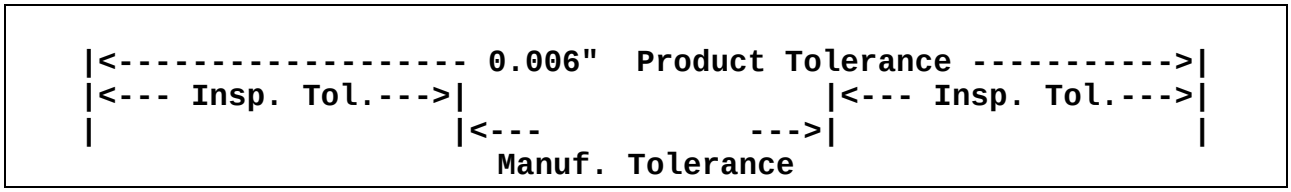
Who Need's Inspection Accuracy

A CMM customers survey rated accuracy as the 7th most important feature of a CMM. Number one was compatibility with CAD computers followed with graphically drawing a picture of the part while inspecting it. While these features are nice they have little real impact on the manufacturing process. The new generation of academia engineers have spent too much time looking into the halo of computer screens and not enough time with the fundamentals and physics of shaping material.

Tool makers use to measure twice and cut once, the golden rule of 10 to 1 was followed. If a process was to manufacture something to a accuracy of A the inspection uncertainty must be less than A/10.

In the past decade the price/performance ratio of inspection equipment has not kept pace with machine tools and manufacturing requirements. The user has been taught that a 3:1 or less ratio is acceptable because that was all he could afford. (The bean counters prevailed)

Suppose you have a final product tolerance of 0.006". Proper practice and Federal Law dictates that you must "GUARD BAND" your inspection data. Inspection readings are the reading +/- the inspection uncertainty. To manufacture a good part, it must now lie within a new manufacturing tolerance zone. If you follow a 3:1 ratio philosophy then the your inspection is capable of 0.002".



This leaves only a 0.002" manufacturing tolerance. All of your product must measure within the 0.002" else you might be accepting bad product and - THE PLANE CRASHES.

If you follow a 10:1 inspection philosophy then the inspection must be capable of 0.0006". The upside is a manufacturing tolerance that has jumped to 0.0048".

If you have ever been in a manufacturing environment cutting steel is a lot more difficult and costly than measuring it. Tightening the manufacturing tolerance has numerous hidden costs, more expensive machine tools, more maintenance, more frequent tool changes, longer machining times, and rejecting a lot of potentially good parts because you could only see them inaccurately.

What is more cost effective? Save on the cost of good inspection or manufacture to a higher tolerance?

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