EOS/ESD Manufacturing Symposium in Singapore

Genting Hotel Jurong, Singapore

ESDA Tutorials-March 27-28, 2017
Symposium-March 29-30, 2017
PrM Certification Exam-March 31, 2017

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ESDA Tutorials-March 27-28, 2017
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PrM Certification Exam-March 31, 2017

FC100: ESD Basics for the Program Manager

March 27 • 9:00 a.m. - 5:00 p.m.

Stephen Halperin, Stephen Halperin & Associates, Ltd.
Certification: PrM (Program Manager)

This presentation is a comprehensive introduction to the fundamentals of ESD causes and control. ESD Basics is a full-day seminar consisting of three presentation sections.

Part 1 includes an overview of ESD impact on industry, with detailed explanations of charge generation, field measurement, the role of capacitance and voltage, charge measurement, and charge decay.

Part 2 focuses on general explanations and illustrations of device failure mechanisms, including Human Body Model, Charged Device and Field Induction Models, and explains the Machine Model.

Part 3 is concerned with protecting ESD sensitive devices and assemblies, defining the Electrostatic Protected Area (EPA), understanding various ESD control elements and material selection, and includes a brief introduction to ANSI/ESD S20.20 ESD Program Development criteria. Several demonstrations and opportunities for discussion make this an interesting introduction to ESD causes and control. No previous ESD experience necessary.

FC101: How To's of In-Plant ESD Auditing and Evaluation Measurements

March 28 • 9:00 a.m. - 5:00 p.m.

Stephen Halperin, Stephen Halperin & Associates, Ltd.
Certification: PrM

This program reviews the evaluation and periodic verification (audit) measurement procedures for the technical requirements specified in the ANSI/ESD S20.20 ESD program development standard. Detailed explanation of instruments, fixtures, and accessories function and usage are provided. Then, the details of "How to" measure are explained and demonstrated. Measurements include those listed in Table 1: Grounding/Equipotential Bonding Requirements; Table 2: Personnel Grounding Requirements; and Table 3: EPA/ESD Control Items. These recommended measurement procedures confirm the proper operation and use of ESD control products and materials selected as part of a facility's S20.20 ESD control program.

Some sample topics covered in this course are:

- ANSI/ESD S20.20 Technical Control Requirements
- Program Manager's Approach to Instrumentation and Applications
- Testing Ground Circuits and Assessing Connections
- Essential Resistance Measurement Procedures and Concerns
- Electrostatic Field and Voltage Measurements
- Personnel Grounding Considerations vs. ESD Control Points
- Product Installation Baseline Measurements
- Evaluation, Acceptance, and Audit Procedures for: Ground Systems, Floors, Worksurfaces, Equipment, Personnel Grounding, Garments, Materials, Production Aids, Packaging, and Ionization Devices
- Electrostatic Analysis Measurements including Worksurface Suppression, Footwear/Flooring, and Ionization Decay

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FC340: ESD Program Development and Assessment (ANSI/ESD S20.20 Seminar)

March 27-28 • 9:00 a.m. - 5:00 p.m.

Ron Gibson, Advanced Static Control Consulting; John T. Kinnear, IBM Corporation

Certification: PrM

This seminar provides instruction on designing and implementing an ESD control program based on ANSI/ESD S20.20. The course provides participants with the tools and techniques to prepare for an ESD facility audit. This two-day course is an ESDA certification requirement for in-plant auditors and program managers who are working toward professional ESD certification.

It is recommended that the ESD Program Development and Assessment Seminar be taken after the Certification candidate has taken most of the other program manager related tutorials.

About the Instructors

Ron Gibson is the president of Advanced Static Control Consulting (ASCC), which was founded in 2010. ASCC provides consulting, ESD material and product qualification, and develops ESD training programs for clients. From 1994 to 2010 Ron was the corporate ESD program manager for Celestica International, Inc. and was responsible for the ESD control programs at all of Celestica's factories worldwide. From 1979 to 1994 Ron worked for IBM. Ron co-authored IBM's initial factory ESD standards. Ron has been a member of the ESD Association (ESDA) since 1988, and has served as an officer in the positions of president, senior vice president, vice president, secretary, and treasurer. He has also served as chairman of the ESDA Standards Committee (STDCOM) for over 10 years and as the first chairman of the ESDA certification business unit. Gibson is an iNARTE certified electrostatic discharge control engineer, an ESDA certified instructor for the program manager certification program, and is a certified chief ESD coordinator for the Reliability Center of Japan.

