Vol.10, Issue No 3, Sep 2020

DESIGN AND PRODUCTION OF A GEARLESS MPTS SYSTEM

Sridhar Gowda, S Naveen, Manjunath.S.H

Asst. Prof, Asst. Prof, Asst. Prof

sridharmpheroor@gmail.com, naveen.rymec40@gmail.com, manju.hubballi1988@gmail.com

Department of Mechanical, Proudhadevaraya Institute of Technology, Abheraj Baldota Rd,

Indiranagar, Hosapete, Karnataka-583225

ABSTRACT

Every area of modern life demands lightning-fast reflexes. Therefore, efficiency and speed are paramount. In modern times, people produce a wide range of machines and tools in an effort to do tasks more quickly. The engineer was always willing to bend over backwards to meet the difficulties of making his designs and concepts a reality. To produce a wide range of goods at lower costs without sacrificing quality, new machinery and procedures are being developed on a constant basis. Being small, clever and possessing something exact in transferring power at right angles without manufactured gears is what the "GEARLESS POWER TRANSMISSION" project is all about. The force is transferred from one shaft to another by two elbow rods set at right angles to each other. When coupled with a second shaft that is powered by a third shaft, the shaft turns anticlockwise. When the number of shafts is altered, the driven shaft's rotational motion changes to anticlockwise relative to the other shaft. It is decided to use "CROSS BELT DRIVE" to fix the issue. To achieve the desired motion, the first driven shaft is accompanied by pulley extensions, while the second driven shaft is powered by a cross belt.

Keywords: Elbow rods, Gearless power transmission, CATIA

INTRODUCTION

Today’s world requires speed on each and every engineers field are confronted to the challenges of efficient transmission of power. Gearless transmission is an ingenious link mechanism of slider and kinematic chain principle. It is also known as ELBOW mechanism. This project is the equipment useful to improve the quality of gear being manufactured and can be made in very less time. The component is exceptionally cornering or transmitting movements at right points. However in certain mechanical application gearless transmission at right angle can likewise work at insensitive or exact edge plane can be contrasted with worm and worm rigging or slant and pinion gear which are constantly utilized as a part of the business for various application. Similarly high proficiency between the info and the yield power shafts as to the rigging efficiencies.

OBJECTIVE

The objective of this project is to understand and implementation of elbow mechanism for the transmission of power from one shaft to another shaft which are in 90° without the usage of gears. In this the power to the motor is being provided with the help of a 6V battery.

JUSTIFICATION & RELEVANCE

The El-bow Mechanism transmits the I/P power towards the O/P side such a way that the angular Forces produced in the slacks are simply transmitted with the help of pins which takes up the I/P power and the right angle drive is transferred towards the O/P slack and pin assembly. Hence very little friction plays while the power is being transmitted; the Hunting and back lash one absent. Therefore, it is appreciated that efficiency as high 90-92% is possible in Gear Less Transmission mechanism.

Functions of gears are:

- Increase speed
- Increase force
- Change direction

MATERIAL:

The material chosen for any component must

(a) Be easily available

(b) Be capable of being processed in the desired examinations and

(c) Have the necessary physical properties. The gears generally fail due to bending, fatigue and impact and the gears are also responsible for the failure of the components in the gears have to very carefully determine since it may lead to pitting.

