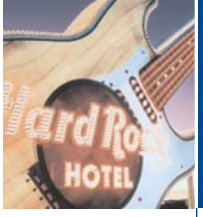

PLASTICS IN THE SIGN INDUSTRY

Router bits for the sign industry

by Rich Lee

Signs and the information they convey have become an integral part of daily life. Companies of various sizes serve this vast market, but they all have common problems when it comes to routing of the materials common to the industry. Wood, aluminum, foam and plastic all have different cutting characteristics and no individual tool can solve all routing problems. This is particularly evident in the routing of plastics in the sign industry.

As a starting point, plastics can be placed into two general categories: flexible and rigid. The tools of choice for flexible plastic usually involve the use of single or double edge "O" flute tools, which are available in straight or spiral flute configurations. In terms of rigid plastics, double edge straight "V" flute tools, spiral "O" flutes with hard plastic geometry, and two and three flute finishers are recommended. The tool materials for most of these router bits are readily available in high-speed steel for hand operations and solid carbide for CNC routing. Solid carbide is a very durable material when utilized in a controlled environment of CNC, but not reliable in hand routing, which tends to be less rigid with more opportunity for tool breakage.

The aforementioned recommendations are general in nature and are just a beginning for tool selection. In order to target an application, the sign maker has a new resource on the Internet at www.plasticrouting.com. This site provides a specific tool recommendation for a variety of plastic materials. The major emphasis of this web site is to recommend router tools that provide the best finish at a productive feed rate. Sign makers, who historically use smaller diameter tools to achieve the necessary radii associated with lettering, will be pleasantly surprised. The tool diameter is the controlling factor in feed rate, but larger diameters are not necessarily superior in terms of finish. The use of micro grain carbide with the necessary geometry to achieve chip evacuation has made smaller diameter tools more effective for the sign industry. The site can also be accessed via a link on IAPD's web site at www.iapd.org.

There have been several new styles of specialty tools recently developed to improve finishes with faster cycle times without tool changes and/or advanced programming techniques. Both should prove to be advantageous to the sign industry.

Figure 1

Figure 2

The first of these tools was developed to provide a smooth bottom surface in lettering or pocketing applications. Most router tools are designed to plunge and rout with the emphasis on the side geometry rather than the point. Consequently, the point end would always leave swirl marks, which required a secondary operation to remove the swirls. The new tool (Figure 1) utilizes a near flat point with radiused corners to create a smooth bottom with an aesthetically pleasing result.

The second innovation (Figure 2) is the development of a rout and chamfer bit designed for plastic sheets. By combining both a straight flute optimized for cutting plastics with a cutting edge sized for specific sheet sizes and a 45 degree chamfer edge, these tools can rout out plastic parts and apply a variable depth edge chamfer in a single pass. By combining these features into a single tool, tool changes within the machining cycle are eliminated and CNC routers without tool changing spindles have new capabilities for parts production.

The advances in router tooling have generally followed the rapid growth and usage of CNC routers or router tables as they are commonly called in the sign industry. These machines have revolutionized the speed and accuracy of sign making and the ability to produce intricate shapes and designs with specialized software. Router tooling has enhanced the CNC user by providing stronger tools with improved cutting geometry specific to the material being machined. However, merely choosing the correct tool without effective machining practices is an exercise in futility. Consequently, a review of proper machining practices would be in order.

- Maintain CNC machines per manufacturer's recommendation with proper lubrication of machine slides and drive systems.
- Check for play in the table or spindle mounting systems.
- Establish a collet, collet nut and tool holder maintenance program and replace collets after 600 to 700 hours of usage.
- Ensure part rigidity by following proper spoil board techniques.
- Establish colleting procedures to maximize tool rigidity.
- Maximize chip load to minimize tool wear.
- Select tools with the shortest possible cutting edge length to achieve depth of cut.
- Use straight through tools where the cutting edge length and shank are the same size to reduce breakage.
- Maximize dust collection to completely evacuate gummy chips produced by some plastics.

The right tool for the job and sound CNC machining practices will improve throughput, product quality and profitability in the sign industry. ■

For further information, contact Onsrud Cutter LP, 800 Liberty Drive, Libertyville, IL 60048; (800) 234-1560; fax (847) 362-5028; www.onsrud.com, www.plasticrouting.com.