Stephen Halperin has over 35 years of industrial ESD experience and is known internationally for his work throughout the industry in process evaluation, control of sensitive environments, measurement and test innovations, standards, professional certification, education, and his many contributions to the electrostatics industry and ESD Association. He served two terms as ESDA president, and chaired standards, local chapter development, education, and professional certification committees. Mr. Halperin is a recipient of the Symposium's Outstanding Paper Award for his original work in facility evaluation; the Association's Outstanding Contribution Award for his life's work on behalf of industry; the Joel Weidendorf Memorial Award for his extensive contributions to ESD standards and its organizational development; and the ESDA's Founder's Award for his work in the growth and development of the ESD Association. He formed Stephen Halperin & Associates (SH&A - 1983), an international electrostatic consulting firm, and established Prostat Corporation (1992) for the design and manufacture of high performance electrostatic analysis and measurement instruments. Mr. Halperin has delivered several technical papers on the measurement and control of ESD and authored many articles on ESD related subjects.

John Kinnear is an IBM senior engineer specializing in process & system technology, and facility certification in accordance with ANSI/ESD S20.20. He has been the IBM ESD site coordinator for the Poughkeepsie site since 1989. He is past chairman of the IBM inter-divisional technical liaison committee for ESD protection and is an important member of his company's committee to develop and implement the ESD corporate program for IBM. John has coordinated the testing of large mainframes for compliance to EMC, safety, environmental, shipping, and volatile organic emission standards. He has also been the lead engineer on testing large mainframe systems to EMC emissions and immunity standards for FCC, CE Mark, VCCI, and other national requirements. As a member of the ESD Association since 1990, John has served in several standards development committees as well as association management positions. John is the appointed technical adviser to the United States National Committee/IEC technical committee 101, where he represents the United States to the International Electrotechnical Commission (IEC). In this position he assisted in the evolution of international ESD standards and supports international adoption of ANSI/ESD S20.20.

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TUTORIAL PROGRAM

MONDAY, MARCH 27, 2017

9:00 - 5:00 FC100: ESD Basics for the Program Manager

TUESDAY, MARCH 28, 2017

9:00 - 5:00 FC101: How To's of In-Plant ESD Auditing and Evaluation Measurements

OR

MONDAY-TUESDAY, MARCH 27-28, 2017

9:00 - 5:00 ESD Program Development and Assessment (ANSI/ESD S20.20 Seminar)

SYMPOSIUM PROGRAM

WEDNESDAY, MARCH 29, 2017

9:00 - 9:15 Welcome and Introduction to Certification

Technical Presentation 1

9:15 - 9:45 Die Attached and Wire Bonder ESD Risk Assessment
Y.H. Goh, W.F. Wong, Mohamed Farhan bin Azmi, Mohamed Ibrahim s/o Badruddin, L.H. Koh, Everfeed Technology Pte. Ltd.

Technical Presentation 2

09:45 - 10:15 ESD Process Capability and Control for a PCBA (Printed Circuit Board Assembly) Manufacturing Line
Tom Pelc, Oracle Corporation; Vesupathy Kannan, Celestica Malaysia Sdn. Bhd.

Demo/Case Study 1

10:15 - 10:35 Demo/Case Study 1: What is electrostatics? Demonstration of Electric Arc using Van de Graaff generator
Everfeed Technology Pte. Ltd.

10:35 - 11:15 Break and Exhibition

11:15 - 11:20 Exhibitor Showcase 1: Sto SEA Pte., Ltd.

Technical Presentation 3

11:20 - 11:50 ESA Phenomena: Light-Emitting Diode (LED) Sticking on Cover Tape at Detaping Process
Gim-Wae Goh, Osram; Y.H. Goh, L.H. Koh, Everfeed Technology Pte. Ltd.

Technical Presentation 4

11:50 - 12:20 Can Devices Get Stuck in Test Handler due to Static Charges? A Case Study
Chua Boon Teck, Reinhold Gaertner, Infineon Technologies

12:20 - 13:45 Lunchbreak and Exhibition

13:45 - 13:50 Exhibitor Showcase 2: ESD Consultancy Sdn. Bhd.

