

DESIGN & FABRICATION OF CHASSIS FOR TELESCOPING 3-WHEEL GO-KART

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ABSTRACT

Most of the recreation parks are using 4-wheel petrol (or) diesel powered go-carts which are expensive, heavy in weight and pollutes the environment. As the fossil fuels are depreciating and cost of the fuels is also increasing rapidly in global markets, it is very much essential to develop new go-kart designs with less weight, runs on electric energy (battery) so that it is not dependent on costly imported fuels like petrol / diesel and also consumes less energy.

3 Wheel electric (battery powered) Go Kart is one of the less weight designs that consumes less energy and adds no pollution to the environment. As a part of our project dissertation, we are planning to fabricate chassis for telescopic 3-wheel go-kart.

Telescopic 3-wheel go-kart has following advantages when compared to 4-wheel 2-seater go-karts;

- Less in mass hence gives good energy economy
- No pollution
- Easy to transport as it occupies less space

Project Involves;

- Study of various types of chassis, materials used for chassis, structural elements like pipes, plates and flats, fabrication operations like welding, cutting, drilling, etc.

I. INTRODUCTION

A go-kart, also written as go-cart (often referred to as simply a kart), is a type of open-wheel car. Go-karts come in all shapes and forms, from motor less models to high-powered racing machines. Some, such as Super-karts, are able to beat racing cars or motorcycles on long circuits.

Gravity racers, usually referred to as Soap Box Derby carts, are the simplest type of go-karts. They are propelled by gravity.

Many recreational karts can be powered by four-stroke engines, while racing karts use a two-stroke or, rarely, higher powered four-stroke engines. Most of them are single seater but some recreational models can

accommodate a passenger. In some countries, go-karts can be licensed for use on public roads often referred to as street tracks. Typically, there are some restrictions; in the European Union, a go-kart modified for use on the road must be outfitted with headlights (high/low beam), tail lights, a horn, indicators, and an engine not exceeding 20 hp (15 kW).

Besides traditional kart racing, many commercial enterprises offer karts for rent, often called "recreational" or "concession" karts. The tracks can be indoor or outdoor. Karts are rented by sessions (usually from 10 to 30 minutes). They use sturdy chassis complete with dedicated bodywork, providing driver safety. Most of these enterprises use an "Arrive and Drive" format which provides customers with all the safety gear (helmets, gloves and driver outfits) necessary, and allow them to show up anytime to race at a reasonable price, without the problem of having to own their own equipment and gear.

Outdoor tracks can offer low-speed karts strictly for amusement (dedicated chassis equipped with low powered four-stroke engines or electric motors), or faster, more powerful karts, similar to a racing kart, powered by four-stroke engines up to 15 hp (11 kW) and, more rarely, by 2- stroke engines, but designed to be more robust for rental use. Typically, outdoor tracks are also be used for traditional kart races.

Indoor kart tracks can be found in many large cities in different parts of the world. These tracks are often located in refurbished factories or warehouses, and are typically shorter than traditional outdoor tracks. Indoor karts are usually powered by a four-stroke gasoline engine producing anywhere from 5 to 13 hp (4 to 10 kW), or sometimes by an electric motor. Many tracks offer competitive races and leagues. At the top level, an Indoor Karting World Championship (IKWC) exists. Nowadays most of the racers are using 4-wheel petrol (or) diesel powered go-carts which are expensive, heavy in weight and pollutes the environment. As the fossil fuels are depreciating and cost of the fuels is also increasing rapidly in global markets, it is very much essential to develop new go-karts with less weight, runs on electric energy / battery so that it is not dependent on costly imported fuels like petrol / diesel and consumes less energy

3 Wheel electric (battery powered) go-kart is one of the less weight designs that consumes less energy and adds no pollution to the environment. Through this project we have made an effort to make less weight 3 wheel go kart chassis which can take 200Kgs Load (50kg Chassi+150Kg Men) and also support parts like motor, batteries, steering, controller etc., this chassis also accommodates retractable seat for passenger making it a 2-seater go-kart.

LITERATURE SURVEY

The go-kart is a vehicle that is small, quick, light, and simple to drive. Since the go-kart is designed for flat-track racing, it has a very poor ground clearance relative to most cars, but it does not have suspension. Because of its ease, low cost, and safer way of racing, go-karting is a perfect outlet for those involved in racing. It is possible to have an indoor or outdoor track. The go-kart tracks are much smoother than the F1 tracks.

