

# Gear Less Power Transmission System: Case Study

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**Abstract:** *In modern machineries, the motion and power need to be transferred from one shaft to other for various and complex activities. Also, it is essential to achieve such objectives with maximum efficiency and minimum cost. For transmitting power between different orientations of shaft, various medium like belt, chain and especially gears are used. But due to cost of manufacture of gear, interchangeability in parts and very limited shaft orientations, need arises for an alternative system. In this project a Gearless power transmission system has been studied, a possible gearless power transmission layout is designed and developed where it can transmit power from one shaft to other without any gear being used. This project deals with transmission of power from one shaft to other at right angle by means of sliding links that form revolute pair with the hub.*

**Keywords:** Gearless drive, Power transmission, Sliding links, Elbow power transmission.

## I. INTRODUCTION

In modern world the living standard of human being were developed by adopting more and more equipment and technology. Today's world requires power or motion on each and every field. An essential requirement of the present world is to achieve the objectives with maximum efficiency at minimum cost. To achieve higher efficiency, proper power transmission is the prime concern of modern era. If someone wants to transfer power efficiently from its source of generation to the required place to obtain required task, then power transmission is vital concern. Different types of medium like chain-sprocket, belt-pulley, friction drive, hydraulic coupling and gears are used to transmit power between two shafts. Some of them are used to transmit power within a short distance like gears or couplings. Belt-pulley or chain sprocket is another type of transmitting mechanism where the power can be transmitted to a long distance. A belt is a looped strip of flexible material used to mechanically link two or more rotating shafts. Belt drives are used as the source of motion transfer efficiently or to track relative movement. Another type of transmitting drive exists which is known as friction drive. A friction drive or friction engine is a type of transmission that, instead of a chain and sprockets, uses two wheels in the transmission to transfer power to the driving wheels. But in friction drive system, the problem with this type of system is that they are not very efficient. In this project a gearless power transmission system has been developed for transmitting motion at right angle without using any gears. This method may be a rattling mechanism that carries force through 90° bends. For that elbow mechanism is used which is an ingenious link mechanism of kinematic chain principle and slide. Based on these ideas, the following objectives can be summarized for this project. • To design and construct a model gearless power transmission mechanism. • Performance test of the constructed model of gearless power transmission mechanism.

## II. METHODOLOGY

### Steps in Methodology

Bevel gears, which are straight teeth or spiral teeth are manufactured on special purposes machines. These require large amount of calculation and every pair or set of gear are made together and there is no interchangeability. The gearless drive has this advantage that it can be machined and manufactured on conventional machines and it provide complete freedom of interchangeability.



### III. MATERIAL USED

1. Shaft
2. cylindrical hub
3. Elbow links
4. Bearings

### IV. WORKING PRINCIPLE



Fig 1: Gearless power transmission machine

- Gearless transmission mechanism transmits power from input to output shafts by means of sliding links that form revolute pair with the hub.
- Links bent at required angle slide inside the holes in the hub.
- Thus the holes in the input hub rotates ;it pushes the links and in turn output hub is rotated.
- This mechanism can be used as a replacement for the bevel gears in low cost, low torque applications.
- It can transmit at any angle 0 to 180 degrees.

### V. CONCLUSION

This project looks very simple and easy to construct but actually was difficult to conceive and imagine without seeing an actual one. Hence, it has been mold to present this project at 90o (El-bow mechanism) only. This system runs well and transmits the power in an angular direction when appropriate links are used with little loss. The system has the freedom of interchangeability and most important thing is its low manufacturing cost. This system does not work at very low transmitting torque. Improper drilled hole may cause problem, and sudden load may break down the mechanism. The speed ratio of the mechanism is almost 1:1.

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