & GMR Hard disk Read/Write heads; which took the world of Hard Disk technology by storm; is still one of the world's Most Sensitive ESD product to be handled and Processed. Contending against this critical task put him in the front line of the ESD Control, exposes him to all the cutting edge technologies and method in the fields of ESD control, taking ESD Control to New Heights. With the change of career path

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in 2005 to Dou Yee has given him the opportunity in working along closely with more experienced ESD Gurus like Mark Hogset, Steven Heyman & Leo G Henry; just to name a few, in the field of ESD Control, Testing and Detection. The lately developed products in field of ESD control, test & detection have open up more opportunities for him to assist the industries to assimilate these prevailing techniques into their Control Programs; grooming the industries in taking up the ESD Control Challenges.

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**AUTHOR:**

**Mr. Marcelon Z. Cada**

BackEnd Quality Engineer

ON Semiconductor Philippines, Inc. - Calamba

**TITLE OF PRESENTATION: *PRIMER ON ANSI/ESD S20.20 – 2007 VERSION***



**ABOUT THE AUTHOR:**

Marcelon Z. Cada graduated at the Meralco Foundation Institute with diploma in Electronics Technology in 1993 and completed a degree in BS Electronics and Communications Engineering in 2005 at the MSE University Foundation. Employed by AMIS Philippines, Inc. since 1994, he pioneered the development of the Metrology Laboratory whose primary function is instrument calibration. Aside from being into calibration, he is the appointed ESD Control Program Manager of the former AMIS Philippines, Inc. now ON Semiconductor Philippines, Inc. - Calamba site. He led the plant to its ANSI/ESD S20.20-1999 certification in 2007 and ANSI/ESD S20.20-2007 certification in 2008. During the 4<sup>th</sup> ASEMMEP ESD Forum in 2007, he presented “AMIS Philippines – Journey Towards ANSI/ESD S20.20 Certification” and “ESD in Backend Manufacturing” during the ON Semiconductor 2008 Engineering Forum in Salt Lake City. Celon, as known to his friends and colleagues, is an iNARTE certified ESD control engineer.

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**AUTHOR:**

**Mr. Toshikazu Numaguchi**

3M Asia Pacific Pte Ltd (c/o Sumitomo 3M Limited)

Electronics Solutions Division Static Control Technical Manager

3-8-8 Minami Hashimoto Sagamihara City

Kanagawa Pref. Japan 229-1185



**TITLE OF PRESENTATION:** *ACTUAL STATIC CONTROL & STATIC CONTROL DESIGN*

**ABSTRACT:**

Our Electronics Industry situation. We have a many ESD control solution products at market and we can buy it. And also we have ESD control standard. (Ex, ESDA S.20.20 and IEC 61340-5-1 EIA 625 etc.) Other hand, Semiconductor susceptibility voltage are going down. Too much sensitive right now indeed. It is Less than 100V 50V 30V. Blue-Ray DVD Pick-up Laser diode is <70V HBM. How about your company ESD control program and actual ESD control level? How to confirm and clarified your ESD control Systems? So, Today. We would like to discuss and understand actual ESD control systems depend on ESD control Voltage Vs actual control level.

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**AUTHORS :**

**Mr. Jose M. Esmeria Jr.** ( Reliability Engineering Department , TDK Fujitsu Philippines Corp ( TFPC) & **Dr. Romeric Pobre** (Physics Department of De La Salle University, Manila, Philippines)

**TITLE:** *REVIEW OF TRIBOELECTRIFICATION*

**ABSTRACT:**

Triboelectrification arising from surface charge build-up is one of the common cause of electro-static discharge (ESD) event in electronic device handling. This is a common misunderstood phenomena during regular quality control articulation. To better understand ESD events, this paper will present an in-depth review of the nature of tribo electrification by citing the theoretical foundation and gold standard practice in ESD measurements. Current trends and future prospects in ESD measurement will be covered to anticipate ESD event for devices designed in the nanoscopic scale.

