

One machine shop's strategy for achieving zero-defect production relies on making all shop floor staff responsible for quality.

# Power to the People

► BY KIP HANSON

All around the manufacturing world, executives increasingly realize they have a traditionally untapped source of expertise and innovation right under their very noses. Plant-floor workers, with their intimate familiarity with their processes and products, are contributing in areas once believed too far afield of their workstations. Quality improvements and productivity gains, large and small, result.

Machine shops, of course, can benefit, too, by driving ownership and decision-making down to the shop floor. MKT Innovations, Brea, Calif., is a superb example of what a job shop can accomplish when ideas and accountability are everyone's responsibility.

MKT Innovations is a high-tech contract manufacturer that specializes in machining aerospace and medical parts. It is committed to delivering zero-defect products on time in an increasingly competitive market. Its customer acceptance rate is greater than 99.5 percent. How MKT goes about this will surprise many, because many of its techniques fly in the face of more "traditional" job shop methods.

## Eyes of the Beholders

One of the first things you notice upon entering the shop, which is located about an hour east of Los Angeles, is a large, well-equipped quality-control area. Any shop that makes complex aerospace and medical parts needs a solid inspection department. However, the room was empty. Inspector's day off, perhaps? Not so.

MKT Innovations has no QC people—at least not in title. Machinists check their own parts. In a bit of a bow to tradition, one machinist might get another to double-check his work, but that's the extent of the inspection "process," with no "final inspection" and no machine downtime waiting for QC to check first articles.

*CTE staff members contributed to this report.*



Photos: K. Hanson

Aerospace parts, such as these for an aircraft refueling system, are among the specialized components machined by MKT Innovations. Given the machine shop's quality is controlled across the shop floor—not at one final-inspection station—review areas (inset) with technical drawings and measurement tools can pop up anywhere.

David Blauvelt, who served as the company's operations manager before recently departing the firm, said that by extracting the essence of Six Sigma, Kaizen and lean manufacturing and applying a little common sense, MKT believes it has invented a "leaner" lean. The company's rejection level is extremely low—much lower than many other shops with full-blown QC departments. At MKT, the manufacturing process itself controls quality.

"Our machinists must take full responsibility for every feature of the workpiece," said Mike Kenney, president.

However, he admitted this is no cinch to accomplish.

"This requires much more overall knowledge of the customer's expectations," he explained. "Our machinists are much more involved in direct communication with our customers' quality and engineering personnel."

Talk about stepping out of one's customary role.

"For some, it isn't easy to address the customer," Kenney added. "They must become better communicators and assume the role of diplomat and negotiator."

Not one to charge employees with a task without providing the appropriate support, Kenney insists that machinists receive training to improve their communication skills. That entails an investment of time, as do visits to customers' facilities with sample parts for evaluation.

Kenney steadfastly stands behind the effort. "These investments have proven overwhelmingly worthwhile."

## Outside the Convention

Wherever possible, MKT sets up projects in which numerous operations are carried out on one machine. Multi-pallet machining centers and live-tooling CNC lathes allow the shop to do what less-equipped shops can't—complete most of its machined products in one cycle.

For example, MKT's Chiron FZ 12W machining centers allow machinists to perform four processes per cycle. Mori Seiki live-tooling CNC lathes eliminate secondary milling and drilling operations.

In addition to reduced cycle time, this technique eliminates additional parts

handling. When a part comes off the machine, it's complete. The result is that quality issues and dimensional problems that might arise during subsequent operations are a thing of the past. It also eliminates any finger pointing between operators and departments.

"We know that if we can get a finished part in one machining cycle, our risks are lower," Kenney said. "If we must feed parts through multiple operations, our work-in-process value is much greater, and if mistakes are made in subsequent operations, the financial impact is also greater. So, the shorter our throughput time is from raw material to finished item, the lower the risk and the greater our ability to offer the customer a more attractive price."

To leverage this technology, MKT pursues repeat work. This has the effect of amortizing setup time, which is by necessity longer (i.e., there are more operations to set up).

