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Fabrication of a Model Go-Kart (With Low Cost).

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***Abstract**: There are many motor sports in the world. Bikes, Cars, Formula one are examples of them. 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 no great speed. The vehicles used are also very cheap. Such a motor sport is Go-Karting. They resemble to the formula one cars but it is not as faster as F1 and also cost is very less. The drivers in go-karting are also not professionals. Even children can also drive it. Go-karts have 4 wheels and a small engine. They are widely used in racing in US and also they are getting popular in India. Go-Karting is a big craze to the Americans and Europeans. It is initially created in United States in 1950s and used as a way to pass spare time. Gradually it became a big hobby and other countries followed it. In India go-karting is getting ready to make waves. A racing track is ready in Nagpur for go-karting and Chennai is also trying to make one. Indian companies are also producing go-karts in small scale. MRF and Indus motors are the major bodies in karts and they are offering karts between 2 lakh and 3 lakh. But to make go-karts popular, the price must come down. For that, many people are trying to build one under 1 lakh and we had also take up the challenge and make our under 78 K. This is a dream come true. A go-kart just under Rs. 100000/-. So we are sure that our project will have a high demand in the industry and also we are hoping to get orders from the racing guns.*

I. Introduction:

Go-kart is a simple four-wheeled, small engine, single Seated racing car used mainly in United States. They were initially created in the 1950s, Post-war period by airmen as a way to pass spare time. Art Ingles is generally accepted to be the father of karting. He built the first kart in Southern California in 1956. From then, it is being popular all over America and also in Europe. A Go-kart, by definition, has no suspension and no differential. They are usually raced on scaled down tracks, but are sometimes driven as entertainment or as a hobby by non-professionals. Karting 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. As a free-time activity, it can be performed by almost anybody and permitting licensed racing for anyone from the age of 8 onwards. Kart racing is usually used as a low-cost and relatively safe way to introduce drivers to motor racing. Many people associate it with young drivers, but adults are also very active in karting. Karting is considered as the first step in any serious racer's career. It can prepare the driver for highs-speed wheel-to-wheel racing by helping develop guide reflexes, precision car control and decision-making skills. In addition, it brings an awareness of the various parameters that can be altered to try to improve the competitiveness of the kart that also exist in other forms of motor racing.

II. Go-Karts In India

Home of go-karts in India. Many people take part in the racing and is getting popular. Go-karts emerged in India in 2003 from MRF, which has a 250cc two-stroke engine, which produce 15 bhp of power, which costs around 3 lakh. Indus motors are also offering Go-karts for 2 lakh to 3 lakh. There are racing tracks in Nagpur for go-karting, which is known as the home of go-karts in India. Many people take part in the racing and is getting popular.

Parts Of A Go – Kart : In a Go-Kart, there are mainly six parts. They are 1. Chassis, 2 .Engine, 3. Steering, 4. Transmission 5. Tiers 6. Brake, and 7. Electric Starter.

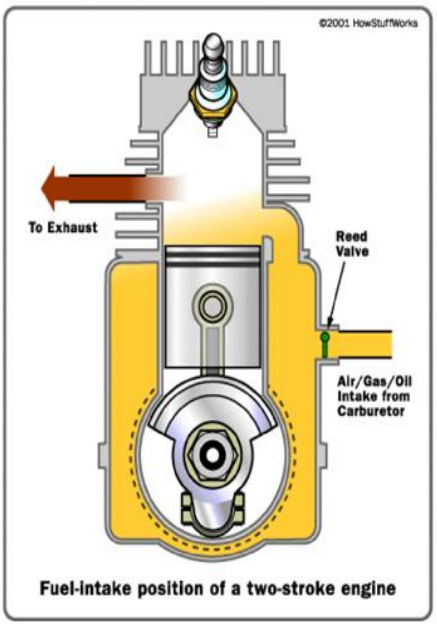
Systems Used In A Go – Kart:

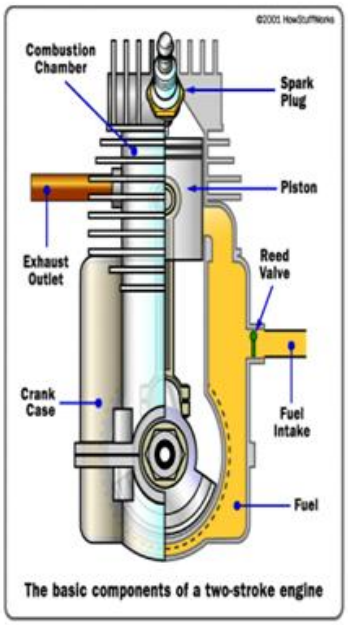
Like every automobile, go-karts also have various systems. Mainly there are 4 systems in this kart. Fuel system ,Ignition system, Lubrication system and Cooling system.

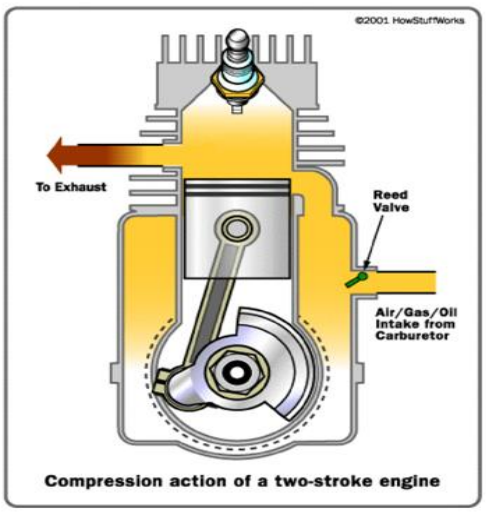
Engines. Generally, there are two main types of cooling system. Water cooling and air-cooling. In twostroke petrol engine, air-cooling system is employed.

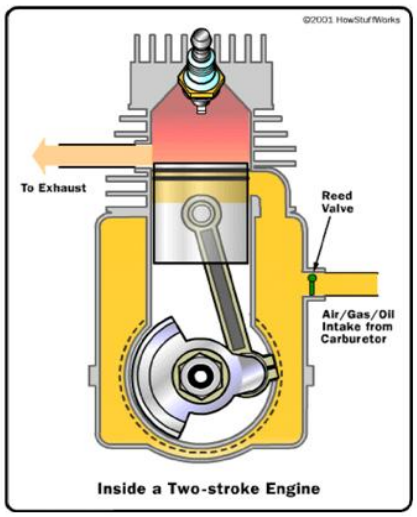
III. Working Of Two Stroke (Petrol Engine) :

The engine we used in this kart is a 2-stroke petrol engine. The 2stroke engine has no valves. Ports serve the purpose of admitting and exhausting the charge. These parts open into the cylinder; they are covered and opened by the sliding piston.





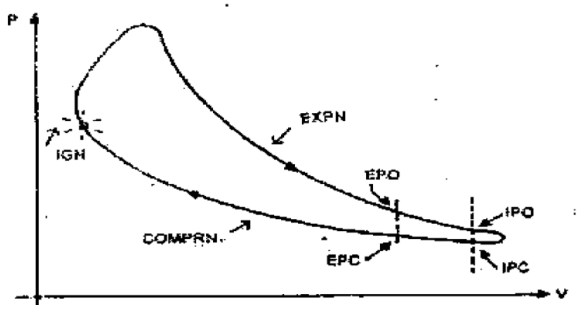




The piston compresses the fuel-air mixture in the combustion chamber as it travels towards the TDC position. In this process, the piston uncovers the inlet port. Fresh charge of fuel-air mixture enters the crankcase owing to vacuum produced in it. This is due to the upward movement of the piston. Thus, in one stroke of the piston, two operations, via suction and compression are carried out. The crankshaft on the follow-through moves through one half of a revolution. As the piston reaches the TDC position, a spark ignites the fuel air mixture. There is enormous pressure due to the combustion of fuel. This pressure pushes the piston downwards executing the expansion or power stroke. In doing so, the piston uncovers the exhaust port and allows the spent gases to go out of the cylinder to the atmosphere. The pre-compressed fuel-air mixture travels from the crankcase to the combustion chamber through the transfer port. The fresh fuel air mixture is fed into the combustion chamber with the help of a deflector on the piston head. It guides the mixture through the transfer port into the