Technical Presentation 5

13:50 - 14:20 "Dummy Versus Live ESD Sensitive Devices Charge Analysis for Automated Handling Equipment ESD Qualification"
Jeremy Ong, Bernard Chin, UTAC Headquarters Pte. Ltd.; L.H. Koh, Everfeed Technology Pte. Ltd.

Technical Presentation 6

14:20 - 14:50 Workstation ESD Monitoring Project
Mohamed Aitbaaka, Charlene Rosal Batislong, ST Microelectronics

Demo/Case Study 2

14:50 - 15:10 Demo/Case Study 2: Influence of Machine Configuration on EOS Damage during Wafer Cleaning Process
Ng Kiong Kay, Infineon Technologies

15:10 - 15:50 Break and Exhibition

16:00 - 16:05 Exhibitor Showcase 3: Cesstech (S) Pte., Ltd.

Technical Presentation 7

16:05 - 16:35 Tri-temp AHE ESD Risk Assessment
Steve Lim, Royal Muar City; L. H. Koh, W. F. Wong, Y. H. Goh, Everfeed Technology Pte. Ltd.

Demo/Case Study 3

16:35 - 16:55 Demo/Case Study 3: Comparison of the Performance of Electrostatic Field Meter & Electrostatic Voltmeter used to Measure Electrostatic Potentials on Materials and ESDs
Rainer Pfeifle, Wolfgang Warmbier

16:55 - 17:05 Lucky Draw Day 1:
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17:05 - 17:30 Questions and Answers Session, close of day 1

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SYMPOSIUM PROGRAM continued

THURSDAY, MARCH 30, 2017

Technical Presentation 8

9:00 - 9:30 "Volume Conductive" Polyurethane Epoxy Sealings and Thick Coatings Meet the Latest ESD Standards
Gerhard Kraus, StoCretec GmbH; Siang Wee Goh, Sto SEA Pte. Ltd.

Technical Presentation 9

9:30 - 10:00 Noble ESD Audit Method in Smart Electronics Manufacturing
Ankan Mitra, WEAMG Electronics Pvt. Ltd.

10:20 - 11:00 Break and Exhibition

11:00 - 11:05 Exhibitor Showcase 4: Wolfgang Warmbier

Technical Presentation 10

11:05 - 11:35 The Innovative Use of Humid Air in Static Control Applications
Albert Kow Kek Hing, ESD Consultancy Sdn. Bhd.

Demo/Case Study 4

11:35 - 12:15 Demo/Case Study 4: What does Conformance to ANSI/ESD S20.20 Really Mean?
John Kinnear, IBM

12:15 - 13:30 Lunchbreak and Exhibition

13:30 - 13:35 Exhibitor Showcase 5

Technical Presentation 11

13:35 - 14:05 ESD Induced Passivation Star Crack – Root Cause and Mitigation
Wan Md Misuari Bin Wan Md Suleiman, Texas Instruments Malaysia

Technical Presentation 12

14:05 - 14:35 Measurement Methods and Air Ionization Affected by Manufacturing Changes
Arnold Steinman, Electronics Workshop, Dangelmayer Associates

Demo/Case Study 5

14:35 - 14:55 Demo/Case Study 5: Importance of SRM verification: Test instruments Verification prior Measurement – Surface Resistance Meter (SRM)
Everfeed Technology Pte. Ltd.

14:55 - 15:35 Break and Exhibition

15:35 - 15:40 Exhibitor Showcase 6

Technical Presentation 13

15:40 - 16:10 Evaluation of ESD Garment with Conductive Ribbon
Bernard Chin, Jeremy Ong, UTAC Headquarters Pte. Ltd.; L.H. Koh, Y.H. Goh, Everfeed Technology Pte. Ltd.

