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SHOP solutions

Cast Polymer is Solid Foundation

When New Vista Corp., a Baltimore-based custom machine builder, originally proposed a high-production automated groove and trim machine for producing large (11/2 - 4", or 38 - 102-mm) pipe fittings, there was a lot riding on the outcome. If company management at one of the world's largest producers of mechanical pipe joining products could not justify the project, the casting and machining for this product line would be transferred offshore.

New Vista got the job, three machines to be supplied over a 21/2-year interval. As a custom machine builder, the company must evaluate the feasibility of different designs and materials in every area of each machine it builds, to make sure that its design best serves the application. One issue: what type of machine base to use?

Up to this point, New Vista had used cast iron or welded steel bases in all of its designs--standard approaches that yielded satisfactory results. But engineers were intrigued by the possibility of utilizing a cast polymer composite base for this application. "We knew the benefits of it, and this application seemed a perfect opportunity to test the waters," says VP of Engineering Jim Brun.

In the US, there are two primary sources for custom polymer castings, both in northeast Ohio: ITW Polymer Castings (Chardon) and Anocast (Chagrin Falls), a division of Rockwell Automation. New Vista contacted both companies and selected ITW.

As-cast polymer composite base for high-production automated groove and trim machine (left), and finished machine being rigged for shipping.

ITW recommended use of a wood mold, and influenced the direction of New Vista's design. Since cast composite is not as stiff as cast iron, much thicker cross sections are employed. But, unlike cast iron, varying thickness won't cause internal stresses. New Vista used a 64 X 61 X 26" (1.6 X 1.5 X 0.7-m) block with six foam cores, cross sections of no less than 8" (204 mm), cutouts for forklift tines, and adjustable mounting feet. Featuring about the same density as aluminum, the

base weighed in at 6500 lb (2925 kg). "We wanted the base to stay heavy to try to capture as much vibration damping ability as possible," Brun explains.

Total cost of the first composite base was $13,500, including $4500 for a wooden mold, $1600 for finish grinding the top surface flat to 0.0025" (0.064 mm), and $500 for secondary machining.

New Vista had estimated cost of a traditional base at $10,000. Was the polymer base worth the additional $3500? New Vista engineers believe the cost was justified in terms of vibration damping ability, which is five to 15 times greater than cast iron and results in better part surface finish, longer tool life, and decreased noise levels.

Although part surface finish is not a critical objective for the customer, tool life is important. Six tool slides employ $220 worth of tooling inserts to perform a number of operations on the fittings, including trimming the end gate, machining grooves, turning "collars," and applying inside and outside chamfers. With one ferrous fitting being finished every 11 sec on a three-shift basis, even a 10% increase in tool life is significant.