INTRODUCTION

1. INTRODUCTION

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.

SCOPE OF THE PROJECT

2. SCOPE OF THE PROJECT

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 1 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 25 K. This is a dream come true. A go-kart just under Rs. 25,000/-. So we are sure that our project will have a high demand in the industry and also we are hopping to get orders from the racing guns.

ABOUT GO - KARTS

3. ABOUT GO – KARTS

Go-kart is a simple four-wheeled, small engine, single sealed 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 Ingels is generally accepted to be the father of karting. He built the first kart in Southern California in 1956. From them, it is being popular all over America and also 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 shone 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.

3.1 Go-Karts in India

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 1 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.

3.2 Go-Karts in Foreign Countries

Go-karts in foreign countries have much more performance than the Indians. One type is a single engined 160cc 4-stroke kart with a maximum speed of around 40 mph and second type, a twin-engined 320cc 4-stroke kart used in outdoor with a maximum speed of 70 mph. There are hundred of racing tracks in US for karting and also they are much more professional than the Indians.

PARTS OF A GO - KART

4. 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. Tyres
6. Brake
7. Electric Starter

4.1 CHASSIS

The chassis is an extremely imported 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 and a small engine. Chassis construction is normally of a tubular construction, typically GI with different grades. In this kart, we use GI B class tube with 1" diameter. The chassis support the power unit, power train, the running system etc.

4.2 ENGINE

An engine of a go-kart is usually a small one. About 100-200cc. In this kart, we use a Kinetic Honda Single Cylinder 98cc 2-stroke petrol engine, which produces about 7.7 BHP of power at 5600 rpm. We use 2-stroke engine because this is used for racing. So there is no need of mileage. Only power.

4.3 STEERING SYSTEM

The steering of a go-kart is very sensitive. Because of lack of a differential, a kart's natural direction of travel, forwards, is very difficult to change. However, the two rear wheels are attached by a solid axle, and must therefore move together, so in order to turn, one of the wheels need to skid over the track surface. In this kart we use a special kind of steering system, disc and link mechanism. This mechanism with modification is widely used in racing cars especially formula one cars.

In this system, the steering spindle is connected to a disk or plate and this disk is connected to the front two wheels using two links. When steering rotates, the disk also rotates and as a result, the link actuates and the wheel will turn according to the rotation of steering.

4.4 TRANSMISSION

Transmission means the whole of the mechanism that transmits the power from the engine crankshaft to the rear wheels. In this vehicle, the power from the engine is transmitted to the sprockets using chain, i.e. this is chain drive. The driver sprocket has 12 teeth and driven sprocket has 44 teeth.

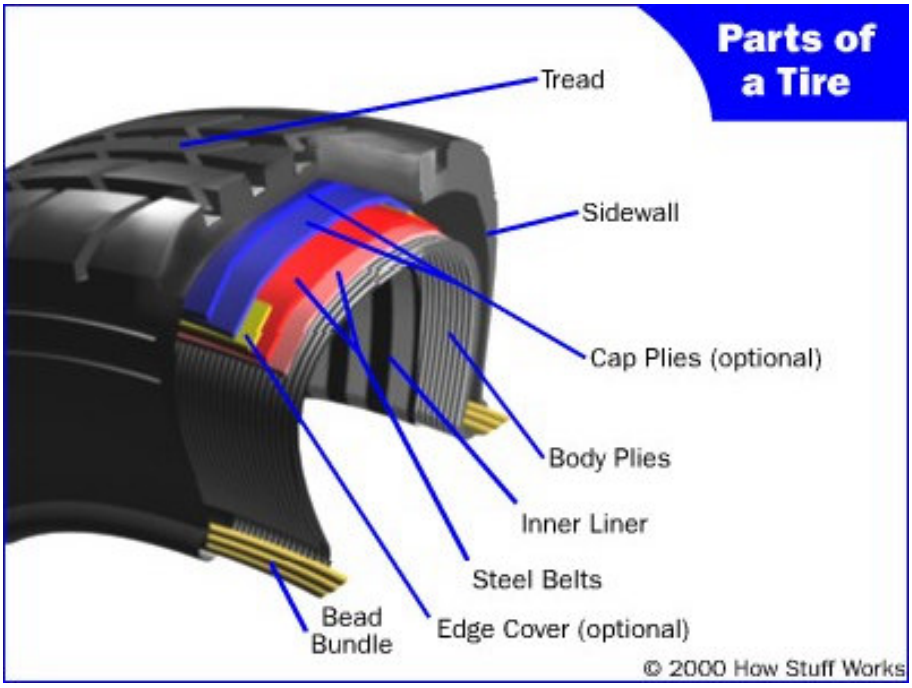
Usually go-karts do not have a differential and so we eliminate differential from our vehicle also. And also this go-kart has no clutch and gears because this is automatic transmission. Belt and pulley type CVT is used in this kart. The power from the engine is transmitted to the rear two wheels using chain drive. We use chain drive because it is capable of taking shock loads.

