

Third School Year

FRICION DRIVES

1. Introduction

In **friction drives** the **peripheral** force between pressed wheels is transferred by **friction**. To **reach peripheral** forces we need both a pressed force and the biggest **friction co-efficient**. **Friction drives** use close parallel shafts or **perpendicular** shafts for transferring smaller **outputs**.

Friction drives have constant or **variable** drives (it means **variators**). **Friction drives** are used for the transfer of smaller **outputs**.

2. The **friction drive** advantages are:

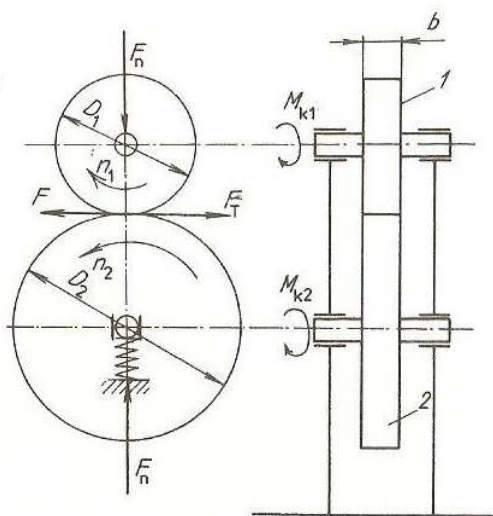
- calm and almost **noiseless** operation, no need for **tractive** elements
- small axial **distance**
- the drive can also work as a **clutch**
- it is possible to change rotations while the machine is running
- immediate **equalization** when the **friction** wheel **slips**

3. The **friction drive** disadvantages are:

- pressure on the shaft and **bearings**
- **instability** of the **gear** speed ratio

4. For a **friction drive** description see Picture 1:

Picture 1



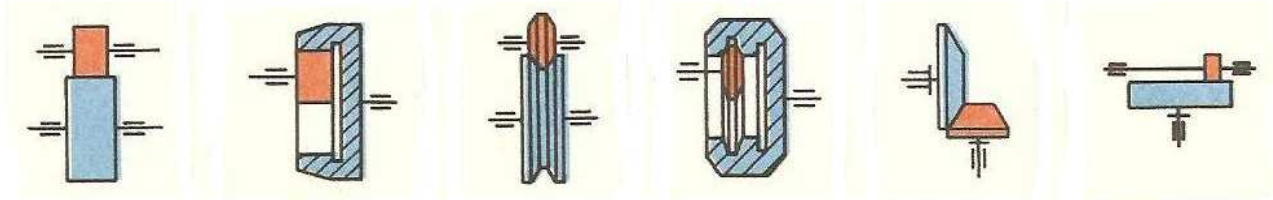
- 1 ... **driving wheel**
- 2 ... **driven wheel**
- D_1 ... **driven wheel diameter**
- D_2 ... **driving wheel diameter**
- F_n **pressed force**
- F_T **friction force**
- F ... **peripheral force**
- b ... **friction wheel width**
- M_k ... **torsional moment**

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5. Types of *friction gear mechanisms*

There are the following types of friction gear mechanisms:

external *internal* *external* *internal* *bevel* *spur*

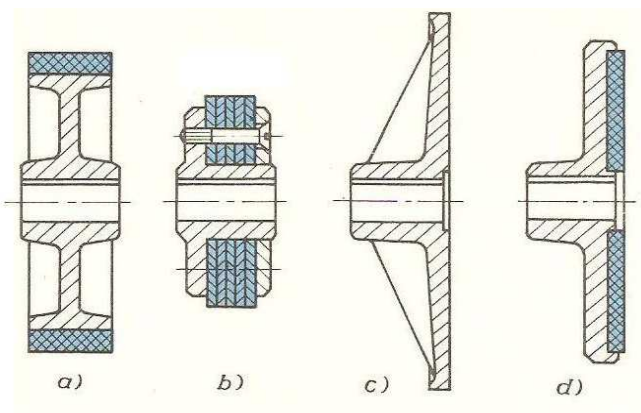


6. *Friction wheel material*

The **output** which is transferred depends on the material of the **driving** and **driven wheels**. Hardened steel, cast iron, **rubber**, **layered leather** and **fibre** are used.