combustion chamber towards its top. The deflector also allows expulsion of exhaust gases by the fresh fuel-air mixture. This process is known as scavenging. We conclude that during the second stroke, two operations, viz. expansion and exhaust are completed. The crankshaft moves through the other half of a revolution. Thus the four cycles of operation, viz., admission, compression, expansion and exhaust are completed in one revolution of the crankshaft.

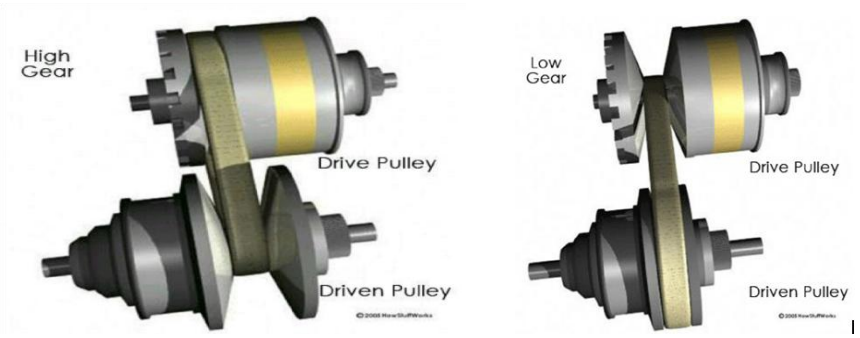
The PV diagram is shown in following figure.



Practical p – V Diagram of 2 – Stroke Petrol Engine

IV. Working Of Automatic Transmission :

This go-kart has no gears and clutches. The transmission we use is not manual, it is automatic. For this purpose, we use continuously variable transmission. We use pulley and belt system type CVT.



For example, when the pitch radius is small on the driving pulley and large on the driven pulley, then the rotational speed of the driven pulley decreases resulting in a lower 'gear'. When the pitch radius is large on the driving pulley and small on the driven pulley, then the rotational speed of the driven pulley increases resulting in a higher 'gear'. Thus in theory, a CVT has an infinite number of 'gears' that it can run through at any time, at any engine or vehicle speed

Specifications Of A Go – Kart :

Engine specifications	
Engine Displacement (cc)	98 cc
No. Of cylinders	1
Type of Fuel	Petrol
No. Of Strokes	2
Maximum power (bhp)	7.7 bhp @ 5600 rpm
No. Of gears / variator	Variator
Max. Torque	1.0 kgm @ 5000 rpm
Overall Length (mm)	1650
Height (mm)	710
Wheel Base (mm)	1270
Ground Clearance (mm)	203
Kerb Weight (kg)	70
Fuel tank capacity	1 litre
Brake	Drum
Type of cooling	Air cooling

Axle	
Type of Material	M S
Length of Axle	44 inches
Dia of axle	25 mm

DESIGN AND DRAWINGS	
Type of Material	GI
Quality	A class tube
Diameter of tube	1 inch