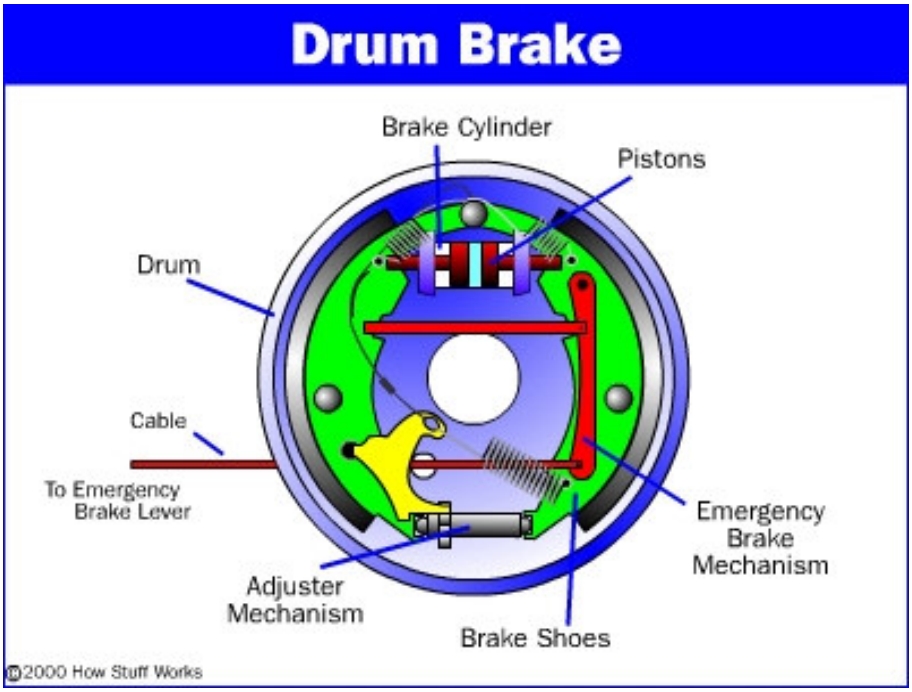
4.5 TYRES

For go-karts, wheels and tyres are much smaller than those used on a normal car. The tyres will have increased grip and a hard one. And also it can withstand the high temperature. In this kart, we use tyres having 14” dia for front and 16” dia for rear. This is used for an aerodynamic shape. The tyres must have pressure of at least 18 psi.

4.6 BRAKE

Typically, go-karts will have single rear drum brakes, which is situated on the rear axle. The brake will capable for stopping the kart running in 40 mph. The pedals actuated by the left leg operate the brakes.





