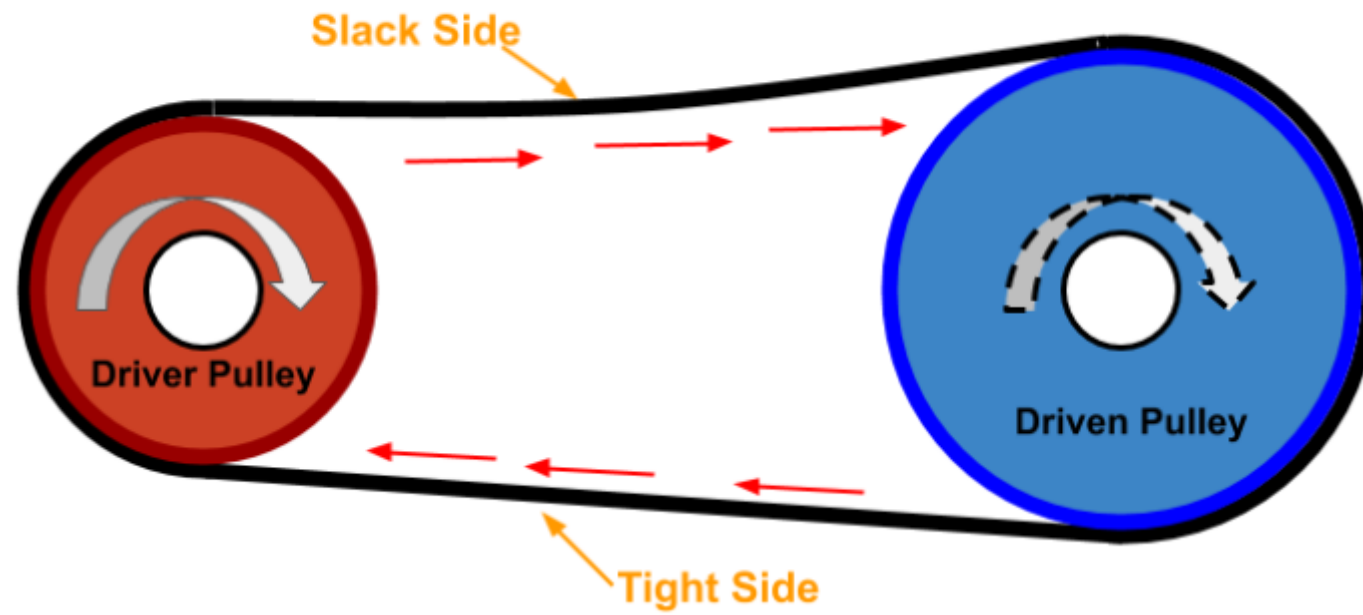


Mechanical Power Transmission

Belt Drive...

Belt Drive Working Principle



A simple belt pulley system consists of a driver pulley, driven pulley, and a belt. When the driver pulley rotates, it causes pulling action due to friction. The pulling effect rotates the driven pulley in the same direction as the driver pulley and results in the tight-side and slack-side on the belt pulley system.

Types of Belt used in Belt Drive

Here are the four different types of belts used to connect and rotate one shaft from another shaft. Each of these belt types has its advantages and limitations.

1. Flat Belt
2. V-Belt
3. Round Belt
4. Timing / Toothed Belt

Flat Belt

Flat Belt

A flat belt has a rectangular cross-section and has application to transfer power from one shaft to another shaft at a relatively large distance. In this, the frictional force between the flat belt and pulley transfers power between shafts.