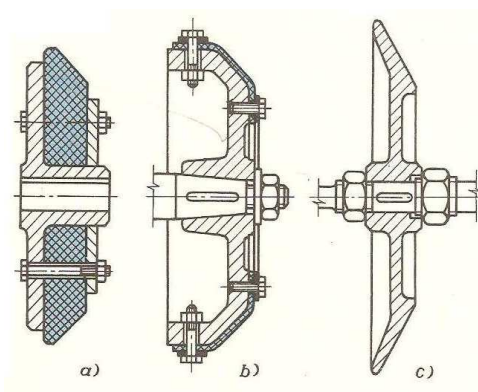
7. Structural layouts of *friction wheels*

Friction wheels are classified as **helical**, **spur** and **bevel** according to shape.



7.1 There are the following examples of **friction** wheels:

- a, b ... **helical** with a **lining**
- c ... **spur**
- d ... **spur** with a **lining**



7.2 There are the following examples of **bevel friction** wheels:

- awheel with a **rubber lining**
- b ... wheel with a **leather lining**

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VOCABULARY

bearing	ložisko
bevel	kuželový
clutch	spojka
co-efficient	součinitel
diameter	průměr
distance	vzdálenost
driven wheel	kolo hnané
driving wheel	kolo hnací
equalization	vyrovnání
fibre	vlákno
friction	tření
friction drive	třecí převod
gear	ozubený převod
helical wheel	čelní kolo
instability	nestálost
layered leather	vrstvená kůže
lining	obložení
noiseless	nehlučný
output	výstup, výkon
peripheral	obvodový
perpendicular	kolmý
pressure	tlak
reach	dosáhnout, docílit
rubber	pryž
slip	skluz, prokluz
spur gear	licní soukolí
torsional	krouťící
tractive	tažný
variable	měnitelný
variator	variátor
width	šířka

