



Milling

How Kennametal's Newest Tools Tag-Team to Energize Aerospace Customers

James Langford | Jun 21, 2022

Using the most basic measure of productivity—what Kennametal engineer Danny Davis calls “counting the cubes,” or cubic inches of metal removed—the toolmaker’s new FBX drills, Harvi Ultra 8X indexable helical end mills and Harvi III solid carbide helical end mills each far outperform the older models they replaced.

The aerospace customers who use them to craft airplane parts from landing gear struts to jet turbine blades and flap tracks would have expected no less.

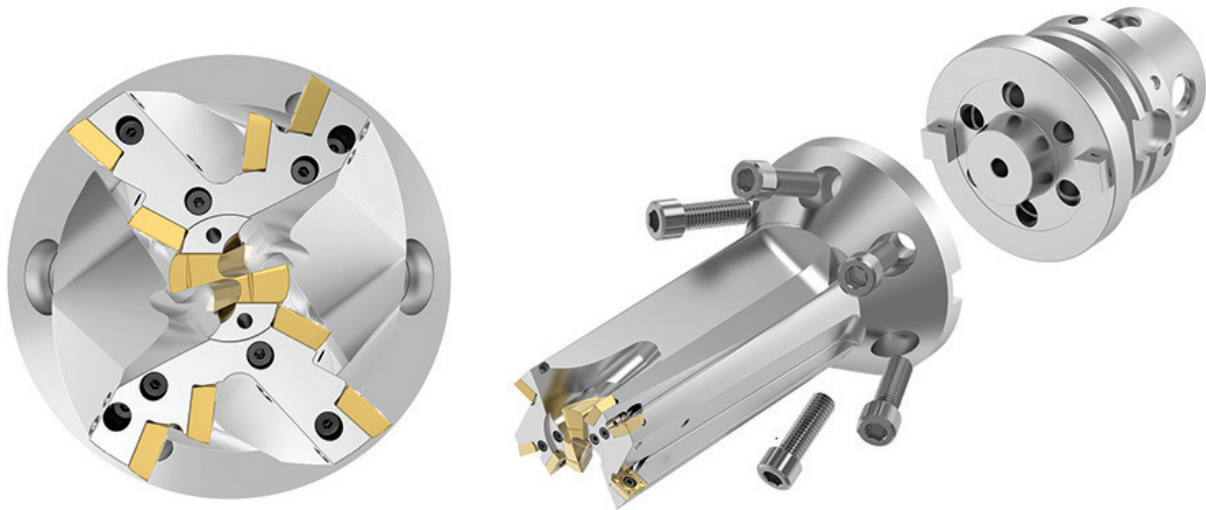
Together, however, the package of tools delivers even more of a marketplace punch, offering machine shops the flexibility to increase productivity, trim cycle time and lengthen tool life even if they’re contending with the restrictions of older or less powerful equipment or tight workspaces.

In essence, it’s the advantage that comes from sending a tag team, rather than a lone wrestler, into an arena or fielding a platoon of soldiers rather than a single scout.

“We like the idea of marketing this as a family of tools that you’d use together because all three have advantages in what they can do,” says Danny Davis, a Kennametal senior staff engineer based in Asheboro, North Carolina.

Overlapping Capabilities & Chain Drilling

The FBX drill, which has two effective cutting edges on the outside as well as a center insert with two effective cutting edges, can penetrate metal workpieces twice as fast as its predecessor, explains Mark Francis, a Kennametal staff engineer for aerospace and defense in Charleston, South Carolina. That makes it ideal for roughing out pockets in a metal workpiece using a process known as chain drilling, in which shapes are formed using a series of overlapping holes that leaves scalloped edges along the perimeter, they say.

