

# Motorola closing in on zero defects

Gannett News Service

A handful of U.S. companies are closing in on an unimaginable goal: Making products that have almost zero defects.

Motorola is now making several complicated products, including pagers and cellular telephones, that are 99.99986 percent defect-free. They contain less than 3.4 defects per million parts produced.

In statistical terms, that's known as the "six sigma" level of quality, and extremely few firms — including Japanese companies — are even close.

An amazing feat, true. But Motorola isn't stopping. Its new target, to be reached within six years, is 3.4 defects per billion parts. "A lot of people say this is an insane level of improvement," said Mikel Harry, director of Motorola's Six Sigma Research Institute.

Others hitting top quality standards:

■ Eastman Kodak, the color film giant, has surpassed six-sigma level quality in a couple of key product lines. Kodacolor film contains less than 1 defect per million parts produced.

■ Catalog company L.L. Bean last spring shipped 500,000 packages without an error. But L.L. Bean's error-free rate — 99.92 percent — still lags its manufacturing counterparts.

The typical U.S. product or service contains about 6,210 defects per million parts, or errors per million transactions. The IRS's tax advice telephone hotline has 140,000 errors per 1 million calls.

Why should companies aim so high?

**'A lot of people say this is an insane level of improvement.'**

— Motorola's Mikel Harry

■ It saves money. Since 1987, Motorola's quality improvement crusade has saved the company nearly \$2.4 billion. That money would have been spent on factory rework, warranty repairs and inventory. Said Harry: "We're laughing all the way to the bank."

■ Products are getting too complicated. Today's state-of-the-art computer memory chip contains 16 million microscopic transistors. Within 10 years, a chip will contain 1 billion devices. At that point, a single defect on a chip with a billion parts would ruin it.

In the same vein, Kodak said a 35mm film negative is made up of an almost infinite number of photographic elements.

Eliminating every possible defect is a goal at Kodak as well as Japanese filmmakers Fuji and Konishiroku, maker of Konica film.

With Motorola's help, several firms are striding toward similar improvements: IBM and Texas Instruments' Defense Systems and Electronics Group plan to achieve six-sigma quality throughout their product lines by 1994; Digital Equipment, six sigma by 1995.

"Several years ago, we didn't like to share anything," said Mike Cooney, quality chief at TI's defense/electronics arm. "But if we share, we're all going to get better faster."

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