# MONO WHEEL

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***Abstract*—**A mono wheel is a one-wheeled single track similar to uni cycle. However, instead of sitting above the outer cycle, the rider sits inside the wheel. The wheel is a ring, usually driven by uni-cycle which is pressed against to the outer wheel. It was designed as a single-passenger vehicle, or a multi-passenger vehicle has been built in 19th Century. Hand-cranked and pedal-powered mono wheels were built in the late 19th century; most built in the 20th century have been motorized. Some modern builders refer to these vehicles as the monocycle, though that term is used to describe motorized unicycles.

I.INTRODUCTION

A **monowheel** is a one-wheeled single-track vehicle similar to a unicycle. Instead of sitting above the wheel as in a unicycle, the rider sits either within the wheel or next to it. The wheel is a ring, usually driven by smaller wheels pressing against its inner rim. Most are single-passenger vehicles, though multi-passenger models have been built.

Hand-cranked and pedal-powered monowheels were patented and built in the late 19th century; most built in the 20th century have been motorized. Some modern builders refer to these vehicles as **monocycles**, though that term is also sometimes used to describe motorized unicycles.

Today, monowheels are generally built and used for fun and entertainment purposes, though from the 1860s through to the 1930s, they were proposed for use as serious transportation.

The world speed record for a motorized monowheel is 98.464 km/h (61.18 mph)

**1 Monowheel History**

Monowheels have actually been around in one form or another since the 19th century. They began with an early bicycle design. After all, if something works with two wheels, could it also work with just one?

Historic view

The first monowheel designs appeared as early as 1869. Several of these featured a seat for the rider with pedals connected to a small wheel, which was in turn connected to the outside wheel. The rider pedals the small wheel, and that drives the large wheel, creating motion. Even at that time, the monowheel was recognized as a difficult means of transportation: One publication remarked that the vehicle was "impracticable for ordinary mortals".

By the early 20th century, inventors were experimenting with monowheels powered by actual engines, including a 150cc single-cylinder engine prototype from 1910 that today sits in the Auto & Technik Museum in Germany. Some designers also built monowheels with airplane propellers up front to aid in steering. None of these designs ever became mass-produced.

In the 1930s, science magazines began featuring designs for car-like monowheels that were enclosed by metal and glass and could seat several people. One article even featured a monowheel tank equipped with a machine.For the next several decades, inventors would experiment with different monowheel designs -- although, arguably, not with the fervor that they had in the late 19th and early 20th centuries. By now, the drawbacks of a monowheel had been firmly established, and its practicality as an everyday vehicle for ordinary people was pretty much discounted.

But as you know, some ideas never die -- no matter how questionable they are. Up next, we'll look at monowheels today and concepts planned for the future.

Today, monowheels are still around, though they aren't being floated as practical replacements for cars anymore. Many are built by hobbyists and amateur engineers and most are used for entertainment purposes.

Builder Kerry McLean created a monowheel powered by a Buick V-8 engine that's capable of more than 50 miles per hour (80.5 kilometers per hour). Amazingly, his creation is street-legal in all 50 states (but good *luck* explaining it to the police if you get pulled over for speeding.) McLean calls his monowheel the Rocket Roadster, and despite

suffering a bad wipeout in one, McLean continues to build his unique vehicles to this day

### 1.2 Steering

In a two-wheel mode of transportation, two systems (wheels) affect motion. Typically one
wheel provides the force to control speed, while the other handles changes in direction:
steering. For a monowheel, both direction and speed are controlled through the same physical apparatus; this generally makes steering more difficult. In a majority of systems, change in direction is effected by the rider shifting his or her weight, or in the sudden movement creating a shearing force between a handhold and the axis that the driver is settled on. Better control can usually be achieved at lower speeds. Because of the steering problem, monowheels have never caught on as a widely accepted mode of transportation

A change in direction can be effected in several ways including:

Leaning. The most common steering solution is that the rider must lean towards his intended direction of travel to turn, and then centralize his weight again once the turn is complete.Turning a gyroscope to provide turning force.Outboard skids to provide friction drag on one side.At speeds faster than a walk, lightly dragging a foot on the ground will cause the wheel to lean to the opposite side. Drag the other foot to bring it back upright.Small wheels used for steering, either one to each side or a single unit either in front of or behind the vehicle. It is a matter of debate as to whether such a vehicle would still properly be called a monowheel.Steerable propellers, which could provide both steering and power to move the vehicle. It has been noted that having a propeller operating near pedestrians could be quite unsafe.

