

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Third School Year

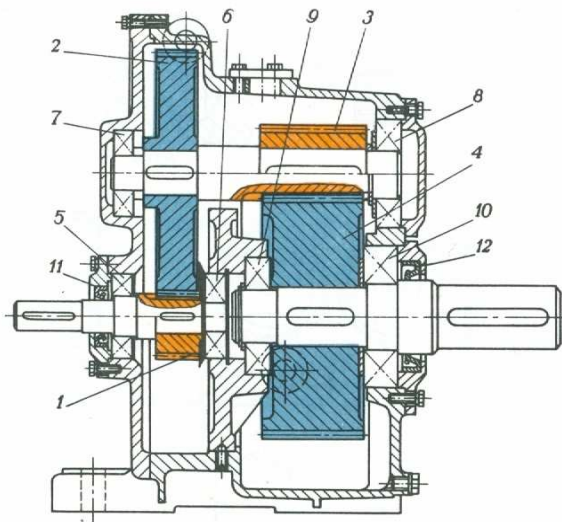
KINDS OF TRANSMISSIONS, GEARS AND SPUR GEARS WITH STRAIGHT TEETH

A **transmission** is mechanical equipment which transfers the **torsion moment**, changes its size or increases or decreases the rotations of a driven **shaft**. It can also change the sense of rotation. Mechanical **transmissions** are used in operating with constant **gears**. Car **transmissions** use gradual or completely changeable **gearing**.

Transmissions are made up of these basic parts:

1. **Gearbox**
2. **Shafts** – *driving* and *driven*
3. **Bearings** - *antifriction* or *sliding*
4. **Gear** wheel – *pinion* and *gear* wheel or *gears*
5. **Sealing rings** – they limit *oil leakage*

Picture 1 – A transmission with two spur gears and a shaft on a vertical plane



1 - pinion of the input shaft, 2 - gear wheel of the central shaft (layshaft), 3 - pinion of the central shaft (layshaft), 4 - gear wheel of the output shaft, 5,6 - input shaft bearings, 7,8 - central shaft bearings, 9,10 - output shaft bearings, 11 - input shaft sealing ring, 12 - output shaft sealing ring.

A **transmission** can have one or more **gears**. The number of **gears** depends on the method of use. This means what output rotation and output **torsion moment** we need. Every **transmission** is evaluated according to its **transference** number. We get this number from the speed ratio, the wheel diameter and the number of teeth of the **driving** and **driven** wheels. The **transference** number is expressed as a ratio – and it is **non-dimensional**.

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A **gear** wheel can be connected with a **shaft** using these methods:

1. **non-dismantled** – the **shaft** is produced with a **gear** wheel as a machined casting.
The **gear** wheel is pressed with an overlap on the **shaft**.
2. **dismantled**

A **gear** wheel with a **shaft** is made:

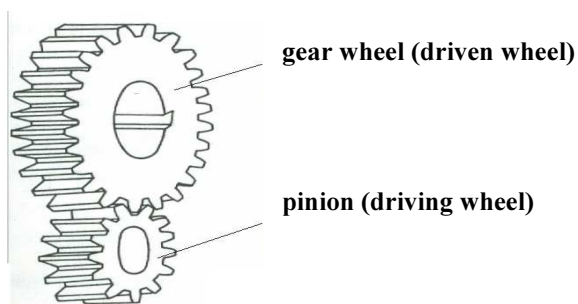
- A) using a **sealing spring**
- B) using **grooving**

The most often used **gears** are:

1. **spur** (see Picture 2)
2. **bevel**
3. **spiral**
4. **worm**

The types of teeth are classified according to their method of use. They can be straight, **slanted**, **backswept**, and other types.

Picture 2 - A spur gear with straight teeth



Geared **transmissions** transfer the **torsion moment** from the **driving shaft** to the **driven shaft** using form contact without **slippage**. The advantages are a constant **speed ratio** and a small **axial shaft** distance.

