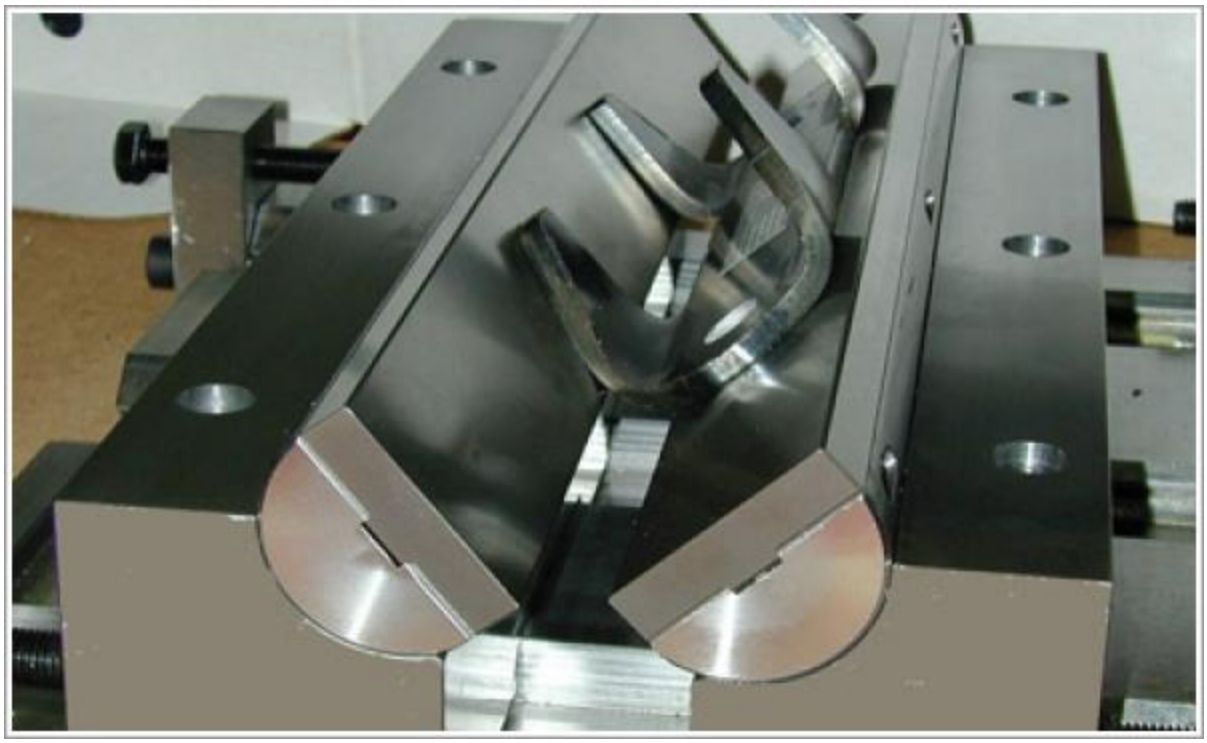

Tool & Die

SOFTENING THE BLOW

By Abbe Miller

September 2009 - Without warning, life can dish out some serious jabs. One day, all is right with the world, and the next, everything that could go wrong will go wrong. The person who can roll with those punches is the type who comes out victorious in the end.

The Rolla-V from Fab Supply Inc., Addison, Ill., isn't all that different from that adaptable person. The rotational press brake die can handle just about anything with which it's confronted. Parts that normally would require post-form machining operations typically can be formed quickly and easily, eliminating secondary operations.

The Rolla-V line is made up of five models, three fixed sizes and two adjustables. With its three fixed-size models, users can form metal from 26 gauge up to 5/16 in. thick. This versatility significantly reduces the number of die changes that typically would be required while forming this range of materials. Model 1 accepts material up to 16 gauge, Model 2 can handle 10-gauge material, and Model 3 can bend parts 5/16 in. thick. The small No. 3 adjustable model can be employed for material that

measures up to 0.5 in. thick, and the larger No. 4 adjustable is capable of forming material up to 11/8 in. thick.

Minimizing setup times will save a company money in the long run, but if a user wants instant gratification, the Rolla-V can deliver that, as well. Problems that arise with conventional tooling, such as die marking, distortion of holes and slots near the bend line and inability to form short and tapered flanges, are nearly eliminated with the patented design of the Rolla-V.

