

FAQ

Module-2: Belts

- 1) What happens if the ratio of tight side and loose side tensions (T_t/T_s) is very large?

When the shaft of driven pulley is jammed, the tight side tension (T_t) increases to a great extent from the initial belt tension (T_i) and to that extent the loose side tension (T_s) also reduces. Then, $(T_t/T_s) > e^{\mu\alpha}$, the belt will simply slip over the pulley, unable to transfer motion to the driven pulley. In doing so the belt may break if the T_t is greater than the breaking strength of belt. Note that T_t , T_s and T_i are the same as F_2 , F_1 and F_i respectively.

- 2) Is the optimum belt velocity to obtain maximum power transmission,

$$v = \left(\frac{F_i}{3m} \right)^{1/2} \text{ is applicable for V belt also?}$$

Yes.

- 3) What is the uniqueness of round belt?

They are best suitable for driving a shaft which is not in plane with the driving shaft. Because of circular cross-section of round belt, the torsional and bending stresses are lower. Further, they have good contact with the pulleys used (V-shaped sheave), providing high friction traction and hence better power transmission.

4) Timing belts have both the superior features of belts and gears, then why are they not used widely in textile industry?

For heavy and accurate power transmission, gears are better option as they are rugged and easy to maintain than timing belts. For cheaper and non-accurate heavy power transmission, chains are better option. For light and accurate power transmission, and if there is space limitation in the machine, timing belts are slowly replacing gear drives. In fact most of the drives in texturing machines and new long ring spinning machines are with timing belts.

5) What is the most suitable application for swinging motor drive?

In tall machines like Bale opener, few belt drives must be positioned at height above 5 feet or so. In this case, periodic inspection of belt slackness by the machine operator or maintenance personal would be difficult. It is better to go for automatic adjustment of belt tension/slackness using swinging motor drive.