

Power Transmission Methods

1. Differentiate between individual drive and Group drive.

Individual Drive

Group Drive

- | | | |
|----|---|--|
| 1. | In this drive IF one motor is used to drive one load. | In this drive only one motor is to be handled. |
| 2. | Noise level at work spot is very less. | Noise level at work spot is very high. |
| 3. | System operator is very safe. | System operator is less safe. |
| 4. | Give good appearances. | not Give good appearances. |
| 5. | The Fixed cost is high. | The Fixed cost is less. |
| 6. | less overload capacity. | high overload capacity. |
| 7. | In this drive speed control of individual is very easy. | In this drive speed control of individual is very difficult. |

2 Write a short note on : Types of Belt Drive

The Belt drive is also known as continuous power transmission.

The Belt is a flexible element of a mechanical system.

The Belt drive is used to transfer the power from one system to another system.

=> These are Seven types of Belt Drive.

1 Open Belt Drive:

In this drive the shafts rotate in the same direction as driving and driven Pulley rotate.

The shafts are arranged in the parallel direction.

2 Crossed Belt Drive:

In this drive more power transfer from one system to another system.

In this drive the shafts rotate in the opposite direction as driving and driven

pulley rotate.

3 ~~Crossed Be~~

3 Fast and Loose Pulley Drive:

In this drive two pulley is used.

Fast pulley is mounted on a shaft with keyed joint

Loose Pulley is runs freely on the shaft

4 Stepped Pulley Drive:

It drive is also know as stepped cone

In this drive we change in speed of driven shaft.

5 Quarter Drive:

In this drive the shafts rotates in clockwise or anticlockwise direction.

6 Right Angle Drive:

In this drive the shafts rotates with axis making 90° with each other.

7 Compound Drive:

∩ This type of driven used when several shafts are driven from one central shaft.

3 State the different types of pulleys used in power transmission and define velocity ratio of pulleys.

Pulleys is a mechanical component used to transfer motion from shaft to belt.

This is different types of Pulleys.

1. Fixed Pulleys
2. Movable Pulleys
3. Compound Pulleys
4. Fast and loose Pulley
5. Jockey Pulley
6. Cone Pulley
7. Step Pulley
8. Round Pulley etc.

⇒ Velocity Ratio of Pulleys,

Let D_1 is the diameters of the driver and D_2 is the diameter of the follower pulley and N_1 and N_2 is speed in revolutions per minute.

Surface Speed of driver = $\pi D_1 N_1$

Surface Speed of follower = $\pi D_2 N_2$

Assuming surface has no slip,

$$\therefore \pi D_1 N_1 = \pi N_2 D_2$$

$$\therefore \frac{N_2}{N_1} = \frac{D_1}{D_2} \quad \text{--- (1)}$$

Similarity $\frac{N_4}{N_3} = \frac{D_3}{D_4}$ --- (2) here $N_2 = N_3$

IF we take belt thickness t

$$\text{than, } \frac{N_2}{N_1} = \frac{D_1 + t}{D_2 + t}$$

Multiple eqⁿ 1 and 2

$$\therefore \frac{N_2}{N_1} \times \frac{N_4}{N_3} = \frac{D_3}{D_4} \times \frac{D_1}{D_2}$$

Here $N_2 = N_3$

$$\therefore \frac{N_4}{N_1} = \frac{D_1}{D_2} \times \frac{D_3}{D_4}$$

This is velocity ratio of Pulley.

4 State the ci) Application cii) Advantages and ciii) disadvantages of

A) Rope Drive B) Chain Drive C) Gear Drive

A Rope Drive:

=> Application:

The main application of rope drive is Power transmission over long distances.

It is commonly seen in elevators and cranes.

=> Advantages:

- 1 Low-Cost and Economical
- 2 Runs in any direction
- 3 Strong and Flexible ropes

4. Smooth and noise resistant
5. long-distance power transitions.

=> Disadvantages

- 1 Failure of rope does not have any sign.
- 2 Wire rope gets corroded.

B Chain Drive

=> Application:

- 1 Moving heavy materials
- 2 Operating Conveyor belts.
- 3 Hydraulic lift truck fork operation.

=> Advantages:

1. High transmission efficiency.
2. Higher velocity ratio.
3. More Power transmission than belts drive.

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=> Disadvantages :

- 1 Costly drives
- 2 High cleanliness required
- 3 Special tool required
- 4 Vibration is Produce.
- 5 Manufacturing of gear is difficult.