

Design of flat bed foldable three wheel scooter

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Abstract – The main goal is to set up a small vehicle, which has sufficient power to carry some load and easy to get transported by it or transport it. People are addicted to motorcycle in India, even if the distance is less than a kilometer It is not affordable to everyone therefore The project involved into a tiny foldable scooter, which can carry by both the sexes and just to rock bottom the cost we added 49cc gasoline powered engine to propel the wheels. The slither link of the steering fork ensures the foldable mechanism and allows humans to cart it, which satisfies the main purpose of short distance, compact, foldable vehicle.

Key Words: Foldable, Three-wheel, less costly, lightweight.

1. INTRODUCTION

The scooter is made from two materials. A wooden bed where engine, brake and acceleration-paddle are mounted, Along with that the skeleton of the vehicle is made from Mild steel metal angle section which is back of the wooden bed and holds everything together. Rear wheel drive gives incumbent tractive force.

Front fork shrinks in length for comfortable carrying. As three wheel gives three point load distribution to ground and low ground clearance ensures good balancing. Total cost of the vehicle is less than 4000inr and it can be less with mass production. Apparently , this is made for whom who in public transport even so they face one or two trudge kilometers to end up at home. It is also helpful who are having knee problem or who can't balance two-wheeler.

1.1 Main idea

People use motorcycle for very short distance which is not only costly but also waste of fuel. The main idea of the try scooter came from Team make it extreme, which has made this type of scooter from 50cc Wood saw's engine. Which was not foldable, Along with that, Data given in the Table below is illustrates population of private vehicles in Gujrat and collected from the official website of RTO Gujrat. There are total 14 millions of two wheeler registered since 1999.

Table -1

Details of Vehicle population in Gujrat from till 2012.			
Types of Vehicle	No.	Types of Vehicle	No.
Motor Cycle/ Scooters	13706590	Police van	2681
Mopeds	2437767	Tractors	687825
Motor cars	2527537	Others	67213
Jeep	185894	Total	19615507

This much of Usage can be decreased by using this small scooter which will helps to reduce the overall unnecessary energy consumption in long term.

1.2 Design

Design is very crucial stage in any project. We have gone through many changes and made many hand sketches. The purpose of the flat bed is to archive low ground clearance, and better foul-ability.

There are two wheels in rear connected with solid axel, and a sprocket is mounted. Engine is mounted on the left side of the vehicle and chain drive is used to connect engine pulley to the rear axle sprocket. Four arms in front are used to connect the front fork with the flat bed. Front wheel is bigger than the rear wheels for surveillance. Very simple handle bars allow turning at high speed and desirable turning radius. Accelerator paddle is given under the right foot for better comfort. We have made animation model of scooter in solid works. This design process has taken 10 days.

Two conical shaped discs provide enough braking force to stop vehicle in very short distance. All the attachments are provided on bed with paddle type mechanism which is easy to operate with this design.



Desirable grade angle=37'

Power=HP*746=1641watt

1.3 Friction Forces

Rolling resistance = $W \cdot 0.043 = 883 \cdot 0.043 = 38N$

Air resistance is negligible but we have taken 7N

Total resistance = $38 + 7 = 45N$

Tractive force at low speed

= $\text{Torque} / \text{Radius} = 4.1 / 0.0762 = 53.80Nm$

Total resistance is less than archived torque so it gives good acceleration.



2. STATISTICS

All the machining process is done under the roof of HGCE workshop, though we outsourced Raw materials, All the things were pre-planned and with very small waste we shaped this entire project. We allocated a week to plan and buy things. There are number of parts we purchased from Ahmedabad kalupr market at very low price, All the parts are listed out with size and price at the end of the paper, now let's see the calculation first,

Weight= 90kilogram (25kg of vehicle + 65 kg of human)

Gravity= 9.81 so, Total $W = 90 \cdot 9.81 = 883N$

Drive wheel radius=7.62c.m

Perimeter=47.8c.m

Co-efficient of rolling resistance $\mu = 0.043$ (for light mud)

Engine max Torque= 4.1N.m @ 4000rpm

Engine max Power= 2.2Hp @ 6000rpm

3. CONCLUSION

There are several types of design has been already made, though these are never been trendy. We reviewed many users and come up with a reason that, This type of scooters needs to be charged for a long time, therefore we designed Gasoline powered scooter which ensures unstoppable ride. Huge number of motorcycles is roaming in gujrat and we are looking forward to replace at-least 60% of it with our scooters. However, we will continue making changes in the design in order to make it user-friendly and reliable.

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