FABRICATION OF MONO WHEEL BIKE

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Abstract - *A mono wheel is one wheeled single-track vehicle similar to a unicycle. The wheel is a ring usually driven by smaller wheel pressing against its inner rim. This type of wheel is motorized in 20th century, before 20th century it was hand cracked and pedal power mono wheel. Working with a single wheel could result in a more efficient mode of transport, as would be associated reduction in size, weight and resistance in a conventional bicycle one wheel provide the other steering a mono wheel has to provide both.*

***Specification**: Both speed and direction are controlled through the same physical apparatus; this generally makes Steering more difficult. in a majority of system change in direction is effected by the rider shifting Their weight , or in the sudden movement creating a shearing force between a hand hold and the Axis that the driver is settled on, Better control can usually be achieved at lower speed Out board skids to provide friction drag one side.*

Fabrication:

- *1st make the wheel with the ms pipe and old tire*
- *Make the frame with square ms pipe*
- *Make three small wheels of solid pvc pipe on lathe machine*
- *Fix the ball bearing with small wheel*
- *Fixed the small wheel with frame*
- *Fix the frame with outer wheel (or) main wheel*
- *Make the engine stain with frame to fit the engine*
- *Fix the engine with the stain on the fram*
- *Fix rest parts and give finish touch.*

***Key Words*: Fabrication of mono wheel bike, two-seater, specification**

1. INTRODUCTION

A mono wheel bike is a unicycle; Garavaglia was first time mortised in 1904 in unicycle. It work on the principle of self-balancing technique, it was generally use for fun and entertainment purpose From 1860 to 1930 ,but after 1930 it start to use as serious transportation because a one wheel vehicle is potentially more efficient than a two wheel vehicle since frictional losses at the wheel and in the drive train reduce, due to the surging (crowd) consciousness (surrounding) of Pollution and energy shortage crises , according to the future environment the automobile and motorcycle are no longer the best for transportation . As the price growing of petroleum products now a day there is need for cheaper and more efficient form of transport.

It's a transitional vehicle it goes most place where a person can walk or ride a bike. In a two Wheel mode of transportation, two-wheel effect motion, typically one wheel provides the force to control speed, while the other handles change in direction, steering, but in a mono wheel bike both direction and speed are control through the same physical apparatus.

The mono wheel is a one wheel single track vehicle similar to unicycle, the wheel is a ring usually driven by smaller wheel pressing against its inner rim consist of an inner and an outer frame, the inner frame has three small wheel that make contact with the outer frame which the actual rotating wheel and has a solid rubber tire .A single wheel vehicle possess yet more challenge to stability and control.

In general bike the rider sits out of the wheel and drive, but in mono wheel bike the rider sits in the wheel on the inner frame that also contain the engine, clutch, propulsion mechanism and petrol/water tank.

The world record speed of this bike is 98km/h or 68mile/h which are create in 2016.

For better control of mono wheel bike can usually be achieved at lower speed.

2. LITERATURE REVIEW

Since 19th Century Mono wheels have actually been around in one form or another. They began with an early bicycle design

After all, if something works with two wheels, could it also work with just one?

In 1869 the first mono wheel designs appeared and the Craftsman Rousseau of Marseilles built the first monocycle.

The mono wheel with an effective power transmission system has to be designed such that it can be handled and controlled by single person even in the rest position. The main and basic constraints that are being taken into consideration for the height of the person riding the vehicle and maximum weights that the vehicle can withstand.

The mono wheel was recognized as a difficult means of transportation: One publication remarked that the vehicle was “impracticable for ordinary mortals”.

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The Rousseau mono wheel can be viewed as a unicycle riding on a track attached to the inner diameter of a large wheel by pedalling the” unicycle “the outer wheel revolves moving the unit forward no steering mechanism was provided

In the early 1900s, a group of American inventors attempted to develop a propeller-driven monocycle known as the D’ Harlingue mono wheel

on a restored 1924 circus mono wheel for some time, it was believed that this is Jumpin’ Joe Gerlach, on a circus machine fitted with a 160cc Honda engine, but it is now clear it is really Hubert Broaches

Basically, the fine machine has been recently built by David Southall. It is called the Red Max. David says its construction was inspired by the 1924 circus mono wheel.