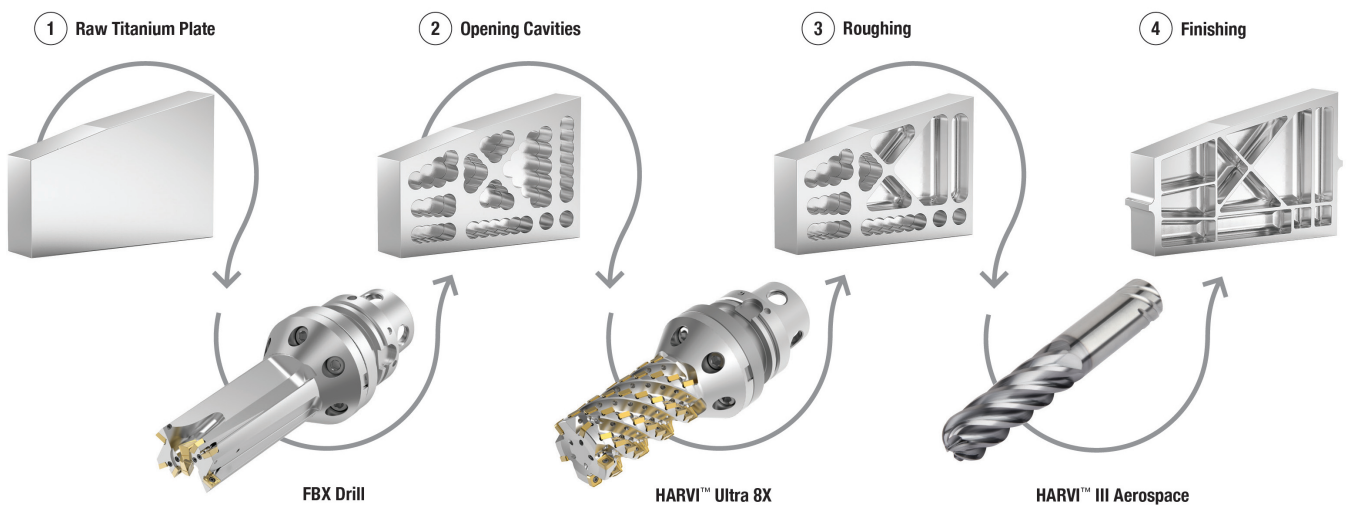


FBX drill | Courtesy of Kennametal

Metalworkers can then turn to the Harvi Ultra 8X indexable mill for smoothing out the scallops and semi-finishing, then use the Harvi III solid carbide end mill to finish the workpiece’s floors and walls.

While the tools have overlapping capabilities—both the Harvi Ultra 8X and the FBX could be used for roughing out a workpiece—combining them plays to their strengths in a way that can prolong tool life and optimize productivity.

Combined Strength



Using Kennametal's newest cutting tools together can alleviate pain points for aerospace suppliers. | Courtesy of Kennametal

Using an FBX drill in the process will negate the axial forces associated with typical pocket-roughing scenarios that can cause chatter and vibration, wearing out a tool faster and lowering workpiece quality.

That makes the tool ideal when shops need to use less-rigid spindle connections on large aerospace structures, Francis says.