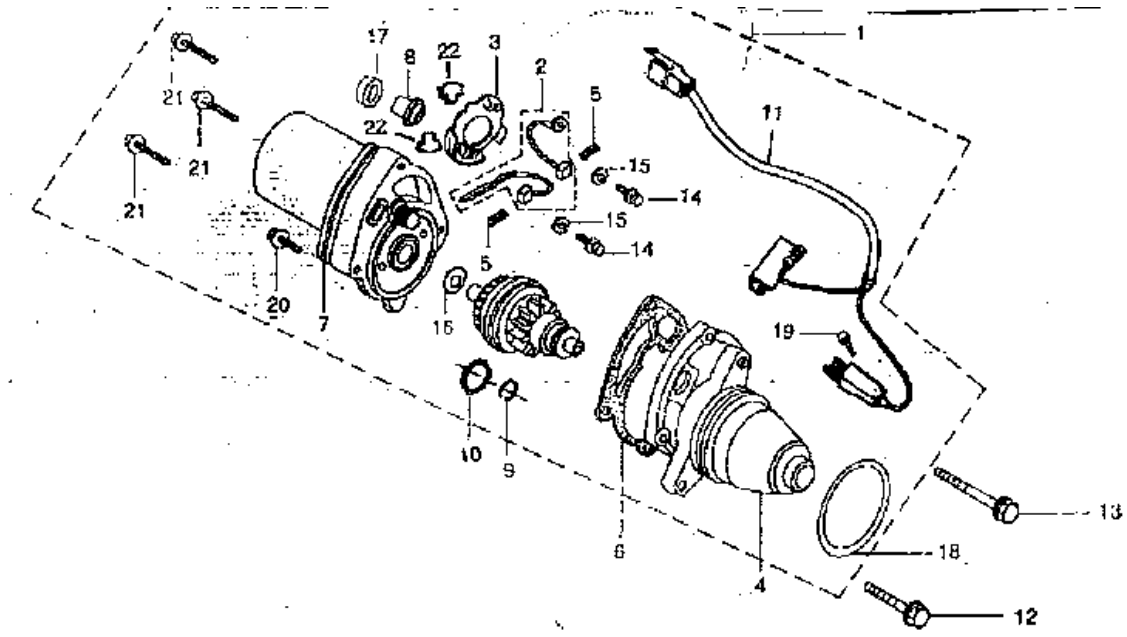
4.7 Electric Start

Both Otto cycle and Diesel cycle internal-combustion engines require the pistons to be moving before the ignition phase of the cycle. This means that the engine must be set in motion by an external force before it can power itself. Originally, a hand crank was used to start engines, but it was inconvenient and rather hard work to crank the engine up to speed. It was also highly dangerous. Even though cranks had an overrun mechanism to prevent it, when the engine started, a crank could begin to spin along with the crankshaft. The operator had to pull away immediately, or else risk a broken wrist, or worse. Moreover, as engines evolved, they became larger and compression ratios increased, making hand cranking an increasingly difficult matter.

Electric starter

The modern starter motor is a series-wound direct current electric motor with a solenoid switch mounted on it. When low-current power from the starting battery is applied to the solenoid, usually through a key-operated switch, it pushes out a small pinion gear on the starter motor' s shaft and meshes it with the ring gear on the flywheel of the engine. The solenoid also closes high current for the starter motor and it starts to run. Once the engine starts, the key-operated switch is opened, a spring in the solenoid assembly pulls the pinion gear away from the ring gear, and the

starter motor stops. Modern starter motors have a "bendix" — a gear and integral freewheel, or overrunning clutch, that enables the flywheel to automatically disengage the pinion gear from the flywheel when the engine starts.



STARTER MOTOR ASSEMBLY

Other than the main parts, the kart also contains some parts such as Mufflers. The muffler we use is Baffle type. In baffle type, the exhaust gas passes through a series of baffles, which causes maximum restriction and hence back pressure. The noise reduction takes place because the length of travel of exhaust gases increases considerably.

Other main part is the headlight. Head light is provided at the front of the kart for sane night racing. The requirement of automobiles is that

these should illuminate the road ahead at a reasonable distance with sufficient intensity.

Also there is a plastic seat in the kart for the driver. The kart is single seated. There is also a bumber in front of the kart.

SYSTEMS USED IN A GO - KART

5. SYSTEMS USED IN A GO – KART

Like every automobile, go-karts also have various systems. Mainly there are 4 systems in this kart.