**ABOUT THE AUTHOR:**

Jose M. Esmeria Jr. is presently the Senior Manager for Reliability Engineering at TFPC in which he is responsible for overall ESD control, Failure Analysis and Materials Science laboratories. He joined TDK Philippines in September 1997 as a Senior ESD engineer. From then on, he leads a team for the first line qualification of the high sensitivity GMR projects in 1998 to the present. Currently, he also, leading a team materials and tools development and process improvement to remove ESD threats in the line. Prior to TDK Philippines he worked in Read Rite Philippines as a Senior ESD engineer under the New Product Introduction (NPI) Group. He has been heavily involved in ESD process qualification of new projects. Prior to Read Rite Philippines he worked in Fujitsu Computer Products of the Philippines or FCPP as a Disk Drive Engineer in March 1996. He was responsible for establishing ESD and contamination control in Disk Drive Manufacturing. Mr. Esmeria is a graduate of Tohoku University of Sendai Japan in 1996 with a Master's Degree in Electronics Engineering and is a recipient of Monbusho Scholarship, Tohoku Kaihatsu Foundation and International Communications Foundations of KDD scholarships. He finished he's BS Electronics Engineering degree in De La Salle University. Mr. Esmeria was one of the founders of ASEMEP ESD Council and former chairman for year 2002- 2003 and a Member of the ESD Association. He is the again elected chairman of the AEC for year 2007-2008. He has published 6 papers in the area of ESD and has 12 years of experience in ultra sensitive ESD devices and controls.

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**AUTHOR:**

**Mr. Michael Josue J. Pacis**

Manager, Quality Assurance & Reliability Department  
Amkor Technology Philippines, Inc.

**Mr. Angel Lu (Amkor Technology Philippines, Inc.)**

**Mr. Manuel Santos, Jr. (Amkor Technology Philippines, Inc.)**

**TITLE OF PRESENTATION: *COST EFFECTIVE SOLUTION & ROBUST ESD CONTROL PROJECTS***

**ABSTRACT**

It is said that necessity is the mother of invention, because of needs and demands we find creative and innovative ways to improve, enhance, simplify and optimize the existing procedures, logistics and controls of our process. Nowadays the challenge is to have a cost effective implementation of the process procedures, process controls, low maintenance and simplified logistics but must never compromise the quality, performance and requirements of the process.

To have an effective ESD Control program the Management shall fund and support the requirements to comply with the standards and meet the Customer requirements. Let us face the reality that the cost to satisfy and maintain the basic ESD Protected Area is very high. The ESD Control must cover from personnel grounding, apparels, machine parts, instruments, floorings, work table, storage cabinets, staging racks, handling logistics, table, chair, documents , essential insulators , monitoring , environment and more.

The focus of this technical paper will show and demonstrate cost effective and robust ESD control system and program supported with studies, practical solution and approach to ESD control and system implementation which will challenge your existing ESD controls.

**ABOUT THE AUTHOR:**

Michael Josue J. Pacis, Jr. is an International NARTE (iNarte) Certified ESD Engineer. He graduated SEE at Mapua Institute of Technology and a licensed Electrical Engineer since 1991. He joined Amkor Technology Philippines (ATP) in 1991 and worked with process engineering and technology development of packages such as SSOP, TSSOP, MQFP, CABGA, MMC & SiP.

In 1995 & 1996, he was given the award of Key Technical Employee & Technical Fellow respectively in the field of process and development engineering. In the past he submitted several technical papers internally in ATP and in ASEMPEP. He is also a Certified ISO/TS 16949 Lead Auditor since 2005. Currently, working as a Quality System Manager at ATP under Quality Assurance and Reliability Department he in-charge of ESD Control, Quality Management System, Document Control Center, SPC Organization, Internal Audit , Quality Data Management and Plant wide System Projects.

For year 2008 – 2009 he is the Chairman of ASEMPEP ESD Council (AEC).

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