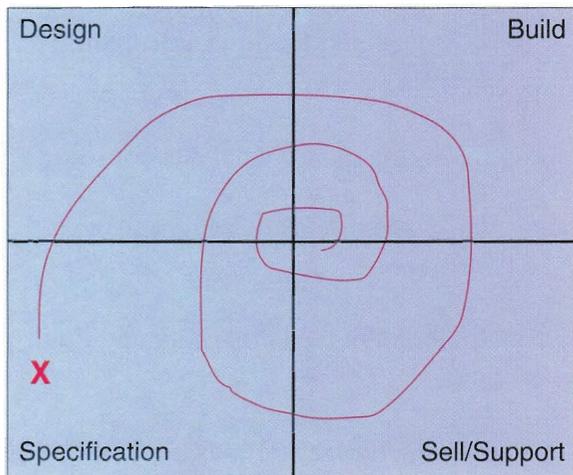


PERFECTING THE PROCESS

by **Kimberly LaPat** Assistant Editor

Since the ultimate success of a manufacturer depends largely on the quality of its products, it stands to reason that continually and consistently improving the *process* by which those products are created is a virtual must.

With the roots of concurrent engineering already in place, Xycom, Inc., an industrial computer manufacturer, solicited the expertise of Munro & Associates, Inc., a leader in concurrent engineering implementation, to help in the growth of a dynamic product development process.



The Spiral Development Model.

Prior to bringing in Munro, Xycom followed an approach based on the Spiral Development process, a four-phase mechanism for constantly increasing the value to the customer through continuous improvement of both the product and the process.

A model of the process, shown above, illustrates how the four parts—specification, design, build, and sell/support—are viewed as an on-going process by which the final product meets the customer's needs as closely as possible. However, the center point of the diagram, representing the perfect meeting of customer needs, is never actually reached in the Spiral Development process. Perpetually evolving technologies and ever-changing customer demands keep the process infinitely looping around the four phases of development.

For Xycom, implementing the Spiral Development process was a significant first step. "However," explains Dan McCarthy, vice president, Munro & Associates, Inc., "the company realized it could not tell the development team to continuously improve the product without providing the tools to help them achieve that goal."

To help provide those needed tools, Munro & Associates was brought in. Through the management support of Xycom's Vice President of Research and Development, Andy McMillan, Munro guided the adoption of a Design for Manufacturability (DFM) process, taught Design for Assembly (DFA) principles, and facilitated initial DFA/DFM workshops.

Working It Out

The first DFA/DFM workshop implemented was, without question, a runaway

success. "However, like many companies," Mr. McMillan of Xycom admits, "we had to deal with designers who felt we *didn't have time* to do DFA/DFM analysis. We also had to overcome the perception that DFA/DFM is just common sense and doesn't require any training. Where we met resistance, we were able to work through it with a *let's-try-it-and-see* approach. After trying it, most resistors were able to clearly see the value of the new process."

As a result of the first workshop, three design engineering sub-teams generated 93 low-risk concepts, 97 medium-risk suggestions, and 53 stretch ideas pertaining to the production of Xycom's 9475/9485/9486 family of industrial PCs. Due to time constraints, concentration was on the low-risk ideas, a number of which were incorporated into the design of the PCs.

One idea, replacing the screws used to secure the product's slide rails with snap-type PEMS, reduced the number of parts from 20 to 12 and eliminated alignment problems. The same concept, replacing screws with snaps, also eliminated parts and created easier alignment when utilized on the product's board mounting.

According to Xycom's Mr. McMillan, "Complete implementation of the low-risk ideas eventually produced reductions in parts, operations, time, and labor cost between 27 and 34 percent from the original design."

Practice Makes Perfect

To address future product designs, additional team members set up a pilot project—designing a new battery holder—something which could be rolled into the PCs later as a running change. Application of the project allowed



Reductions in parts, operations, time, and labor costs were realized for Xycom Inc.'s 9475/9485/9486 family of industrial PCs as a result of the first DFA/DFM workshop.

designers to continually improve the product development process, while still developing the actual products. In other words, the *process* didn't cease when production began.

"The original design of the battery holder consisted of four parts," says Xycom's Mr. McMillan. "Through teamwork, guidance from Munro & Associates, and the empowerment of engineers, the team created a one-part battery holder."

The results of the new design were astounding. Reductions in parts, operations, time, and cost were between 75 and 88 percent. Cost alone was reduced 88 percent, from \$3.45/unit to \$0.43/unit.

"While the team dramatically improved the assembly's cost, it also accomplished the longer-term objective of enhancing Xycom's product development process," observed Mr. McCarthy of Munro & Associates.

Emphasis on Process

Utilizing the DFA/DFM principles taught by Munro & Associates, Xycom's 3100 industrial workstation family was recently developed with exceptional improvements over the product it replaced.

The workstation's parts count was drastically reduced with the new design. The original product was manufactured with a total parts count of 160, while the new 3100 workstation consists of only 57, for a dramatic savings of 103 parts.



By applying the DFA/DFM principles taught by Munro and Associates, parts counts and production time of Xycom's 3100 industrial workstation family was greatly decreased.

In addition, assembly time of the new product was substantially decreased from that of its predecessor. Assembly of the earlier product was achieved in 51 min. However, after implementing the new design, assembly time was reduced to 18 min, yielding an impressive 33-min reduction.

Says Xycom's Mr. McMillan, "These improvements not only reduce costs, but they dramatically improve process capability and product quality. As a result, we can better serve our customers and help them be more successful in their businesses."

Xycom's commitment to continually improving its development process has allowed it to go beyond the initial steps of concurrent engineering. The company has incorporated DFA/DFM principles into its design process, and has significantly enhanced its ability to provide its customers with market-leading value in its products. **A**

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- ✓ Strategic product planning assistance for executives
- ✓ Executive and engineering management paradigm presentations
- ✓ Facilitation of hands-on DFA/DFM workshops and training
- ✓ Long-term implementation assistance for DFA/DFM principles
- ✓ Design for Serviceability/Recycling assistance and Design for Reliability services
- ✓ Six Sigma quality analysis/consulting
- ✓ Value-analysis/Value-engineering evaluation
- ✓ Competitive benchmarking and Pugh analysis
- ✓ Manufacturing methods, assembly ergonomics and plant layout evaluation
- ✓ Production line balancing consulting
- ✓ Product design and re-design services
- ✓ On-going support for corporate DFA/DFM programs

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