Demo/Case Study 6

16:10 - 16:30 Demo/Case Study 6: Do Devices on PCBs Really See a Higher CDM-like ESD Risk?
Reinhold Gaertner, Infineon Technologies

16:30 - 16:40 Lucky Draw Day 2:
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16:40 - 17:00 Questions and Answers Session and close

FRIDAY, MARCH 31, 2017

8:00 - 5:00 Professional Program Manager Certification Exam

NOTE: You must initiate an official file in your name at EOS/ESD Association, Inc. headquarters, and complete all pre-requisite courses to be eligable to take the exam. EXAM FEE APPLIES

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Technical Presentations

1. Die Attached and Wire Bonder ESD Risk Assessment
Y.H. Goh, W.F. Wong, Mohamed Farhan bin Azmi, Mohamed Ibrahim s/o Badruddin, L.H. Koh, Everfeed Technology Pte., Ltd.

ANSI/ESD SP10.1 acts as an ESD risk assessment guideline for test personnel to audit Automated Handling Equipment. Two units each of die attached and wire bonder machine were audited. Additional ESD risk assessment considerations, on top of ANSI/ESD SP10.1, were proposed and discussed.

2. ESD Process Capability and Control for a PCBA (Printed Circuit Board Assembly) Manufacturing Line
Tom Pelc, Oracle Corporation; Vesupathy Kannan, Celestica Malaysia Sdn. Bhd.

Devices are getting more sensitive and passive components charged as high as 6KV have quickly become popular. ESD failures are occurring on SMA (Surface Mount Assembly, typical in PCB Assembly Process) lines that were thought to present no risk to components. This paper will provide an effective way to manufacture with ESD sensitive components.

3. ESA Phenomena: Light-Emitting Diode (LED) Sticking on Cover Tape at Detaping Process
Gim-Wae Goh, Osram; Y.H. Goh, L.H. Koh, Everfeed Technology Pte., Ltd.

12% of 1000 ESD sensitive devices (ESDS), LEDs, stick on cover tape during detaping process at customer equipment. Besides the loss of LEDs sticking on the cover tape, machine suffered high stoppages, low yield, and reprograming of pick up sequence of collect

4. Can Devices Get Stuck in Test Handler due to Static Charges? A Case Study
Chua Boon Teck, Reinhold Gaertner, Infineon Technologies

Very lightweight devices (VQFN-24 package) got stuck in a gravity feeder at several places and stopped the process of testing. Since the devices are very lightweight devices the idea came up that the sticking is due to static charges on the mold compound

The final paper will show how this hypothesis was confirmed, calculating the attraction force depending on the charging voltage and the weight of the device.

5. Dummy Versus Live ESD Sensitive Devices Charge Analysis for Automated Handling Equipment ESD Qualification
Jeremy Ong, Bernard Chin, UTAC Headquarters Pte. Ltd.; L.H. Koh, Everfeed Technology Pte. Ltd.

Dummy units are commonly used for automated handling equipment (AHE) ESD qualification prior to releasing for production, due to resource limitations. Charge analysis for one hour vs 72 hours baking time for ESD sensitive devices (ESDS) were studied. This paper proposes live ESDS for AHE ESD qualification.

6. Workstation ESD Monitoring Project
Mohamed Aitbaaka, Charlene Rosal Batislong, ST Microelectronics

- Analysis of existing systems
- Requirements Specifications
- Proposed Solution & Methodology
- Project Management
- Solution & Implementation
- Functional Organigram
- Pareto of Potential Root Causes After Brainstorming
- Ishikawa Causes and Effect Diagram
- Why Analysis Methodology

7. Tri-temp AHE ESD Risk Assessment
Steve Lim, Royal Muar City; L. H. Koh, W. F. Wong, Y. H. Goh, Everfeed Technology Pte., Ltd.

This presentation will discuss: Qualifying ESDriskofstate-of-the-artnewlypurchased automated handling equipment (AHE) with tri-temperature (tri-temp) capability, as per standard organization ESD control limits; Evaluating ESD compliance and non-compliance AHE process steps; and appraising non-compliance AHE process steps and recommend corrective actions as per ANSI/ESD SP10.1 and ANSI/ESD S20.20-2014.

8. "Volume Conductive" Polyurethane Epoxy Sealings and Thick Coatings Meet the Latest ESD Standards
Gerhard Kraus, StoCretec GmbH; Siang Wee Goh, Sto SEA Pte. Ltd.

