

6.4 CHAIN DRIVES

A chain drive consists of an endless chain running over two sprockets driver and driven. These are used where positive action is required. The velocity ratio is constant up to some extent. The chains are mostly used to transmit motion and power from one shaft to another, when the centre distance between the shafts is short such as in bicycles, motorcycles, agricultural machinery etc.

The chain drives has the following advantages over a belt drive.)

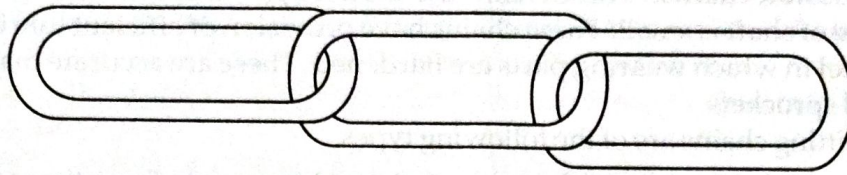
- (i) It is a positive drive.
- (ii) It can be employed both for relatively long or short centre distances.
- (iii) A small and compact size of the drive as to belt drive and occupy lesser space.
- (iv) Less loads on the shafts.
- (v) The drive can have 98 percent efficiency under ideal conditions.
- (vi) Gives constant velocity ratio.

Disadvantage of a chain drives are that due to wear of chain joints, there is gradual stretching of it. Its costs are relatively high. Its operation is noisy. This drive is heavy and lubrication is also required.

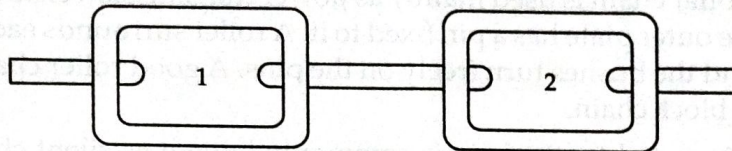
Chains are made up of rigid links which are hinged together and are of various types, classified as per their use.

- (i) Hoisting chains
- (ii) Conveyor chains
- (iii) Power transmission chains

1. Hoisting chains: The hoisting chains are used for hoisting and hauling purpose. These are of two types chains with oval links and chains with square links.



(a) Chain with oval links



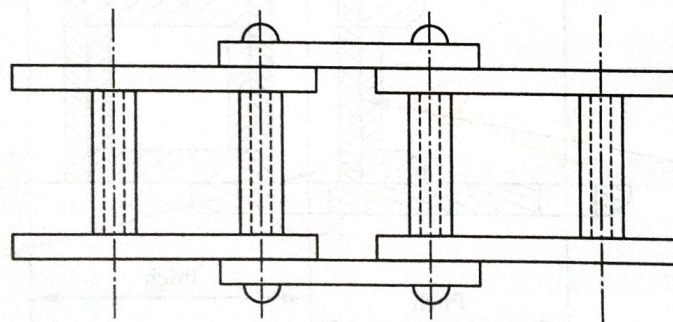
(b) Chain with square links

Fig. 20 Hoisting chains

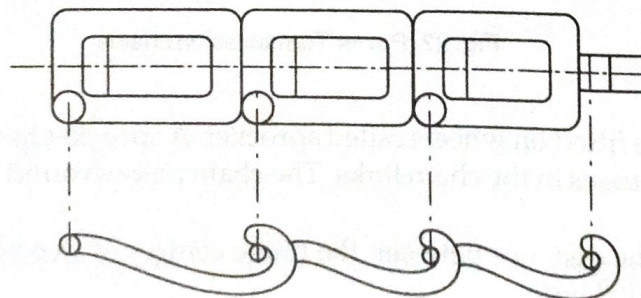
- (i) **Chain with oval links:** It has a special type of sprocket. The joint of each link is welded. These are used only at low speeds such as in chain hoists and anchors for marine works.
- (ii) **Chain with square links:** This chain consists of links of square in shape. This type of chain is used in hoists, cranes. The main advantage of the chain is that it will not kink or tangle so easily as the chain with oval link.

2. Conveyor chains: Conveyor chains are used for handling the material in mills, mines and factories. These are two types.

- (i) Detachable or hook joint chain
- (ii) Closed joint type chain



(a) Closed joint type chain



(b) Detachable or hook joint type chain

Fig. 21 Conveyor chains

Conveyor chain are made up of un-machined malleable iron casting or of press steel links and are best suited for non-abrasive operating conditions.

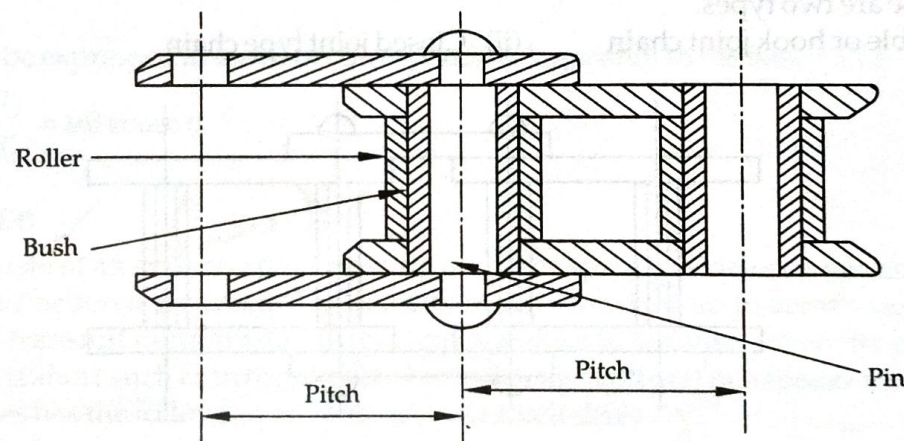
3. Power Transmission chains: These chains are used for power transmission, when the distance between the centre of shaft is small. These chains have provision of efficient lubrication. The chains are made up of steel in which wearing parts are hardened. These are accurate machines and run on carefully designed sprockets.

The power transmitting chains are of the following types.

- (i) *Block chains:* These chains are used for transmission at low speeds. Sometimes these are also used as conveyor chains at low speeds.
- (ii) *Roller chain:* The roller chain is used mainly as power transmission chain. A bush is fixed to the inner plate whereas the outer plate has a pin fixed to it. A roller surrounds each bush, the roller turn freely on the bushes and the bushes turn freely on the pins. A good roller chain is quieter and wears less and compared to a block chain.
- (iii) *Silent chain:* The inverted tooth chain is commonly known as silent chain. It is widely used when noiseless running is desired. Its construction is such that it can easily be made in any width to suit the load to be carried. Silent chains do not have rollers. The outer face of teeth are ground to give an included angle either of 60° or 75° . When properly lubricated, this chain gives durable service and runs very smoothly and quietly.



(a) Block chain



(b) Roller chain

Fig. 22 Power Transmission chains