

GREEN CAR FABRICATION

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Abstract: *In recent years, terms like "going green" and "eco-friendly" have become buzz words on talk shows commercials and product packaging. The term "eco-friendly" has been used for so many different products and practices, its meaning is in danger of being lost. By understanding the true meaning of eco-friendly, we can implement the practices that will lead to healthier living for the planet and its inhabitants, big and small. People engage in eco-friendly activities because they are concerned about the health of the environment. Environmental issues were first rushed to the forefront of the collective consciousness in the late 1900s when people realized that their activities were having a negative impact on the environment. Pollution rampant use of natural resources and other activities were questioned in light of information about how these activities hurt the environment, and people began to look into more environmentally friendly ways of living and doing business. As we all know, there are lots of MNC's who works on eco-friendly environment. Many companies realized that investing in green product development would pay off, and lines of eco-friendly products can be found in many regions of the world today as a result. These products are usually made in factories which are environmentally friendly, such as facilities built from recycled materials which use solar panels for power, and they are made from components which are also good for the environment, like plant-sourced ingredients for soaps, or recycled metal for electronics. Product packing, advertisement, and other materials may also be environmentally friendly.*

Keywords: environment, alternate fuel

1. Introduction

Strictly speaking, eco-friendly products still have an impact on the environment, but the impact is greatly reduced when compared to conventionally produced products. In some cases, environmentally friendly products may even have a positive benefit depending on how the company does business. Many such products are also aimed at lifestyle changes which benefit the environment, so even if the product itself is not totally neutral the actions undertaken by the consumer after buying the product are beneficial. For example, eco-friendly light bulbs require energy and resources to make, but they save energy once they are installed in a home.

Products are not the only thing which can be environmentally friendly. Activities can also be friendly to the environment, as in the cases of things like carpooling, gardening, composting, and recycling. Some people think that eco-friendly products are only the first step, and that people who are really committed to the environment also need to modify their lifestyles, reducing the amount of resources they use by living more efficiently.

In the same field we are going to initiate our steps which provide us eco-friendly environment with healthy health. Human powered transports includes walking, bicycles, row boats, and other environmental friendly ways of getting around. In addition to the health benefits of the exercise provided, they are far more environment friendly than most other options. Similarly we are going to make a prototype of a GREEN CAR, which is environment friendly as well as makes us healthy by a kind of exercise as we do at the time of driving bicycle. Difference is only that normal bicycle is

designed for one or two people but this car is for seven people. The prototype which we are going to make is 7 – seated car which is driven by paddling of the persons who sitting in this car in face to face position.

The seventh person will only control and steer the vehicle. Here this car has a new mechanical device i.e. differential, which is not ever induced in the model made so far as shown in Figure 1. This will reduce the turning radius of the vehicle, which is a prior requirement where non availability of wide roads are the main cause of trouble at the time of turning. As the power produced is done by all the people sitting in the car, the fatigue to individual is very less. As the fuel depletion is at high rate due to increase in consumption thus these kinds of vehicles are the future of the world.

1DISCRIPTION OF THE COMPONENTS

1.1 Brief Description of Major Equipment

1.1.1 Chain Drive

A chain is a reliable machine component, which transmits power by means of tensile forces, and is used primarily for power transmission and conveyance systems. The function and uses of chain are similar to a belt. There are many kinds of chain. It is convenient to sort types of chain by either material of composition or method of construction. Chains are used for high transmission power and can impart as much as 5000 hp. They are mostly used when the distance between the centers is short. They are now in general used for the transmission of power in cycles, motor vehicles etc. A chain may be regarded as a belt buildup of rigid links, which are hinged together in order to provide the necessary flexibility for the wrapping action around the driving and driven wheels. A typical configuration for RS60-type chain is shown in Figure