1. Fuel system
2. Ignition system
3. Lubrication system
4. Cooling system

5.2 FUEL SYSTEM

The purpose of fuel system in SI engines is to store and supply fuel and then to pump this fuel to carburetors. The fuel supply system also prepares the air-fuel mixture for combustion in the cylinder and carries the exhaust gas to the rear of the vehicle. The basic fuel supply system used in the vehicle consists of the following.

a) Fuel tank

b) Fuel strainer or Fuel filter

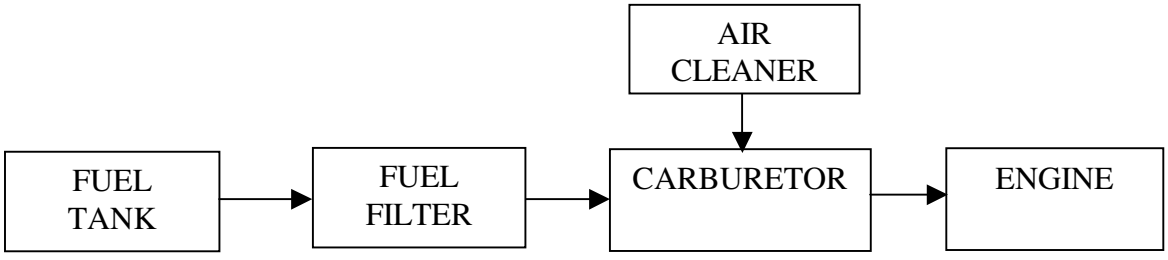
c) Air cleaner

d) Carburetor

Chemistry of Combustion

The type of combustion that takes place in an engine is commonly called Burning. Burning is an example of chemical change. In a chemical change as substance losses those characteristic by which we recognize it and is changed to a new substances with different properties. The petrol is burned in the engine and the products that result no longer resemble petrol.

The petrol in the fuel lines differs from the petrol that is drawn into the engine. As it passes through the carburetor and intake manifold and is mixed with aim some of the petrol is changed from liquid to vapour. This process of vaporization is called a physical changed. No new substance is formed since the petrol vapour is still recognized as petrol. Diesel fuel oil and petrol are both mixtures of volatile hydrocarbons compounds of hydrogen and carbon. A compound is a substance that can be separated by chemical means into two or more simpler substances. Hydrogen and carbon are examples of elements. In chemistry an element is defined as a substance, which cannot be separated into simpler substances by chemical action.



Fuel Tank - It is reservoir of fuel oil for an engine. It is kept in and elevated position so that the fuel will flow to the carburetor through the filter by gravity. Our fuel tank has a capacity of 1 litre and there is also a fuel level indicator in it.

Fuel Filter - Dust, particles of dirt or other unwanted particles might be present in the petrol. This petrol should be free from these particles. Therefore, the petrol filter is used.

Air Cleaner - Since the atmospheric air is highly cornices and contains dust and dirt particles, it is allowed to enter the engine intake manifold only through an air cleaner.

Carburetor - The mixture of petrol and air burns in the combustion chamber of the engine. The carburetor is a device to mix the petrol with air in the proper ratio for the purpose of combustion. The quantity of petrol and air can be indifferent ratios. The quantity of petrol can sometimes be more and sometimes less. The speed of the engine changes according to the richness of the petrol in the mixture. Function of a carburetor is to

a) Meter the quantity of charge to give correct air-fuel mixture.