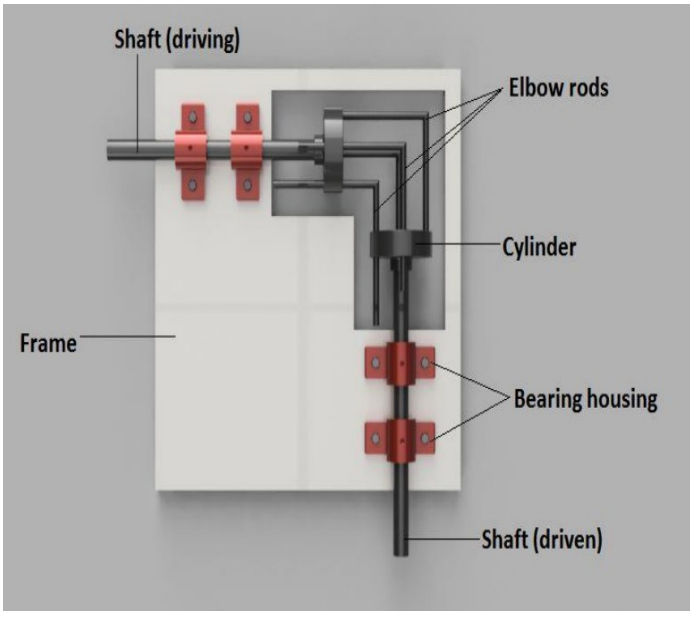
METHODOLOGY

- Basic rough sketch
- CATIA design
- Analysis

- Procurement of the components
- Fabrication
- Assembly

DESIGN AND FABRICARION

Here is a wonderful mechanism that carries force through a 90ºbend.Translating rotational motion around an axis usually involves gears, which can quickly become complicated, inflexible and clumsy-looking, often ugly. So, instead of using gears, this technology elegantly converts rotational motion using a set of cylindrical bars, bent to 90º, in a clever, simple and smooth process that translates strong rotational force even in restricted spaces. A gearless transmission is provided for transmitting rotational velocity from an input connected to three bent links. Both the input shaft and the housing have rotational axes. The rotational axis of the input shaft is disposed at an angle of 90 degrees with respect to the rotational axis of the housing. As a result, rotation of the input shaft results in a processional motion of the axis of the bent link. The rotary and reciprocating motion of bent link transmit rotation of prime mover to 90 degree without any gear system to an output shaft without gears. The transmission includes an input shaft.



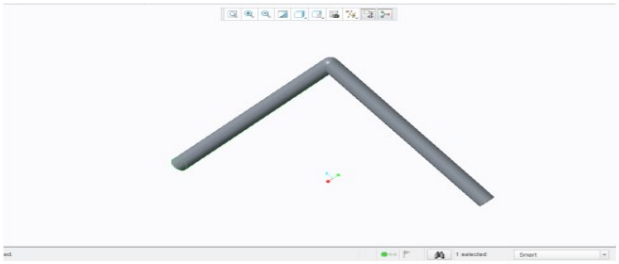


Fig 3.1 Design of (L) link

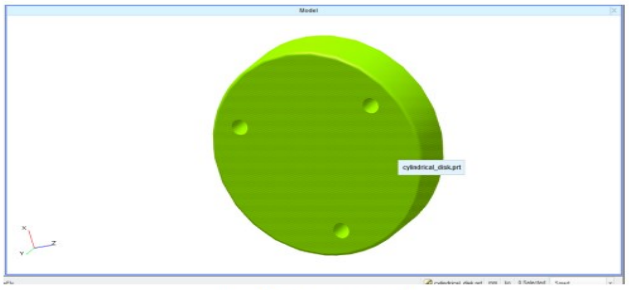


Fig 3.2. Cylindrical disk

DEVELOPMENT

1. The basic design of parts and assembly in CATIA.

2. The following figure shows the isometric view of the

Rendered picture from the CATIA model.

CHOICE OF MATERIAL:

For engineering purposes depend upon the following factors:

- Availability of the materials.
- Suitability of materials for the working condition in service.
- The cost of materials
- Physical and chemical properties of material.
- Mechanical properties of material

Assembly

1. First the base plate was fitted with the supports under it.
2. Then motor and shaft assembly separately was fixed to the base plate.
3. Now comes the main part of the picture- the discs with the L-shaped frames was coupled With the shafts.
4. Finally the shaft assembly on the other side was also been attached.
5. Total assembly was done and some painting work is done for good visual appearance.

RESULT

The above design was fully fabricated and designed to work under the range of 80 rpm to 100 rpm. This under the working to be precise and apt to the calculations performed and the stress distribution obtained.

ADVANTAGES AND LIMITATIONS

The gearless power transmission system was mainly made in order to reduce the usage of gears which are complex in design and to reduce the wear conditions that occur in gear over a period of time which would require high cost of manufacturing for the replacement of the gear. This mechanism is simple, cost effective, and efficient compared to gears. Still the design has some of the cons that make infeasible in

operations where sudden loads are applied and also it needs to have the starting torque low for the functioning of the mechanism.

CONCLUSION

Some mechanical devices are successful because they are well-designed and constructed, while others are successful because their moving components are precisely fitted. Despite its apparent simplicity and ease of construction, this project was really rather challenging to conceptualise and envision in the absence of a real-life example. The forces that predominate among the plans of the active tinkers are an event and a reality in the creative mental process.

We have already completed the necessary research on motions.

Although it is typically easy to produce acceptable analyses of existing mechanisms, effectively synthesising new mechanisms requires insight and creativity.

Therefore, we are pleased to bring you our project, the gearless gearbox at 90 degrees (El-bow mechanism), which we have designed after much effort in understanding how it functions.

REFERENCES

[1] Prof. A. Kumar and S. Das, DzAn arrangement for power transmission between co-axial shafts of different diameterdz, International Journal of Engineering Research and Technology (IJERT), ISSN: 2278-0181, Volume 2, Issue 2, March 2013, Page .no: 338-347.

[2] Prof. B. Naveen Bardiya, T. karthik, L Bhaskara Rao Dz, Analysis and Simulation of Gearless Transmission Mechanism", International Journal Of Core Engineering & Management (IJCEM) ,Volume 1, Issue 6, September 2014, Page.no: 136-142.

[3] Prof. Mahantesh Tanodi, DzGearless power transmissionoffset parallel shaft coupling", International Journal of engineering Research and Technology (IJERT), volume 3, Issue 3, March 2014, Page.no.129-132