Carbon fiber loaded conductive floorcoatings normally have very good electrical properties according to EN 61340-4-1 and EN 1081 but: they don´t meet the requirements of the combination resistance human/shoes/floor according to EN 61340-4-5 or ESD STM 97.1 - 2006, they create voltages of > 100 volts. The solution for this problem is to apply an advanced Epoxy or Polyurethane sealing on top of the floor coatings or to use so called "volume conductive coatings" instead. The paper will introduce another very economic technology, which can be used in order to make an epoxy floor "ESD-safe".

Technical Presentations continued

9. Noble ESD Audit Method in Smart Electronics Manufacturing
Ankan Mitra, WEAMG Electronics Pvt. Ltd.

ESD Audits were made at predetermined frequency to ensure necessary grounding connections stay connected as per intended specification. However, even with such audits there had been failures which were attributed to ESD after very expensive failure analysis. Continuous monitoring for various electronics manufacturing stages has helped raised flags in the manufacturing shop-floor but still gets restricted to become a full-proof mechanism.

This is where Internet of Things (IoT) for ESD control and compliance comes into picture. IoT not only monitors both the stationary and dynamic ground connections but also integrates a pre-monitoring schedule of all the elements required for ESD control.

IoT enabling a factory specifically for ESD control system, creates immense visibility by flagging any connection failures and also comes up with solution, specification from standards, name of pre-approved suppliers as applicable. Most importantly a log of such a connection failure which can be pulled-back along with corrective action for audit requirement in future.

In this presentation we shall share details of hardware and embedded software solutions which we have experimented with and deployed as pilot in electronics manufacturing shop-floors along with the results recorded. Presentation closes with the challenges identified and the path forward.

10. The Innovative Use of Humid Air in Static Control Applications
Albert Kow Kek Hing

This paper presents the four (4) levels of uses of the Humidity Control Device (HCD) to achieve targeted ESD control objectives. The innovative use of humid air described herewith is a further technical disclosure to the papers presented in the Singapore (2012), Germany (2013), and Korea (2015) ESD Symposiums.

11. ESD Induced Passivation Star Crack – Root Cause and Mitigation
Wan Md Misuar, i Bin Wan Md Suleiman, Texas Instruments, Malaysia

Electrostatic Discharge (ESD) failure is a product quality failure once known to be a low DPPM and undetected in Semiconductor assembly. To some extent, engineers believe it is only a hypothetical failure and more like a myth. Until recently, die passivation damage in form of star crack found systemically upon assembly wafer saw process proves that ESD failure is a no hypothetical failure or myth. This presentation elaborates a case study on ESD failure of an RF semiconductor die with passivation star crack. It explains star crack as the signature of the ESD failure, root cause analysis and later mitigation taken to eliminate the ESD failure.

12. Measurement Methods and Air Ionization Affected by Manufacturing Changes
Arnold Steinman, Electronics Workshop, Dangelmayer Associates

Manufacturing has brought increased semiconductor device functionality through smaller geometries, larger wafer sizes, and faster operating speeds, as well as increased disk drive storage density. It has also resulted in lower ESD withstand voltages for products. Measurements are needed to assure that the manufacturing process can safely handle these products. To produce these advanced technologies the use of air ionization for static control has changed. This paper explores measurement methods for process risk assessment and new ionization requirements.

13. Evaluation of ESD Garment with Conductive Ribbon
Bernard Chin, Jeremy Ong, UTAC Headquarters Pte., Ltd.; L.H. Koh, Y.H. Goh, Everfeed Technology Pte., Ltd.

A new batch of ESD garment (smock) was found to fail on compliance verification after 10 washes. An experiment was carried out to verify if smocks attached with conductive ribbon will have longer durability. This paper evaluates the durability of two types of smock up to 110 and 420 washes.