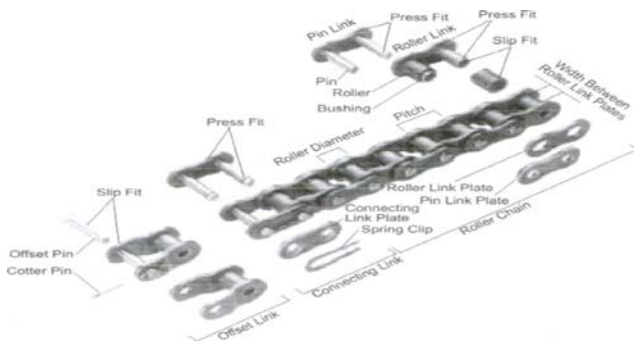


Figure 1 – basic components of a chain drive

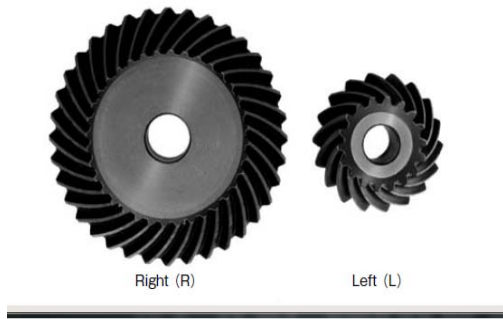


Figure 2 Bevel gears

While designing of the chain drive various terminology and mathematical equations are used. The general formulas we used for calculation process are:-

In a Chain drive,

'D' is the pitch circle diameter of the sprocket.

'Z' is the No. of Teeth on the sprocket.

$$\alpha = \frac{360}{z}, \text{ Where}$$

α = Angle between two successive tooth.

$$\sin\left(\frac{\alpha}{2}\right) = \frac{p/2}{D/2}$$

or $D = P/\sin(\alpha/2)$, where

$\frac{\alpha}{2}$ = Angle through which sprocket rotates.

Velocity Ratio 'i' of the chain drive is given by-

$$i = \frac{N_1}{N_2} = \frac{Z_1}{Z_2}, \text{ where}$$

N_1, N_2 Speed of rotation of driving and driven shaft (rpm).

Figure 3 Sprocket and Chain

Bevel gears are used to transmit power between two intersecting shafts. In a bevel gear as shown in Figure 4, the teeth are cut on a conical surface. In great majority of bevel gear drives the shafts are at right angles. Here is the diagram of the bevel gears with its nomenclature. The terminology as shown in figure-5, helped us to better understand the

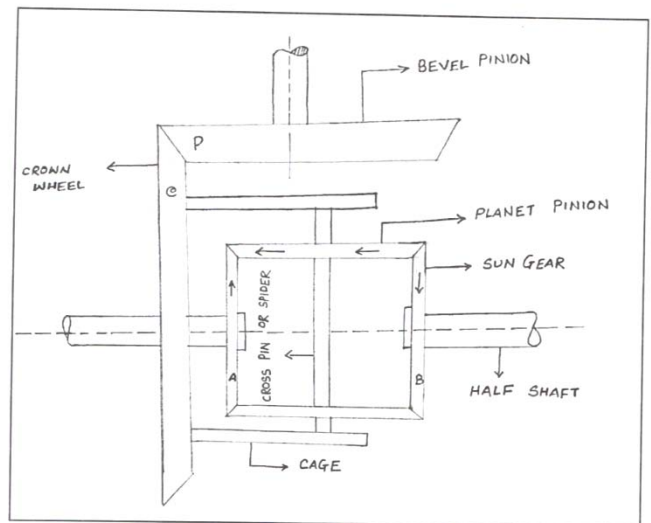
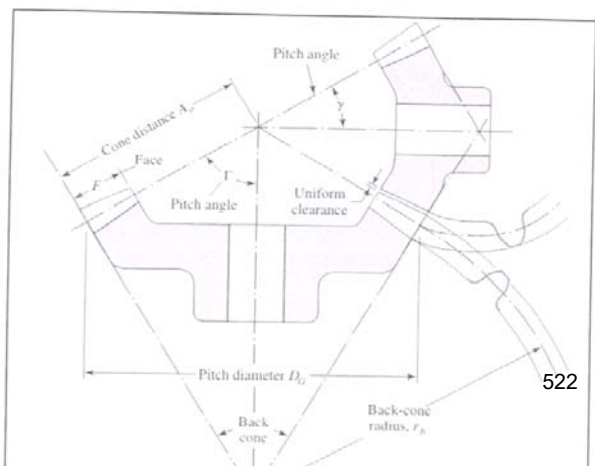


