

TECHNOLOGICAL UNIVERSITY (TOUNGOO)
DEPARTMENT OF MECHANICAL ENGINEERING

THREE STATE SPEED REDUCER

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Three Stage Speed Reducer

Aim and Objectives

- The three stage speed reducer transmits horse power has been designed.
- Its manufacturing gears to be in minimum cost and have safety.
- Gears are widely used for transmitting small or large amounts of power from one shaft to another.
- They will operate quietly and with very low friction losses.
- For example (rice mill, lathe machine, milling machine, etc)

Construction of Three Stage Speed Reducer

The main parts of the three stage speed reducer have two parts. They are

1. Gear

2. Shaft

- Gear

Gear reducer can be classified into different types of depending upon the application when very high speed is occurred worm and worm wheel reducer are desirable. For medium speed ratio ordinary gear can be arrangement that the input speed is reduced step by step.

The design of gear is thus a tried and error proves with each new trial coming closer to the final results. In this project all pairs of gear are spur gear.

Spur gears are toothed wheels whose tooth elements are straight and parallel to the shaft axis; they are used to transmit motion and power between parallel shafts. When two gears mesh, the smaller gear is called the pinion and the larger is the gear.

- Procedure of Gear

Material -high carbon steel

Size - shown in fig1:

Number of Teeth – 34

Tools and Equipment

- vernier caliper, cutting, boring tool, gear cutter
- mandrel
- chuck key
- spanner, centre drill
- lathe machine, milling machine

1. Select stock as specified.
2. Cut off to length in power saw.
3. Grip work in universal lathe chuck.
4. Face end and drill hole.
5. Remove work from chuck and press on mandrel.
6. Mount mandrel between centers.
7. Turn outside diameter as per drawing.
8. Setup milling machine for teeth ends.
9. Gear cutter side of work as per drawing.

- Procedure of Spur Gear(pinion)

Material - high carbon steel

Size - shown in fig 3

Number of Teeth – 24

Tools and Equipment

- Vernier caliper, cutting, boring tool, gear cutter
- Mandrel
- Chuck key
- Spanner, centre drill
- Lathe machine, milling machine

1. Select stock as specified.
2. Cut off to length in power saw.
3. Grip work in universal lathe chuck.
4. Face end and drill hole.
5. Remove work from chuck and press on mandrel.
6. Mount mandrel between centers.
7. Turn outside diameter as per drawing.
8. Set up milling machine for teeth ends.
9. Gear cutter side of work as per drawing.

- Shaft

A shaft is the component of mechanical devices that transmit rotational motion and power. In the process of transmitting power at a given rotational speed, the shaft is inherently subjected to a torsion moment or torque. A shaft usually carries power-transmitting component such as gear, which exert forces on the shaft in the transverse direction (perpendicular to its axis). These transverse forces cause bending moments to be developed in the shaft.

- Procedure of Idler Shaft

Material -mild steel
 Size -shown in fig 2:

Tools and Equipment

- steel rule, vernier caliper
- vernier high gauge, turning tool
- parting tool, centre drill
- chuck key, tool post spanner
- file, lathe machine
- tap and dieset

1. Select stock as specified.
2. Cut off to length in lathe machine.
3. Grip work in universal lathe chuck.
4. Face end square.
5. Drill centre hole.
6. Turn 17mm diameter as per drawing.
7. Turn 12mm diameter as per drawing.
8. Chamfer ends as per drawing.
9. Remove work from chuck, file burrs, and break sharp corners.

- Procedure of Driver Shaft

Material -mild steel

Size -shown in fig 4:

Tools and Equipment

- steel rule, vernier caliper
- vernier high gauge, turning tool
- parting tool, centre drill
- chuck key, tool post spanner
- file, lathe machine
- tap and dieset

1. Select stock as specified.
2. Cut off to length in lathe machine.
3. Grip work in universal lathe chuck.
4. Face and square.
5. Drill centre hole.
6. Turn 17mm diameter as per drawing.
7. Turn 12mm diameter as per drawing.

8. Turn 10mm diameter as per drawing.
9. Chamfer ends as per drawing.
10. Remove work from chuck, file burrs, and break sharp corners.
11. Set up lathe for cut required number of threads per inch.

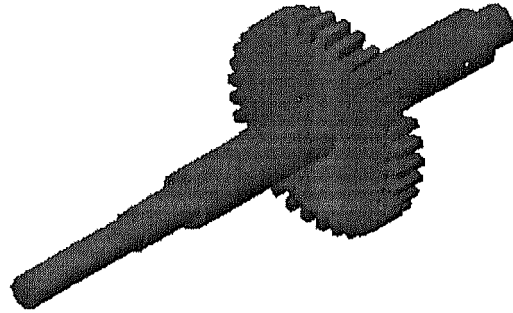


Figure 1 Driver gear

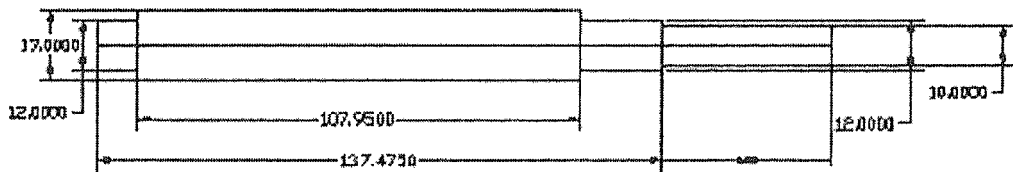


Figure 2 Dimension of gear driver shaft

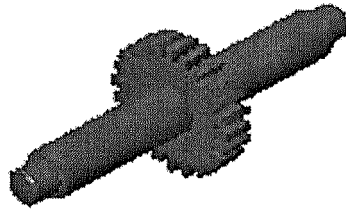


Figure 3 Driven gear assembly

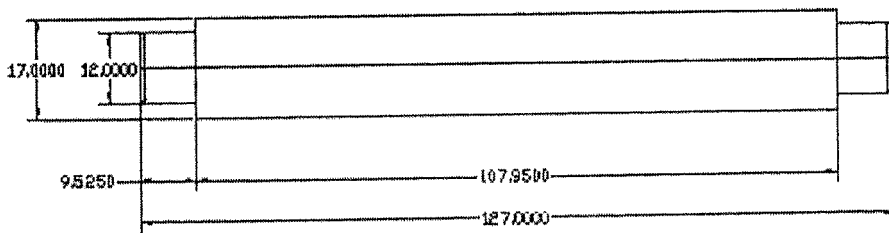


Figure 4 Dimension of driven gear shaft

