

## ***On The Forefront:* December, 2002**

By Phil Zarrow

### **Certifying the SMT Process Engineer**

“Are you experienced?”

*Jimi Hendrix*

You don't need to have been in this industry of ours very long to learn that there is a range of competency with regard to assembling circuit boards. I'm not talking about machine capability here; I'm talking about “the nut that holds the steering wheel” – the human factor running the process. Think about it for a second. You've met engineers, technicians, operators, even managers who have impressed you with their knowledge and where-with-all. But you've also become acutely aware that there are a “lot of bozos on this bus”.

How does a truly good process person get recognized for his/her capability? Not from a point of vanity, mind you, but to distinguish themselves from the teeming masses. In some respects, the Practicing Engineer (PE) moniker attempts to do this but this is general in terms of engineering disciplines. A practicing engineer certainly has earned your respect but I once met a PE that couldn't even read a blue-print and that certainly detracts from the genre. In addition, SMT process technology is not taught at the undergrad level. Nor do you pick it up by attending countless seminars and workshops, though these help immensely. The fact is that you learn as you practice it (well, hopefully you learn). But where's the proof that a SMT practitioner really knows the intricacies of his trade?

The answer comes from the Surface Mount Technology Association (SMTA), that great bastion of knowledge, education and understanding for our industry. The solution is the SMTA's “SMT Processes” and “SMT Systems” Certification program. This program tests and certifies the knowledge, skills, and comprehension of the SMT assembly processes and systems at a true, practicing engineering level. While there are indeed other programs out there that certify specific process areas (rework and repair, ESD, etc.) SMTA Certification confirms current competence at a fundamental level of overall SMT process technology.

The SMT Process Certification program is a three-day workshop that covers SMT assembly process starting with the basics but also getting into the nitty-gritty of assembly engineering. This includes line-balancing and process optimization, stencil technology, solder chemistry and metallurgy, stencil design, reflow and wave-soldering methodology, down-time calculations, process troubleshooting, moisture sensitive device management

and a lot more. The SMT Systems Process Certification program, moves into Statistical Process Control, Defect analysis, Design for Manufacturability and systems related issues. In both programs, a comprehensive 2-day “refresher” workshop is given by very experienced instructors to get the candidate into the “think” mode because next comes – “the Exam”. The test has two parts, one an open-book, the other a closed book and each takes a half-day to complete. None of that multiple-choice and true-false stuff. And be ye warned, there is basic algebra and geometry (yes, that four-letter word: math) throughout the workshop and exam. Okay, that probably scared off at least half of the prospective candidates.

So, this program is not for the weak of heart or experience. On the other hand, you don’t have to have a four year degree to be eligible to enroll in the program. (You don’t have to know how to read blue-prints, either.) You do have to have at least 2 years of college or equivalent and at the very least one year minimum process level experience. In reality the candidate should have a good working knowledge of all the process steps from material deposition through test and inspection including how and when to do the appropriate calculations.

Thus, this program is not for newbies or folks who have learned all their SMT knowledge from books and magazine articles (the proverbial “Popular Mechanics Engineers”). The workshop portion of the program, as stated earlier, is a refresher. It helps blow out the cobwebs and also, perhaps, bring a different perspective to the subject matter. By no means can someone take and rely upon the workshop and coursebook to bring them up to speed for certification. You had better have some solid experience behind you before you enroll. A SMTA Certified Engineer is not a Paper Engineer. As mentioned, there is need for performing elementary engineering mathematics so bring along your calculator (or slide rule).

The subject matter of the workshop and the exam is real, practical and applied. Line balancing, for example, is a major element of the Process program. Sounds pretty basic, but how many people responsible for running one or more SMT automated assembly processes really understand how to balance a line? The answer is how many unbalanced lines do you see in the field – quite a few, if not a majority of them. Why is that - it’s not rocket science? It is a basic component of attaining profitability so it is very important for every manufacturing facility yet it is a somewhat scarce commodity. Statistical Process Control is another example and a key component of the Systems program. We all know the acronym and quite a number of facilities have incorporated important aspects of SPC but how many assemblers really use SPC as a manufacturing tool? When the topic of MSDs is brought up, most people think of Material Safety Datasheets. A major process issue is Moisture Sensitive Devices and while the problem of micro-cracking and the so-called “popcorn effect” have been with us for over 20 years, how many practitioners have a true awareness of JEDEC-033 and how many effective MSD tracking systems have you seen implemented at OEMs or CEMs ? (Of course, regular readers of this column are very much “in the know” on these topics and above average.)

The person who has a handle on these issues and, hence, the assembly process is the type of person you would want to have overseeing your SMT assembly processes. Your confidence and quality level benefits from such distinguished individuals whether they are in-house, at your CEM or even in Applications at your equipment supplier. The SMTA Certification distinguishes them. While the Certification cannot guarantee the recipient's performance (or his social skills), it definitely demonstrates his/her comprehension of the SMT assembly processes and/or systems. If you're interested and you think you have the "right stuff", consult the SMTA website for registration: [www.SMTA.org](http://www.SMTA.org).

The few, the proud, the SMTA Certified. Remember, we're all in this together.

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