

September 2018

Technical Tips

Slug trouble

1. What is the slug trouble?

The slug, or the punched waste, fails to fall through the die and be left on the sheet. The trouble may happen with the tool that had been no problem or even with a brand new set.

2. What causes the trouble?

The downward force, which is generated by the gravity, the inertia and the abrasion between the slug and the die, is overwhelmed by the force pulling the slug back upward for some reasons.

a. Burrs of the slug

Burrs are one of the factors of the upward force. When burrs generate, the slug catches the punch with the burrs and is withdrawn with the punch. Burrs are generated by the dull cutting surface, by a larger clearance or by a slower cutting speed.

b. Insufficient punch insertion

This often occurs after a cutting head is sharpened.

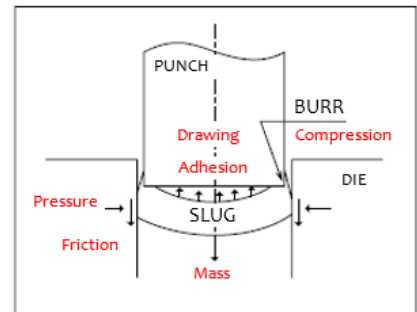
c. Magnetic attachment

d. Involved in the punch's withdrawal force

e. Oil-related attachment

f. Unfortunate tolerance combination

Every piece of punch, die and holder slightly vary due to tolerance. An unfortunate combination of deviation could cause a tiny bur or fail to provide a sufficient abrasive resistance.



3. How could we remove the cause?

a. Maximize the punching speed to minimize burrs.

b. Punch

- Urethane ejector (provided to over $\phi 6.0$)
- Apply roof top. The sharp end thrusts the slug when punching and pushes the slug back like a spring reaction when returning - more powerfully than the other top shapes.
- Apply shims to help punch insert more deeply.

c. Die

- Try Slug Wiper die.
- Have a proper clearance.

d. Sharpen your tools

- Sharpen a dull surface. The earlier, the better.
- Do not forget to degauss the sharpened object.
- Apply as many shims as necessary.

Q & A

Q: What could we do to minimize scratches on the backside of the sheet?

1. Replace the ball transfers / the brushes.

If the balls are covered with metal waste, the sheet will be damaged by the rough surface. Or if the brush is worn and not as high as required, the sheet will contact the holder while traversing.

2. Apply TIC coating to the stripper (upward forming tool only).

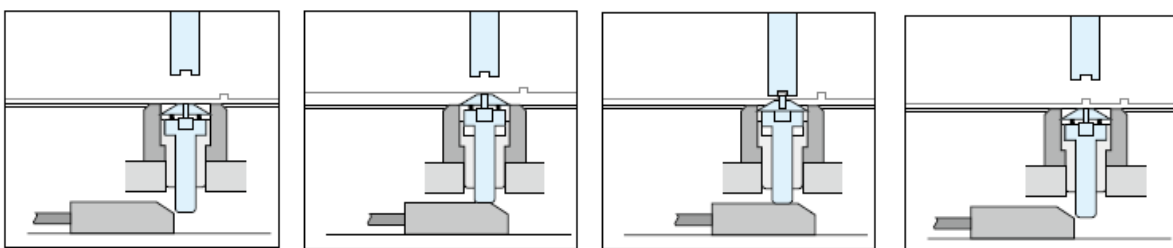
Many of the lower portion of upward forming tools are a little longer than punching dies because of its complicated construction. Therefore the forming surface stands out in the turret surface. The part called stripper is the one which contact the metal sheet. If the stripper has damage, projections will scratch the sheet. TIC coating will protect the stripper and reduce such possibility.

3. Try lower die model (upward forming only).

Lower type of the die is available but selection is limited. (Ask us)

4. Try a retractable model (upward forming only).

See blow. N.B. Some machines could not take this option. (Ask us.)



1) SHEET MOVES

2) PUSH UP

3) STRIKE

4) BACK TO POSITION

Good

- ✓ Fewer scratches on a metal sheet
- ✓ A metal sheet does not bend when punching takes place near the forming area.
- ✓ No limitation in table speed
- ✓ No interference with the work holder