A **chassis** is the basic framework of your vehicle. Sometimes the **chassis** is only the frame, while other times it includes the wheels, transmission, and sometimes even the front seats. A **chassis** is one of the most important components of a vehicle, without which the **car** would have no structure.

Coupe French car manufacturer “Poniard” used body panels entirely made of aluminum to dress the “Dana”. In the past few years manufacturer is increasingly using the expensive aluminum for their vehicle bodies. 72 years after the introduction of Dodge’s all-steel body, the Car Manufacturer Audio (in cooperation with the Aluminum Company of America (Alcoa)) was finally able to develop an equivalent in Aluminum. The Audio Aluminum Space Frame, used in the AAA, is the first car to be fitted with a chassis and Fig. 2: Audio Space Frame body made from 100% aluminum. The main reason to use aluminum or fiberglass Instead of steel is to save weight.

II .METHODOLOGY

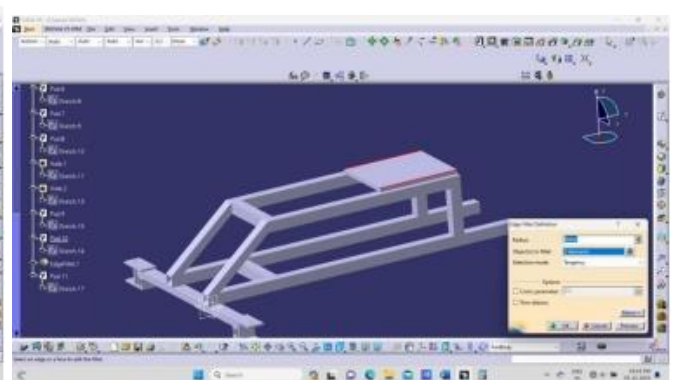
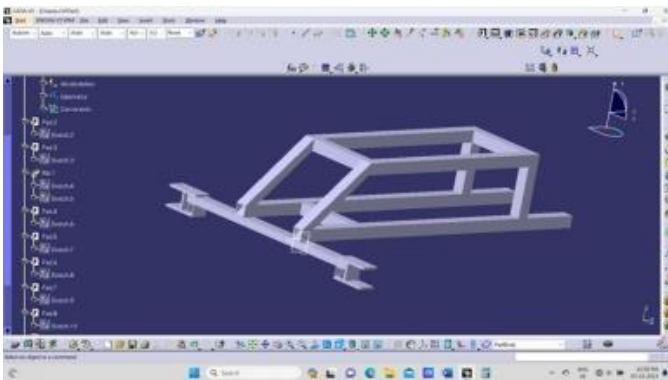
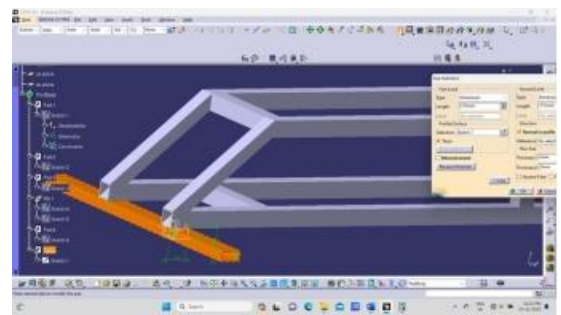
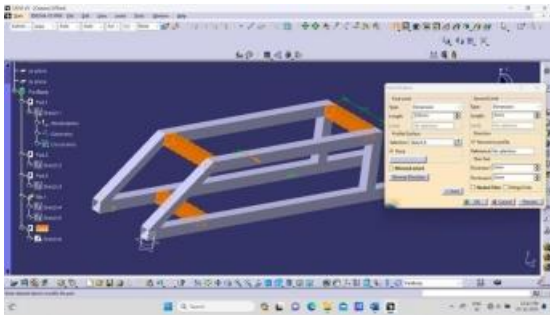
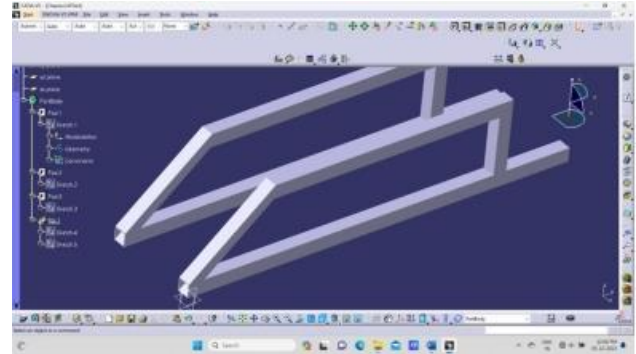
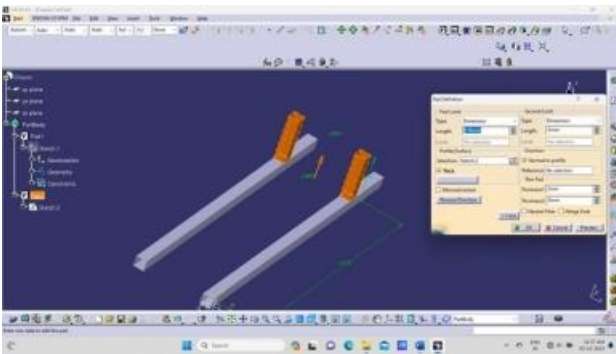
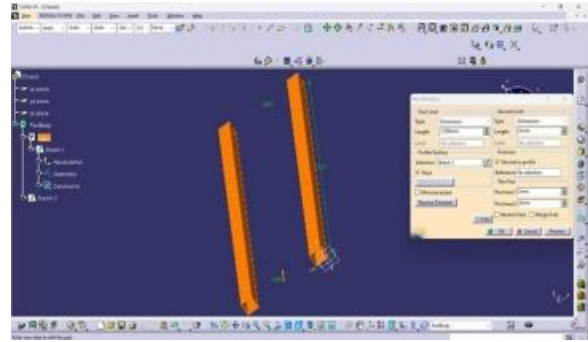
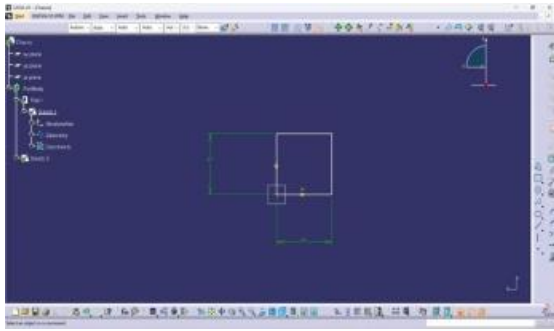
We have taken a Mild Steel (MS) Square pipe of side 40mm and thickness 2mm and we have marked the pipe at distance 1200mm from its edge and using measuring and marking tools and we have performed cutting operation using angle grinder machine with respect to the markings and we have performed grinding operation after cutting operation using angle grinder machine to get better surface finish with respect to the markings and we have obtained 2 pipes of length 1200mm, side 40mm and thickness 2mm by following above mentioned