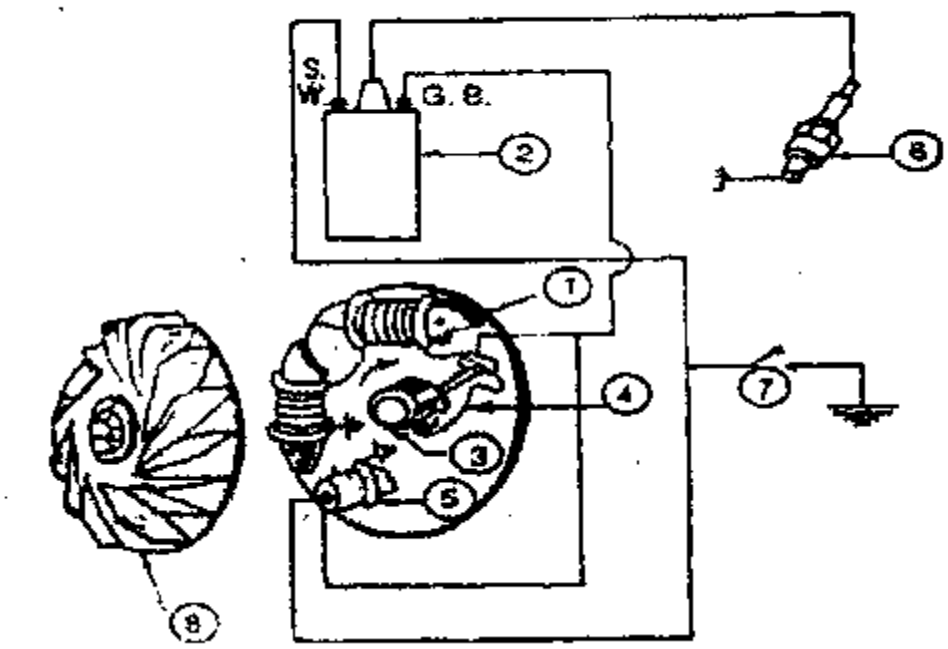
b) Atomize petrol into fine particles so that it burns quickly.

5.2 IGNITION SYSTEM

The ignition system used for small two-stroke engine is flywheel magneto type. The advantage of this system is that it is set combined. The flywheel magneto is basically used only for a single cylinder engine though ones suitable for multi-cylinder engine have also been developed. The principles of this type of ignition can be easily understood with following description.

Magneto Generator

The ignition magnet of a magneto generator, which produces alternating electrical impulses in a low-tension armature winding or coil. At an appropriate moment the circuit through the winding is broken by means of an interrupter, which forms an integrate part of the magneto. A condenser connected across the breaker assures rapid cessation of the primary current, and this results in the induction of a high tension impulse in a fine wire secondary winding, which either surrounds the primary winding or is surrounded by it, both being wound on a magnetic coil. An advantage of the magneto is its self-contained character. All the demands of the system are in on compact unit from which it is necessary only to run a low-tension cable to the lighting system and high-tension cable to the spark plug.



FLY WHEEL MAGNETO (ROTATING MAGNET TYPE)

1. Ignition Coil
2. Condenser
3. H. T. Coil
4. Cam
5. C. B. Point
6. Sparck Plug
7. Ignition Switch
8. Flwwheel Magnet

Figure shows the different views of a single cylinder design of flywheel magneto. A small magnet is provided with laminated pole pieces and the assemblies cast in the engine flywheel, which also acts as a cooling fan. In addition to the magnet, the magneto consists of a coil with a w-shaped or three pole laminated core, an interrupter and a condenser, all of these parts being mounted on a base plate or starter plate. The two curved slots in the stator plate permit of adjusting the spark timing.

