May 2019 Newsletter
The IEEE Reliability Society
Joint Section Chapter: Boston - New Hampshire - Providence
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http://www.ieee.org/bostonrel

I recently went on the web to order some parts for a small electronic project. I found most of the parts from reputable well known distributors however some items were on back. I found these parts on Amazon however as I was placing the items in my online cart I noticed many of the items not being fulfilled by Amazon but were being shipped from a third party distributor. I also noticed many of these items were not shipping from here in the United States however were coming from overseas particularly China. This got me thinking why are these components coming from China and are they possibly counterfeit. Checking online documents didn't provide any real data on the manufacturer or supplier. Prices also varied from what I would expect to pay to prices just "too good to believe". Online sellers are convenient and provide access to products that would normally not be available in small quantity from known distributors however there are risks.

Having worked for a military contractor I saw the risks from counterfeit material as there was a shift to use more commercial off the shelf (COTS) hardware. Large contractors could monitor and control their supply chain but what about smaller end users. Industry groups such as the Semiconductor Industry Association (SIA), the ERAI, the Government Industry Data Exchange Program (GIDEP), and the European Semiconductor Industry Association (ESIA) are doing what they can to police or track discovery of counterfeit components. However there's still the potential that counterfeit material could enter the supply chain. The saying "Caveat Emptor" still hold however when things are intentionally kept from the buyer the blame rest with the seller who could have no other purpose but to make money at the risk of the customer.

So the next time a component fails consider that it could have failed due to it being a less reliable counterfeit product that slipped into the supply chain.

Regards
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IEEE Reliability Society AdCom Member '16-'18
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Recent Activities:

March 13, 2019 — **"ESD QMS Best Practices Strategy for Class 0"** Ted Dangelmayer, Dangelmayer Associates

April 10, 2019 — **"DfR- DESIGN for RINSE-ABILITY: EFFECT OF SMT COMPONENT PACKAGE DESIGN ON CLEANING EFFECTIVENESS"** Norman Armendariz, PhD Raytheon

Upcoming Events:

May 8, 2019 — **"An Introduction to Use Class 7",** Adam Bahret, Apex Ridge Reliability

June 12, 2019 — **"High Power Electron Beam Reliability: A Federal Case"**, Dan Weidman, MIT Lincoln Labs

Reliability Society Sponsored Conferences

RAMS	Reliability & Maintainability Symposium	USA *January (annual)*
ISQED	Int'l Symposium on Quality Electronic Design	USA *March*
IRPS	IEEE Int'l Reliability Physics Symposium	USA *March-April*
WF-IoT	IEEE World Forum on Internet of Things	Ireland *April 2019*
ICPHM	IEEE Int'l Conference on Prognostics & Health Management	USA *June (annual)*
ISSSR	Int'l Symposium on Safety & Software Reliability	China *June*
SG4SC	IEEE Int'l Forum on Smart Grids for Smart Cities	Europe *November*
PHM-Chengdu	Prognostics & Systems Health Management Conference	China *October*
ICRMS	Int'l Conference on Reliability, Maintainability & Safety	China *October (annual)*

Society Membership includes:

- Society Newsletter (electronic),
- IEEE Transactions on Reliability (online),
- IEEE Reliability Society Conference Digital Library (online), and
- IEEE Reliability Society Resource Center (online).

“ESD QMS Best Practices Strategy for Class 0” March 13, 2019 Ted Dangelmayer, Dangelmayer Associates

While most companies are acutely aware of the hazards of ESD (electrostatic discharge), few are aware that the ESD QMS (Quality Management System) Strategy is equally important as the technical requirements. This is especially true for the extreme ESD sensitivities of Class 0 since the trend toward Class 0 devices is escalating rapidly. Furthermore, most companies do not know what their device sensitivities are because 90% of IC datasheets do not include CDM (Charged Device Model) Sensitivity data. The absence of this data and the lack of understanding of ESD QMS best practices have reached a critical stage.

S20.20 (ANSI/ESD S20.20) is the best industry standard available and is an excellent foundation for ESD QMS best practices programs. However, companies with advanced technologies have found they must customize the technical requirements of S20.20 and introduce sound ESD QMS practices to avoid unacceptable failure rates in the factory and field.

