Reliability of Electronics: Tin Whisker – All You Should Know

SYLLABUS

INSTRUCTOR INFORMATION:

Instructor: Dr. Jennie Hwang

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Availability: Usually available between 3 p.m. and 5 p.m., Eastern Standard Time, USA. You may leave a message anytime.

PROGRAM DESCRIPTION

You may not be able to see tin whiskers with your naked eye, but these ever-growing metallic filaments can cause short circuits leading to electrical failures. As the miniaturization of electronics continues and PCBs become denser with more components, the dangers posed by tin whiskers grows even more. This course provides a holistic coverage on relevant aspects of tin whiskers, including both physical and phenomenal occurrences, as well as fundamental scientific perspectives. We'll explore various measures to mitigate tin whiskers, as well as their relative effectiveness, and encourage you to join us in questioning and discussing ideas for future solutions.

This course provides working knowledge and pragmatic perspectives to all who are concerned about product reliability issues in relation to tin whiskers, such as designers, researchers, managers, quality/manufacturing and reliability professionals, and business decision-makers.

Presented by Dr. Hwang, a long-standing pioneer in SMT manufacturing and lead-free implementation, she brings her deep knowledge and broad experience to this course through both hands-on and advisory capacities in commercial and military applications. Over the decades, she has solved the toughest reliability and production issues by utilizing her comprehensive knowledge and insightful observations.

COURSE STRUCTURE

- Instructor and participants meet online twice from the comfort of their own home.
- Participants can view recorded online sessions to review course content and class discussions.
- Participants apply key concepts to create a real-world design from concept to completion.
- All required materials are included in the course.
- Course materials are accessible 24/7 on the new IPC Edge Learning Management System.
- The course can be accessed on virtually any device with an Internet connection and major web browser, including Chrome, Firefox, Safari, Edge, and Internet Explorer.

SUPPLEMENTAL MATERIALS

- Book: (ISBN-0-07-143048-2) "*Lead-free Implementation: A Guide to Manufacturing*" McGraw-Hill, New York, 2005, Jennie S. Hwang.
- Book: (ISBN-0 901 150 401) "*Environment-Friendly Electronics—Lead Free Technology*", Electrochemical Publications, LTD, Great Britain, 2001, Jennie S. Hwang.
- Book: (ISBN-0-07-031749-3) "*Modern Solder Technology for Competitive Electronics Manufacturing*", McGraw-Hill, New York, 1996, Jennie S. Hwang.
- Book: (ISBN-0-90-115029-0*)"IC Ball Grid Array & Fine Pitch Peripheral Interconnections*", Electrochemical Publications, LTD, Great Britain, 1995, Jennie S. Hwang.
- Book: In Japanese, "*Solder Paste: Technology and Applications for Surface Mount, Hybrid Circuits, and IC Component Manufacturing*", Industrial Research, Japan 1990, Jennie S. Hwang.
- Book: (ISBN-0442-2075-49) "*Solder Paste: Technology and Applications for Surface Mount, Hybrid Circuits, and IC Component Manufacturing*", Van Nostrand Reinhold, New York, 1988, Jennie S. Hwang.

IPC STANDARDS COVERED (PROVIDED WITH COURSE)

- JEDEC/IPC-JP002: Current Tin Whiskers Theory and Mitigation Practices Guideline
- IPC-J-STD-006 (Revision C & Amendment): Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications
- IPC/PERM-2901: Pb-free Design & Assembly Implementation Guide
- IPC-J-STD-004 (Revision C & Amendment): Requirements for Soldering Fluxes
- IPC-J-STD-005 (Revision C & Amendment): Requirements for Solder Paste

COURSE SCHEDULE

WEEK 1

Main Topics for Part 1:

- Definition & clarification
- Physical phenomena
- Reference point
- Causes and factors
- Concerns & impact
- Case Study

Main Topics for Part 2:

- Reliability
- Test conditions
- Mitigation remedies
- Relative effectiveness of mitigating measures
- Plausible mechanism
- Tin whisker vs. tin pest
- Summary

ASSIGNMENT:

- Participants to bring further questions and issues for discussions