**Shaving and Burnishing Guidelines** used in designing and building tools used in these operations.

**SHAVING AND BURNISHING 3 STATION**

- **PIERCED PUNCH**
  - \( A \)

- **SHAVE PUNCH**
  - \( B \) Diameter
  - \( T \)
  - CONCAVE SHAPE
  - \( C \)

- **BURNISH PUNCH**
  - \( D \) Diameter
  - \(.0002/.0004\) Per Side Larger Than \( B \)
  - \( E \)

**Dimensions**:
- \( A = B \) Minus 10% \( T \) Per Side
- \( B = \) Nominal Shave Dimension
- \( C = B \) Diameter Plus .0005 Per Side
- \( D = B \) Diameter Plus .0002/.0004 Per Side
- \( E = D \) Diameter Plus .001 Total

**Ball Tip**
This illustration is an example of a single station shave and burnish operation. The dimensional relationships are the same as set forth on the previous page. Remember, die cut holes one inch and smaller tend to close and blanks under one inch tend to swell. This should be taken into consideration when determining final sizes.
SHAVING CONTOURS

STRIP LAYOUT

NOTCH 1  NOTCH 2  SHAVE  PART OFF

ADDITIONAL BRIDGE WEB
OPTIONAL FOR ADDED STABILITY

10% - 15%
METAL THICKNESS
SHAVE ALLOWANCE

1-1.5 X METAL THICKNESS

BRIDGE WEB

RESULTING SHAVE SLUG

THE ABOVE ILLUSTRATION IS FOR CONTOURS AND LONG CUTOUTS, WHEREBY THE SHAVED SLUG OR SCRAP BECOMES UNSTABLE AND TENDS TO PULL OUT OF THE DIE. DESIGNING IN ONE OR TWO BRIDGES WILL KEEP THE SLUG IN THE LOWER DIE AND ALSO PREVENT THE "ROLLING" OF MATERIAL. THE SAME CLEARANCES AS SHOWN IN THE PREVIOUS PAGES APPLY. IT IS ALSO NECESSARY TO APPLY HEAVY STRIPPER PRESSURE ALL AROUND THE SHAVED AREA.
Normally, as a general rule, the shaving allowance should be ten percent of material thickness per side for most materials except aluminum. Depending upon the application, specification, tolerance and slug stability, it may be necessary to experiment with different allowances.

<table>
<thead>
<tr>
<th>Material Thickness-Inch</th>
<th>Allowance-First Shave</th>
<th>Allowance-Final Shave</th>
</tr>
</thead>
<tbody>
<tr>
<td>.03</td>
<td></td>
<td>.0045</td>
</tr>
<tr>
<td>.05</td>
<td></td>
<td>.0065</td>
</tr>
<tr>
<td>.06</td>
<td></td>
<td>.007</td>
</tr>
<tr>
<td>.08</td>
<td>.007</td>
<td>.0035</td>
</tr>
<tr>
<td>.100</td>
<td>.008</td>
<td>.004</td>
</tr>
<tr>
<td>.125</td>
<td>.010</td>
<td>.0055</td>
</tr>
<tr>
<td>.175</td>
<td>.014</td>
<td>.007</td>
</tr>
<tr>
<td>.250</td>
<td>.020</td>
<td>.010</td>
</tr>
</tbody>
</table>
The above part is 3/16 inch thick and requires 2 shave operations. The first shave leaves 10% material per side for the second shave. The part is then rotated in the die 189 degrees and shaved from the opposite side as the first shave. Doing this eliminates the roll over material condition from the piercing operation.

This is the side view representing the shaved hole condition as well. It also has a coined chamfer area around the notch edge.

This part is similar to the above part as is fabricated in the same manner.