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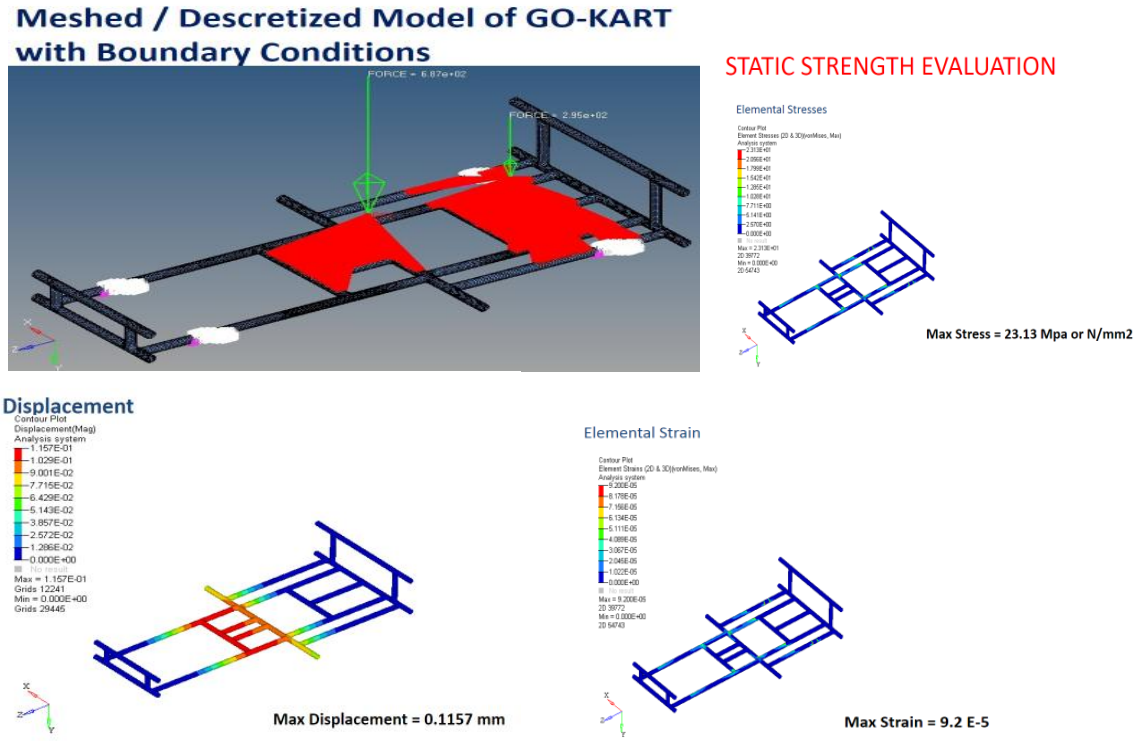
Type of Material	GI
Quality	A class tube
Diameter of tube	1 inch

Sprocket	
Type of Material	MS
Outer radius of sprocket	80mm
No. Of Teeth	44
Fuel tank	
Material	metal
capacity	10 lit
Steering	
Dia of the tube	I inch
material	GI

Brake	
Position	= Single Rear
Type	= Drum Brake
Brake Dia	= 110 mm

Fabrication

Chassis: The chassis is constructed with the GI pipe as per dimensions and bends in required places using bending machine. Then the pipes are welded rigid. Strength evaluation is made. The results obtained are The Max strength is 23.33n/mm^2,strain 9.2 E-S and maximum displacement is .1157mm.



Axle: The required shaft is taken as per the dimensions and turned on the lathe

Sprocket: The sprocket is welded on the axle at required place.

Brake: The brake is also placed in the axle in the left side. The boredom is connected to it and is connected to left pedal in front of kart.

Accelerator: The accelerator pedal is placed is the right side of the front of the kart and is connected to the engine.

Engine: The engine is mounted in the chassis and the chain is connected to the sprocket and engine.

Fuel Tank: The fuel tank is placed in the upper position of the engine level using clamps and bolts.

Muffler: The two pipes are taken as per the dimension and join together. Then 3 'V' Shaped cuts are made in large cylinder and 3 washers are placed inside it and the 'V' cuts are re welded and grinded. The inlet end of muffler is bolted to the exhaust of engine and also a rubber bush is placed to support the muffler.

Rear Wheels And Tyres: The 2 wheels are connected to the both ends of the axle and bolted together. Then the assembly is connected to the chassis using 2 bushed bearing.