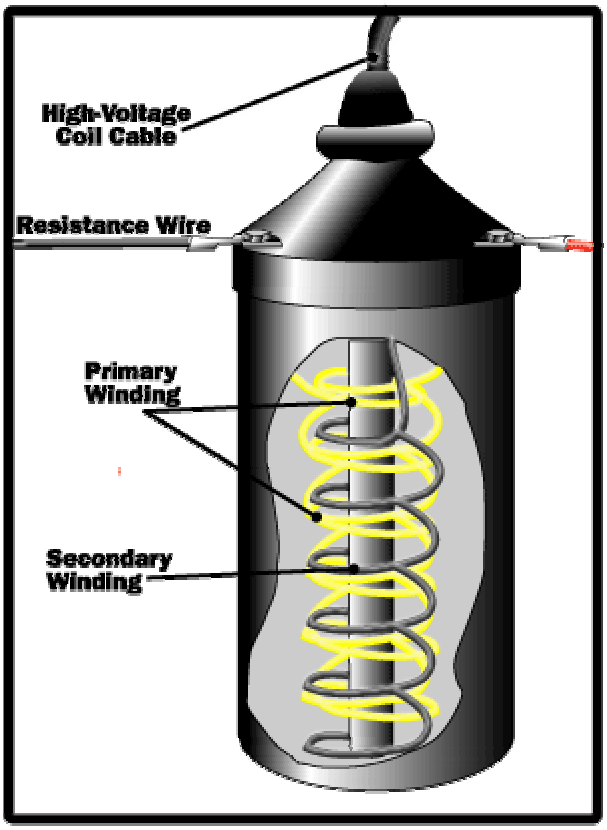
As the poles of the core pass those of the magnet, the magnetic flux passes through the coil first in one and then in the opposite direction and alternating electric impulses are induced in it. When the flux has been well established the primary circuit is closed and a moment later when the primary current is at its maximum, the circuit is broken by the interrupter, which is actuated by a cam on the crankshaft. Magnetos also have a device coupled to it so that the timing is advanced as the engine speed increases. This helps in ignition of the charge in the cylinder.

The magnetos are either fitted with build-in type of two coils – one ignition coil and the other lighting coil or alternately they have separate ignition coil. These are attached to a starter or fixed plate and terminate in soft-iron pole-pieces closely matching the shape of the flywheel which rotates around them.

Ignition Coil

The coil consists, in fact, of two coils which may be considered as separated electrically, although they are both wound on the same iron core and share a common terminal. One coil, known as the primary, is fed from the battery, and the principle of operation depends upon the fact that, if the supply to this coil is suddenly interrupted, then the voltage is created or induced in the other coil known as the secondary. The voltage in the two coils can be considered for our purpose to be in the same ratio

as the number of turns of wire on the two coils, so that by providing relatively few turns on the primary winding, and a very large number on the secondary the necessary, high voltage is obtained.



The voltage required to cause a spark between the sparking plug points depends upon both the pressure of the mixture with the cylinder and the gap between the points under average conditions a voltage of the order of 10,000 volts is needed.

Earlier it has been stated that the development of the higher voltage in the secondary winding of the ignition coil only occurs when the electricity supplied to the primary winding is suddenly interrupted. This

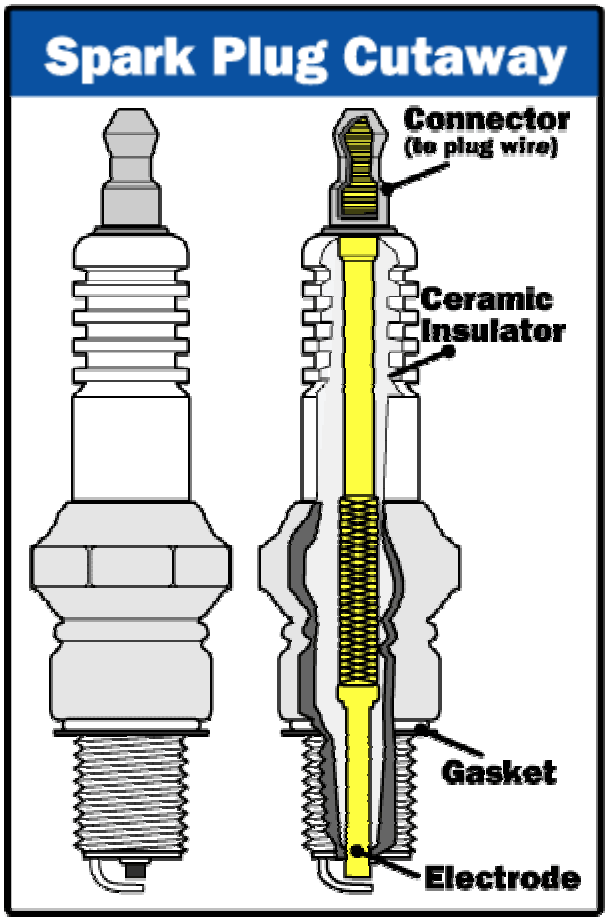
interruption is arranged to take place at the correct time by the contact breaker points.