David has now kindly provided more details: The wheel itself is a 5-foot diameter hoop of 2-inch tube. It was a bit beyond what I can do so was made for me by The Angle Ring Company. The pulleys on which it runs were custom-made by AED rollers. Everything else was cut, bent and welded in my shed!

The engine is a 90cc four stroke from a Chinese quad bike. The quad engine is fully auto with electric start. The friction drive wheel is the rear wheel from a mini motor. It has a cable-opera.

Fig 1: Old Mono Wheel Bike.

Fig 2: Old Mono Wheel Bike.

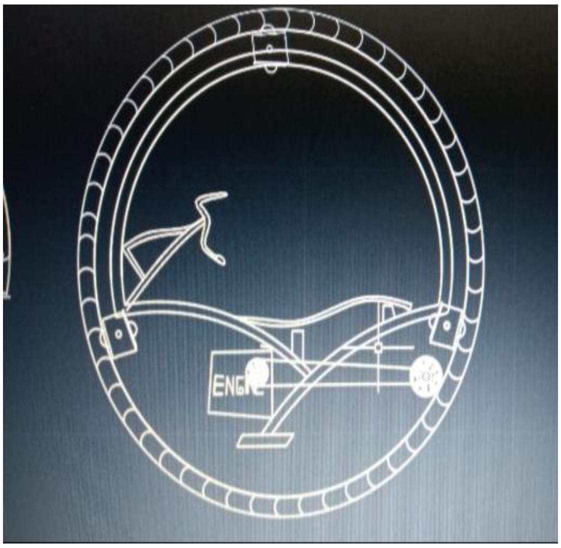

Fig 3: New model of Mono Wheel Bike.

Table -1 Comparisons of old model and our model

Old model	Our model
Wheel diameter is 5 feet	Wheel diameter 6 feet
Up to height of 5.5-feet person can seat	Up to height of 6.5-feet person can seat
Only one person can seat	Two persons can seat
Load capacity up to 100 kg	Load capacity up to 175 kg
Without gear	With gear
Only kick system to start the bike	Both kick and self-system to start the bike
Mileage 35km/h	Mileage 45km/h

3. REQUIREMENT ANALYSIS

S. No	Object	Quantity
1	Tire	1
2	Outer wheel (ms pipe)	1
3	Frame (ms pipe)	1
4	Engine	1
5	Seat	1
6	Fly wheel	1
7	Supporting wheel	3
8	Chain sprocket	1
9	Metal plate	5 m
10	Welding rod	
11	Nut bolt	
12	Ball bearing	6

Fig 4: MS Pipe (Circular)

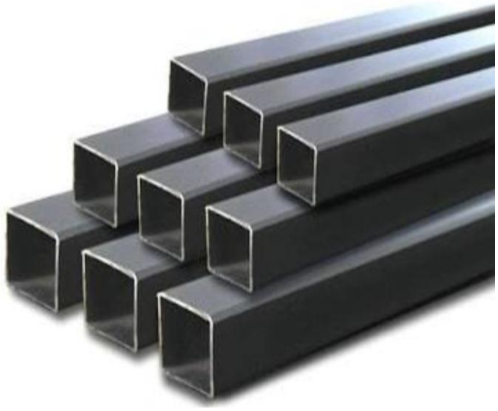

Fig 4: MS Pipe (Square)

Fig 5: Engine

Fig 6: PVC Rod

Fig 7: Ball Bearing

Fig 7: Chain Sprocket

We are using bike engine, i.e. normal petrol engine
Specification of engine

Type	: 4stroke single cylinder
Displacement	: 125cc
Maximum power	: 10.87ps @7500 rpm
Maximum torque	: 10.6Nm @6000 rpm
No of cylinder	: 1
Cooling system	: air cooled
Valve per cylinder	: 2
Transmission	: manual
Ignition	: dc –fully transistorized (ECU)
Starting	: kick and self-start
Fuel supply	: fuel injection
Battery	: 12volts 5Ah
Gear box	: 5speed
Bore	: 52.4mm
Stroke	: 57.8mm
Compression ratio	: 10.01
Emission type	: BS5

4. CALCULATIONS

The following are design criteria for motor sizing according to the project objectives:

- Maximum speed (Vmax) – 90km/hr.
- Maximum load (with driver weight –300 kg
- Gross vehicle weight– 70 kg. (assumed)
- diameter of outer wheel (dw) – 162.0 m or (6 feet)
- acceleration time (ta) - 05 seconds.
- Maximum incline angle (α) - 40 degree.

