

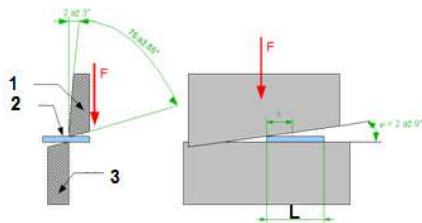
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Fourth School Year

PRESSING EQUIPMENT

Pressing equipment is one of the highly productive technologies suitable for large-series production. **Pressing** leads to a change in the shape of material without removing **chips** at temperatures, which do not **exceed** the recrystallization temperature. The most often method of **pressing** is **cutting**. **Cutting** leads to a separation of material from a **sheet** or **strip**. This is done with **shears** or special tools – that is a **cutting punch**. The **shears** gradually separate material. The **cutting punch** does it in one moment.

Shears



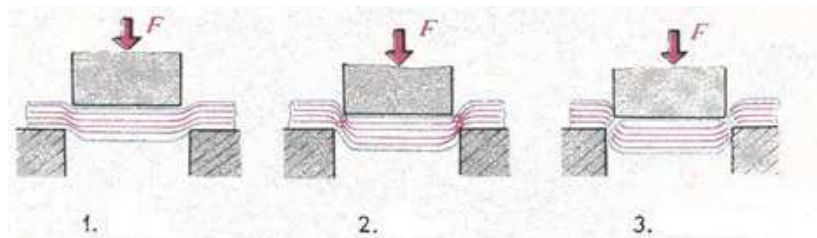
1. Upper **blade**
2. Material
3. Lower **blade**
- L...Cutting edge length

Cutting punch



Cutting principles:

Cutting phases:



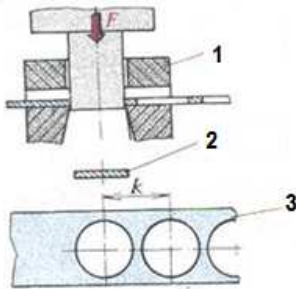
- 1st phase: when the **cutting punch** and **die** contact each other it leads to the formation of elastic deformation
- 2nd phase: stress increases the limit of elasticity and a **permanent** deformation forms

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- 3rd phase: stress increases above the breaking strength in the cut and a **blank** is separated from the **sheet**.

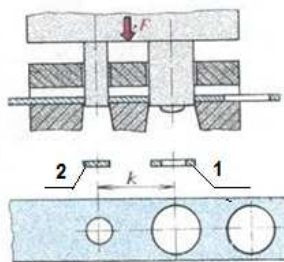
Kinds of *cutting* tools:

- 1) **Simple cutting punch** – one simple **blank** is cut out in one **stroke**



1. Leading **blanking punch**
2. **Blank**
3. **Waste**

- 2) **Gradual cutting punch** – in the first step a hole is made, in the second step the **periphery** cuts (the **blank** has to be for example, a washer under a screw nut)

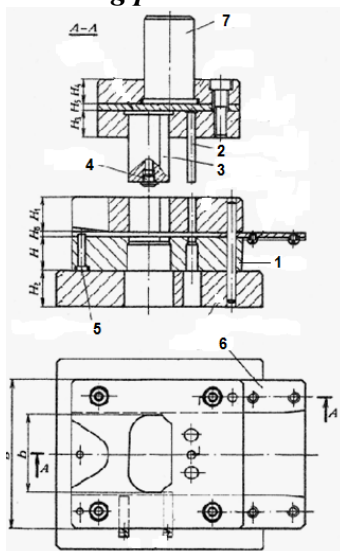


1. **Blank**
 2. **Waste**
- k...tool pitch

- 3) **Combined cutting punch** – the tool makes a hole and the **periphery** cuts in one step

- 4) **Combined tool** – the tool carries out other operations except **cutting**. Such as for example: **drawing**, **bending**, **flanging** and other operations.

Gradual cutting punch:



1. **Blanking die**
2. **Hole-making blanking punch**
3. **Peripheral punch**
4. **View-finder**
5. **End stop**
6. **Guide bar**
7. **Shank**

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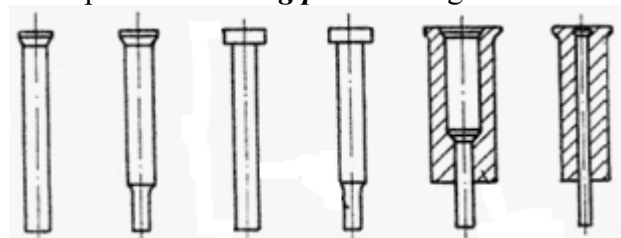
Basic parts:

a) Non-standardized:

Blanking punches:

The **blanking punch** is the moveable part of the **cutting punch** and it is produced from tool steels or alloyed carbide. It is checked for pressure and **buckling**. Due to its greater **brittleness** a **blanking punch** of alloyed carbide has to be shorter.

Examples of **blanking punch** design:



Blanking die:

The **blanking die** is the fixed part of the **cutting punch**. Its size comes from the size of the **blanking punch** and the **cutting clearance**.

b) Standardized parts:

Shank:

It clumps the upper part of the **cutting punch** in a **press ram**. It is placed into the centre of gravity of the cutting force.

Guide bars:

They are used to lead material between the **blanking punch** and **blanking die**.

View-finder:

It is used for centring of the **cutting periphery** to the **pre-cut** opening.

