



## **Review Of Vehicle Dynamics of An Ev Go-Kart**

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### **ABSTRACT:**

This project is intended to know about the functionality of the different components which are all involved in the manufacturing and working of a small-scale go-kart and the importance of each of the factor and their effects upon the performance. The go-kart comprises of many components and few of the major components are like chassis, shafts, power train system, battery (since it is a report for an electric kart vehicle), controller, throttle, etc...

These were used as a fun ride and an entry level for a motorsport career seeker. The karts are small fun vehicles which requires no registrations to drive and is not road legal hence it is always driven in a controlled environment.

Keywords — Go-Kart, Battery, Controller, Throttle, Environment

### **Literature Review :**

#### ***William F. Milliken [1]***

Written for the engineer as well as the race car enthusiast, Race Car Vehicle Dynamics includes much information that is not available in any other vehicle dynamics text. Truly comprehensive in its coverage of the fundamental concepts of vehicle dynamics and their application in a racing environment, this book has become the definitive reference on this topic.

#### ***T.Z Quazi [2]***

Taking part in a run Over the last 50 times, go- kart racing has developed into one of the most competitive forms of motor racing in the United States. Kart racing has acted as a turning gravestone for numerous motorists seeking careers in NASCAR and Formula One; all began their careers in this less expensive but high- octane style of motorsports contending.

#### ***Yuvraj Shet [3]***

The drivers in these are very professionals and accurate. They can drive it very fast. But there are also motor sports which do not need professional drivers and need not much speed. The vehicles used are also fewer amounts Such a motor sport is Go-kart. They resemble to the formula one car, but it is not as fast as F1, and cost is very less. The drivers in go-kart are also not professionals.

#### ***Ammar Qamar Ul Hasan [4]***

A go-kart is a small four wheeled vehicle. Go-kart, by definition, has no suspension and no differential. 'Carting is commonly perceived as the stepping stone to the higher and more expensive ranks of motor sports. Kart racing is generally accepted as the most economic form of motor sport available.

#### ***Shubham Kolhe [5]***

A Go Cart also spelled as Go-Kart is a four wheeled vehicle designed and meant for racing only. It is a small four-wheeler run by I.C Engine. It is a miniature of a racing car. This report documents the process and methodology to produce a low-cost go-kart.

***Klaps [6]***

Brake pedal 'feel' is increasingly important for modern vehicles, thus a modern braking system must provide more driver safety and comfort far beyond that of the basic driver-initiated deceleration.

***Hedrick [7]***

The time delay which is created by the driver's foot changing from the accelerator pedal to the brake pedal could be dangerous in an emergency. Thus, a good design of pedals with suitable lateral separation and step-over height between the accelerator, clutch and brake pedal is important.

***Rudramoorthy [8]***

discovered that the brake disc surface might have reached a potentially- hazardous temperature due to frictional heat. The goal of this study is to identify a lightweight material that can replace the brake disc and evaluate the performance of such discs under severe braking conditions.

***Munzer SY Ebaid [9]***

The challenge to teams is to develop a vehicle that can successfully compete in all the events (static and dynamic) described in the Formula Society of Automotive Engineers rules. This project is considered as an educational, practical, and training exercise on mechanical engineering principles for the undergraduate and graduate students. Also, it is a high-performance engineering project for engineering students to acquire design concepts in automotive, engineering skills, and the freedom to express their creativity and imaginations.

***T. P. Ashok Kumar [10]***

This paper presents a comprehensive analysis of an electric go-kart equipped with a regenerative braking system. It delves into the design considerations such as motor selection, battery capacity, and controller optimization to achieve optimal performance and energy efficiency. The study includes simulation and experimental results to validate the effectiveness of the proposed design in terms of energy regeneration and overall system performance.

***N. G. P. A. Chandrasekara [11]***

This paper focuses on the design and development process of an electric go-kart. It discusses various aspects of the design, including the selection of components, vehicle dynamics, and performance optimization. The study provides insights into the challenges and considerations involved in transitioning from traditional gasoline-powered go-karts to electric propulsion systems.

***C. P. Wong [12]***

This paper presents the design and development process of an electric go-kart, focusing on the integration of electric propulsion technology. It discusses the selection of key components such as motors, batteries, and controllers, as well as the design considerations for optimizing performance and efficiency. The study provides valuable insights into the challenges and opportunities of electric propulsion in go-kart applications.