When working with conventional tooling, flat material is placed across the die opening while the top tool pushes the material down into the shape of the vee die. If the sheet metal contains holes and slots near the bend line, those holes or slots will not be formed in the same manner as the rest of the sheet because there’s no bending force being exerted in that area. The surface below the hole or slot won’t bend until it makes contact with the side wall of the die deep inside the vee opening. By that time, the short fulcrum makes bending difficult. This can cause distortion or flaring around the edges of those holes and slots and severe die damage, as well.

"With the Rolla-V, downward pressure from the punch [top tool] causes the rotors to exert upward pressure on the workpiece. This upward pressure causes the part to be formed around the punch tip," says John Wold, president of Fab Supply. "Because the rotors are fully supporting the sheet from the underside, the areas that contain the cutouts are kept on the same plane as the rest of the sheets during forming. This eliminates the distortion and flaring that typically occurs when forming these types of parts with conventional vee dies."

Utterly unscathed

The versatility of sheet materials that the Rolla-V handles, including thickness, type and those prefabricated with holes and slots, allows for a versatility in the end applications. For G & W Products, Fairfield, Ohio, parts are produced for industries such as military, power distribution, aerospace and retail fixtures. Gary Johns, CEO, says the company implemented the Rolla-V because of customer needs.

"Many customers require parts with a complex geometry or severe bends, which can’t be formed with conventional press brake tooling," he says. "Some of our parts are produced from polished stainless steel and aluminum and need to be scratch- and die-mark-free. The Rolla-V dies eliminate the use of [die film], which is often necessary when forming cosmetically critical parts on conventional tooling."

Die marking is eliminated due to the significantly larger surface area on which the bending pressure is being exerted.

"You're using the same amount of pressure, but you're spreading it over a surface area that's many times larger [than that of the lead-in radius of a conventional vee die]," Wold explains. "In addition, if you look at the forming action, there's basically a static contact between the workpiece and the forming surface of the rotor. That eliminates any marking that would result from the drawing action of the material as it goes down into the vee die."

Johns says the Rolla-V played a major role in the production of an aluminum bracket that was formed at a steep angle, which historically would slide in conventional tools. The previously used tooling caused deep marks, and in addition, the angle of the form would vary. "After using Rolla-V, I could set my angled side gauge to an exact angle, and the part was always right, and the marks disappeared," he says.

In this corner

As far as metal fabrication is concerned, McNeilus Cos. Inc., Dodge Center, Minn., can be considered quite the heavyweight. It produces concrete mixers and refuse vehicles, and for the fabrication of parts for both product segments, it uses Rolla-V dies.

"The Rolla-V dies also give us the ability to make short flange dimensions in thicker material," says Chad Jensen, fabrication supervisor at McNeilus. "Before purchasing the Rolla-V dies, we struggled to form deck plate [tread plate] material consistently because the deck plate pattern would land differently from part to part on standard vee dies, but with the Rolla-V die, the deck pattern always contacts the rotor in the same way, resulting in repeatable bend angles, which also eliminates the die marks in the deck plate pattern."

When using conventional forming methods, angular inconsistency and damage to the diamond pattern in tread plate are common due to the varying thicknesses found within the sheet. But it's not inevitable to encounter issues with angular consistency with the material when using the Rolla-V. And again, the perfect bends come thanks to the large surface area on which the sheet of metal is resting.

"When you form tread plate over a regular vee die, the bending pressure is concentrated over a relatively small surface area," says Wold. "The concentration of load results in damage to the

diamonds. The other problem is, depending on how those diamonds hit the vee opening, you may or may not be consistent with your bend angle. If the top of your diamond is sitting up on the lead-in radius to the vee, you'll either get your 90 degree bend, or you'll go slightly over. If the lead-in radius hits between the diamonds, it's essentially acting like your material is thinner, therefore, the same ram position will produce an open bend."

Whether it's a massive cement mixer or military aircraft, the components that make up an end product must be as perfect as possible. Sacrificing part quality by attempting to form complex parts with conventional tooling may not always be the right approach, especially when the desired results, along with the bonus of increased productivity, are possible with the Rolla-V. **FFJ**