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**Variety of materials in the furniture and interior design industry**

**A technical report on current challenges in the trade and the associated processing solutions by Christian Wimmer, B. Eng. MBA (Leitz Industry Manager Furniture and Interior Design).**

**Your own home is the centre of your life - an oasis of well-being and a place of retreat. For many people, however, their own home is also increasingly used as a workplace. This blurs the functions of the furniture. This means that the demands on furniture are high. They should be beautiful and cosy, but also multifunctional. To ensure that a piece of furniture can fulfil all requirements in terms of design, materials, size and functionality, the trend is therefore moving away from a uniform look towards individual, mostly handcrafted solutions with a variety of user properties. Colours inspired by nature, natural materials and a clear, minimalist design are popular.**

For craftsmen, this results in almost unlimited design possibilities, but also new challenges. The number of materials to be processed has increased significantly and combinations of natural wood with high-tech surfaces are the order of the day. One example of such high-tech surfaces is anti-fingerprint (AFP) coatings. These are preferably used in the kitchen furniture sector, but are also being used more and more in classic furniture construction or interior design. In the recent past, modern, puristic designs with high-gloss and matt lacquer surfaces have become a trend, but the end consumer quickly realised the disadvantage of these seemingly elegant surfaces: Fingerprints and grease residue are visible immediately after touching and the beloved designer piece quickly looks unsightly. In contrast, the so-called anti-fingerprint surfaces, which make fingerprints invisible thanks to a special coating, are becoming increasingly popular.

In addition to such high-tech surfaces, solid wood furniture or furniture with real wood surfaces are also very much on-trend. After all, wood is the ideal and most natural material for cosy and sustainable interior design and can be perfectly combined with a wide variety of materials and colours.

This raises the question of how such a wide range of materials can be machined in the best possible way. The prerequisite is always to ensure perfect quality on the workpiece and the highest possible efficiency, productivity and flexibility within the machining process. Above all, however, users must ask themselves which tool solutions are suitable for this in order to be able to produce successfully.

**Solution 1: Sizing cut with scoring and main circular sawblade**

The most conventional processing method is cutting using a sizing circular saw. Craftsmen attach particular importance to the quality of the cut. As perfect as possible with tear-free edges on both sides and clean cutting surfaces in all panel materials and decors, so that time-consuming reworking can be avoided. To achieve this, we recommend using a new or freshly refurbished circular sawblade before sawing panel material with sensitive surfaces (such as anti-fingerprint materials). To ensure that the top edge is as perfect as possible, the radial projection of the circular sawblade to the panel should be set at up to ten millimetres. To achieve a perfect bottom edge, the use of Ritz circular sawblades is highly recommended. It is also advisable to place the panel on the saw table with the visible side facing upwards. This allows you to achieve perfect work results and maximise the lifetime of the circular sawblades used.

**Solution 2: Combining different cutting materials for panel sizing**

Panel dividing saws are becoming increasingly common in craft businesses. For a perfect cut edge without further sizing steps, coated wood-based materials, such as chipboard or MDF as a single panel, must first be pre-scored on the underside with a scoring circular sawblade and then sawn with a main circular sawblade. To ensure that the main circular sawblade and scoring circular saw blade function optimally, it is highly advisable to match the cutting widths of the two circular sawblades to each other and also to maintain them in pairs after the end of the tool life.

Many carpenters implement this utilisation concept in their machining processes on a daily basis. However, there is an opportunity to save costs, which many users hardly realise. If, instead of a carbide scoring circular sawblade, a diamond-tipped variant is used together with several main circular sawblades, tool costs can be significantly reduced over longer periods of time. Specifically, it is recommended to use up to ten carbide main circular sawblades together with a diamond scoring circular sawblade. Due to the significantly higher wear resistance of diamond cutting materials, these scoring circular sawblades achieve a much longer tool life than the main circular sawlades with carbide tipping used at the same time. This means that the scoring circular saw blade remains in the machine after the main circular saw blade has reached the end of its service life. This means that only the main circular saw blade needs to be replaced and reconditioned. This means time-saving processes and additional savings in tool costs. An additional savings effect: the main circular saw blades with carbide cutting edges can be resharpened several times up to the end of the tool life of the diamond scoring circular saw blade. The resulting loss of cutting width can be easily compensated for by changing the scoring depth without any major additional effort. This procedure allows you to get the maximum tool life out of all tools and save costs.

A perfect example of this is the combination of RazorCut PLUS circular saw blades and DP scoring circular sawblades from Leitz. RazorCut PLUS, with its cutting geometry trimmed for a finish cut, ensures perfect, chipping-free edges and smooth, score-free surfaces, even in delicate decors. In combination with the diamond scoring circular sawblades, users can save costs and achieve consistently high sawing quality.

**Solution 3: Stationary technology (CNC)**

CNC technology has established itself as a manufacturing concept in many craft businesses and the trend continues unabated. After all, CNC machines can be used to produce complex workpieces and a wide variety of shapes and designs quickly and easily. After all, it is possible to process almost all coated and uncoated wood-based materials, solid wood elements, compact panels or plywood with end mills, jointing cutters and circular saw blades. However, the quality of the machining result always depends on the machining strategy and the tool systems used.

**CNC sizing with shank or jointing cutters**

The aim of sizing with jointing cutters is to achieve tear-free edges on both sides. This can best be achieved with diamond-tipped tools that have alternating cutting angles - i.e. angled cutting edges. However, this centre angle may only have a certain minimum size in order to reduce the cutting pressure. Tools with excessively large cutting angles produce rough and porous, pitted surfaces on chipboard with a loose centre layer. This can lead to problems with edge adhesion or water testing, especially with laser edging Another argument against the use of such tools is the significantly higher purchase and maintenance costs. Tool systems with a high centre angle are generally equipped with extra-long cutting elements. The use of diamond cutting edges therefore incurs high costs both in terms of purchase and re-sharpening.