Flat Belt

Advantages of Flat Belt Drive

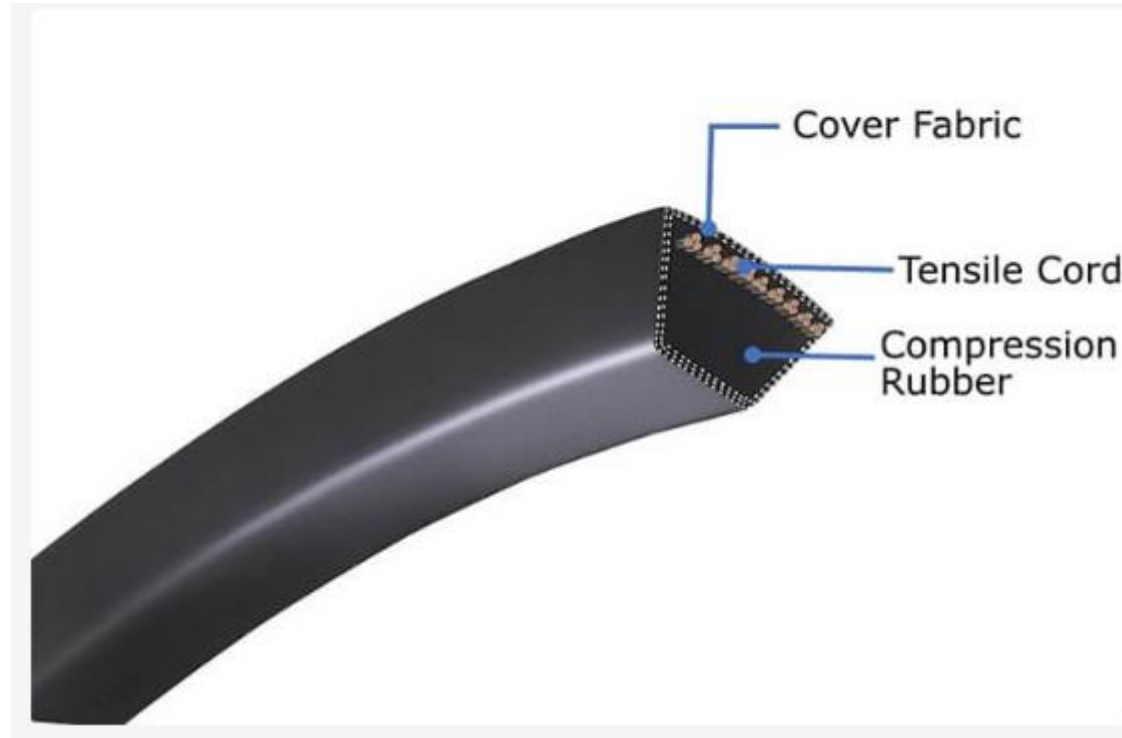
- Low Cost and simple to manufacture.
- Transfer Power at a relatively large distance.
- Can withstand high load

Disadvantages of Flat Belt Drive

- Not Suitable for small distances.
- High Slippage and creep results in loss of power.
- You can not achieve a constant Velocity ratio between driver and driven pulley.
- High Noise
- Low Mechanical Efficiency

V-Belt

V-Belt has a trapezoidal cross-section and is used in the grooved pulley. They have an application to transfer power from one shaft to another at small distances.



Advantage of V-Belt Drive

- Transfer power between small distances.
- Low slippage and alignment problem.
- Can transfer high power at high speed.

Disadvantages of V-Belt Drive

- High Cost compared to flat belt drive.
- V-belts can not transfer power at a longer distance.

Round Belt

Round belts have a circular cross-section and are used in round groove pulleys.



Advantages of Round Belt

- Transfer power at relatively larger distances.
- Low cost
- Less wear
- High mechanical efficiency ~ 95%

Disadvantages of Round Belt

- High slippage

Timing Belt

The timing belt has teeth that fit into the toothed pulley. They are also known as positive transfer belts. [Click this link for more details on timing belts.](#)



Advantages of Timing Belts

Timing belts have the following advantages compared to flat or round belt drives.

