

Short-Cut to Design & Production

New technology gives boxmakers a precise, inexpensive tool to create flat steel rule dies in-house.

The steel rule dieboard for the boxmaker has been one of the principal bottlenecks for creating a quick-turnaround box design and production system for the typical box-plant. Recently, however, Gerber Innovations, a division of Gerber Scientific, Inc. has managed to break the bottleneck by developing the Gerber Profile™ Die Tool Production System. The Gerber system blends the design capabilities of the computer with a three-axis rotary cutter to allow the user to produce every kind of diecutting tool on one machine. By merging these two processes, you get the two-fold advantage of reducing production costs and enhancing quality.

The two primary methods for producing steel rule dieboards are common woodworking tools (typically a jigsaw) or the newer laser cutter. In the case of the medium-size converting operation, there generally isn't enough volume to justify an in-house die shop. However, going to an outside source often slows design and turnaround time to the point where the shop cannot compete effectively. The limitations of the typical jigsaw, or mill and counter cutter, are the cost and space needed for the dedicated machines that perform only a single operation. The laser, while very flexible, is expensive and requires a great deal of maintenance and downtime, and is feasible only for large die shops or the largest of the integrated converting operations. In addition, the laser's biggest problem lies in accuracy and how the rule is held in the plywood frame.

In general, jigsaw cutting requires highly skilled craftspeople and is very labor intensive. Lasers require expensive and complex equipment and present environmental challenges. The smoke from the burning operation must be vented, and the moisture in plywood creates an uneven

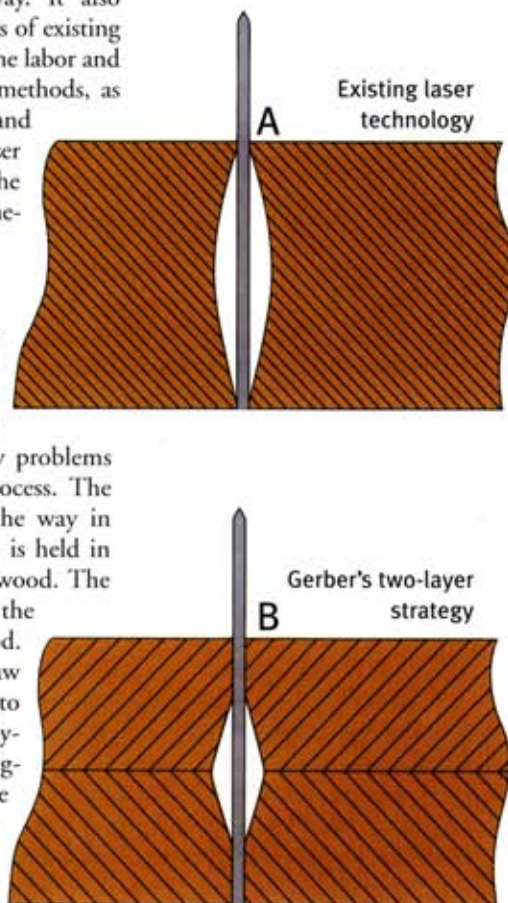
'burn' on the interior of the plywood sheet. Plus, neither process has the ability to produce a complete set of diecutting tools on one machine. Typically, counter-plates, strippers and blankers require separate, multi-step procedures involving additional pieces of capital equipment, meaning diemakers and converters must spend hundreds of thousands of dollars if they wish to function as full-service shops.

The versatility of the Gerber Profile Die Tool Production System allows the user to produce every kind of diecutting tool on one machine in a very quick and clean manner and cost-effective way. It also addresses the various drawbacks of existing diemaking, including the labor and skill requirements of manual methods, as well as the cost, complexity and environmental concerns of laser systems. In terms of cost, the Profile system is one-half to one-third that of a laser system.

QUALITY CUTTING

Since steel rule dieboards first appeared in the folding carton and corrugated markets, diemakers and diecutters have continually faced quality problems during the manufacturing process. The primary complaint involves the way in which the steel rule, or knife, is held in the base material, usually plywood. The steel rules are inserted into the dieboard kerfs in the plywood. The kerfs are made by a jigsaw or a laser. The laser kerfs, due to the low heat transfer of the plywood, are oval-shaped (see figure 1), and when the steel rule is inserted, there is little contact area between the wood and the knife. This can lead

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diecutting

to slippage or movement during production, and the knife can be knocked out of vertical, causing serious problems in the process. The kerfs made with a jigsaw overcome this problem, but require a great deal of skilled labor to produce accurately, and they require more time than the automated cutting available with the laser.

The Profile system is designed to address the specific difficulties of dieboard making. The system uses a computer-controlled, three-axis cutter to create two dieboard layers that are mirror images of each other. Because the cutter

process. In addition, it will allow much closer coordination between die production and the box design, especially where graphics are involved and a precise diecut is needed in relation to a graphic design on the box.

The most significant point, though, is that the small-to-medium converter can get control of the die making process and be able to provide much quicker turnaround for customers who need new designs or need to modify a box to incorporate a product change. Instead of being dependent on outside vendors for this, the converter can have this operation available as needed. In an era of ever-shortening press runs and shorter turnaround times, this machine offers a unique solution.

MINIMAL MAINTENANCE

While a machine such as the Profile offers significant opportunity to the converter, it might raise questions of maintainability for plant operations crews not familiar with the technology. The Profile system, however, requires only minimal maintenance. Air filters for the electronics modules should be cleaned every two to four weeks, and the ways should be lubricated with a light wiping of oil once a week. The drives are sealed and

require no lubrication, and the machine is also self-calibrating to address a chief complaint against laser cutters.

INNOVATION AND SOLUTIONS

While Gerber has not been in the packaging field before, it has created a piece of technology that can bring multiple levels of benefit to the box designer. This is all part of Gerber's strategy to seek out industries that have been plagued by problems for a long time, and provide them with breakthrough technology solutions. In the past, Gerber has successfully taken on industries such as textile and apparel, signage and ophthalmology.

When it looked at the packaging industry, Gerber referred to some of its past innovations in the printing and textile fields to develop the Profile. Because diemaking is a bifurcated industry with high labor involvement in the diemaking process, and the only previous automation option (lasers) was extremely expensive, the company looked for ways to provide a medium-size operation with the benefits of flexible automation. The Profile system accomplishes this through a special routing technique, referred to as Gerber RPM™ (Rotary Precision Machining). Furthermore, it relies on a user-friendly, open architecture manufacturing software called DieWorks™, a Windows-based program that allows for the quick and easy generation of tool paths, and is capable of driving multiple Profile machines simultaneously, cutting work time in half.



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is driven from a computer program, the registration of the dieboards is exact each time, eliminating the waste or repair time associated with wood-working tools. Also, the precise grooves generated by the Profile have more than adequate wood-to-rule contact for

knife stiffness, and can be created in the same time as laser cut dieboards, but without the environmental issues.

Once cut, the Profile's two dieboard halves are glued together using a registration pin set for guides. The final glue setting is done in a vacuum press and results in a dieboard that is exceptionally flat, strong and stable. The cutaway view illustration shows a cross-section of the dieboard, in which the rule is held at the top and bottom of the kerf by a parallel section equal to three times the kerf width, with a diamond opening in the middle.

ONLINE SHORT-CUTS

The use of the Profile's computer-driven cutting table has benefits that extend beyond the ability to produce precise die-cuts and elimination of waste. In an industry that is moving rapidly to online ordering and online proofing, this machine will position a boxmaker to get box designs electronically and cut dieboards without having to translate between paper drawings and the dieboard cutting