ANDERSON MACHINING SERVICE AND WALTER TEAM UP TO IMPROVE ON SUCCESS

"IF IT AIN'T BROKE DON'T FIX IT" GOES THE OLD SAYING, BUT WALTER'S INNOVATIVE NEW DC170 DRILL ENABLED ANDERSON MACHINING SERVICE TO DRAMATICALLY IMPROVE UPON AN ALREADY SUCCESSFUL APPLICATION.

BACKGROUND

Some people say manufacturing is a lot like pro sports. That's because the competition is fierce, and no matter how good you are, if you're not improving then you are falling behind. That's a lesson not lost on Anderson Machining Service, Inc., www.amscnc.com, headquartered in Jefferson, Wisconsin. Anderson has a lot to be proud of. Starting in 1980 as a "mom and pop" shop with one drill press at the back of the house, it has grown to a Six Sigma company with two facilities, 150 employees, and a client list that includes Harley-Davidson, HydraForce, and other major industrial OEMs and Tier I suppliers.

CHALLENGE:

- Need for continuous improvement by identifying better drilling methods for cross hole intersection manifold machining
- Ability to eliminate the need to generate special code to manipulate transitional areas where holes intersect

SOLUTION:

Walter DC170 solid carbide drill

- Sturdier drill to handle stresses when cutting intersecting holes
- Revolutionary land design that allows for managing interruptions without having to slow down

RESULTS:

- Increased drill speed from 300 to 400 sfm
- Improved cycle time by 30-40%
- Achieved excellent surface finish decreasing need for rework
- Reduced tool inventory by replacing two drills with one

The new Walter DC170 drill in operation at Anderson Machining Service drilling one of the many holes in a manifold.

"Our specialty is precision machining of close tolerance, high feature content parts, delivered correct and on time," says Erik Anderson. He began with his parent's firm as a young man back in 1982. Today he is Anderson's Operations Manager and you'll often find him on the shop floor sharing his accumulated manufacturing knowledge, listening to concerns, and upholding his family's legacy for precision and quality with each and every part that leaves the factory. That's the kind of attitude and approach that enabled Anderson Machining Service to win the 2013 Harley-Davidson operational excellence award as a best performing supplier in their supply chain.

"We believe in empowering well trained and motivated people with the best possible technology."

"We believe in empowering well trained and motivated people with the best possible technology," states Anderson, "and we stress that no matter how many times you've machined a part, you never stop looking for a better way to do it."

That's more than just a slogan, as was illustrated recently when Anderson Machining Service took a new approach to the manifold drilling that it does for one of its key customers, HydraForce. Located in Lincolnshire, Ill., HydraForce is a leading supplier of manifolds and other hydraulic products for heavy equipment.

An example of one of the many deep-hole drilling applications performed at Anderson using the Walter DC170 drill.

"The purpose of a manifold is to direct oil components in a hydraulic system, so it stands to reason that this job entails the drilling of a lot of intersecting holes," says Anderson. That's an understatement. Anderson Machining Service drills over 100 different manifolds for HydraForce. The primary part material is Dura-Bar 65-45-12, a continuous cast ferritic ductile iron, and the number of intersecting holes ranges from 25 to 30 in some of the smaller manifolds to 300 in many of the large ones.

These jobs were highly time consuming. Drill speed of 300 surface feet per minute (sfm) had to be reduced by 50% each time the drill encountered an interruption – that is, each time it exited one part of an intersecting hole and prepared to engage the other. "When you are doing 300 of these cross hole intersections per part, which is often the case, that's a lot of cycle time," Anderson recounts. It was also a time-intensive job for Anderson Machining Service's programmers, for in order to generate machining code they would have to customize, or "manipulate," the transitional areas of the tool path where holes intersected.

"The reason we needed to slow down with each interruption was to protect the drill from possible failure," Anderson continues. "Plus, not all intersecting holes are on center, and this makes things even more difficult for the drills. For instance, when a half-inch hole intersects with a one-inch hole, it may be as much as 30% off centerline. In a case like this the drill will start to dig on the corner of the intersecting one-inch hole. This causes excessive tool wear and, in the worst case scenario, catastrophic tool failure.