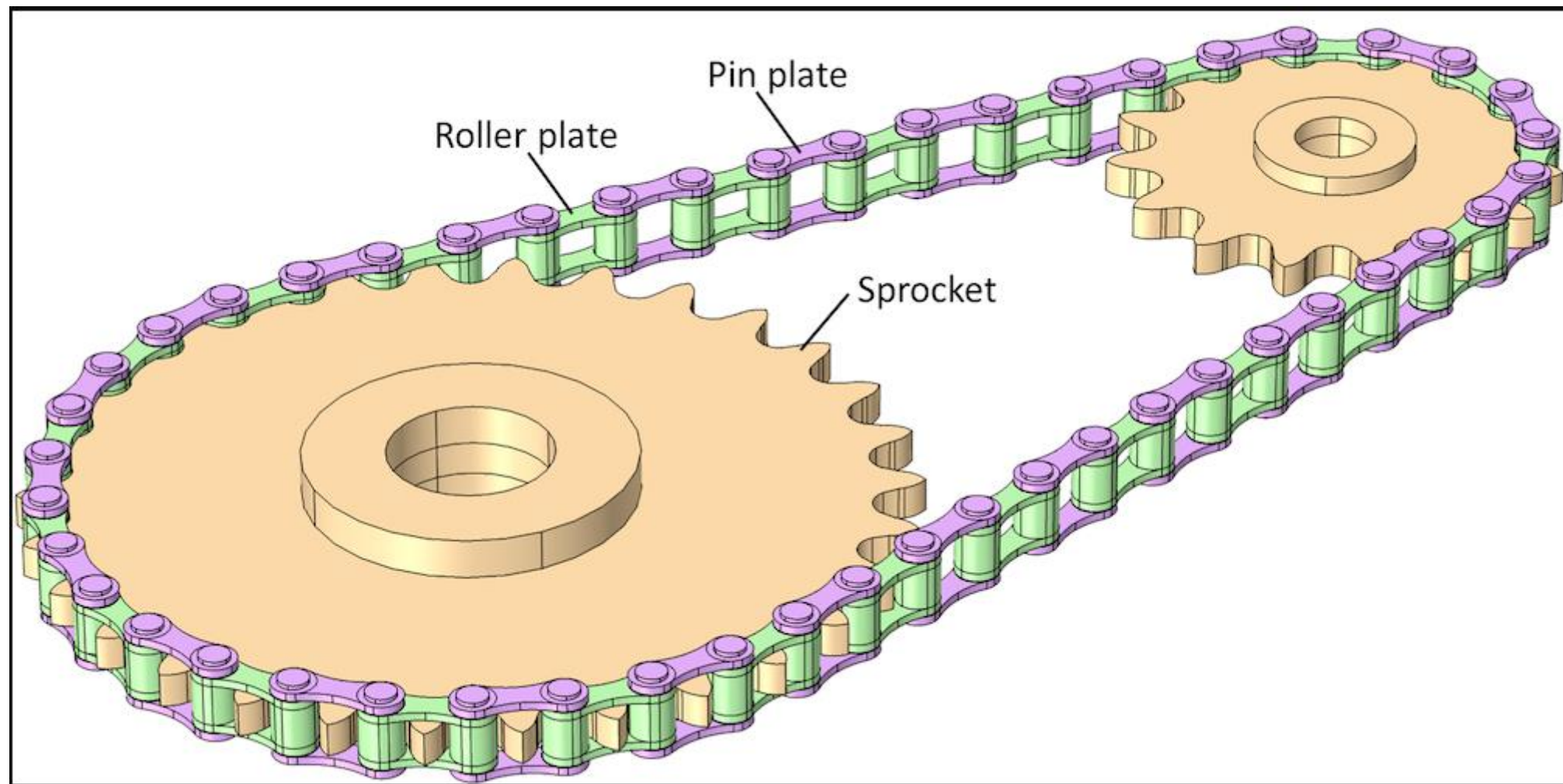
- Low Noise
- Low vibrations
- No slippage Problem
- High Mechanical Efficiency: Upto 98%
- Constant Velocity Ratio
- Low Maintenance

Disadvantages of Timing Belts

Along with so many advantages, they have the following limitations as well:

- High Cost
- Initial alignment with the timing pulley is required.
- Used to transfer relatively low power.
- Transfer power at a relatively smaller distance.

Chain Drive



Advantages of chain drive

- 1 No slip and creep during the power transmission, it ensure the perfect velocity ratio.
The output side rotate at precise speed.
- 2 High transmission efficiency than friction drive.
- 3 They can be operated under adverse thermal and atmospheric conditions.
- 4 It can operate under wet conditions.
- 5 It can use in both short and long distance power transmission.
- 6 It transmit more power than belt and rope drive.
- 7 The chain drive permits high velocity ratio in single step.
- 8 In low speed drives, chain drives are more practical than belt.
- 9 Since all parts are made of metal, it occupy less area than belt drives.
- 10 Less load on the shafts.
- 11 Far less frictional loss
- 12 One chain can be used to transmit motion to more than one shafts.
- 13 The chains are often narrower than belt, it helps easy gear shifting (varying gear ration)

Disadvantages of chain drive

- 1 There may be velocity fluctuation and under excessively stretched chain conditions.
- 2 Conventional chain drive suffers vibrations due to chordal effect.
- 3 The production of chain drive is higher than belt drives.
- 4 The chain drive needs accurate and careful mounting.
- 5 The chain drive need careful maintenance, lubrication and slack adjustments.
- 6 If there is no frequent proper lubrication the chain wear out faster than belts and ropes.

Gear Drive