Figure 4 Terminology in bevel gears

1.1.3 Differential

When the car is taking a turn, the outer wheels will have to travel greater distance as compared to the inner wheels in the same time. If therefore, the car has a solid rear axle only and no other device, there will be tendency for the wheels to skid. Hence if the wheel skidding is to be avoided, some mechanism must be incorporated in the rear axle, which should reduce the speed of the inner wheels and increase the speed of the outer wheels when taking turns; it should at the same time keep the speeds of all the wheels same when going straight ahead. Such a device which serves the above function is called a differential. Figure 5 shows its top view and Figure 6 shows its 3D View.



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Figure 5 Top View of Differential

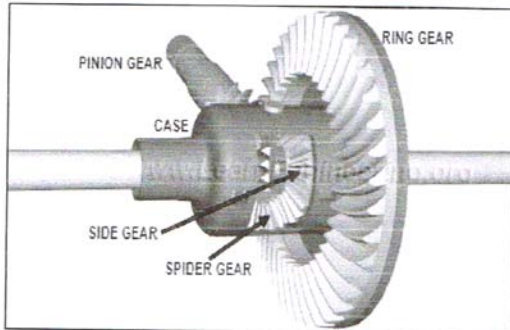


Figure 6 Cross Sectional View of Differential

1.1.4 Steering Mechanism

It is to be noted that for perfect steering we must always have an instantaneous center about which all the wheels must rotate. For this purpose inner wheel has to turn more than the outer wheel. To achieve this condition, two types of mechanism have been devised i.e. Rack and Pinion arrangement. Some of the angles, forces and phenomenon's which are to be considered while driving of vehicles and also assembling of steering are:

- Camber angle
- Castor angle
- Cornering force
- Self-righting torque
- Under steer and over steer
- Toe in and toe out

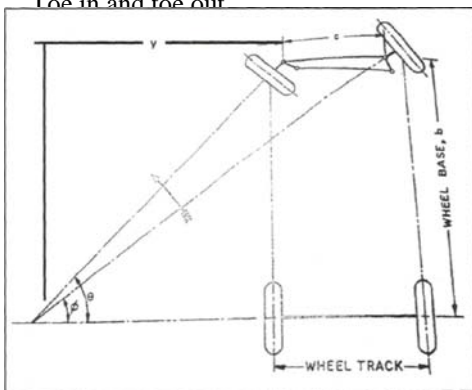


Figure 7 Steering Mechanism in Automobile

The rack-and-pinion steering system converts the rotational motion of the steering wheel into the linear motion needed to turn the wheels, and provides a gear reduction, making it easier to turn the wheels. On most cars, it takes three to four complete revolutions of the steering wheel to make the wheels turn from lock to lock (from far left to far right) as shown in Figure 1. Turning of wheels depends on the steering ratio. It is the ratio between the angle turned by the steering wheel and the angle turned by the road wheel. A higher ratio means that one has to turn the steering wheel more to get the wheels to turn a given distance, and vice versa. A rack and pinion assembly must satisfy specific requirements, such as backlash elimination, etc. The steering

system is also subjected to continuous vibrations. So, any backlash will lead to noise. Apart from gear errors, backlash comes from the fact that the central portion of rack teeth span and the corresponding mating pinion teeth are more prone to wear. Thus, backlash elimination becomes inevitable in steering systems. To accommodate the steering linkages, along with the gearbox within the track width of the vehicle, rack travel is limited. This low rack gain with high reduction gear ratio puts a limitation on pinion diameter. For a small diameter pinion, sufficient tooth strength is achieved by reducing the number of teeth. This introduces undercutting. Undercutting is avoided by resorting to a pinion profile shift. The profile-shifted pinion has increased tooth width than the tooth space. The rack and pinion in the RPS is assembled under a preload force. The nominal torque value required to rotate the pinion depends upon this preload. The preload is so adjusted that the steering is not too responsive during the straight-ahead motions and not too stiff during turning. The components of a Rack and Pinion Steering (RPS) gear-box are shown in Figure 2. The rack and pinion have different helix angles as well as opposite hand of helix. The axes of the rack and pinion are non-parallel, non-intersecting. The pinion is installed at an angle equal to the difference between the helix angles of the rack and pinion.