Studies over many years have shown that the best machining results in terms of perfect edges and a tear-free centre position are best achieved with tools that have an cutting angle of 50 degrees. This is the only way to achieve a perfect cutting result when jointing and avoid unnecessarily increasing process costs. Such as with the EdgeExpert cutting tools from Leitz.

In addition to the choice of the optimum tool, the machining strategy also has an important influence on the machining quality during sizing. It is therefore advisable to pay attention to appropriate approach and corner strategies throughout the entire milling process. Users who are dealing with this topic for the first time are well advised to have an experienced contact person with detailed knowledge of the material, tool and machining process at their side.

**Mitre cutting with CNC machines**

Mitre sawing is one of the most demanding processes in the furniture and interior design industry. On 5-axis machining centres or with special CNC sawing units, bevelled saw cuts can be produced very efficiently at all required angles. In practice, it has been proven that circular sawblades specially designed for mitre cuts are an absolute must for this area of application. The main difference to conventional circular sawblades lies in their low cutting width and simultaneously high axial run-out quality. These technical features are of great importance here in order to avoid chipping on the pointed side of the mitre. Particularly with very pointed mitres - such as 60 degrees - the slightest inaccuracy in the overall system significantly impairs the machining result.

Another important point is the use of the correct processing strategy. In this case, it is recommended to score the panel two millimetres deep on the inside edge in a first cutting movement with feed cutting. The separating cut is then made in the opposite direction. This enables CNC users to achieve the perfect cut. Tear-free on both edges and without defects in the cutting surface. Examples of such circular sawblades, especially for mitre cuts, are the carbide-tipped circular sawblade Katana and the diamond-tipped circular sawblade WhisperCut from Leitz. Both Katana and WhisperCut enable perfect cutting results in all common materials thanks to their small cutting width and particularly smooth running behaviour.

**The nesting process**

The nesting process uses shank tools to cut nested profiles from plate-shaped materials. Particularly with delicate parts and high feed rates, CNC users are regularly faced with the challenge of the milled parts being displaced and damaged by the high-speed milling cutter during separation. The vacuum of the machining table is not sufficient to compensate for the resulting forces and prevent the manufactured parts from slippingThis can be avoided by using smaller tool diameters. On the one hand, this reduces the cutting forces, but much more important are the smaller cutting grooves that are created. If, for example, the cutting tool diameter is reduced from 16 to 12 millimetres, this corresponds to a 44 percent reduction in the machining volume. The less material is removed during nesting and the smaller the resulting cutting grooves are, the less this weakens the vacuum performance on the machining table and the workpieces are held securely in place.

Leitz offers a comprehensive and powerful tool programme for such challenges with its nesting cutters. With diameters from 10 millimetres and, depending on the version, suitable for feed rates of up to 35 m/min, it is perfect for precise and, above all, fast nesting - ideal for processing plywood, compact laminates, clamping plates or MDF.

Depending on the machine equipment and processing method, a wide variety of tool solutions and processing strategies are used in furniture production or interior design. The variety of materials and the demands on the material and end product are constantly growing, but the processing methods themselves will hardly change in the coming years. For this reason, universally applicable tools with maximum performance are becoming increasingly important in the industry. After all, ‘time is money’ and ‘quality pays off’ will continue to apply in the future. More efficiency, more flexibility and more productivity in production will therefore not only help to save money or increase output quantities, but these keywords will also be increasingly taken into account in the area of tool reconditioning in the future. Craft-orientated furniture manufacturers and interior fitters will take this into account in their future business plans. It's good to have a tool partner at your side who can offer suitable tool solutions, needs-orientated services and a wealth of knowledge about processes, machines and materials. For more efficiency, productivity, flexibility and quality in the trade.

**The company**

Founded in 1876 in Oberkochen, Southern Germany, the Leitz Group is the worldwide leading manufacturer of tools for industrial processing of wood, wood derived materials, plastics, compound materials and non-ferrous metals. The product spectrum covers the complete range of precision tools for automated machines. In a complete package of advisory services, approximately 3,000 employees pass on their experience of cutting tools to customers so meeting daily the requirements of a complete problem solver and producing service provider. Leitz products regularly are used in more than 150 countries.. Together with its two legally independent sister companies Boehlerit and Bilz, Leitz forms the globally active Brucklacher Group. With a total of 16 production sites, its own sales and service companies in 38 countries at 137 locations and an exclusive partner network, the Brucklacher Group is a global player represented on all continents. The Brucklacher Group employs over 4,000 people worldwide and generates an annual turnover of around 450 million euros.

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**ill. 1:** When sizing, supposedly simple things such as the protrusion of the sawblade or the position of the visible side can be decisive for the quality. (Photo: Leitz)

Ein Bild, das drinnen, Zähler enthält.

Automatisch generierte Beschreibung

**ill. 2:** Many users still have potential to reduce their costs when working with panel sizing saws. Recommendation: The joint use of diamond-tipped scoring circular sawblades and carbide-tipped main circular sawblades helps to save money in the long term. (Photo: Leitz)

Ein Bild, das drinnen, Zahnrad enthält.

Automatisch generierte Beschreibung

**ill. 3:** When mitre sawing on CNC systems, it is important to ensure that the circular sawblades used are actually suitable for such applications and which machining strategy is used. (Photo: Leitz)

Ein Bild, das Boden, silbern enthält.

Automatisch generierte Beschreibung

**ill. 4:** When nesting, it is advisable to use cutters with small diameters. This reduces the cutting volume and the vacuum performance on the processing table remains consistently high. The workpieces are thus held securely on the table. (Photo: Leitz)