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UP FRONT

Zero Tolerance

If Greg Hetland has his way, avoidable errors will soon be a thing of the past for manufacturers.

Greg Hetland believes you can teach old dogs new tricks.

His latest subjects are U.S. manufacturers, the majority of whom continue to rely on plus and minus tolerancing, an antiquated method used to communicate an engineer's design intent from the drawings through manufacturing and inspection. Problem is, though, this "language" is fraught with ambiguities, and one engineering drawing can elicit several interpretations. As a result, "about 80 percent of the engineering drawings in existence in the world do not represent design intent," says Hetland, founder and president of the Hopkins-based International Institute of Geometric Dimensioning & Tolerancing (IIGDT). "That's a scary thing."

Scarier yet is that as manufacturing becomes increasingly miniaturized, the need for pinpoint accuracy throughout the process has spiked proportionally. Today's designs for computer hard-disk drives, medical devices, fuel injectors, and other precision devices feature tolerances (that's "wiggle room" to you and me) of 1 micrometer (one millionth of a meter), and smaller.

Without a well-defined language that is readily understood and consistently interpreted by designers, fabricators, and inspectors, "we get parts that are manufactured incorrectly, inspected incorrectly, and at the end of the process, they don't fit," Hetland says. "Thus, we have a tremendous amount of rework all around the world."

And it's costing manufacturers billions, possibly trillions of dollars every year. Hetland estimates that companies routinely lose up to 40 cents on the dollar in operational costs.

He also believes he has a solution to stop the bleeding. Hetland, who holds a Ph.D. in engineering management, has developed what he terms a "simplified approach" to geometric dimensioning and tolerancing (GD&T) training. Simply put, GD&T is a method for precisely defining the geometry of mechanical parts using a set of universal symbols. Hetland has streamlined the existing GD&T "vocabulary" from 14 symbols down to three. "So the engineer, the manufacturing person, and the inspector can now all be singing off the same song sheet," he says.

Hetland's next step is to help manufacturers break their bad habits, whose origins trace back to college and university classrooms. "The foundation of the problem is that, with very few exceptions, engineering curriculums at universities and colleges around the world lack GD&T training at even the most fundamental level," he says, adding that industry compounds the problem when it assumes colleges and universities are serving up GD&T-trained recruits.

Though the average university can't afford to add another course to its existing curriculum, Hetland instead proposes educating the educators so they can integrate precision GD&T language into their existing programs.

On the industry level, Hetland—working under the auspices of IIGDT—offers accelerated courses through public and in-house seminars. He also consults with local businesses to solve specific problems. His goal is to not only help companies reduce costly manufacturing redundancies, but to help enable them to discover entirely new pockets of profitability.

"Look at it this way: If you're still in business, that's a good thing. If you're making money, that's even better," he says. "But the tremendous part of this is that there's a solution that will allow you to make more of a return on your investment than ever before. You can generate an unprecedented amount of value, and you can do it with your existing employees and resources."

—Andrew Bacskai