

STUDY AND EXAMINE THE GO-KART WORKING MECHANISM

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ABSTRACT

Generally, go-kart is a very fun to drive, it works on a simple structure about the chassis which is base of go-kart is made by different type of materials (alloy steel), after that this car includes various types of I.C engines according to the power consumption. Mostly go karts uses clutch system for that transmission is attached to engine at rear axle. In go kart small steering system uses, this is approximately 12inches. Tires in this car usually small as compare to normal car tires, they are able to work in both wet and dry road conditions. Modeling and Design are performing in solid works, CATIA, and ANSYS, go-kart racing organize by NKRC (National Kart Racing Competition) in Nagpur and Hyderabad. This paper concentrates the study and examines the go-kart working mechanism. The objective of this paper is to study and implement the working mechanism of Go-Kart with some modern technique respectively.

Keywords: - Go kart, SOLID WORKS, CATIA, FUSION 360 and ANSYS, NKRC.

1. INTRODUCTION

A small wheeled go-kart consists a small engine, single seat and the most important part chassis which is characterized by the light and strong material and absence of suspension system so the chassis is independent of suspension that is why it is easy to operate. Go-kart runs on flat track so the clearance level from earth is very small as compare to other vehicles. Art Ingles who is father of go-kart was actualize and used in United States in the 1950s. These days' go-kart has huge craze in India, Europe as well as U.S. go-kart is a best avenue for those who are stimulated in racing [1].

Importance of safety vehicles demand increasing day by day so automobile sector has changes drastically in design and material. They deal with the chassis design frame and various loading tests like front, rear and side forces and will strongly note about vibration, shocks, twists and other stresses because the chassis usually refers an engine, tires, suspension etc. Today, the go-kart is only for racing purpose so design and testing process are must than theoretical and simulation studies. So

the research work aim is to focus on detailed methodology of virtual design, testing and dynamic performance on the chassis of go-kart. Go-Kart used as a very popular, cheaper, and smaller way of automobile racing. It is usually used as a low cost and lot of safer way as compare to other motor sports such as Formula one. There are many people which are link it with young drivers, but apart from youngster, adults are also active in this Karting. Craze of Go-Kart is continuously increasing day by day. With continuous improvement go-kart industry will surely obtain a very bright ranking of popularity in the future in designs, technologies and racing tracks. There are four major components of go-kart: i. Chassis, ii. Engine, iii. Steering System, iv. Braking System, v. Chassis Chassis of go-kart is the base in which engine, operator seat and steering system mounted. It is a skeleton frame made up of pipes and other materials with different shapes. Chassis of go-kart must have stability, torsional rigidity, impact forces as well as it should have high degree of flexibility without suspension and it should be feasible to bear a sustain load of accessories and operator. Chassis should be designed for safety purpose without any compromising the structural strength [1-2].

i. Engine

All knows that engine is used to give power to the wheels of the vehicle. Amusement go-kart cars consist of 4-stroke engines or electric motors while in racing go-karts 2-stroke engines is used which is powered by 2 to 10 hp [3]. In today world BRIGGS AND STRATTON 127cc units engine is very popular for racing of go-karts and this is our proposed engine for project. This kind of engine is adequate for racing and fun activities.

ii. Steering System

Steering system is just a mechanical arrangement to ensure that the front wheels are approaching desired direction. The main mechanism is rack and pinion steering mechanism where pinion gear is turn by steering wheel and pinion moves on the rack [4]. Another modern technology is to adjust the steering according to the comfort of operator. In older design the recirculating ball were uses and this mechanism is still found in modern trucks and utility vehicles. In go-kart car 12-inch steering which is standard size is used normally.

iii. Braking System

In this variation of speed there is a major role of braking system, normally braking system is used to control or deform the speed of vehicles. The braking system is used to provide the enough braking force to completely lock the wheels [4]. In modern time the disc brake is in high trend, when the disc brake applies the calipers squeezes the pairs of pads against the disc. In that case the friction retards the rotation of shaft such as vehicle axle. Generally, brakes are applied to rotating wheels but they can take another form such as surface of moving fluid [1].

2. LITERATURE REVIEW

Halderman D.J et al. [3] says that the chassis is the framework of vehicle in which engine, transmission, final drive components are mounted on the chassis. So the chassis should be strong and bearable for the suspension and operator. Mitchell et al. [4] studied that the wheel base of the vehicle is the center distance of the front wheel to the center of the rear wheel when we take view from the side. Long wheelbase vehicle is much smoother and stronger than the short wheelbase vehicle and it increases the stability of vehicle from the cornering. Martin says that every karter has responsibility to determine its own requirements or needs. he has also responsibility to stay in spirit and stay with the rules in which he is participating. Setting of go-kart chassis increase our theory knowledge as well as our practical knowledge and it should be improve time to time [4].