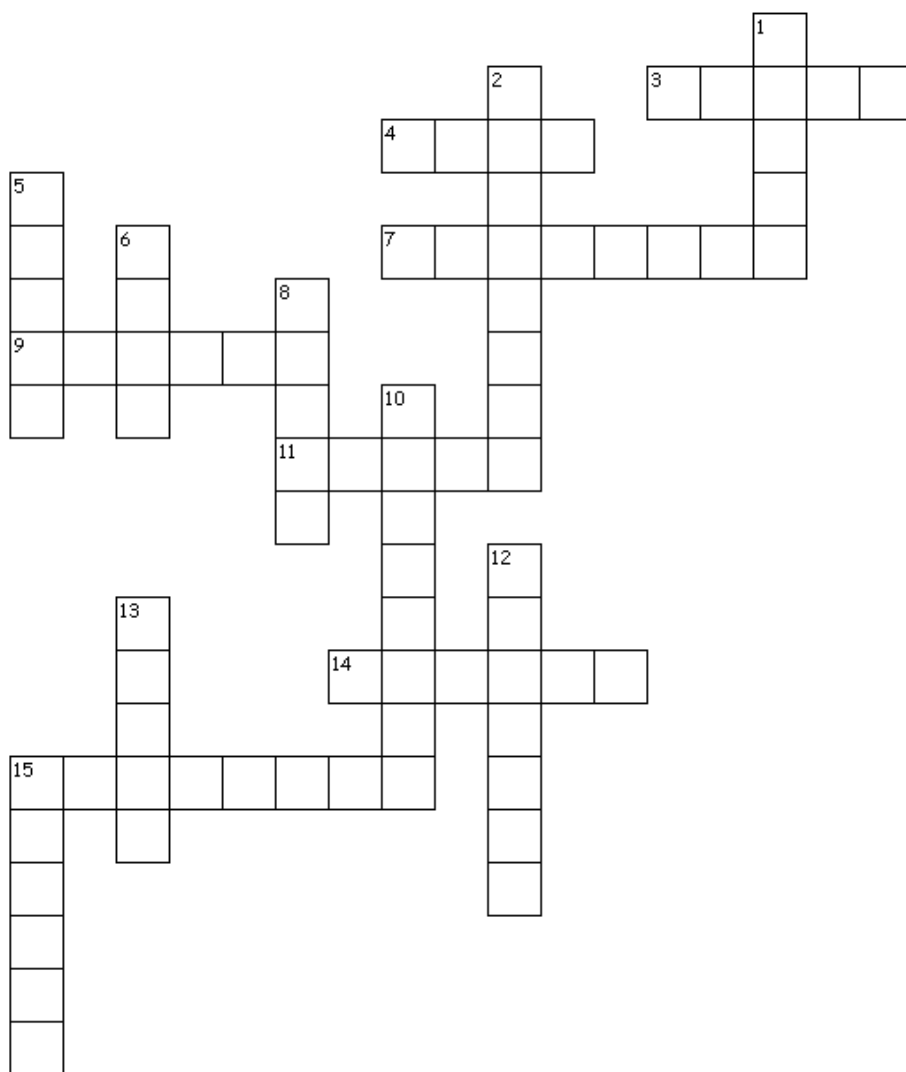
COMPREHENSION QUESTIONS

1. How do we reach the peripheral force?
2. When do we use friction drives?
3. What are friction drive advantages?
4. What are friction drive disadvantages?
5. What types of friction gear mechanisms do you remember from the text?
6. What kind of driving and driven wheel materials do we use?

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EXERCISES

1. Criss Cross Puzzle - 16 words were placed into the puzzle.



Across

- 3. kolo
- 4. prokluz
- 7. vnější
- 9. spojka
- 11. síla
- 14. obložení
- 15. otáčka

Down

- 1. kuželový
- 2. vzdálenost
- 5. dosáhnout
- 6. licní
- 8. hřídel
- 10. tření
- 12. hnací
- 13. šířka
- 15. pryž

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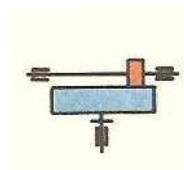
2. Match A with B. Then translate the expressions into Czech:

A	B	
1 driven	a drive	_____
2 tractive	b force	_____
3 peripheral	c operation	_____
4 torsional	d iron	_____
5 friction	e wheel	_____
6 noiseless	f element	_____
7 cast	g lining	_____
8 rubber	h moment	_____

3. Match the pictures with their descriptions:

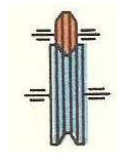
1 bevel

a



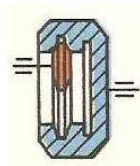
2 internal

b



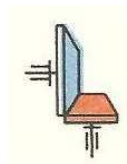
3 spur

c



4 external

d



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KEY FOR TEACHERS

1. Criss Cross Puzzle

spur	licní
bevel	kuželový
force	síla
rubber	pryž
wheel	kolo
lining	obložení
slip	prokluz
width	šířka
clutch	spojka
distance	vzdálenost
reach	dosáhnout
friction	tření
external	vnější
driving	hnací
shaft	hřídel
rotation	otáčka

2.

A		B	
1	driven	e	wheel <i>kolo hnané</i>
2	tractive	f	element <i>tažný člen</i>
3	peripheral	b	force <i>obvodová síla</i>
4	torsional	h	moment <i>krouťící moment</i>
5	friction	a	drive <i>třecí převod</i>
6	noiseless	c	operation <i>nehlučný chod / operace</i>
7	cast	d	iron <i>litina</i>
8	rubber	g	lining <i>obložení pryží</i>

3.

1d 2c 3a 4b