Automation: Water in a Drought

The iguana's solution, or how to swim with the sharks without becoming lunch.

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CHARLES DARWIN MAY seem an unlikely mentor for the PCB industry. In today's economy, however, we must be open to lessons from any source. Darwin theorized that the land iguana of the Galapagos Islands once lived on the island's volcanic surface, at a time when its vegetation was diminishing. "No food on land?" it apparently thought. "Wonder what's floating in the water?" Thus the land iguana became the "marine" iguana, and grew happily fat on a vegetarian version of chicken of the sea.

A similar evolution is taking place in the PCB industry. Volume production is going to Asia. Small- to mid-sized manufacturers are adjusting by adopting low-volume, quickturn production. For these companies to succeed, they must implement strategies that speed turns without sacrificing quality. Return on investment (ROI) for such strategies must be short and must significantly aid the bottom line.

Historically, large manufacturers invested the time and resources to automate front-end tooling. They retained CAM support staff responsible for scripting and programming the automation needed to streamline the CAM process and to minimize errors. Smaller shops typically could not afford such overhead. Perhaps a CAM operator knew some programming or scripting, and could automate some processes. However, time spent on these activities took away from processing jobs, and in a small company, work needs to continually flow.

With the evolution to quickturn and lower volumes, speed through the front-end is critical. The accuracy of the results is also critical because any mistake here will cause reprocessing – and delays. As a result, manufacturers of all sizes must consider the benefits of front-end tooling automation. For smaller manufacturers, however, making the Darwinian transition – and the payroll – is the issue. There are three keys to making automation successful.

1. Customize the tool to your manufacturing requirements. Although today's CAM tools work out of the box, they are standardized to meet the needs of the masses. The way to achieve a high level of productivity is by customizing the tool to your manufacturing requirements and processes. Most CAM tools permit some level of automation. Many CAM products allow the user to record commands in a text file by scripting their software operations. This text file or script can be replayed to mimic the exact actions at a later time. It also serves as a starting point from which parametrics (variables, logic, and so forth) can be added to make the script into automation that can process jobs based on specific parameters, such as panel size and plating type.

2. Develop strict tooling standards. Owning the proper CAM tool is only part of the automation solution. Tooling standards are critical to defining rules and standard panels. Without them, tooling engineers are free to provide tooling as they see fit or, as we like to call it, "panelization by opinion." Standards, and therefore automation, must be driven by proven rules and processes that have been developed based on a manufacturer's product mix and capabilities.

3. Get a smart partner. The small- to mid-size firm must find the right individual to develop the automation. Large manufacturers can typically afford dedicated in-house programmers. Smaller ones often cannot, and therefore must consider outside automation services.

How does automation plus production equal ROI for the little guy? Investing in automation reaps both tangible and intangible returns. The tangible returns include time saved and reduced scrap. We can all relate horror stories of monies lost in scrap due to poor tooling. The predictability of automation, along with its lack of reliance on human interaction, makes the tooling output consistent and accurate. A few saved production orders can more than compensate for the upfront investment in automation.

Time was, before Gerber RS-274X, data files came with separate aperture listings that required manual input. This was, in my experience, one of the most error-prone areas in the front-end. Finally, CAM tool suppliers devised software (automation) to automatically interpret and read the aperture list, all but eliminating this error. But while tool vendors may solve through automation global industry problems, they will not do the same for company-specific issues. This is left to the manufacturer.

The front-end tooling process, when heavily automated, should require fewer operators. These operators can be reassigned to areas that use their experience and talents. And new CAM operators can be trained more quickly because automation permits them to be productive without initially understanding all the details.

Intangible returns include more jobs processed, because of quicker throughput in the front-end tooling department; more on-time deliveries, because of fewer production delays due to tooling errors; better consistency on the shop floor; and, most importantly, happier customers. Regardless of company size, automation is an investment that can provide great returns even under poor economic conditions. Take a lesson from the land iguana, which found nourishment close at hand when his familiar island went dry. ○

This is second in our series on better Board Shop Management. Service is a key differentiator, and front-end work is highly services-oriented. – *Dan Beaulieu*

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