Surprisingly, however, MKT does not do what most other shops might when faced with long setup times: produce more parts than ordered and inventory them in hopes of a future order. In fact, the opposite is true; MKT pursues small-lot work, with it reaching its most competitive performance in batch runs of 500 to 5,000.

As a result, not only do MKT's single-cycle setups take longer, they happen more often. To assist with this, the company invested heavily in quick-change tooling. And common tooling is employed for jobs wherever possible, with programmers keeping the same tool in the same tool station from machine to machine. Standard tool lengths are utilized, reducing tool touch-offs.

One glance at MKT's tool crib illustrates that the company believes in the axiom "A place for everything, and everything in its place." It's well stocked, and bins of kitted tooling line the walls, ready for the next setup. To



"We tend to profit best from difficult-to-produce items, which require constant monitoring by skilled personnel," said Mike Kenney, MKT president. While the company is always looking for ways to automate, Kenney stated he and others never forget that "manpower is our most precious resource."

top it off, there's no toolcrib attendant. While many shops would be inclined to assign a "policeman" to watch over its tooling investment, MKT trusts its machinists to treat the company's tooling, equipment and, especially, parts as they would their own.

This ties into MKT's philosophy that its biggest asset is its people. "Nothing happens without the machinists," Blauvelt said.

To this end, machinists at MKT participate in management-level decisions. From estimating and engineering to the hiring and firing of co-workers, machinists at MKT are involved. If there's a slowdown, it's the machinists who make the hard choice to either cut everyone back to 20 hours a week or lay off friends and relatives.

"They understand money," Blauvelt stated. "Quote a job too high, and they'll lose orders. Quote it too low, and they'll lose money."

As a result, MKT offers its employees bonuses for making sales goals, and subtracts from those bonuses for defects and late deliveries. The firm's management finds the latter is rarely necessary.

MKT machinists are also responsible for ordering their own materials and supplies. Blauvelt sensed this writer's skepticism. "If a person is capable of buying a house, paying bills and raising kids, he ought to be able to buy a package of sandpaper or a piece of alu-

minimum without someone looking over his shoulder.”

All of these factors contribute to MKT machinists taking pride in their work—and, even more, pride in the success of their company.

Kenney recounted how shop personnel facilitated the company’s ability to diversify its client base.

“This year, our sales group qualified a new prospective customer that met our ideal profile for expansion and diversity,” he said. “However, when this prospect called with its first opportunity, it required small lots of 10 items within a 2-week time frame. We were already booked out for 6 to 8 weeks with good repeat business from customers that were exceeding our diversity objectives.

“Our shop personnel recognized the value in performing for the new prospect, and, through creative means, found ways to accommodate its sched-

ule requirement. This resulted in a very positive impression. Sales can now visit with a feather in its cap and negotiate harder for the contracts we are after.”

In another instance of going beyond traditional shop-floor boundaries, MKT’s finishing department supervisor took it upon himself to analyze the root cause of a customer’s recurring reject problem. While MKT provided primary machining for a part with flat surfaces, the client finish-lapped it. However, some microscopic chips and burrs were fouling the customer’s lapped finishes.

“Our supervisor met with the customer’s lapping personnel, figured out what was causing the problem and then called a meeting with all parties to reach agreement on the new acceptance criteria,” Kenney said.

### **The Beat Goes On**

The price paid for having a customer acceptance rate greater than 99.5 per-

cent is some inefficient and costly production processes. The job shop is preparing to invest in new equipment to address this—in particular, inspection automation.

“We have installed a new CNC CMM and are now working to have programs prepared in advance of production to save time during first-article inspection. This efficiency improvement will go directly to our bottom line,” Kenney said.

The company’s trust in its machinists and their commitment to their work also goes straight to the bottom line, because satisfying—in fact, delighting—aerospace and medical industry customers allows MKT’s business to take flight and stay healthy.

### **About the Author**

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