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COLUMN BY | NOEL ARCHIE

All the Difference

CHOOSING ROUTER BITS FOR CLADDING MATERIALS

Cladding, the application of a non-loadbearing "skin" to the outside of a building, is intended to enhance the aesthetic appeal or, in some cases, to offer further protection from the elements. Today, there is a growing trend for buildings in industrial zones, apartment complexes, office towers, commercial properties and even residential housing units to employ panels, facades and other features to augment the attractiveness of the property. While the decorative trim may have started with an architect's design, followed by the building owner's approval, the manifestation of the vision is often produced from materials cut by a CNC router.

TOOLS

Since a variety of materials are being used for decorative trim, it is important to know what technology to use when manufacturing cladding pieces. Using the right tools minimizes the likelihood for flaws to be created on the routed (or knife cut) piece, even at the very edges. Those flaws can be magnified when a cladding panel is hoisted above a retail shop door or attached to the side of an office building. That means unhappy clients, remakes and scrap, and that's not good for business.

Variables in tool selection

As with any other CNC router application, selecting the best tool and programming it, using the optimum parameters available, is crucial when cutting cladding materials. To achieve maximum success, follow these guidelines:

1. **Tooling considerations** – Aluminum composites are often ideal with v-groove tools that allow for the cladding piece to be folded on edges slightly larger than the dimensions called for. They are then finished by an extrusion process to insure a cleaner end product. Profile tools will differ based on the material to be cut. The one used for cutting compos-

ites is not the same one employed for high-pressure laminates or for fibre cement. Because they are all unique in the way they need to be processed, that impacts the routing tool selected and how that tool wears. Up-cut routing tools are used with cladding materials since they allow vacuum systems to whisk away chips and dust from cut edges. That also minimizes downtime between cycles by leaving behind a cleaner router table surface. Drilling tools may be required, as well, if the end user needs mounting holes added to the cladding pieces.

2. **Special circumstances** – A standard carbide tool will cut ACM (aluminum composite material) and fibre cement but not for very long due to its more abrasive nature. A cooling and lubricating system employed during the CNC routing process may be required in some cases in order to keep the router tool from overheating and basically melting or shortening its life, resulting in additional overhead costs.
3. **Correct feeds and speeds for the job** – The right feeds and speeds can vary greatly. Typically, cutting ACM cladding materials occurs at speeds of 600 inches per minute or higher. The throughput desired for production cycles can alter that somewhat— slowing down the cutting speed to avoid stacking too many cut pieces that can become marred in some way. Flaws may then show up in bright sunlight when mounted on a building. CNC router software programs guide operators when it comes to selecting the correct settings. For instance, the sound that a router makes when cutting will "talk" to operators, letting them know with a screech or a whine when the setting is not ideal. The same is true with the edge quality when a panel comes off the table or when tools are breaking too often.
4. **V-grooving** – V-cutters and an insert, a solid body v-bit and a ball nose tool, may all work for grooving processes that do not cut all the way through a material. Steel V-cutters with a carbide insert allow just for that insert to be replaced as needed, resulting in a cost savings for the CNC router shop. Some of those insert tools have two cutting edges, so customers get the maximum benefit.
5. **Extra labor** – Choosing a less-than-ideal router means substandard edge quality when a cut piece comes off the table. As a result, it can lead to manual post-routing operations to fix the problem afterwards.
6. **Cycle time** – Using the wrong feeds and speeds to cut cladding materials can impact throughput time in the form of slower or unexpected multiple passes required during the CNC operation. If a first pass is not "clean" then additional cutting cycles (or grooving) may be required. If that doesn't work, then a post-routing manual operation could be next.
7. **Unnecessary tool changes** – Employing a router bit that is not ideal for the material being cut may mean more tool changes than planned for, which adds to the production cycle time. When this occurs, there can be extra costs for new routing tools or the cleanup that might be needed on the routing table surface.

All of these issues impact the cost of routed materials, and in many cases, were not factored into the quoted price. Nor should they be if the correct tooling is chosen and the optimum settings are initially programmed into the CNC routing routine.

Pathway to quality

Employing CNC router technology to manufacture architectural cladding pieces and panels for the building industry becomes more of a challenge as different materials and composites are introduced. Shops that may have started out routing pieces for other industry sectors, such as for the sign industry, have taken on cladding jobs as well. That works best when employing the specialized tooling needed and, in some cases, purchasing another dedicated machine. The training process for this specialized routing application should include everything from the software program to onsite practical demonstrations with the CNC router supplier and initial production runs under the watchful eye of a trainer.

The path to a quality finished product comes from matching the cladding material to be cut with the proper routing tool, the ideal feeds and speeds, the most up to date software, an efficient table vacuum system and operator training/ongoing support. It sounds complicated, but that small router bit at the end of spindle, if chosen wisely and used correctly, can be the key to higher production levels, better quality, less scrap and happier clients. **mt**

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