***A. K. Kalathil [13]***

This paper presents a performance analysis of an electric go-kart, focusing on key metrics such as speed, acceleration, and energy efficiency. It discusses the impact of various design parameters on the overall performance of the go-kart, including motor characteristics, battery capacity, and controller settings. The study provides valuable insights into the performance capabilities of electric propulsion systems in go-kart applications.

***K. N. Prashant [14]***

This paper presents a detailed design and analysis of an electric go-kart, focusing on performance optimization and energy efficiency. It discusses the selection of components, vehicle dynamics, and control strategies to achieve the desired performance characteristics. The study provides valuable insights into the design considerations and challenges associated with electric propulsion systems in go-kart applications.

***Kiral Lal [15]***

The chassis is an extremely important element of the kart, as it must provide, via flex, the equivalent of suspension to give good grip at the front. Karts have no suspension and are usually no bigger than is needed to mount a seat for the driver.

***Prof. Alpesh V. Mehta [16]***

The fibre to take load in the form of a structural element, but the matrix phase only sustains small amount of applied load. In addition, beside the matrix material is ductile; it also protects the individual fibres from mechanical abrasion or chemical reaction with the environment which will cause surface damage.

***Mat and Ghani's [17]***

This research is conducted in 2012 carried out a light chassis development for "Eco-Challenge" race cars that could safely withstand loads and compulsions. Chassis analysis was carried out by addressing normal carloads such as engine and driver weight, acceleration, braking and cornering forces.

***Tsirogiannis E [18]***

In the 2019 study conducted by Tsirogiannis and his friends, an integrated methodology of developing an electric car chassis was demonstrated. The main criteria for the development of the electric car chassis are the elimination of cost and time, as well as an increase in hardness and strength, which is subject to mass reducing.

***Joel.Ja [19]***

A structurally balanced chassis was designed for an electric motorcycle in a 2018 study by Joel et al. simulated the real-time forces on the chassis and suspension geometries. Cost and weight of the chassis to determine the material most suitable for the chassis.

***S. Arshibad [20]***

He went on to show that a vehicle's chassis is crucial to preserving its speed and performance, making it necessary to do static and dynamic analyses of go-kart chassis. Electric go-karts are replacing conventional go-karts due to all the benefits they provide, which include less pollution and environmental friendliness.

***N.A.Z. Abdullah et al. [21]***

The model update approach is crucial for enhancing the dynamic features of the go-kart chassis structure. By handling the record of dynamic reactions from test structures to have an accurate model for any reenacted examination and limited component, they showed that model refreshing is concerned with the remedy of limited component models.

***Santosh Kumar et al. [22]***

He comprised the study on the frame of go-karts; at times, researchers were concerned with material selection, simple structural analysis, safety, and structural stability. He offered a detailed examination of the systems used in a go kart, including the steering and braking, transmission and consideration fostering selection.

***Mr. Nikunj (2011) [23]***

The fibre to take load in the form of a structural element, but the matrix phase only sustains small amount of applied load. In addition, beside the matrix material is ductile; it also protects the individual fibres from mechanical abrasion or chemical reaction with the environment which will cause surface damage.

***D. Raghunanda [24]***

The chassis material is considered depending upon the various factors such as maximum load capacity, absorption force capacity, strength, rigidity. The material selected for the chassis building is AISI 4130

***Prof. Nirmal Chohaun [25]***

He written report on "DESIGN AND FABRICATION OF ELECTRIC GO-KART" published on IRJET. Year of publication: 15 SEP 2020. The goal of this report is to design and build a working model of an electric go-kart.

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## CONCLUSION :

There are so many factors that should be considered and common to all the engineering vehicles. With an approach of engineers can come up with the most effective possible product for the society. The chosen design is the safest & the foremost reliable car for any racing vehicle. All the parameters like Reliability, safety, Cost, Performance, aesthetics, ergonomics, Standard dimensions & material were also taken in consideration on an equivalent time. Wherever possible finite element analysis was done on the regularly loaded parts & modifications were done accordingly to avoid any sort of design failure. The designing of Go-kart can develop many skills. The training of 3-D modelling software like Solid works is important to get desire design. The analysis of design determines the stresses developed within the chassis which plays a crucial role in factor safety. By the conclusion of the analysis, we can say that the chassis is safe or not and by seeing the deformation occurring and stresses modification within the kart chassis is feasible.

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