RESEARCH ARTICLE OPEN ACCESS

FABRICATION OF THE BUGGY CAR

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Abstract:

The purpose of this project is to fabricate a buggy car which can be more popular at sport event. The performance of the buggy car will depend on the chassis. The flexing in the chassis is based on the middle and back section of the project. By considering the forces and stresses and other parameters are calculated based on the problems occur. The vehicle must have good maneuverability and with minimum ground clearance

Keywords — **Roll cage, Suspension, Wheel assembly, Braking, Transmission.**

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I. INTRODUCTION

A vehicle which is All terrain is named as buggy car is commonly used for the off road capabilities with light weight. This will be used to ride at hilly areas, sand dunes and uneven terrains. Buggy is a simple vehicle with a engine mounted on open chassis or roll cage, it is single seated. Buggy car is manufactured by considering various parameters with certain rules for safe. It contains various parts like Roll cage, Braking, Suspension, Steering, wheel assembly, Transmission. Buggy car must posses with quality of suspension and braking system and roll cage also might play a key role for vehicle while rollover of vehicle.

2. FABRICATION PROCESS:

Fabrication is process which all the parts has been assembled together. This process involves the Roll cage, steering, Suspension, Wheel assembly, Transmission etc in buggy car.

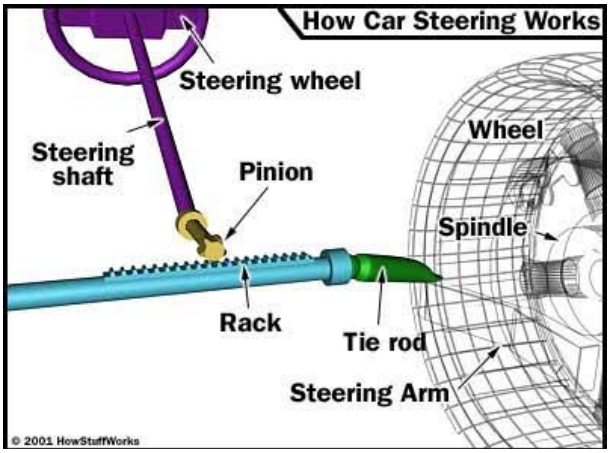
A. Roll cage:

The purpose of the roll cage is to provide safe environment. The passenger compartment of is to protect its occupants from being injured in an accident, particularly in events of rollover. For the fabrication of frame we focused on a light weight and safe frame still that meets all the requirements. For frame making of we considered the material of AISI4130 chromolin hollow pipes which contains 18% of carbon. The joining of these hollow pipes will be cut into different lengths and weld together by using TIG welding with temperature of between 70F-100F copper filler material has used for weld. For the support of mounting other parts brackets also placed on roll cage where ever required.

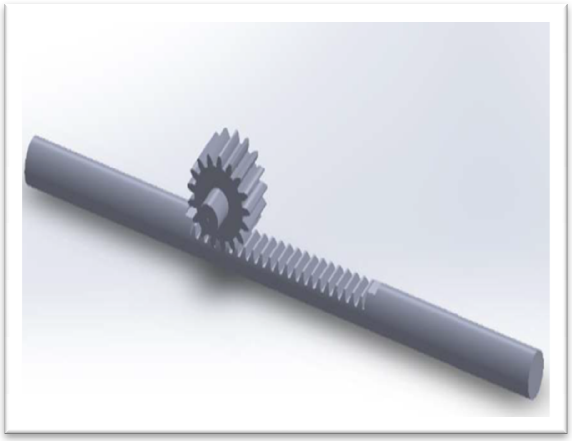
B. Steering

Steering is most important one which helps to turn the wheels of vehicle. The steering system consists of the steering wheel, steering column and linkage system. Our vehicle is controlled by rack movement by the pinion direct from the steering column to the steering arm. The steering system has to provide good maneuverability. The steering system will depend on the inner and outer angles of the vehicle, the factors like kingpin inclinations scrub radius, centre of gravity. Based on the Ackerman's geometry we are calculated inner and outer angles and turning radius of wheels. The rack and pinion which converts the rotational motion in

to linear motion that will connects to the tie rods as linkages and that will connected to the wheel knuckle which give turning movement to wheels by rotating steering.



Steering system



Rack and pinion

C. Suspension:

Suspension plays a vital role in the ATV (All Terrain Vehicle) type of vehicles. Suspension is the system of tires, tire air, shock absorbers and other linkages that connects to the vehicle. It is important for the suspension to keep the road wheel in contact with the roads surface as much as possible, because all the road and ground forces are acting on the vehicle. The suspension of front and rear may be different. In front we are using A arms for mounting of the shocks and wheel. The roll cage is kept at the optimized height to reduce the body roll, it has good strength to absorb the loads. In rear we used H arm and I arm to support. This will provide the connection of calliper for brake. In this we are using double wishbone system which has sharp cornering, camber angle changes, contact patch reduces, and handling reduces. The double wishbone suspension has upper and lower control arms which boots negative chamber.. It is more flexible and provides better ride comfort in bumpy terrain zones.

