Common Stamping Problems

Manufacturers know that punching can be the most cost-effective process for making holes in strip or sheet metal. However, as the part material increases in hardness to accommodate longer or more demanding runs, greater force is placed on the punch and the die button, resulting in sudden shock, excessive wear, high compressive loading, and fatigue-related failures.

The results of some of these problems are shown in the photos on this page.

Punch Chipping & Point Breakage

Chips and breaks can be caused by press deflection, improper punch materials, excessive stripping force, and inadequate heat treatment.

Slug Jamming

Slug jamming is often the result of improper die design, worn-out die parts, or obstruction in the slug relief hole.

Slug Pulling

Slug pulling occurs when the slug sticks to the punch face upon withdrawal and comes out of the lower die button.

Punch Wear and/or Galling

Die performance and longevity can be improved through the use of regular maintenance, as well as the use of lubricants and leading edge punch designs.

Punch Head Breakage

Punch deflection leads to punch head breakage. Cutting shear, press tonnage, the type of backing plate, alignment, and the types of punches and retainers all require careful consideration when designing a punch.

This booklet deals with several common punching problems; presents some likely causes; and, offers solutions to these problems— including Dayton products.

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Improving Punch Performance

The formula on the right can help you determine the perforating force required to obtain optimum performance from your punches. In the example, the shear strength of the part material (S) is 30,000 PSI. In the ‘Press Force Requirement’ example shown, you can see that the material requires 107,000 Cold Rolled Steel.

Example

<table>
<thead>
<tr>
<th>Material</th>
<th>T (psi)</th>
<th>S (ksi)</th>
<th>Perforating Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel</td>
<td>90000</td>
<td>0.627</td>
<td>107,000</td>
</tr>
<tr>
<td>304L</td>
<td>150,000</td>
<td>0.6</td>
<td>107,000</td>
</tr>
<tr>
<td>304</td>
<td>200,000</td>
<td>0.5</td>
<td>107,000</td>
</tr>
<tr>
<td>303</td>
<td>250,000</td>
<td>0.4</td>
<td>107,000</td>
</tr>
<tr>
<td>301</td>
<td>300,000</td>
<td>0.3</td>
<td>107,000</td>
</tr>
<tr>
<td>430</td>
<td>400,000</td>
<td>0.2</td>
<td>107,000</td>
</tr>
<tr>
<td>304L</td>
<td>500,000</td>
<td>0.1</td>
<td>107,000</td>
</tr>
</tbody>
</table>

For additional information on tool steels, coatings, cleanroom tools, and guidelines for the selection of the best product for your operation, contact your local Dayton Progress representative.
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