



Hands On at University of Dayton

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Why do designers and mechanical engineers need experience operating a manual mill, lathe or surface grinder? A similar question might be asked about CNC machinists: who cares about all that handle cranking and lever turning when practically all machining these days is under computer and servomotor control?



Students learning machining on manual machine tools at the University of Dayton. The second phase of a machine shop modernization project was completed in 2019 with the addition of eight KTM-3VKF knee mills from Kent USA.

The answer to both questions is simple: because it makes them better at their jobs.



machinable products. As for machinists, they need to feel how a knee mill reacts as they plow a cutter through a chunk of steel, or watch the part deflect as they turn a long journal on an engine lathe. Without this first-hand experience, their chances of being truly effective on CNC versions of these same machine tools are less likely.

Back to Basics

To Sean Falkowski, associate professor for the Department of Engineering Management, Systems, and Technology at the University of Dayton, this is all just so much preaching to the choir. He and other instructors at the university have taught the fundamentals of machining to thousands of engineering students, many of whom have gone on to good-paying jobs at Makino, General Electric, Honda Motors, and other well-known manufacturing companies.

The machines they use to teach those skills? Manual knee mills, engine lathes, and surface grinders from Kent USA in Tustin, Calif.

"I'm a professor in engineering technology, and one of the things we still require of our students is that they attend a manual machining class," he said. "The purpose is twofold. The first, obviously, is to teach them machining, for all the reasons just described. They learn basic shop safety, how to read drawings and determine proper cutting parameters, and then perform all of the machining steps needed to produce the components for an assembled product—in this case, a basic two-jaw clamp. When they're done, they have to measure it, which is something else we teach here. We also have senior-level students who work with industry partners on prototypes and other advanced products as part of their Capstone Project. And while our students are doing all this, they're adding valuable knowledge to their engineering skills toolbox."





Having learned the fundamentals of machining, University of Dayton students often go on to good-paying jobs at GE, Honda Motors, and other manufacturing companies.

The Upgrade Project

Fortunately for the students, they have some excellent new equipment on which to do their projects. Over the 2018 summer shutdown, Falkowski oversaw the installation of eight SSM-1340BV manual precision lathes and four KGS-618 surface grinders. And half a year later, during the holiday break, he finished his machine shop modernization project with eight KTM-3VKF knee mills. All of the machines came from Kent. All have rigid cast-iron structures, hardened and ground ways and slides, precision spindle bearings, powerful drive motors, and a variety of features that make the machines both easy to run and productive.

It was a long time coming. Three years ago, having recognized that the school's existing equipment mix was hopelessly outdated, Falkowski worked with Director of Engineering Laboratories Eric Grimm to give the shop a total makeover. They evaluated the options, determined which brand of equipment would be best for the students' needs, then turned to Dave Dearth, sales engineer at the local Kent USA dealership, Advanced Machinery Companies, based in Dayton, for price and delivery.

"Sean did most of the heavy lifting on this project," said Grimm. "All I did was help push through the purchase order approvals and coordinate with Advanced Machinery, who were the real heroes in all this. They brought everything in on time, unpacked it all, leveled the



The Deeper Reason

That brings us to the second of Falkowski's twofold reasons for learning manual machining an increasing number of young people have never touched a piece of machinery in their life.



A student works on one of the University of Dayton's eight SSM-1340BV manual precision lathes from Kent USA.

"Back in the day," he said, "most of us worked on our bikes, our lawnmowers, and eventually our cars. But many of our students step into the classroom for the first time and their only experience with manufacturing has been watching a YouTube video, if that. The result is that they're either afraid of machinery, or worse, have no fear of machinery at all. It's our job to give everyone healthy respect for the machine shop, and help them develop the skills they'll need when they leave here."

The University of Dayton offers four-year degrees and, as mentioned earlier, the students passing through Falkowski's classroom go on to careers in aircraft design, industrial management, manufacturing automation, power generation, and space technology. But not everyone takes the same path getting there. The school also partners with nearby Sinclair Community College, which allows students to earn a two-year Associate's certificate in manufacturing technology and then complete their Bachelor's degree at the university.



parents that we're not offering a purely academic degree; that they're going to get a chance to actually cut metal and learn real-world skills. To do that, however, we needed machinery that looks good and is dependable, and Kent definitely fits the bill in that respect. So even though much of our program is based on manual equipment, visitors quickly recognize that it's all very modern, still relevant to the industry, and that they will gain valuable knowledge here. All in all, we've been very successful at conveying our message."

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