To choose engine who's capable of producing as such as required torque to propel the vehicle, it is necessary to determine the total force required.
Effort (TFR) requirement for the vehicle:
TFR = FN + FR + Fa
Here
TTE = total tractive effort [N]
FN = force necessary to overcome rolling resistance [N]
FR = force required to climb a grade [N]
Fa = force required to accelerate to final velocity [N]
1st step: Determining Rolling Resistance
Rolling Resistance (RR) is the force necessary to propel a vehicle over a particular surface. The worst possible surface type to be
Encountered by the vehicle should be factored into the equation.
$Rr = Ww \times g \times rfc$
Where:
Rr = rolling resistance [N]
Ww = Weight on wheel [kg]
g = gravitational force
rfc = Rolling Friction Coefficient
$Rr = 25 \times g \times 0.002$ (rfc value for bicycle tire on concrete)
$= g \times 0.05N$
2nd step:
Determining Acceleration Force
Acceleration Force (Fa) is the force necessary to accelerate from a stop to maximum speed in a desired time.
$Fa = Ww \times g \times Vmax / (g \times ta)$
Where:
Fa = acceleration force [N]
Ww = Weight on wheel [kg]
Vmax = top speed [m/s]
Ta = time required to achieve top speed [s]
$Fa = 25 \times g \times 4.16 / (9.81 \times 5) = g \times 2.126$ N
3rd step: Determining Total force required
The Total Tractive Effort (TFR) is the sum of the forces calculated in steps 1, 2, and 3. TFR = Rr+ GR + Fa = (2.126 + 4.31 +
.05) × g = 6.481× 9.81 = 53.56 N
4th step: Determining Wheel Torque
To verify the vehicle will perform as designed in regards to total force required and acceleration, it is necessary to calculate the
Required wheel torque (Tw) based on the force required.

Tw = TFR ×Rw
Where
Tw = wheel torque [Nm]
TFR = total force required [N]
Rw= radius of the wheel/tire [m]
Tw = 53.56× .810 = 43.86 Nm.
Therefore, the motor must be able to provide 86.76 Nm of torque to the wheel through the power train.

5. CONCLUSIONS

Considering that we used the bike seat so that more than one can travel and ride the mono wheel bike. To make it possible for any height of a person can ride, ranging from 5'2|| to 6'8|| to cycle it we provided long horizontal bike seat for seating purpose .We have proved the theoretical concept that if one wheel bike is done the outer wheel rotates by 0.8 revolutions so that we can travel a long distance We have realized that the weight of outer wheel is so much that we try to reduce the whole weight of the bike and also increase the mileage and the speed of bike, we also use self-start system and kick system also for future. And can be extensively used in the crowd's area and also use in transport purposes of the industrial works to a greater extent. When driven with the help of IC engine we developed a competitive mode of transport. Mono wheel is a research project in which continuous study on the existing design in the future helps it to increase its effectiveness to a greater extent. It can be further improved with a better technology and better design according to develop in the science.

- It takes less space and low fuel consumption, because it is only run on single wheel and it has less weight when compared with other engine vehicle.
- It has no friction los in construction due to a smaller number of parts are arranged and also has less power is sufficient to drive the vehicle.

Working with a single wheel could result in a more efficient in mode of transport, as would the associated we reduction in size, weight and resistant.

6. FUTURE SCOPE

Builder Kerry Mclean created a mono wheel powered by a Buick V8 engine that's capable of more than 50 miles per hour. McLean call his mono wheel the rocket roadster amazingly, his creation is street legal in all 50 states.

Jack Lyell, who create a contraption called the RIOT wheel. This vehicle features an engine inside a huge tire, and the driver sit in a seat outside the wheel where he steers.

One designer Shaun Stevens has even showed off his idea for an electrically powered mono wheel motor cycle hybrid.

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BIOGRAPHIES

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