The shock absorbers will provide vehicle to sustain on road from uneven areas. The shocks are mounted on the lower arms. We have chosen Fox float 3 Evol R as front and Endurance for rear wheels.

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Front Fox Float 3 EVOL

D. Wheel assembly:

In wheel assembly there are two types of masses that are sprung mass and unsprung mass. The mass of the vehicle damped by spring is known as sprung mass and the wheel assembly mass is not damped by the spring, it will come under unsprung mass. For wheel assembling the components needed are spindle, knuckle, hub, wheels and tires. The spindle is manufactured such as knuckle, bearing and hub are to be fitted and its material is taken as mild steel. Knuckle is also attached to the wheel fitted with the spindle and arms are also mounted on the knuckle.

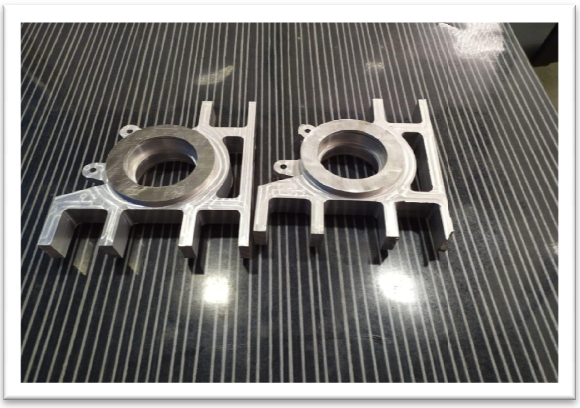
Brake callipers are placed on the knuckle. The tie rod which connects the rack and pinion is also mounted on the knuckle.

The hub is also a part of wheel assembly on which a disc plate is placed for applying of brakes. The material used for front hub is mild steel and rear hub is aluminium. The tires are selected based on the traction required for the vehicle. Based on calculations we have decided to take tires of

For, Front and Rear Tires – 23*8-12

Where, 23' is the diameter of wheel, 8' is the width of the tires 12" is diameter of rim.

Rear Knuckle



Rear Hub

E. Braking:

The braking system for the vehicle is responsible for stopping the vehicle at all the times and it is integral for drivers safety. We used hydraulic braking system. While coming to braking many considerations will come like pressure, coefficient of friction and heat dissipation. Pressure is the friction that generated between moving surface with other. In brakes the pressure applied by means of hydraulic system. The friction that generated in between the tire and road is coefficient of friction. Heat dissipation is most important one while designing the brake system. As a pad temperature rises while applied the brakes, so in order to control and avoid brake fading of friction material must have high heat dissipation. We have used x split type barking system, which means one front wheel and one rear wheel connect as cross to the master cylinder to the calliper. We used maruthi 800 master cylinder To fill the fluid in the brake liners bleeding operation has performed to remove air gaps and for applying accurate brakes. We used vespa callipers for the buggy car. The pedals will position with 6:1 Ratio for acceleration and braking. The brake callipers will be attached to the rotor disc in to the pads.

Brake callipers

F. Transmission:

Transmission system is one of the most important

system in every automobile that has a significant impact on their efficiency. Transmission allows the variation of torque between engine and gear box. Automobile require a different torque at different levels of our vehicle. We have used CVTech CVT coupled to engine, which is coupled to reduction of gear box. Engines have the different ranges of speed which produces maximum torque. The CVT and gear box has selected on the basis of output of engine.

CVT means continuous variable transmission this can be used in place of gear rod

while it can change continuous range of effective gear ratios. CVT reduces the complexity of the vehicle. It has a better efficiency at all speeds. The CVT ratio is 0.43 to 3 which is suitable for our requirement. Gear box is mounted on the vertical roll cage pipes. This mounting is based on the position of the CVT and engine. Te drive shafts are connected to the either side of the gear box which are connected to the hubs of the two wheels. In gear box the teeth should have sufficient strength so that they will not fail under static loading.

Gear Box

The Engine and CVT are connected with the pulley of straight position without any slippage of the belt, after the engine starts the Cvt will slowly tight the belt which will results in increasing of the speed.

3. RESULT:

The fabrication of the buggy car has done with the help of various processes and other types of machining which required. The vehicle is tested on track. Small errors that occurred has been rectified. The process helped the members to learn each and every thing in practical.

4. CONCLUSION:

The fabrication of the vehicle has been performed many of the new steps have learnt. The bending of the pipes is performed at CNC machines. We can reduce the weight of vehicle by considering less weight materials. It may increase more cost of the vehicle.

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