Koustubh et al. [5] analyze that the design of chassis act as an important role and it can develop many skills in designing software like FUSION 360. From the analysis it can predict that the chassis is safe to bear stresses or not and also seeing the deformation and modification in chassis design. Harshil et al. [6] examined that the engine and aerodynamic designed easily propel the speed of go-kart car. Braking system designed is act as vital role to stop the rear wheels safely and easily at higher speed. Steering system has also design gives the proper turning radius at any condition and satisfies the minimum condition of radius. According to International go-kart association, [7] an American company became first go-kart manufacturer company in 1958 and McCulloch was the first engine manufacturer of go-kart in same year. After that the go-kart race widely spread in Europe and now a days it is very popular in India. Ramini et al. [8] studied that go-kart is a one seater vehicle, its size is small but the major factor is that traditional suspension is completely lack. There are no dampers or springs and camber and caster angles is including with tires. We have performed many stresses test in our project to make a good and safe vehicle.

3. DESIGN, METHODS AND WORK DONE

In this section, a brief explanation is given regarding the design, software or method used to design the chassis of the Go-cart. Further, the work done till the end of the October has been mentioned and elaborated.

3.1. Design and methods

The go-kart car is all about designing process, without designing it cannot be possible to find out the applied stresses such as front impact stress, side impact stress and rear impact stress. In this project the designing work is done by FUSION 360 software and analysis is done by ANSYS. The material selection is the most important part of designing that's why the chassis of vehicle should be hollow pipes (alloy steel) and other materials to make it light and shock absorbent.

(AISI is an American standard base code)grade of material for our chassis. After weld the chassis with mild steel welding chassis was ready. Length and width of chassis are

To give the power and speed of go-kart we bought a “BRIGGS AND STRATTON” 127cc engine and BKT(10 and 11 inches)tires. After the paint job of chassis we fixed the engine and rear tires with rear axle and torque converter. All this process we completed till end of October and this was our work done.

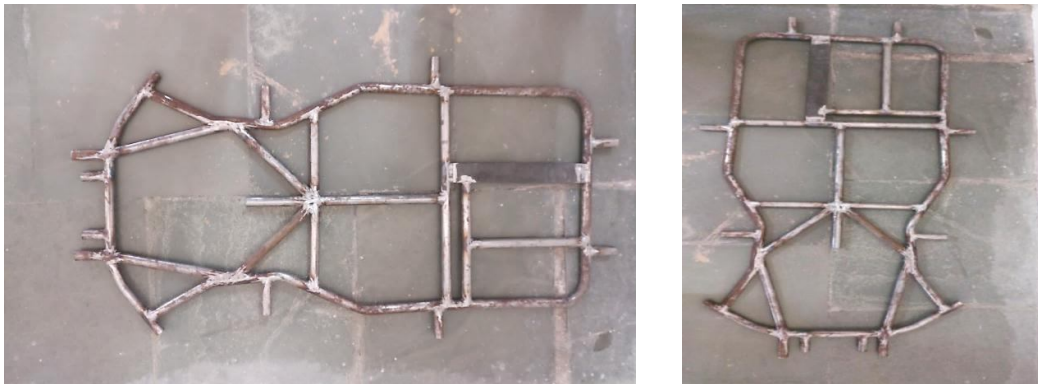


Fig. 3 Chassis of Go-kart (mild steel material with 1 inch inner diameter. circular pipe using mild steel welding)



Fig. 4 “BRIGGS AND STRATTON” engine of 127cc with 3.5 HP



Fig. 5 BKT tires 10 inches diameter of front and 11 inch diameter of rear

4. CONCLUSION

With self-design and assembling the prior aim is to build a perfect go-kart by using less cost and without compromising the safety and performance of vehicle. In chassis the stress will generate in designing which plays an important role. FUSION 360 and ANSYS is used to evaluate, create and

modify the best vehicle design to achieve its set goals. The main goal is to simplify the design to make a light weight and safety purpose vehicle then it will improve in the speed of go-kart.

FUTURE SCOPE

In future go-kart will develop by many ways such as 4-stroke engine. Alternative fuels like bio fuels which are cheaply cost will be used in place of petrol. Solar energy can be produce by solar panels will be apply in go-kart, then it will be convert into E-Kart. Suspension system should be added to bear vibrations and shocks. By the help of solar energy, the planet can be preventing from pollution. Development in aerodynamic shape will increase the go-kart speed.

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