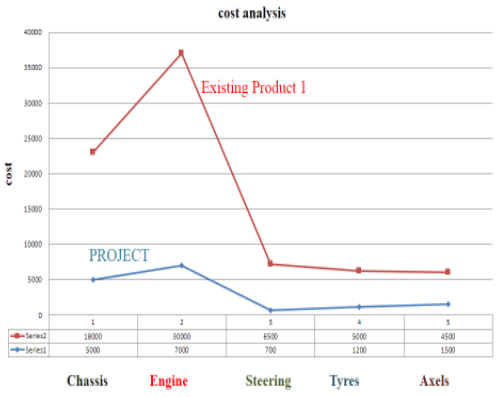
Steering: The steering spindle and steering are made as per the dimensions and bolted together. This is connected to the plate and link mechanism. This mechanism is connected to the 2 front wheels.
Seat: First the seat is mounted on seat stand using bolts and the seat is bolted on the chassis.
Electric Start: The battery is placed under the seat and connected to the starting motor using wires. And the switch is placed in the steering spindle stand.
Painting: The painting is done to increase the appearance to the kart. The chassis, steering and steering spindle, wheels, seat, muffler, engine cover etc. are painted using different colours. The pedals are also painted.

Estimation And Costing : Costing may be defined as systematic procedure for recording accurately every item of expenditure, incurred on the manufacture of a product by different departments of any manufacturing concern.
Objectives Of Cost Estimation: Main objectives of costing are as follows: To help the producer in deciding the manufacturing and selling policies. To help in filling up tender enquiries. To decide the amount of overheads, this helps in comparing and checking the actual overheads of the factory. To decide the wage rates of the workers after carrying out a time study. It helps to decide whether a particular material should be purchased from the market or to be manufactured. It helps in improving the designs, which may reduce the cost of production.

Costing

Cost of existing products:

Sl. No	Description	Quantity	Cost in Rs.
1.	Chassis	1	20000/-
2.	Engine (Kinetic Honda)	1	20000/-
3.	Steering System	1	4000/-
4.	Wheels and tyres	4	2000/-
5.	Brake (Drum)	1	4000/-
6.	Rear Axle	1	4000/-
7.	Transmission System	1	8000/-
8.	Fuel Tank	1	2000/-
9.	Seat	1	2000/-
10.	Workshop(welding rods, ignition system, wires)		3000/-
11.	Muffler	1	1000/-
12.	Extra Fittings		2000/-
13.	Painting+ Sticking		3000/-
14.	Labour Cost		2000/-
15.	Indirect Material Cost*		1000/-
		TOTAL	**Rs. 78,000 /**



The final go -kart is shown below.

*Indirect material cost includes cotton waste, emery paper, oil, kerosene, grease etc.

V. Conclusion

The 98cc, 2 stroke, 4 wheeled racing car, Go-Kart, we finally made one under 25K which is a big truth. But we made just a proto type of that performance machine. The materials we used are not up to the mark of automotive standard. Big companies will design one go-kart at a minimum of 2 years. But we made this from within two months. We do not recommend driving this go-kart at a speed of 80 km/hour but it is best suited in 30-40 km/hour speed. An old men aged about 50+ and women can also drive this gokart. The report is prepared in such a manner that every layman can understand the details pertaining to the project. The report is prepared in simple language and described well. The report give adequate idea and design guide lines for making suitable report is expected to prove valuable to the successor students of mechanical engineering to know the essentials of a project and project report. The matter discussed in the early pages just give a broad outline of small-scale industries. We have, tried to cover all the aspects concerned with our project.

VI. Future Scope

Go Karts can develop by using 4 stroke engine. Bio-Fuels which are of low cost can be used in place of petrol. Solar Energy can also utilized by solar panels where they are pollution free with moderate cost. Suspension system can also be added in system to lower vibrations and shocks. Body development of kart can be done preventing it from environmental conditions and aero dynamic shape of body increases its speed.

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