### 1.3 Risk factors of monowheel

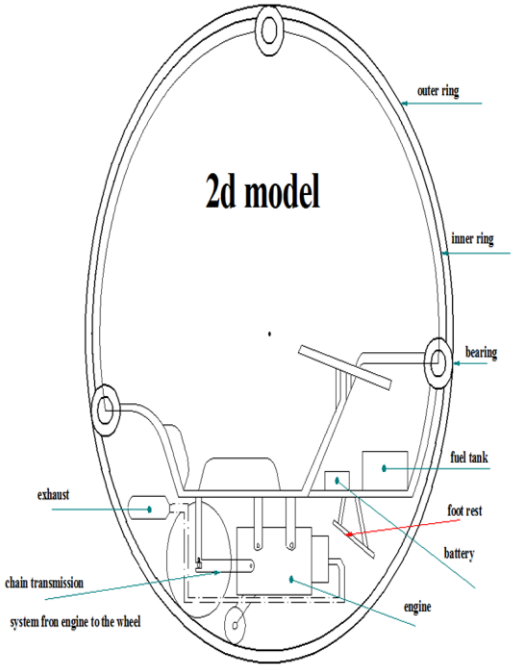
- Limited horizontal stability :A single wheel can fall over, unless it is quite wide or has some form of active stabilization, such as a gyroscope. Some designs have used outrigger skids or small wheels to address this. In many one-person designs, being at a stop requires the driver to put their feet on the ground, the same way as on a motorcycle.
- Limited capacity :Monowheel tend to be larger than a car of similar carrying capacity. Most have been kept small by being built to carry only one rider and with little or no space for baggage.
- Risk of "gerbiling": In most designs, if the driver accelerates or brakes too hard, it is possible that the force applied overcomes the force of gravity keeping the rider at the bottom of the wheel, sending the rider spinning around the inside of the wheel. This is known as gerbiling because it has some similarity to the situation of a gerbil running too quickly inside of a hamster wheel.Visibility issues: In driver-inside designs, the rider is always facing the inner rim of the wheel, which can obstruct the view of oncoming hazards from all angles.

### Objectives of the study

The main objective of this project is to provide knowledge about monowheel to the society.
The main importance of the project is to reduce the traffic which is mainly causing due to number of two and four wheelers appearing on roads.
It is very difficult to see the obstacales present on the roads in fourwheelers so to overcome from this circumstances monowheel is much needed.
As all the designs and manufacturing process involved in all the vehicles is very much complicated,so we are preferring the monowheel since its design and aesthetic appearance is too compact.

### CAD MODEL

Cad Drawing (2d)



| Sl .No | Material | cost |
|---|---|---|
| 1. | Outer frame | 5000/- |
| 2. | Inner frame | 7500/- |
| 3. | Bearings | 2500/- |
| 4. | Engine unit | 9500/- |
| 5. | Petrol tank | 850/- |
| 6. | Chain spocket and chain | 1450/- |
| 7. | shock absorber | 1250/- |
| 8. | exhaust silencer | 2550/- |
| 9. | Battery | 1250/- |
| 10. | Tyres | 5500/- |
| 11. | fastening materials(nuts and bolts) | 1000/- |
| 12. | lathe expenses | 1000/- |
| 13. | welding | 1500/- |
| 14. | painting | 2500/- |
| 15. | Miscellaneous | 2000/- |
| | **Total** | 45350/- |