This interactive presentation provided tips on how to determine if you are at risk and how to establish a robust ESD QMS strategy. Also ESD CDM & HBM (Human Body Model) device sensitivity data as well as how to prepare for Class 0 were defined.

AUTHOR BIO: Ted Dangelmayer is the president of Dangelmayer Associates, LLC and has assembled an ESD consulting team consisting of the foremost authorities in virtually all ESD areas of both product design and manufacturing. He received the “Outstanding Contribution” award and the EOS/ESD Association, Inc. “Founders” award. He was president of EOS/ESD Association, Inc., chairman of the ESDA standards committee, and general chairman of the EOS/ESD Symposium. He has published two editions of his book, ESD Program Management, numerous magazine articles, and technical papers. Ted holds three patents and is iNARTE certified. He is currently president of the Northeast local chapter of EOS/ESD Association, Inc., a member of the ESDA education Council, ESDA Marketing Team, Advanced Technologies Team, Nominations Committee and ESDA Publicity Team.

“DfR- DESIGN for RINSE-ABILITY: EFFECT OF SMT COMPONENT PACKAGE DESIGN ON CLEANING EFFECTIVENESS”, Norman Aremendariz, PhD, Engineering, Fellow Raytheon

PRESENTATION: Recent CCAs-circuit card assemblies manufactured using SMT-surface mount technology processes have exhibited cleaning residues remaining on the surface of components and within electronic component / package housings with discoloration (degradation) of Cu-wire insulation and discoloration (oxidation) of the metal contacts observed, which may compromise the surface conformal coating properties, and possibly degrade the component’s electrical performance and long-term reliability.

Given that military applications require a high level of performance and reliability, CCAs- circuit card assemblies and components undergo a semi-aqueous chemical cleaning process after SMT-surface mount technology assembly in order to properly prepare CCAs for the conformal coating process and protect the electronic components as intended from moisture and harsh environments.

However, if any active cleaning constituents and un-reacted by-products are not removed or rinsed completely from the surface or from within the components, then the surface may not be suitable for subsequent conformal coating, and may also result in materials degradation and/or corrosion, which may detrimentally affect the electrical performance, if entrapped within the components.

This presentation discussed the “physics” of liquid entrainment / entrapment / cleaning / rinsing and their effects on component materials with experiments performed to determine the, major component design parameters required to adequately aqueous-rinse components of their cleaning residues with the objective of developing and providing “Design for Rinse-ability” guidelines to deploy. In addition, accelerated humidity testing with electrical testing was discussed, that was performed to determine the degree of degradation / corrosion or electrical reliability of components exposed to cleaning chemistries.

AUTHOR BIO: Norman Armendariz is an Engineering Fellow at Raytheon responsible for materials engineering design, materials analysis, process equipment development, production support and technology roadmaps associated with the manufacturing of CCA- circuit card assemblies used in missiles, smart munitions, ground based radars, and mobile sensors across multiple US and international sites.

Norm has over 25 years of industrial experience, having worked for

Lockheed/NASA, Motorola, Intel, Texas Instruments and American University.

He holds an interdisciplinary PhD in Chemical Engineering from New Mexico State University, MS in Materials Science Engineering from the University of Illinois at Urbana-Champaign, and BS Metallurgical Engineering from Colorado State University, with 9 US patents and 29 peer-reviewed publications.

Advisory Committee (AdCom) Members 2019

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Chapter Seeks Volunteers

We are interested in having you help out as a volu contributing as much or as little as you would like. We a good team of volunteers that help us keep things goi if you would like to join us, there is probably a opportunity to choose how you would like to contr Email or talk to any of us at the next monthly present or attend one of our Advisory Committee meetings.

For updates on upcoming events: http://ewh.ieee.org/r1/boston/rl/events.html.

Readers can contact chapter newsletter editor Ken Rispoli (ken-rispoli@ieee.org) with any comment/suggestion or if interested in contributing to our next issue. Thanks.

The IEEE Reliability Society Joint Section Chapter
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