SMT Manufacturing Productivity and Yield - Mitigating Production Defects – Module 2

SYLLABUS

INSTRUCTOR INFORMATION:

Instructor: Dr. Jennie Hwang

Email: jennie.hwang@h-techgroup.com

Phone: 216-577-3284 Mobile

Best time to call: Between 3:00PM to 5:00PM ET USA. Leave message anytime.

PROGRAM DESCRIPTION

This course addresses common production challenges in tin-lead and lead-free systems that can reduce yield, increase costs, and compromise product reliability. It explores the root causes of these issues, their impact, and practical solutions to mitigate their occurrence, ensuring higher production yields and reliable outcomes.

The SMT Manufacturing Productivity and Yield - Mitigating Production Defects course is offered in two modules. Module 1 and Module 2 function as independent courses. Learners can take them separately and focus on specific topics of interest outlined in the course schedule this course is taught by an international Hall of Fame inductee for women in technology and a renowned author of several groundbreaking, globally recognized books on lead-free technology, electronics manufacturing, and reliability, who is a record-holder in solving some of the industry's most challenging reliability and production issues. Drawing from extensive hands-on and advisory experience across both commercial and military applications, the course delivers comprehensive knowledge with unparalleled depth and breadth.

LEARNING AND PERFORMANCE OBJECTIVES

Module 2 of the course consists of two 2-hour sessions over one week and delivers practical knowledge and actionable strategies for preventing and resolving production floor defects. By examining the root causes and contributing factors of common defects, this module focuses on manufacturing challenges related to bare PCBs, PCB fabrication, and components. Participants will gain a detailed understanding of each issue, with clear remedies and preventive measures outlined for commonly occurring defects. Designed to support high production yields while ensuring product reliability, this course is ideal for anyone involved in solving and preventing production problems. Target participants include designers, quality assurance specialists, manufacturing and reliability professionals, researchers, managers, and business decision-makers. It is also well-suited for those seeking a comprehensive understanding of production challenges and their solutions. The course strikes a balance between real-world hands-on

practice and the engineering principles that support sound manufacturing practices. Participants are encouraged to bring their production floor issues for discussion.

COURSE STRUCTURE

- Instructor and participants meet online twice per week 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)

- IPC-9708 - Standard Only: Test Methods for Characterization of Printed Board Assembly Pad Cratering
- IPC-A-600 - Revision K - Standard Only: Acceptability of Printed Boards
- IPC-1602 - Standard Only: Standard for Printed Board Handling and Storage
- IPC/JEDEC-J-STD-020 - Revision F - Standard Only: Moisture/Reflow Sensitivity Classification for Non-hermetic Surface Mount Devices (SMDs)

- IPC/JEDEC-J-STD-033 - Revision D - Standard Only: Handling, Packing, Shipping and Use of Moisture, Reflow, and Process Sensitive Devices

COURSE SCHEDULE

Module 2 will focus on production defects associated with bare PCB, PCB fabrication, and components – causes, remedies, and preventive measures. In this 4-hour course, you will learn and be updated on the following topics:

Topics include:

1. Premise
2. BGA solder ball drop
3. PBGA crack
4. BGA/CSP interposer heat damage
5. BGA/CSP co-planarity issue
6. Large BGA rework challenge
7. Ceramic capacitor damage
8. SOT issue
9. Tome stoning
10. 01001 component issue
11. PCB board sagging
12. PCB-related issues
13. PCB pad-cratering
14. PCB pad lifting
15. PCB bare board issues
16. Thermal damages
17. Concluding summary

ASSIGNMENT:

Participants to bring further questions and issues for discussion.