process. We have taken a Mild Steel (MS) Square pipe of side 40mm and thickness 2mm and we have marked the pipe at distance 1080mm from its edge using measuring and marking tools and we have performed cutting operation using angle grinder machine with respect to the markings and we have performed grinding operation after cutting operation using angle grinder machine to get better surface finish and we have obtained 2 pipes of length 1080mm, side 40mm and thickness 2mm by following above mentioned process. As our Chassis frame is inclined in the front up to 40degrees, we have marked the obtained length1080mm pipe at distance 900mm from its edge with an angle of 40degrees using measuring and marking tools and we have performed cutting operation for obtained length 1080mm pipe using angle grinder machine with respect to the markings and we have performed grinding operation after cutting operation using angle grinder machine to get better surface finish with respect to the markings and now, after grinding operation according to the design we have performed bending operation by fitting the pipe in wise and we have obtained 2 pipes of length 1080mm, width 40mm and thickness 2mm and with an angle 40degrees by following above mentioned process. We have taken a Mild Steel (MS) pipe of length 25mm, breadth 50mm and thickness 2mm and we have marked the pipe at distance 515mm from its edge using measuring and marking tools and we have performed cutting operation using angle grinder machine with respect to the markings and we have performed grinding operation after cutting operation using angle grinder machine to get better surface finish with respect to the markings and now we have obtained one piece of pipe of length 515mm, length 25mm, breadth 50mm and thickness 2mm by following above mentioned procedure.