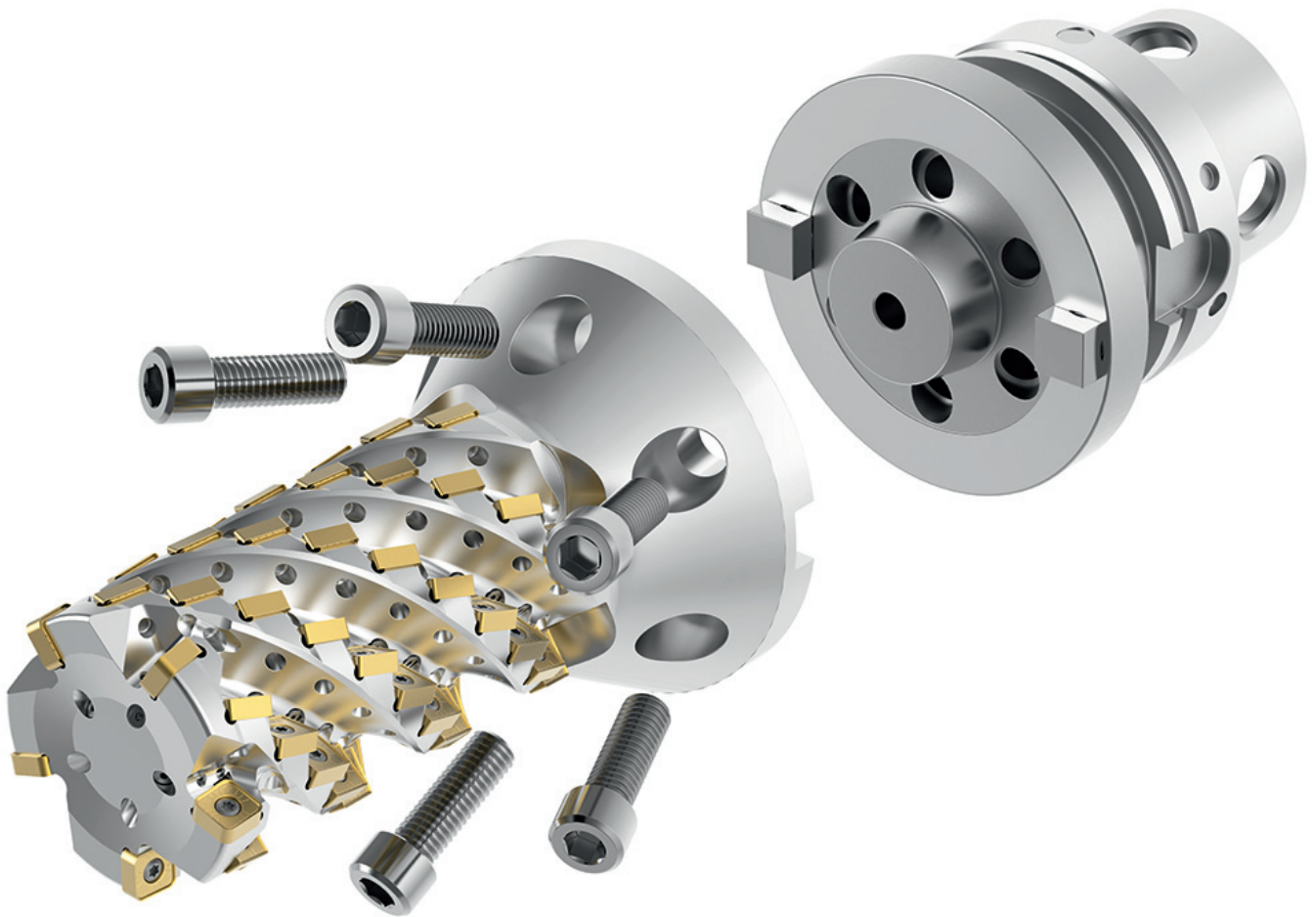
Cutting at an axial depth of 6 inches, for example, creates high tangential forces and bending moment.

“You start having either chatter or vibration,” which can lead to flaws such as a tapered wall, he

explains. "If you have the FBX drill, you can remove the bulk of that material without having the tangential forces or the bending-moment issues, then come back in with the Harvi Ultra 8X for what's still a roughing operation, but the scallops require less radial engagement, so the process is not nearly as abusive to the spindle and fixturing."

The Ultra 8X has eight cutting edges per insert, double the number on the previous model, which provides a huge boost in the economy of cutting edges to buyers.

The helical milling cutters are built to provide the highest metal removal rates on the market, particularly with high-temperature alloys, the company says.



Harvi Ultra 8X indexable helical end mill | Courtesy of Kennametal

The Harvi III, a solid carbide end mill with six flutes, uses unequal spacing between them to deliver chatter-free machining on stainless steel and high-temperature alloys, even at the highest feed rates.

Shops that don't have the budget for the latest and most powerful CNC equipment, or the space to set it up, may want to consider the benefits of combining such tools, Davis says.

Kennametal customers grappling with limited budgets for new equipment—or space in which to install it—frequently consult with Davis and Francis on how to get the most out of what they already have.

The two men travel to worksites around the country to confer with clients and devise ways to overcome the challenges they're facing.

'The Weakest Link'

"When I'm face to face with a customer, the main thing we try to do is count the cubes" being removed

with current tools and processes, Davis says, then look for the weakest link.

"Is the machine tool the weak link? Is the spindle connection the weak link? Are we exceeding the horsepower or the torque requirements of the machine tool?" he asks. "Whatever the weak link is, what we want to try to do is maximize the tool's performance as much as we can."

Davis often confers with business customers struggling to meet increased production goals, especially when capacity appears to be maxed out. It's a situation that has become more and more common in today's market.

In such cases, businesses either need to optimize their processes or buy new equipment, and they "don't want to buy new equipment unless they absolutely have to," he says.

Crafting a solution sometimes requires analyzing the strengths and weaknesses of an array of different machines and determining the combination of tools that will maximize the productive potential of each.

"You have to come up with some new tools, you have to actually do the work behind the scenes and in your own office to figure out what's going to work, what kind of parameters you're going to run and what gives the best removal rate," Francis says. "You check chip count and cube count. If they want something, we're going to try and give it to them as best we can, and we're going to try to exceed their expectations."

Is your business trying to maximize productivity without buying new equipment? Tell us about your experience in the comments below.

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