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2. How To's of In-Plant ESD Auditing and Evaluation Measurements
3. ESD Program Development & Assessment (ANSI/ESD S20.20)

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1. Cleanroom Considerations for the Program Manager
2. Ionization Issues and Answers for the Program Manager
3. System Level ESD/EMI: Testing to IEC and Other Standards
4. Packaging Principles for the Program Manager
5. ESD Association Standards Overview
6. Device Technology and FA Overview
7. Electrostatic Calculations for the Program Manager

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Booth 2
Dou Yee Enterprises Pte Ltd
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Booth 9
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ESD Management & Consultancy
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159 Sin Ming Rd, #06-02
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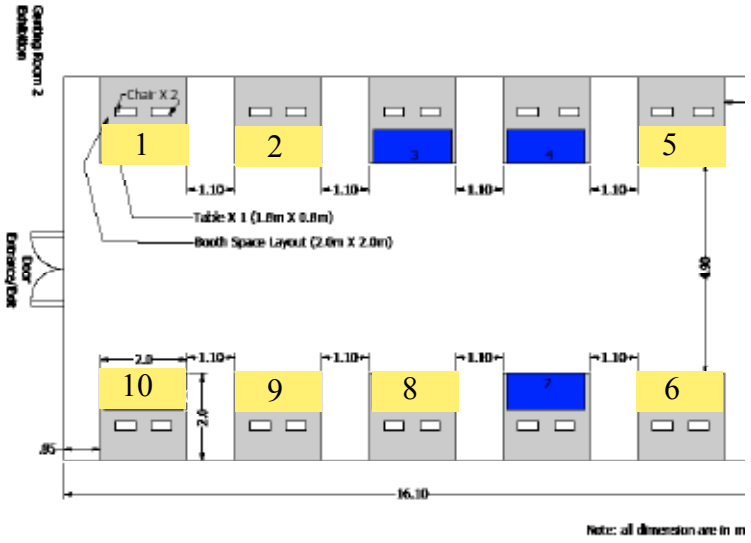
Phone: +65-6453-3080

Booth 5
Wolfgang Warmbier GmbH & Co. KG
Untere Gieswiesen 21 Hilzingen 78247 Germany
Phone: +49-7731-8688-19

EXHIBIT SETUP	8:00 – 12:00 March 29, 2017
EXHIBITS OPEN	12:00 – 5:00 March 29, 2017
	9:00 – 3:00 March 30, 2017
EXHIBIT DISMANTLE	3:00 – 5:00 March 30, 2017



Each space includes standard table 6 x 2.5 feet, two chairs, and one power socket with standard 3 pin UK plug, 240 V AC
To register for space please use the form on the next page.

ACCOMMODATION

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EXHIBITS OPEN 12:00 – 5:00 March 29, 2017
9:00 – 3:00 March 30, 2017

APPLICATION FOR EXHIBIT SPACE

Name of Company:_____

Street Address:_____

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Please provide web address to be used for your link on ESDA website: _____

We will exhibit and demonstrate the following products or services:_____

_____

We are_____Manufacturers_____Other (please specify)_____

Exhibit Space Rental: $1,000.00 USD
FULL PAYMENT DUE WITH REGISTRATION

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THE UNDERSIGNED HAS READ AND AGREES TO ABIDE BY THE TERMS ON BOTH SIDES OF THIS APPLICATION.

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NOTES:
1. Each exhibitor receives one (1) symposium registration package for each booth rented.
2. SPACE WILL BE ASSIGNED IN THE ORDER OF RECEIPT OF REGISTRATION
3. Management reserves the right to relocate exhibit space, as necessary, to conform to show regulations.

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☐	ESD Program Development and Assessment **March 27-28** (ANSI/ESD S20.20 Seminar)	$ 1510 USD/2154 SGD
☐	Symposium Only **March 29-30**	$ 800 USD/1141 SGD
☐	Professional Program Manager Certification Exam **March 31, 2017** NOTE: You must initiate an official file in your name at EOS/ESD Association, Inc. headquarters, and complete all pre-requisite courses to be eligable to take the exam.	$ 80 USD/114 SGD

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Payment Information

☐ **Will pay in cash at the event**

Only checks drawn in U.S. currency on a U.S. bank that is a member of the Federal Reserve will be accepted; make checks payable to ESD Association.

Amount enclosed $_____ ☐ Check ☐ Visa® ☐ MasterCard® ☐ American Express® ☐ Discover®

Credit card number:_____ Security code:_____

Name on card:_____ Expiration date:_____

Cardholder's signature:_____

Billing Address_____

City:_____ State:_____ Zip/Postal Code:_____

For other forms of payment contact:

Mr. Yohan GOH, Phone: +65 9221 1456
No.2 Tuas Link 1, Jurong Industrial Estate, Singapore 638590
Email: yohan_goh@everfeed.com.sg