"Given the profit margins involved," he adds, "if you break a drill then you negatively impact your profit on that particular job…sometimes for a long time to come."

SOLUTION

Tooling specialists from Walter (Waukesha, WI) www.walter-tools.com/us approached Anderson Machining Service claiming they had a better way to drill these manifolds. "Anderson is a very progressive company, continually looking for ways to improve and Walter brings a high level of technical skill to machining, so we were confident they would consider a new approach to manifold machining," says Andy Wedesky, a Walter field sales engineer and leader of the team. That approach is embodied in the Walter DC170 solid carbide drill.

"Two drills, a 12xD and a 16xD, were formerly used. Now, one DC170 does the work of both."

Walter is focused on increasing customer productivity by offering solutions to improve machining processes. The new Walter DC170 is a good example of that focus. It is an internally cooled drill with a

Anderson Machining Service's Whitewater, WI plant features the latest in CNC machining technology.

Process Engineers Noel Dubey (left) and Kurt Harders develop workflow and generate machining codes for Anderson.

copper-colored DPP coating that aids performance and helps with regrinding. It also features an innovative land design that orients the margins radially. Thanks to the lands' shallow cooling grooves at the drill end, coolant flow encompasses the entire drill point, producing optimal cooling of both the drill and the workpiece interface. This is particularly important given the high temperatures generated during drilling. The polished flute design also inhibits chip packing and facilitates chip breaking.

"The new drill runs faster, runs harder, lasts longer, and significantly decreases our cycle time. It's a home run."

Innovative design, excellent results

The new design also contains more material behind the cutting edge, making the drill sturdier than conventional designs, thus boosting both tool life and process reliability. Wedesky felt this feature would be especially helpful for Anderson Machining Service, given the stresses that drills can be subjected to when cutting intersecting holes. Additionally, the innovative alignment of the new land design results in significantly smoother drill operation, reducing vibration to a minimum. This not only enhances hole quality, but the superior "guidance" that this provides is particularly important during deep-hole drilling where cross holes and inclined exits are involved.

"We ran some parts for them and they were impressed," recounts Wedesky. "The new land design with the additional thickness allows the DC170 to take a little more side pressure and still keep going straight, plowing through off center interruptions without having to slow down."

"It did surprisingly well in this application," says Anderson. "It's a very exceptional drill." After IMTS Anderson Machining Service began converting to the DC170, phasing it in to all areas of production.

RESULTS

The results so far have confirmed initial expectations. As previously noted, drill speed for this application had been 300 sfm, reduced by 50% each time the drill encountered one of the many interruptions; now Anderson Machining Service is running at 400 sfm, with no decrease in speed for cross hole interruptions. This has resulted in a 30-40% improvement in cycle times, aided by the fact that two drills, a 12xD and a 16xD, were formerly used. Now, one DC170 does the work of both, eliminating a tool change and reducing tool inventory. Additionally, the new design's superior ability to control the coolant flow contributes to an excellent surface finish that decreases the need to rework holes after drilling.

Programming time, too, has benefited, as programmers no longer need to customize or manipulate the hundreds of cross hole interruptions.

Tool life has also increased with the new drill. And when the tool needs regrinding, the DC170's eight visible cooling grooves can be used as a scale for regrinding. The drills can be reconditioned up to three times, until only two cooling grooves are left remaining.

"When the Walter reconditioning service regrinds and recoats the drill you're assured new tool life and performance," says Wedesky. "Often, with a lot of reconditioning, this doesn't happen, and users get half the performance and a decreased tool life." He adds that the level of reconditioning Walter provides lowers users' tooling costs.

Summarizing the DC170's prime benefits, Anderson says "The new drill runs faster, runs harder, lasts longer, and significantly decreases our cycle time. It's a home run."

Outcomes documented in this case study are specific to Anderson Machining Service, Inc. use of Walter tools in conjunction with other manufacturer's products. Specific results may vary for other customers.

John Gwinn (left), Plant Manager and Erik Anderson, Operations Manager, Anderson Machining Service by one of their many high speed machining centers.

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