Advantages:

1. high **efficiency**
2. long **durability**
3. simple **maintenance**

Disadvantages:

1. **demanding** production
2. high costs
3. **accuracy** is **demanding**

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VOCABULARY

antifriction	valivý
axial	osový
backswept	šípovitý
bearing	ložisko
bevel	kuželový
demanding	náročný
dismantled	rozebíratelný
driven	hnaný
driving	hnací
durability	životnost
efficiency	účinnost
gear	ozubený převod, soukolí
gearing	ozubení
gearing profile	profil zubu
grooving	drážkování
layshaft	předlohový hřídel
non-dimensional	bezrozměrný
non-dismantled	nerozebíratelný
oil leakage	únik oleje
sealing ring	těsnící kroužek
shaft	hřídel
slanted	šikmý
sliding	kluzný
slippage	skluz
speed ratio	poměr otáček
spiral	šroubový
spring	pero
spur	čelní
torsion moment	kroutící moment
transference	převodový
transmission	převodovka
worm	šnekový

COMPREHENSION QUESTIONS

1. What is a transmission?
2. What parts is a transmission made up of?
3. Can you name the most often used gears?
4. What does a geared transmission transfer?

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EXERCISES

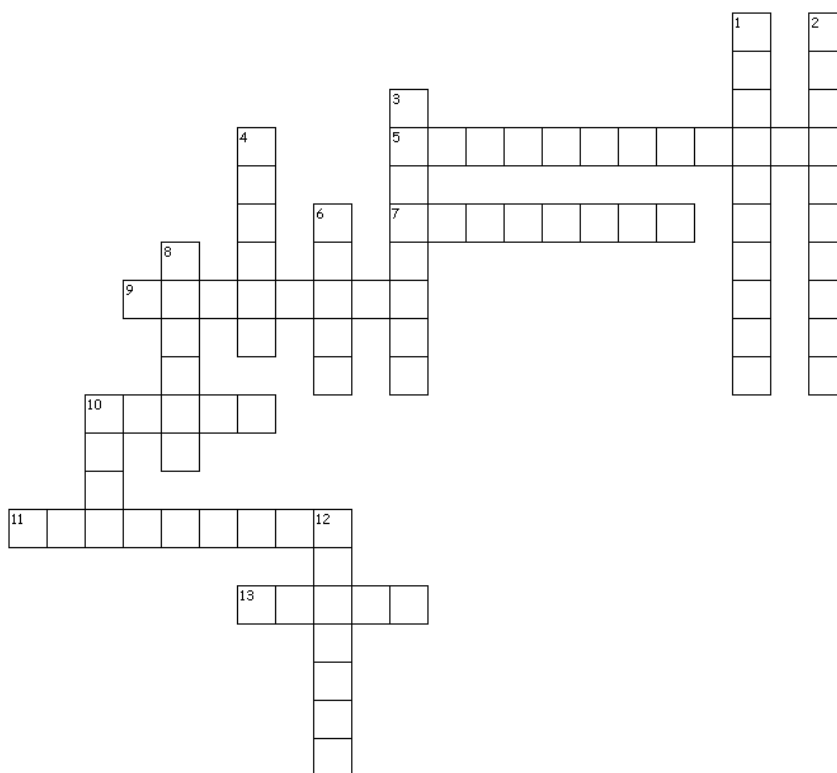
1. **Criss Cross Puzzle** - 14 words were placed into the puzzle.

Across

- 5. převodovka
- 7. přesnost
- 9. drážkování
- 10. kolo
- 11. náročný
- 13. hřídel

Down

- 1. účinnost
- 2. měnitelný
- 3. přímý
- 4. pastorek
- 6. osový
- 8. hnáný
- 10. šnekový
- 12. ozubení



2. Read the definitions and supply the words from the box:

accuracy	durability	increase	gradual	demanding	spring	distance
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- 1 happening slowly over a long period
- 2 to become or to make sth greater in amount, number etc.
- 3 a twisted piece of metal that can be pressed or pulled but which always returns to its original shape or position
- 4 to last for a long time without breaking
- 5 expecting a lot of work or attention from others
- 6 the amount of space between two places or things
- 7 being exact or correct

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EXERCISES – KEY FOR TEACHERS**1. Criss Cross Puzzle**

transmission převodovka
shaft hřídel
gearing ozubení
pinion pastorek
wheel kolo
changeable měnitelný
driven hnáný
axial osový
efficiency účinnost
demanding náročný
accuracy přesnost
straight přímý
grooving drážkování
worm šnekový

2. Definitions

- | | | |
|---|---|-------------------|
| 1 | happening slowly over a long period | GRADUAL |
| 2 | to become or to make sth greater in amount, number etc. | INCREASE |
| 3 | a twisted piece of metal that can be pressed or pulled but which always returns to its original shape or position | SPRING |
| 4 | to last for a long time without breaking | DURABILITY |
| 5 | expecting a lot of work or attention from others | DEMANDING |
| 6 | the amount of space between two places or things | DISTANCE |
| 7 | being exact or correct | ACCURACY |