SOLUTION BULLETIN

FORMING HINGES IN THE PRESS SAVES TIME, INCREASES ACCURACY

THE PROBLEM:
Simple forming of sheet metal in a punch press has been around for many years. Extrusions, lance and forms, dimples, embosses and even spring tabs are examples of simple forms that can be created in a punch press. All of these eliminate the need for secondary operations.

Hinges, a more complex form, may also be processed in a punch press. With today's machine technology—punch presses with stroke control—hinges no longer need to be a headache to produce. Your punch press does the work for you. By using a hinge tool on the turret press, fabricators can punch many different types of knuckles of different lengths and diameters. Fabricated metal enclosures and similar cabinetry that require hinges can be fabricated with integral hinge knuckles. This eliminates secondary operations to attach hinge components and can eliminate the need for separate hinges, fasteners, spot welds or assembly operations.

Forming hinges in a punch press may eliminate the cost of specialized press brake or stamping tooling necessary to create hinge forms. Forms created in a punch press can also ensure accuracy over more manual secondary operations.

THE MATE SOLUTION:
Forming a successful hinge in a punch press is a process that typically involves two forming tools, Forming Tool 1 and Forming Tool 2 (also referred to as the "knuckle tool"), and three forming strokes. These forming tools are in addition to standard punching tools used to create the tabs for forming.

Fig. 1. Hinge forming tools, shown in 114-Style tooling.

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- After the tabs have been punched in the sheet to be formed, Forming Tool #1 is used to make the first 2 forming strokes. This first form produces the leading edge of the tab that will slide around the interior of the second tool during the final forming stroke. The first form is placed in all of the tabs to be formed in a part or a sheet of nested parts.

- The *second forming stroke* is added to all tabs to be formed. This forming stroke bends the tab up to a designed angle, typically between 75 and 88 degrees. The stroke depth for these first two forming strokes is identical. The spring loaded lower assembly, or die, pushes the sheet off the lower insert before the sheet advances to the next forming location.

- The *final forming stroke* uses Forming Tool #2, or the "knuckle tool." As the knuckle tool lowers down towards the sheet metal tab, the raised tab enters the upper tool, making contact near the front (or lower) edge of the tool. As the tool continues to descend, the tab is forced to slide around the perimeter of the upper tool, curling around to form a hinge. This tool also includes a spring loaded lower assembly to lift the material off the lower insert before advancing to the next forming location.

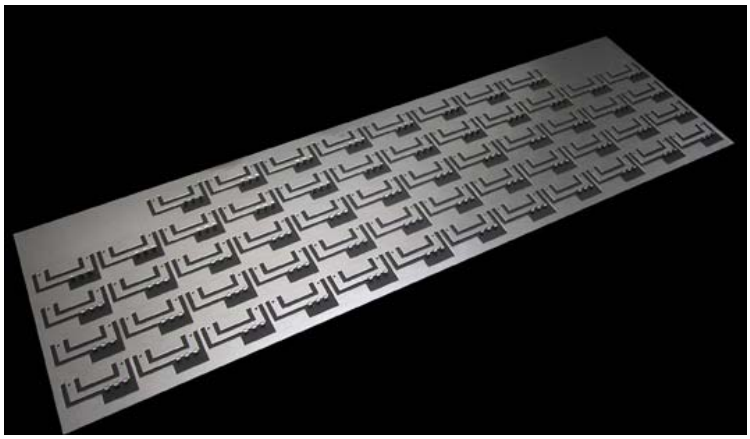

Fig. 2. Sheet of hinges formed on the punch press using Mate hinge tooling. Secondary forming operations and tooling eliminated.

AVAILABLE TOOLING STYLES AND STATION SIZES

- Available in all tooling styles

MATERIAL AND OTHER RESTRICTIONS:

- Hinges can be formed in mild steel, aluminum and stainless steel
- Thicknesses can range from 0.030"(0,80 mm) to 0.060"(1,50 mm) incorporating pin diameters from 0.062"(1,60 mm) to 0.188"(4,77 mm)

TONNAGE RESTRICTIONS:

- None known

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WATCH THE VIDEO:
Watch a video of the three-stroke hinge forming process on a punch press:

http://www.youtube.com/watch?v=GF8OxmMeqVE

TIPS AND TECHNIQUES:
- Mate developed a comprehensive hinge tool tips and techniques guide that is included with every hinge tool order. To learn more, ask your Mate sales engineer or dealer.

HOW TO ORDER:
- Use shape code “H1” for Forming Tool 1
- Use shape code “H2” for Forming Tool 2

OTHER MATE PRODUCTS TO CONSIDER:
- Other related Mate special applications tooling such as cold forged emboss for stamping logos or part numbers.

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