

45-Piece Conversion to Single Casting Doubles Service Life

Valley Fabrication builds a variety of agricultural harvesters that operate in conditions where muddy soil, rough terrain and vegetable debris make abrasion-resistant material important. Unfortunately, the fabricated drive wheels on the company's 30,000-lb. drive train equipment were wearing out too quickly, so the company sought out a metalcaster to improve the part life and reduce cost.

Craft Pattern & Mold, Maple Plain, Minn., had worked with Valley Fabrication before on other agricultural equipment parts. The pattern and prototyping shop suggested replacing the mild steel used in the original fabrication with austempered ductile iron (ADI), which is a more abrasion-resistant material.

"I didn't have much experience with ADI," said Peter Degroot, Valley Fabrication's engineer on the project. "But there has been a considerable difference in the wear of the wheels—a factor of two or maybe more in length of service."

At first, Craft Pattern cast the outer portion of the wheel, where



Valley Fabrication uses the cast drive wheels on harvesting equipment for spinach, leafy romaine lettuce and celery.

the wear-resistance was needed, and bolted that onto a welded center sprocket. After the new design was in production for a year, Valley Fabrication returned to Craft Pattern to produce the entire wheel as a casting in order to reduce the cost.

With the directive to drive down the

price, the metalcaster worked to streamline its nobake sand casting process.

"Normally, we would gate on the outside," said Tony Cremers, president of Craft Pattern. "For this part we gated on the center hub and fed through a thinner section. This reduced the amount of sand we needed on the outside, making the cost of the casting more affordable."

Originally, the outside diameter of the wheel was machined, but Craft Pattern was able to achieve tight enough tolerances via casting to eliminate that step. Finishing processes were reserved for machining the center hub and drilling in bolt holes.

"With each design step, we were able to eliminate some type of cost," Cremers said.

The final single-piece casting design for the drive wheel—converted from a 45-piece weldment—yielded a net savings of 30%.

"To our end-user, there's a double savings," Degroot pointed out. "For a slight savings in price, he gets twice the life."

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The 280-lb. cast drive wheels serve as the main drive component for a track-driven produce harvesting machine.