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Asian OEM engineers now agree the idea of their attention to every precise detail is a misperception

“Functional Build” Claims Cost Savings and Greater End-User Satisfaction: Could Your Final Assemblies Benefit?

A Design News component production article discusses how Japanese engineers have embraced the counter-intuitive concept of “functional build” vs. “conventional” (perfect parts) build methodology. Using this concept, many OEMs now make end-product assemblies at lower costs with greater customer satisfaction on product reliability. This important analysis is worth revisiting and is excerpted here. The complete article is available online at designnews.com/ *

Conventional engineering wisdom has stated that the reason for the high quality of many complex products made by Asian OEMs is that their engineers insist on perfect component parts.

Jay Baron, president-researcher at a Michigan-based automotive think tank has spent half a lifetime delving into such matters. He claims the reason for the quality dominance of Japanese automakers, for example, is that they take fewer part measurements and accept more *out of “spec” parts!* This counter-intuitive heresy, he states, has resulted in superior reliability records for Asian vehicles, and has more to do with repeatability than with part perfection.

Perfect Parts ≠ Best End-Product

Incredibly, his studies show that stories of Japanese attention to detail on every component are more folklore than reality. He points out that Japanese engineers do not

insist on making each part to precise tolerances on all dimensions.

They do, however, insist that the final assembly be in spec. By focusing on the quality of the end-product assembly, and not simply on all of the absolute measurement values of its components, they

in fact end up with higher customer product satisfaction levels at lower total costs.

“Functional Build” Changes the Focus

Dubbed “functional build,” Baron’s think tank group says the approach is gaining adherents among North American and European OEMs. Asian adoption, particularly among automotive manufacturers, however, is now commonplace.

In an automotive door study, Japanese manufacturers had the lowest rank for its doors as measured by Cpk quality standards, but had higher customer satisfaction scores. In contrast, North American doors had higher Cpk’s, but lower customer satisfaction scores.

Zeroing In on the Critical

With functional build, holding only the *most* critical tolerances, with close but repeatable tolerances for all the others, is the

The “Functional Build” Approach

Part Process Model

Tight Tolerances: on Key Parts & Points

Close but Consistent Tolerances on All Other Parts, Points



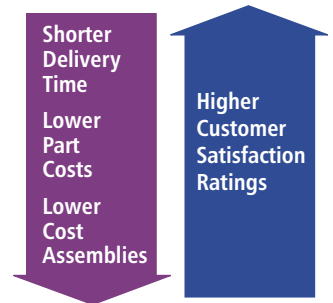
End-Product Results

Shorter Delivery Time

Lower Part Costs

Lower Cost Assemblies

Higher Customer Satisfaction Ratings



Conventional manufacturing calls for each part to strictly pass the so-called Cpk. In “Functional Build,” parts tight on key points, close on all others, are used, with overall assemblies held to tighter tolerances.

key. Baron suggests design engineers employ functional build by changing their thinking in the following two ways:

■ Don’t assume tighter tolerance and more check points will boost quality. Adding unnecessary check points to molds/dies and parts will only drive up costs and just add more time to the process.

■ Be familiar with die making, production and assembly processes for the parts you’re designing. Lack of manufacturing knowledge causes designers to adhere to unrealistic specs. It’s easier—but not necessarily better—to hold the line on all out-of-spec tolerances. Says Baron: If you understand the assembly, then you’ll know how the assembly process affects your costs. ■

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