**3D VIEW**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**OPERATIONAL SEQUENCE**

RAW MATERIAL

↓

MACHINING OPERATIONS

↓

FITTING

↓

ASSEMBLY

↓

FINDING ERRORS IF ANY

↓

SOLVING ERRORS

↓

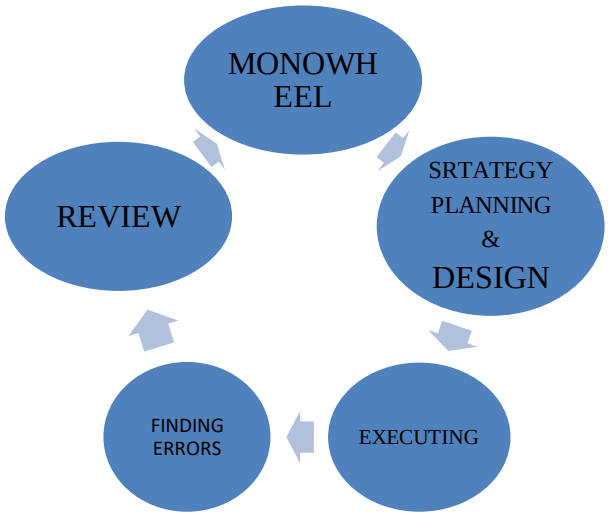
FINAL PRODUCT

**Preparation of models:**

Softwares used: CAD

SOLID WORKS

**Methodology of the project**




**Cost Report**

**3.1 COMPONENT DESCRIPTION**

**Outer frame**

Needs to be big and sturdy enough to sit in, and allow the drive to make it move. I used a 50mm diameter steel tube with a wall thickness of about 3.5mm, shaped into a 1.5m hoop. For tread, I cut up bicycle tires and pop-riveted them on the outside of the ring.

**Inner frame**

Holds the rollers, power source, drive, and seat. Experiment with positions, but keep the center of mass as low as possible for stability.

**Rollers**

These allow the outer ring to revolve around the inner frame. I used custom-made 100mm nylon rollers with ball races to allow free movement. Mine has four, some designs use more. If cost is an issue, you can use skateboard wheels set at an angle.

**Power source**

This could be a petrol engine, an electric motor, pedals, or even steam power. It comes down to personal preference and engineering ability.

**Drive**

Usually a friction-type drive. I use the wheel from a MiniMoto, running against the inside of the outer ring.Other things to consider in the design: The gearing needs to be calculated. top speed of around 10mph if it's your first attempt

**Exhaust**

An **exhaust system** is usually piping used to guide reaction exhaust gases away from a controlled combustion inside an engine or stove. The entire system conveys burnt gases from the engine and includes one or more **exhaust pipes**. Depending on the overall system design,

**Tyres**

A rubber covering, typically inflated or surrounding an inflated inner tube, placed round a wheel to form a soft contact with the road.

**Self stater**

A **starter** (also **self-starter**, **cranking motor**, or **starter motor**) is a device used to rotate (crank) an internal-combustion engine so as to initiate the engine's operation under its own power. Starters is electric.

**Fuel tank**

Fuel tank is the storage area where the required amount of fuel storage can be done.depending upon the overall weight of the monowheel the quantity of fuel storage can be calculated.

**Shock absorber**

Shock absorbers do two things. Apart from controlling the movement of springs and **suspension**, shock absorbers also keep your tyres in contact with the ground at all times. At rest or in motion, the bottom surface of your tyres is the only part of your vehicle in contact with the road.

## CONCLUSION

It has been an interesting journey through the development of this project. At the beginning we used our limited knowledge to implement only the basic features. However, through the months of development, new issues and errors led to new ideas which led to newer methods of implementation which, in turn, led to us learning even more about the concept and apply more creative and efficient ways to produce a good project. New methods helped us in adding flexibility to the various parts of the project , making the further addition of newer features easier and less time consuming which, again, led to the possibility of adding even more features. This sequential chain reaction of progress and ideas has enabled to learn so much through the months of working on this project and we have done our best to add as many features as we could and provide a good output.

Before concluding, it is worth mentioning that this project would never have been possible without the tremendous amount of encouragement by the staff and guides of our department.

We are content with the outcome of this project and are hopeful that it meets the requirements expected and we wish that it may inspire others to be creative and critical in the field of mechanical .

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