Continuing our focus on sheet metal forming, this issue of DFM guidebook focuses on design guidelines for bend relief parameters, distance between holes and bends and offset bend parameters.

If you design sheet metal parts, you may know that bend relief is a notch cut made into the material when a bend is made close to an edge. Bend relief prevents the sheet metal to distort or tear when it makes a transition from flat surface to a bend.

Here are some of the guidelines you can read in this issue:

- Bend Relief Parameters
- Spacing between holes in Perforated Metal
- Hole to Bend Distance in Perforated Metal
- Offset Bend Parameters
- Distance between Offset Bends and Extruded Hole

If you have any feedback or questions on DFM guidebook, please write to us at info@dfmpro.com.

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Bend Relief Parameters

When a bend is made close to an edge, the sheet metal may tear unless bend relief is given. Bend relief helps in controlling the sheet metal material behavior and prevents unwanted deformation when a bend does not extend the entire length of a part, or a form is close to other sheet metal features.

It is recommended to use rectangular relief. The minimum depth (D) of a bend relief should be equal to the material thickness plus the radius of a bend. The minimum width (W) of a bend relief should be equal to 1.5 times the material thickness.

\[ D = \text{Depth of Bend Relief} \]
\[ W = \text{Width of Bend Relief} \]
**Spacing Between Holes in Perforated Metal**

Perforated metal is nothing but a pattern of holes on a sheet metal surface. It has endless applications in enclosures, partitions, sign panels, guards and screens as it offer several benefits like larger open areas, higher strength-to-weight ratio, good aesthetic appeal and different hole sizes.

It is recommended that minimum distance between the holes in a perforated metal should be equal to 1.2 times the material thickness.

\[ D = \text{Distance between holes} \]
Hole to Bend Distance in Perforated Metal

When a bend is made too close to the hole, the hole may become deformed. The minimum distance recommended for circular holes and rectangular holes is as following

For Circular Holes:
It is recommended that the minimum distance from the edge of a circular hole to a bend should be 3 times the material thickness

For Rectangular Holes:
It is recommended that the minimum distance from the edge of a rectangular hole to a bend should be 3.5 times the material thickness.

D1 = Distance Between Hole and Bend
D2 = Distance Between Rectangular Holes and Bend
Offset Bend Parameters

An offset bend, also called as joggle is made up of two very short bends formed simultaneously. It is used to joggle other sheet metal surface or overlap of a sheet.

It is recommended that:

- The bends angles (A1) should be obtuse angles or right angles.
- The maximum height (H) of an offset bend should be five times of the material thickness.

\[ H = \text{Offset Height} \]
\[ R = \text{Bend Radius} \]
\[ A1 = \text{Offset Bend Angle} \]
**Distance between Offset Bends and Extruded hole**

The minimum recommended distance from the bend’s inside surface to the major diameter of extrusion should be equal to 2.5 times the material thickness.

\[ D_1 = \text{Distance between offset Bend to extruded Hole} \]