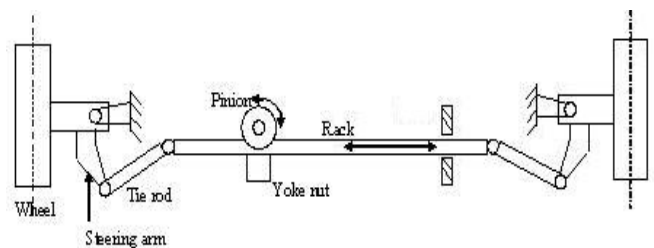


Figure 8- Rack & Pinion

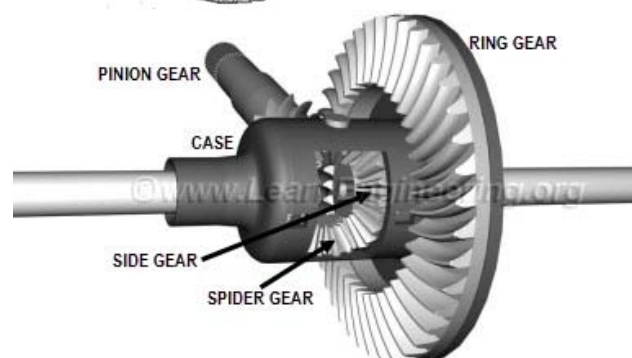
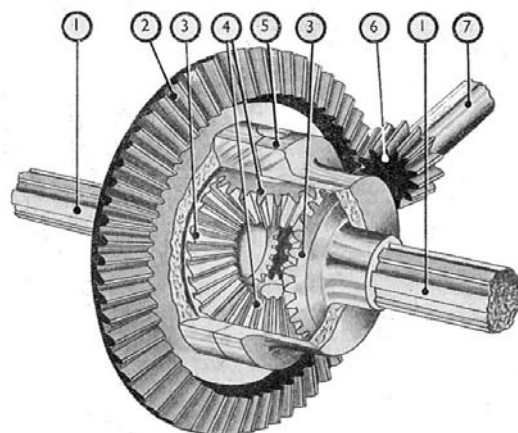


Figure 9 Differential

2 FRAME CONSTRUCTION

2.1 Frame – Pain sheet metal is being used for the frame set up and the price of the sheet metal in the market is 1500-2005 \$/ton.



Figure 10 Frames

2.2 Channel - Channel is used for the preparation of the chassis. The cost of the channel is RS. 1117.30 of CRL 96 inches rigid channel used in small trucks.

2.3 Gear Arrangements - The gear arrangement consist of bevel gear and the chain sprockets arragments used in 24inch bicycle and in rickshaws ,the gear ratio which will be used in our project is of 54:22. The first frits of the ratio describes the bigger sprocket teeth no. and the secondary digits shows the smaller sprockets.

Points which are Figured out

- On increased rate of pollution our suggestion this prototype for the smart cities across all over the globe will render healthy and eco environment.
- The prototype has new implementations which allows it for reduction in cost to design.
- After completion of the fabrication of this green car it is expected as boon to the environment and it is the best way to reduce fuel consumption and make

people healthy in smarter way.

3 Conclusion

The initiative that has been taken by us is the start for upcoming new era in which people as well as government are becoming moré health conscious and have started taking measures for sustainability of our planet for the upcoming generation respectively. Here we enumerate the following conclusion while using green car in today's life.

- A smarter way to make people healthy as it provides work out for all the persons riding on green car.
- Reducing the fuel consumption and its wastage.
- Can be employed at various places where riding distance is up to 10 km.

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