Stops:

They ensure the shift of a **sheet** one pitch between individual **blanks**.

Main technological principles:

Blanks are produced in an accuracy IT 12- 14 (common **cutting punch**), resp. IT 9 -11 (a **cutting punch** with guide posts).

Blank roughness is also determined by the type of punching die and it moves in a range Ra 6,3 – 0,2. It is necessary to design the shape of the **blank** so that at least 70 % of the **sheet** is used.

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VOCABULARY

bending	ohýbání
blade	břit
blank	výstřižek
blanking die	střižnice
blanking punch	střižník
brittleness	křehkost
buckling	vzpěr
chip	tříška
cutting	stříhání
cutting clearance	střižná vůle
cutting punch	stříhadlo
drawing	tažení
end stop	koncový doraz
exceed	přesahovat
flanging	lemování
guide bar	vodící lišta
hole-making blanking punch	děrovací střižník
periphery	obvod
permanent	trvalý
pitch	krok
pre-cut	předstřižený
press ram	beran lisu
pressing	lisování
pressing equipment	lisovací technika
shank	stopka
shear	nůžky
sheet	plech
strip	pás
stroke	zdvih
view-finder	hledáček
waste	odpad

COMPREHENSION QUESTIONS

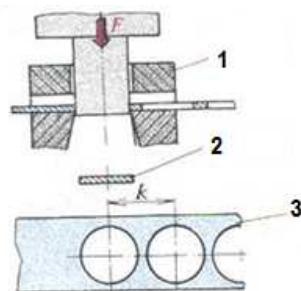
1. What do you remember about pressing equipment?
2. What is the most often method of pressing?
3. Can you tell us cutting principles?
4. What kinds of cutting tools do you know?

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EXERCISES

1. What can you see in the picture? Then describe the picture.

- 1
2
3



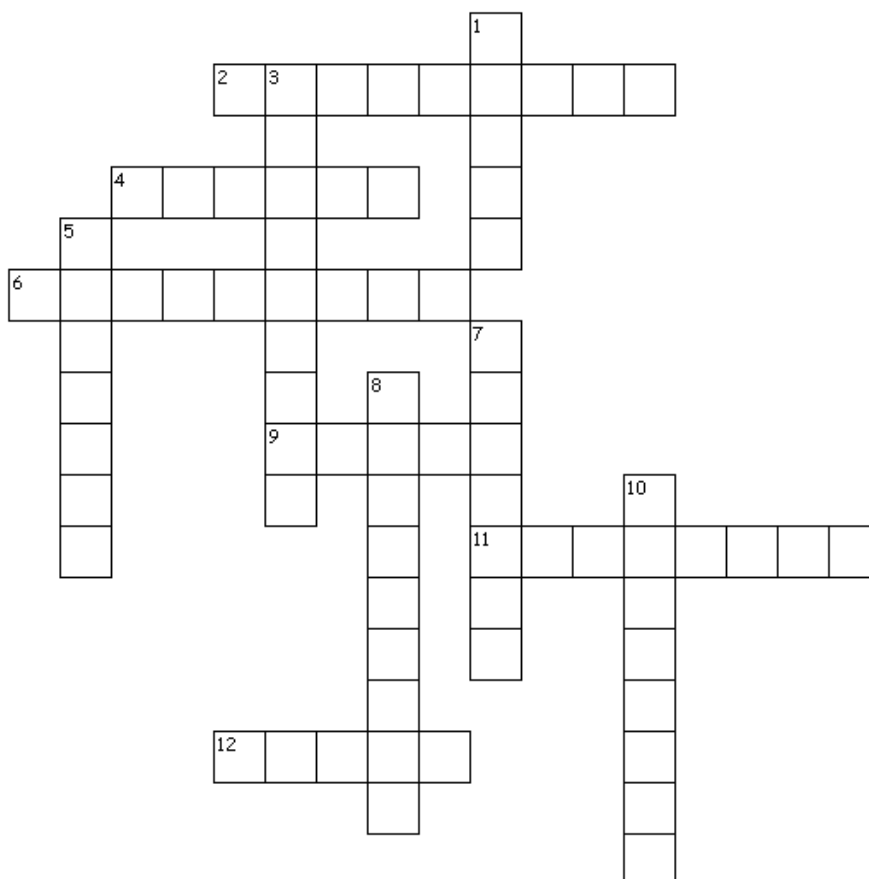
2. Criss Cross Puzzle - 12 words were placed into the puzzle.

Across

2. postupně
4. zajišťovat
6. obvod
9. plech
11. zvyšovat
12. výstřížek

Down

1. odpad
3. drsnost
5. ohýbání
7. stříhání
8. trvalý
10. lisování

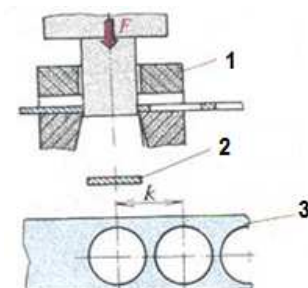


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EXERCISES – KEY FOR TEACHERS

1. Simple cutting punch

- 1 Leading blanking punch
- 2 Blank
- 3 Waste



2. Criss Cross Puzzle

cutting	stříhání
pressing	lisování
waste	odpad
bending	ohýbání
permanent	trvalý
increase	zvyšovat
sheet	plech
gradually	postupně
periphery	obvod
ensure	zajišťovat
blank	výstřižek
roughness	drsnost