

Build Quality In

by **Karla Osorno**

EE TECHNOLOGIES, INC.

Ask any customer to name the most important factors in choosing a supplier and you are likely to hear quality, cost, and delivery. These are the three areas where customer expectations are established and measured to evaluate a customer-supplier relationship. Interestingly, quality impacts costs and delivery. This is especially true when quality gaps result in increased costs and longer delivery times. Suppliers who understand this concept choose to build quality into the product rather than relying on inspection controls to ensure quality. Building quality in ensures they build products that meet internal and external expectations.

Build it in

Every manufacturing process has its inputs and outputs. Manufacturers determine the desired output and then determine only the nec-

essary inputs and required steps to achieve the desired output. For each step, the process will include the quality activities and actual production activities within the production step. When done well, it will be seamless to determine which movements are quality activities and which are production activities. And some inspection activities will clearly be quality functions. By building in these quality activities, you will have more manufactured products and better results.

To visualize how critical building in quality can be, imagine a tall building—a high-rise or even a skyscraper. Each level of the building from the foundation to the rooftop must have quality built in and be inspected by the workers and inspectors as required. Failure to build quality in will result in additional costs, unnecessary delays, and potentially dire conse-



BUILD QUALITY IN *continues*

quences. The steps to manufacturing a product also have foundational requirements, and each process builds upon the last.

Even though the number of variables in specific processes will differ, there will always be an order to the steps that makes the most sense. For example, one company may take raw materials, inspect the raw materials, build the product, and then ship the product. Another group tries to take the raw materials, build the product, ship the product, and then inspect the raw materials. In the second scenario, the inspection of raw materials would have to happen at the customer's location long after the fact. Sound like a good idea? Absolutely not. This may seem like it could never happen, but situations similar to this do happen. So check process steps by asking questions and observing, being careful to pay attention to the sequence of steps in manufacturing.

In-Process Inspection

In the sequencing, consider in-process inspection of prior steps by the assembler. Let's say you have a five-step process. When step two includes reviewing critical aspects of step one production, the opportunity to stop incorrect processing and make corrections exists. The operator at step two has authority to stop production, correct process steps, repair defects and keep time and costs from accumulating. Steps three, four, and five no longer have to deal with issues created at step one because they are prevented from reaching the later steps.

Step three reviews step two only and steps four and five review only the prior step. This is an efficient way to build quality into the process. Building it in reduces overall costs and speeds up the delivery to the end customer.

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First article inspections are a form of product inspection. This type of inspection will confirm accuracy of product characteristics and some process accuracy. But processes are fluid and although some controls exist to keep the process stable, there is variability making in-process inspection important to the quality of the end product.

Cost of quality

For every product, there is a cost of quality. And every customer has to pay it. But they have to pay more when quality is inspected by someone other than the line operator. Costs are less when quality is built in to the product and production process.

Some of the other advantages that come from operator reviews include increased teamwork and accountability. As an operator, it is easier for me to respond to quality concerns for work I just completed moments ago than for work I did yesterday or the day before. I can own it and take personal responsibility for immediate correction. There is no need for defensiveness or negativity. I just acknowledge the issue and correct the process immediately.

Additionally, I am grateful to my team for not letting issues go on to the next step. All in all, it is a win-win situation for me, my team and the company.

Final Inspection

Final inspection activities add value and should not be eliminated. Final inspection evaluates the overall look, function and quality of a product. Test results may also be a part of final inspection review. This review along with review of product to customer documentation may also be conducted.

Random final inspection based on prior results is sufficient when in-process inspection is built in to the process. Sampling may be increased when results are unsatisfactory. All final

inspection results are documented as evidence of final inspection.

Often product certifications are provided to the customer with the end product. Any other documentation requested by the customer is also included with the shipped goods.

Metrics

Inspection results are documented at point of inspection whether in-process or final. Further analysis of the results is conducted to ascertain process root issues. These root issues can then be understood and corrected to benefit future production runs and of course the customer.

Making decisions using metrics is one of the most important activities a manufacturer can take on. When the data are collected and not used, the consequences can be tragic and costly.

Benefits

The magnitude of delivering high-quality products with the right cost and at the right

time is significant to manufacturers. By building in quality, conducting in-process inspections, making final inspections, and using metrics, manufacturers assure more consistent results and with fewer frustrations.

A focus on quality benefits manufacturers and customers in many ways, including improved communications and more successful partnerships. They also benefit by future business relationships and referrals. You have undoubtedly heard the adage "Build it and they will come." How about this instead: "Build it right and they will come." **SMT**



Karla Osorno is business development officer for EE Technologies, Inc., an EMS provider delivering complete engineering and manufacturing services with locations in Nevada and Mexico. To read past columns or to contact Osorno, [click here](#).

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