Third School Year

RADIAL AND AXIAL BRAKES

Brakes are used for reducing speed or for stopping the motion of ***bodies***. They can also ensure their position of rest. According to the methods of ***achieving*** braking effects, ***brakes*** are classified as:

- mechanical (the effect is reached by ***skid friction***)
- flow (using the internal ***friction*** of liquids)
- electric (using the working of the ***stator*** field and ***brake*** rotor together)

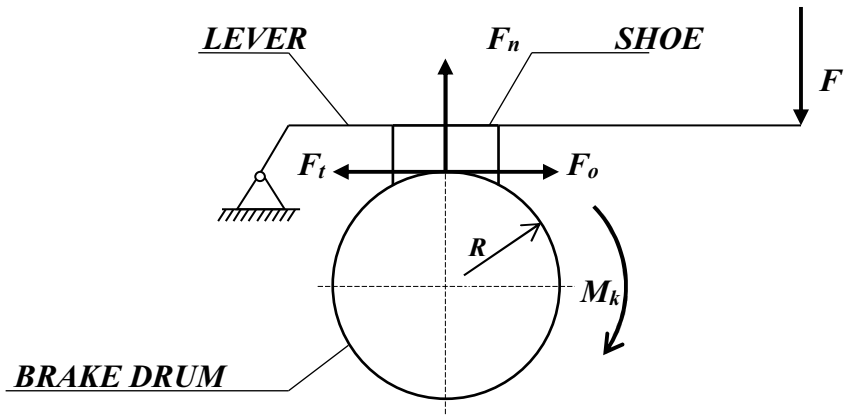
***Brakes* are used for example by:**
– vehicles, ***cranes***, ***conveyors***, ***lifts***

Mechanical *brake* structure
A basic component of every ***brake*** is the ***brake drum*** or disk and the pressure ***element***. ***Brakes*** are ***radial*** or ***axial*** according to how they work together. ***Brakes*** are ***shoe***, ***band*** and ***multi-disk*** according to the shape of the pressure ***element***. ***Shoe brakes*** are ***drum*** or ***disk***.

Brake control is carried out:

- mechanically (by a weight, by a ***spring***)
- hydraulically (for passenger car ***brakes***)
- pneumatically (for train ***brakes***, for truck and tractor ***brakes***)
- electro-hydraulically (for ***crane*** and ***lift brakes***)

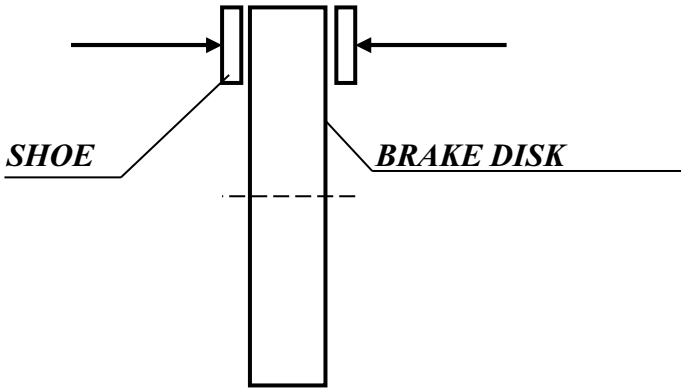
Single-shoe *drum brake (radial)*



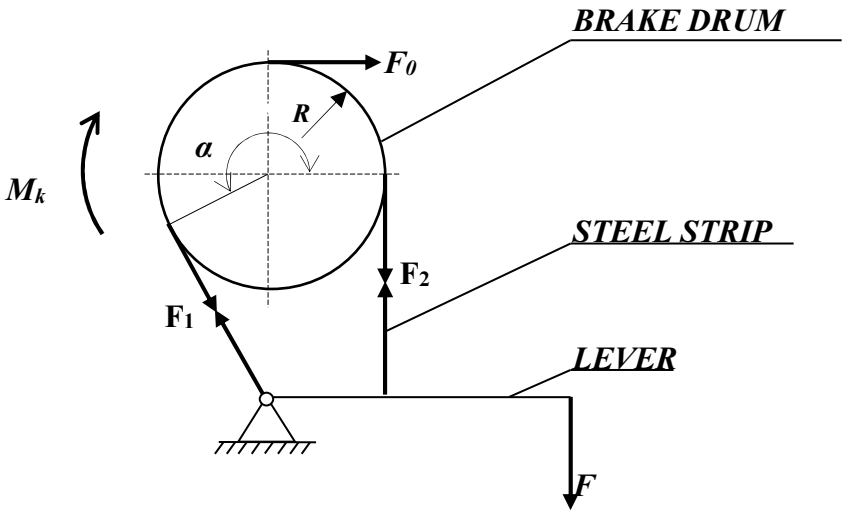
M_k – ***torsion moment***
F_o – ***peripheral*** force
F_n – normal force
F_t – frictional force
R – ***drum radius***
F – force for the braking moment

Skid friction condition is:
$F_t = F_n \cdot f$
f – ***skid friction co-efficient***

Disk brake diagram (*axial*)



Simple *band brake*



F_o – ***peripheral*** force
F_1, F_2 – force in ***strips***
F – force for the braking moment
M_k – ***torsion moment***
α – angle of contact
R – ***drum radius***

Source: Jiří Zelený: Stavba strojů

VOCABULARY

achieve	dosáhnout
axial	axiální, osový
band	pásový
body	těleso
brake	brzda
brake control	ovládání brzd
brake drum	brzdový buben
co-efficient	součinitel
conveyor	dopravník
crane	jeřáb
disk	kotouč
element	člen
friction	tření
lever	páka
lift	výtah
multi-disk	lamelový
peripheral	obvodový
radial	radiální
radius	poloměr
shoe	čelist, čelisťový
skid	smyk, smykový
spring	pružina
stator	stator motoru
strip	pás
torsion moment	kroutící moment

COMPREHENSION QUESTIONS

1. What is the main use of brakes?
2. Where do we use brakes?
3. What is the basic component of every brake?
4. How is the brake control carried out?

EXERCISES

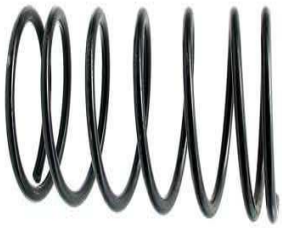
1. Name what you see in the pictures:

1

2

3

4



5

6

7

8

2. Translate the verbs into English:

1 pracovat
2 brzdit
3 snižovat
4 dosáhnout
5 použít
6 provést

3. Choose 4 of the verbs from Exercise 2 to translate the following sentences:

1 Brzdy snižují rychlost.
2 Pasažér vlaku použil záchrannou brzdu.
3 Pracujeme společně.
4 Dosáhneš na dno?

EXERCISES – KEY FOR TEACHERS ONLY

1.

1 lever
2 wheel
3 crane
4 spring
5 vehicle
6 drum
7 lift
8 liquid

2.

1	pracovat	***work***
2	brzdit	***brake***
3	snižovat	***reduce***
4	dosáhnout	***reach, achieve***
5	použít	***use***
6	provést	***carry out***

3.

1 ***Brakes reduce speed.***
2 ***Train passanger used the emergengy brake.***
3 ***We work together.***
4 ***Can you reach the bottom?***