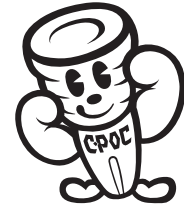


TECHNICAL COUNSELING FAQ

This time, we will introduce the prevention of warping (curvature) during blank punching.



WARPING PREVENTION OF BLANKING OUT

Q Although processing a blank out, the removed product may be warped or partially twisted. Currently, leveler corrects, but is there any good way?

A When the plate is punched out, the scraps are generally curved. (See Fig.1)
 This is because the material is subjected to bending and bending at the same time as punching, which causes plastic deformation of the material. (See Fig.2)
 Therefore, if the slug is a product like a blank tool, it may be necessary to make adjustments such as passing through a leveler in a later process.

As this measure,

1. Slitting the outline (Periphery).
 This method is generally adopted as a method of punching out the outer periphery (contour) of the product rather than punching out the product. In this case, products are connected by micro joints and separated after processing. (See Fig.3)
2. Reduce the die clearance.
 As the clearance increases, the bending force applied to the material increases and the curvature increases. In the case of a blank type, we recommend a clearance slightly smaller than the appropriate clearance. However, if the clearance is too small in the case of a thick plate, the burden on the tooling will increase and it may also cause damage to the tooling.
3. Re-grind early.
 Even when punched with a worn cutting edge, the bending force is increased and the curvature is greater. We recommend re-grinding early and punching with a sharp cutting edge.

Fig.1 Curved slug when punching

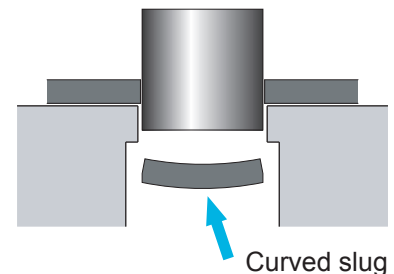


Fig.2 Applied force to the punching time

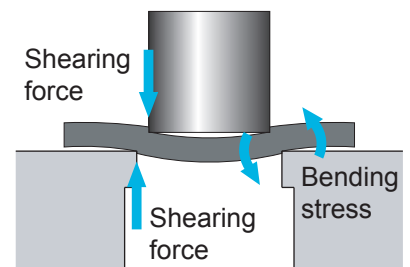
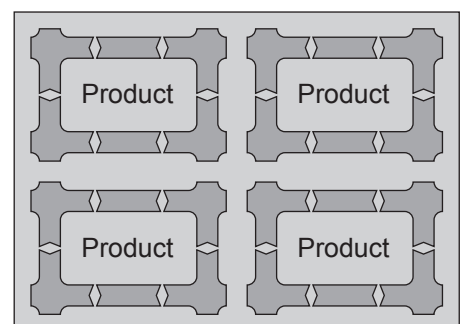


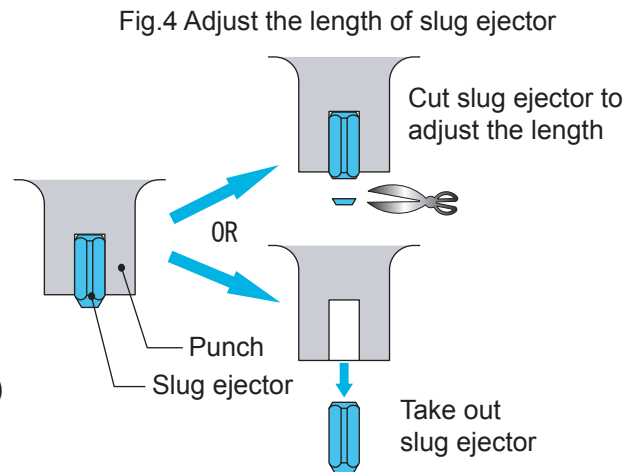
Fig.3 Micro joint processing



TECHNICAL COUNSELING FAQ

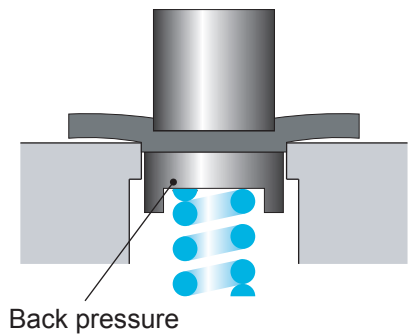
WARPING PREVENTION OF BLANKING OUT

4. Adjust the output length of the urethane kicker.
Even in the case of the blank type, a urethane kicker may be attached to the punch depending on the shape and size of the cutting edge, in order to prevent the phenomenon that the blank product is lifted without being dropped out (It is called slug pulling).
As a result, depending on the material and thickness of the workpiece, it is possible that deformation such as warpage may occur in the blank product.(See Fig.4)



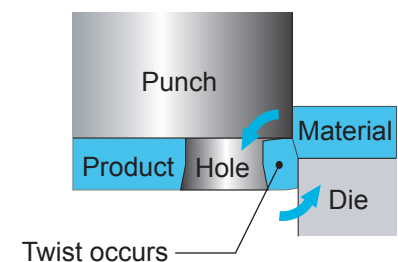
5. Back pressure
This is a method of correcting the curvature of the material by applying reverse pressure to tool and applying back pressure.
(See Fig.5)
Half sheared is done in this process, and it is pierced in another process.

Fig.5 Tooling with back pressure



6. To strengthen the holding force.
By using 1 bigger station size and increasing the plate pressing force, the bending force of the workpiece is suppressed and deformation is reduced.

Fig.6 Holes close to the edge of product outline



8. Do not attach shear angles to the blank type.
When punching with a punch with a shear angle, the blank is deformed by the shear angle. Always grind the punch surface (the surface that the material hits) flat.



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