



## Breaking the mold

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### **Triangle Tool, an injection mold company, finds a solid niche in the larger end of the market, Gary Toushek discovers**

Triangle Tool Corporation of Milwaukee, WI, has made its reputation by designing and building very large plastic injection molds and by offering outstanding, conscientious service to its customers—not just after the sale but throughout the process, beginning with initial sales contact. Designers, engineers, and technical sales staff work closely with the customer every step of the way, from the preliminary design onward, to ensure that the final product meets (and usually exceeds) expectations.

Triangle was established in 1963, and Roy Luther joined the company three years later as a partner. In 1982 he bought out the founding partner, and with a vision for large-size programs, he began modernizing the facility with new technology such as larger CNC boring mills and large CNC four- and five-axis machining centers. In 1987 Luther moved Triangle to a new larger building on 18 acres. Since then it's expanded several times to the current 155,000 square feet, with plenty of room to grow.

In 1993 an opportunity arose to acquire A-1 Tool Corporation in Chicago. After the purchase, Luther brought A-1's employees to Milwaukee for a close-up look at a modern mold-making plant to show them how he would upgrade A-1 and to open their eyes to future possibilities. Today, with new technology and equipment, the two companies are operated as parallel organizations, each with its own sales staff and customers; both build medium to large molds, with Triangle's capabilities going to the very large sizes. A-1 Tool is run by Roy's son Geoff and has recently completed its ISO certification.

With today's injection molding presses ranging from Micro to 9,000 tons, Triangle's manufacturing focus is on the medium to very large molds, including multi-action complex injection molds, modular stack frames, structural foam molds, co-injection, gas-assisted injection, multi-shot, compression, blow, and die-cast molds.

These tools produce pallets and returnable packing, industrial containers, battery containers, agricultural equipment parts, large residential appliance and storage products, garbage carts and wastebaskets, as well as plastic products for the home-building, recreational, lawn and garden, irrigation, and plumbing markets. Triangle's geographic markets go beyond the US to Canada, Mexico, and Venezuela.

In describing the company's emphasis on customer service, technical sales manager Vic Baez explains that both Triangle and A-1 have sales personnel that have been involved "with great depth" in the plastic injection mold industry. "Some of us have tool-making or engineering backgrounds, others have design backgrounds, and we've brought our technical skill and engineering expertise to the sales front," he says. "Our engineering manager and his team work with customers and review designs to make sure they're properly suitable to be a molded product."

Interaction between Triangle's CAD systems and a customer's part geometry results in a product that meets the criteria for an injection molded process while optimizing cycle times and the tool design. The engineering team also develops tool designs that the shop floor needs—whether it's programming a design and cutter path for machining or full-scale tool drawings and design for the toolmakers to do the final fitting—all linked by state-of-the-industry software and CNC manufacturing systems. Everyone has access to the data, so there's no gap in the system. On the shop floor the focus is on large CNC machining centers and high-speed five-axis machines. "The faster we remove steel, the less time the tool is on the machine, the less time it has to be handled, and the more cost-effective we are in producing the tools," says Baez. "That's why we've concentrated on new technology and are constantly updating our equipment."

Triangle's custom mold building process doesn't really lend itself to typical lean manufacturing processes, but the company does use lean for supply chain management, including meticulous multi-shift scheduling, ordering, stocking and tracking materials, and managing components to manufacture the mold.

Technical salesman Walt Grannen explains that a major component of what distinguishes Triangle from its competitors is that once a mold is built and assembled, it's sampled on-site to make sure everything is "formed, fit, and functioning properly." Most competitors ship molds to outside sampling services or the customer's site and do their testing there. "Since our lead times are under control, the sampling is scheduled as part of our service. This allows the sample parts to be used for the customer's advanced function testing or market introduction." The molds are shipped production-ready for seamless installation into a customer's manufacturing process. If any issues develop after that, Triangle's plane can bring customers in or fly engineers out immediately.

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