After we have taken a Mild Steel (MS) plate of thickness 8mm and we have marked the plate at length 60mm and breadth120mm from its edge using measuring and marking tools and we have performed cutting operation using angle grinder machine with respect to the markings and we have performed grinding operation after cutting operation using angle grinder machine to get better surface finish with respect to the markings and we have welded all the pipes together using arc welding machine and we we have obtained the chassis base frame by following above mentioned process.

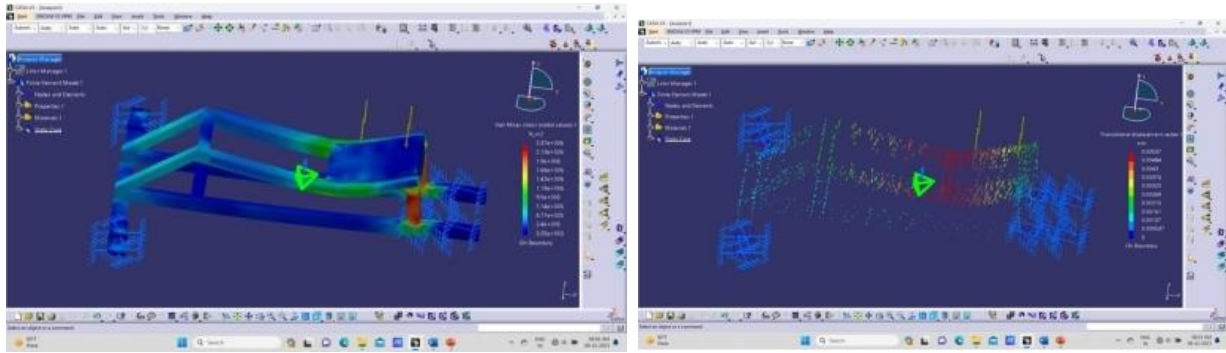
III.MODELING AND ANALYSIS

MODELING

By using Catia V5 Software we have designed the following parts,



ANALYSIS



IV. FABRICATION

We have assembled all the components together and the final image of the project is as shown in the figure.



Fig- Final Output

V. RESULTS AND DISCUSSION

3 Wheel electric (battery powered) Go Kart is one of the less weight designs that consumes less energy and adds no pollution to the environment. As a part of our project dissertation, we fabricated chassis for telescopic 3-wheel go-kart which contains less in mass hence gives good energy economy and No pollution, easy to transport as it occupies less space when compared to 4-wheel 2-seater go- karts.

PARAMETERS	SPECIFICATIONS
Overall length	1450mm
Overall width	960mm
Overall height	500mm
Wheel base	1160mm
Track width	860mm
Ground clearance	200mm
Max speed	50Kmph
c. g. height	149mm
Stopping distance	24m
Overall weight	74kg
Steering ratio	1
Motor	Geared Motor
Battery	Lead Acid
Turning radius	3.4m
Disc brake	12"

MATERIAL COMPARISON	
PROPERTIES	Gr. 43A (Pipe)
% carbon	0.25 to 0.3
Density (g/cc)	7653Kg/Cum
Yield strength (Mpa)	240MPa
Elastic Modulus Gpa	200 to 215
Tensile strength Mpa	430 to 510

Table: - Go-Kart specifications

VI. CONCLUSION

We are using 40mm x 40mm, 25mm x 50mm and 25mm x 25mm Mild steel pipes to fabricate chassis of go-kart. The mild steel material sizes and thickness of 2mm is sufficient to bear the load of 150Kgs as per the analysis conducted. The chassis is so designed, it is able to accommodate motor, 3 wheels, batteries, driver and retractable seat, controller etc.

ACKNOWLEDGEMENTS

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VII. REFERENCES

- Company, Houghton Mifflin Harcourt Publishing. *"The American Heritage Dictionary entry: chassis"*
- Sturme, Henry (2 April 1908). *"The Use of Unsuitable Vehicles"*. Commercial Motor. 7 (160): 146–147. Retrieved 10 September 2010.
- Pfeffer, Prof Dr Peter E. (2017). *8th International Munich Chassis Symposium 2017: chassis.tech plus*. Springer. p. 176. ISBN 9783658184599.
- *Jump up to:^a^b "Tatra takes you further"*. Retrieved 1 July 2015.
- *"Tatra AS"*. Archived from *the original* on 28 March 2010. Retrieved 22 August 2013.
- *"Triumph Herald 2000 chassis"*. Triumph Herald 2000 and Viking Fibreline Caravan.

