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A Review Paper on Design and Fabrication of Gearless Power Transmission for Skew Shafts

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Abstract: Today's world requires speed in all fields. Therefore, speed and quick work are the most important. Now the days to reach speed,different machines and equipment are man-made. The engineer has managed incongruous challenges to bring ideas and design closer to reality. New machines and techniques are continuously developed to produce various products at cheaper and high-quality rates. The GEARLESS TRANSMISSION project is a compact and portable device, which is skilled and has something precise to transmit power at a right angle without tools in production

Keywords: Gearless mechanism, Skew shaft Component of the model and its operation, Design of Shaft, Hub, Elbow.

I. Introduction

An essential requirement of the present world is to achieve the objectives with maximum efficiency at minimum cost. This requires least manufacturing cost of replacement when any instrument fails. And also, that it performs the intended function at a higher efficiency. The gears are expensive to produce. Your need to increase transmission efficiency that cannot be accomplished using the gear unit.It has intricately examined in point of interest in thewhole book so designing that the apparatus drives have low mechanical efficiencies. Since Factor identifying with under frictional Forces between the mating gear teeth, the unpredictable chasing of the riggings, the reaction between the teeth can't be overcome and consequently the proficiency can't be more than 55%of late apparatuses of warm slant sort are being made in poly propylene and epoxy material where the Frictional Forces are similarly disposed.

II. Contruction

It consists of El-Bow Rod which are 90 angle Bended and attach to the flange the flange which can be to the solid rod, the rod is 30mm in diameter the small pulley is attach to the rod the 1 HP motor 1440 rpm are attach and power can be transmitted through there are 3 El-Bow rods used to transmit the power at perpendicular distance the bend links are attach to the flange. The motor pulley (driver) transmitted power to the bigger pulley by the means of V-Belt the bigger pulley is attach to the rod and rod carries flange to support the rod pedestal bearing are used to guide the rotating motion of the rod. Links are made up of bright bars as the bright bar material has good surface finish these links slides inside the through and through drilled cylinder thus, forming a sliding pair.ugh the bigger pulley.

III. Working

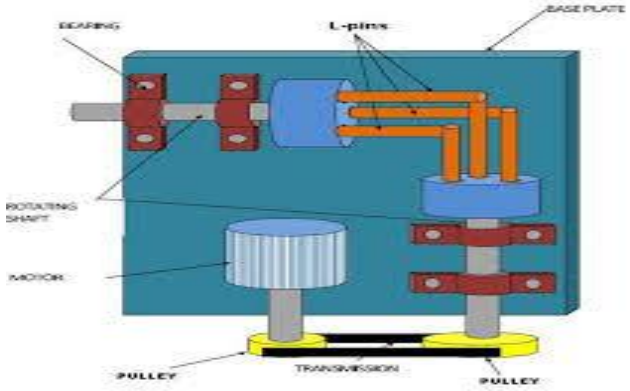

Fig. 1 Working Diagram

The Gearless Transmission system transmitted motion at the perpendicular direction with the help of driving (input shaft) which carries motor and driven shaft When the motor shaft is rotated it transmit the power to the driven shaft by the means of V-Belt these the connections slide inside the hollow cylinders thus forming a slippar Our mechanism has 3 of those sliding pairs.the flange are placed in hollow cylinder and are drilled at to each other the whole assembly is mounted on the angle plate.

IV. Design Calculations

Testing of the machine and for functioning
Power of motor = 1⁄4 H.P = 746 x 0.25 = 186.5 N- m /s
Rpm of motor N= 1440 rpm
Power of motor P =186.5 watt.

$$P = 2\pi N TP /60 \text{ --------- (Eq.1)}$$

Where, N = Rpm of motor = 1440
T = Torque transmitted From eq.1 we get, $186.5 = 2\pi \times 140 \times T/60$ T = 1.23 N-m T = 1238 N-mm.

V. Designing Of Shaft

Following stresses are normally adopted in shaft design
Max tensile stress = 60 N/mm2
Max shear stress = 40 N/mm2 Considering 25 % overload
Tmax= 1238 x 1.25= 1.525 x 10 3 N-mm
The shaft is subject to pure torsional stress
We know T= 3. 14/16 x fs x d3 15250 = 3. 14/ 16 x 70x d3 D =10.20mm
Taking factor of safety = 2 D = 10 x 2 = 20mm
A shaft dia= 20mm & L= 230mm $M=2151.11N\times230mm = 494755.3Nmm$
Bending stress for shaft $\sigma=32M\pi\times d3 = 186.649N/mm2$
Tensional shear stress of shaft $Mt=60\times106kw2\pi n$
Where, Kw=7.5, n=120 Mt=596831.03Nmm $\tau=16Mt/\pi d3 = 16\times596831.03/\pi\times203 = 112.57N/mm2$

VI. Designing Of Hub

Considering a hub of internal dia= 32mm & outer Dia= 92mm, length is 82mm. $p = 100\times9.81 = 981$ 4 $\sigma b = pDi2 /D02-Di2 = 980\times322 /922-322 = 135.01N/mm$

VII. Designing Of El-Bow Rod

We know that, Same torque is transmitted to bent link shaft So
torque on each shaft = T /3 = 15250 /3 = 5083 N mm
T= 3. 14/16 x fs x d3 5083 = 3. 14/ 16 x 70x d3 D = 7.17 mm.
Take approximately D=8mm. Dia rod = 8mm & L= 300mm $Z = 0.78R3 = 0.78\times43 = 49.92 kg/mm2$
Bending stress of rod $\sigma = PL/4Z = 186.5\times300/4\times49.92 = 280.19 N/mm2$

VIII. Methedology

Transmits the power between two shafts whose axis are at 90° bent links three links slides relatively according to the motion given to input shaft .Due to this, the rotational motion of input shaft is converted into sliding motion of links which is then converted to rotational motion of the output shaft.

IX. Conclusion

During working on experimental setup and after a long discussion we came to know that proposed arrangement used for any set of diameters with any profile of shafts for skew shafts of any angle but the shaft's must be having the rotational motion about his own axis, transmission of motion is very smooth and used only for the equal R.P.M. of driving shaft and driven shaft by given type of links for suitable joints for revolute pair.

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