

PCD TOOLING INNOVATIONS LEAD TO SIGNIFICANT PRODUCTION SAVINGS IN GROWING NICHE



Since its early appearance in the 1960's, Medium Density Fiberboard or MDF continues its rapid growth of popularity with furniture makers, cabinet and countertop producers. MDF is valued because the smaller wood particles and resin resist pullout during machining and there are no knots or grain patterns to consider during finishing. While this material machines very uniformly, its abrasive nature causes rapid wear on many types of cutting tools. Polycrystalline diamond or PCD tooling is the preferred cutting tool material due to its long life and superior finish.

According to Gary Dyer, President of H3D Tool Corp. (Newcomerstown, Ohio), "The PCD cutting tool is capable of providing glue joint quality cuts with tool life 25 to 50 times that of traditional carbide tipped tools. The tool life is then repeated an average of six times, after each resharpenering."

Since the mid 1970's, H3D has excelled in the design and development of specialized diamond tooling. H3D recognizes that by understanding the customer's process flow, several processing steps can often times be incorporated into one diamond tool design, lowering overall cutting and shaping costs. The joint creative process between toolmaker and fabricator has led to

innovations impacting many industries including not only companies using MDF, but also Particle Board, Natural Hardwoods, Solid Surface and other exotic materials. “In the past ten years,” commented Dyer, “H3D has worked very closely with the fabricators and manufacturers to develop processes that allow customers to shape, groove, fold and glue materials; such as using standard ½” materials to create a 1 ½” lip from one piece of material and the ability to make a radius cove back splash from the decking sheet for the countertop industry. Of course, these tool designs provide substantial cost savings for the countertop fabricator by reducing labor associated with cutting and gluing separate pieces together.”



The shop floor of H3D utilizes several Vollmer machines in their operation

Advanced Technology Makes The Partnership Possible

Gary Dyer has always realized that utilizing the most advanced technology was essential to H3D’s

sustained growth. “We constantly scan the marketplace to insure that we have the latest technology for designing and fabricating the tools required for the many industries we serve, including MDF, Particle Board, Natural Hardwoods and Solid Surface materials,” stated Dyer. He continued by saying, “By working with the customer to understand the final application of the tool, and the processing of their material, we can create and model tools using the latest computer software. These models illustrate the fabrication of the tool, as well as the performance of the tool in the final application.”



Samples of the MDF that H3D fabricates

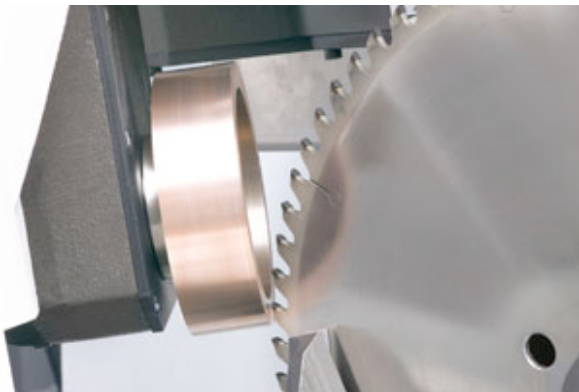
With this thorough understanding of the customer’s project, the H3D design and engineering team creates a 3-D model of the material and the associated cutting tool. This modeling process

guarantees that the cutting tool will provide the expected results for the customer in terms of overall cost, tool life, fit and finish. The modeling process also allows H3D to fabricate the tool via computer-generated programs to insure that when it is released to the manufacturing floor the process flow will proceed uninterrupted. The process is used for both the manufacture of the tool body and the final fabrication operations, which are both critical for optimum tool performance.

While PCD tooling delivers many production and economic benefits to its end users over traditional carbide tooling, the same properties that give the tooling excellent cutting characteristics also complicate the process of finishing the tool. For solutions to these complex requirements, Gary Dyer and H3D Tool Corp. turn to Vollmer of America for their expertise.

The Art & Technology of Advanced Tool Manufacturing

Diamond tooling, or more specifically polycrystalline tooling (PCD), is available in several grades or types with varying crystal sizes and concentrations. Individual crystal sizes vary from 0.8μ to 25μ . and exhibit the hardness and toughness associated with natural diamonds, but make excellent cutting tips for rotary tools and saw blades. However, since the diamond material is so hard and difficult to grind, these materials are typically eroded to size using wire and rotary erosion machines.



H3D recently upgraded to a Vollmer QXD400, a six axes CNC machine as a welcome addition to their compliment of erosion type machinery. The QXD400 incorporates simultaneous movement along all six axes and combines state of the art erosion technology with the ability to grind or polish the cutting edge on the same machine to provide for optimum finish on the diamond-cutting surface. “The Vollmer QXD400 expands our design and fabrication possibilities allowing

us to create the best possible cutting action for the customer based on their machinery, materials and the desired results,” stated Dyer. The performance of the Vollmer provides an edge finish of 0.2Ra and regularly maintains tolerances of 5μ, or .0002”. These tolerances allow the tools to run at higher RPM’s and provide more uniform finishes in the final applications.

Dyer stated, “Today, many of our customers are using CNC routers and feed through machines that process the material at high feed rates.” The tools manufactured utilizing Vollmer technology enable the customer’s machine to operate at maximum efficiency while providing a quality edge finish, with all of the wings perfectly aligned to provide equal cutting pressure. This equal cutting pressure increases tool life and maximizes the finish on the material.

In addition, these tolerances have also allowed for machining at spindle speeds up to 24,000 rpm in specific applications. “These tolerance zones can easily be captured and maintained throughout the life of the tool through the use of advanced CNC machines that have been built to exacting specifications to manufacture and recondition the tooling for our customers,” said Dyer.

Increasing Profitability By Lowering The Total Cost Of Ownership

According to Gary Dyer, during the past six years H3D has seen a dramatic increase in the use of PCD tooling for processing many types of materials including MDF, Particle Board, Natural Hardwoods and Solid Surface. When dealing with carbide tools, many customers experience higher costs of operations as a result of frequent tool changes and the lower productivity and downtime associated with these tool changes. As the tool wears, we also see a decrease in edge quality, which often times results in another processing step. “This coupled with inconsistent performance after resharpening has been overcome through the use of PCD tools,” added Dyer.

He concluded by commenting that in the current economic environment, it has become increasingly important that the true impact of operating costs are well understood. Diamond tooling is an investment. An investment in your current cost structure, an investment in improved results for your customer and an improved cost per unit machined. While it may seem to be cost effective to use tools with lower initial cost, it could be costing your business and your customers in the long run. In other words, it is not the purchase price of the tool that determines

the cost of the tool, but the operating cost per lineal foot of cutting or shaping that determines net worth. As H3D customers have discovered, developing working relationships with the tool manufacturer and allowing them to be a part of the fabrication process can have a tremendous impact on the bottom line. “And by applying that philosophy to our own operating procedures and through our relationship with Vollmer,” concluded Dyer, “we can deliver our customers state of the art tooling at the lowest possible cost... that’s what we call real value.”