Spark Plug

An essential part of the ignition system is the provision of electrodes within the engine cylinder, across which the ignition spark can discharge. It is desirable to arrange that these electrodes shall be easily accessible and they are, therefore, mounted on a screwed-in plug.

A sparking plug consist essentially of a steel body which bears the earthed electrode, an insulator, and a central rode which forms the other electrode, fed from the distributor. The lower part of the body is threaded to suit a screwed bole provided in the engine, the length of the threaded portion known as the reach and varying with the plug design. The body of the plug seats on to a soft steel washer when it is screwed into the engine.

The insulator operates under particularly arduous condition since not only must it withstand the high ignition voltage, but it's lower and is subjected to the full bear of combustion and it is also liable to mechanical shock. At one time, the insulator was mode from porcelain but modern plugs use ceramics based on sintered aluminium oxide.



The central electrode is seated into the insulator and is provided with a screwed terminal at the upper exposed end, often shaped to accept a snap-on connector. The tip of the electrode, at which the spark occurs, usually has an insert of heat-resisting metal such as nickel.

The ignition voltage is about 25,000 volts and the distance between the central and earthed electrodes is about. 202 inch and is adjusted by bending the outer electrode.

5.3 LUBRICATION SYSTEM

It is a common known that if two rough surfaces are rubbed together, there is a resistance to the motion and heat is generated. In an IC

engine surface which rub together are not tough by normal standards, yet if they are allowed to run in direct contact get one another, the temperature more rise to so high a degree that local melting will occur and the surfaces will slide to seize. It has been shown than even if the surfaces are super finished, seizing will occur unless lubrication is provided.

The primary objective of lubrication is to reduce the friction and wear between bearing surface. Lubrication accomplishes this requirement by interposing a film of oil between the sliding surfaces. Other function of lubricating oil in internal combustion engines are, such as the pistons by packing up heat and dissipating it through the crank case and reducing compression losses by acting as a seal between the cylinder walls and piston rings.

A lubricant must be able to perform certain task in order to accomplish its purpose satisfactorily. It must posses sufficient viscosity and oiliness to protect mechanical devices of the necessary speeds, pressures and temperatures.

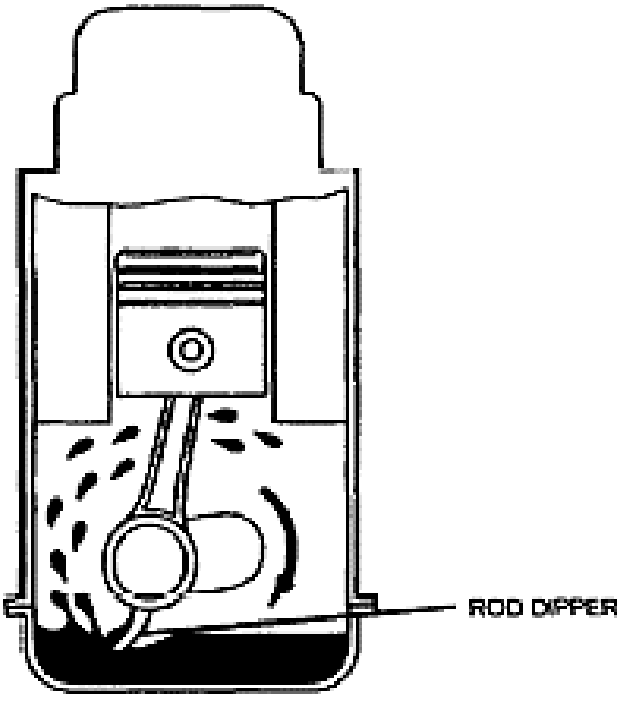
Types of Lubricants

Lubricants are classified in three forms - fluid, semisolid and solid. Fluid oils are used in automobile engine lubrication systems, semi solid

oils are used in chassis lubrication. Solid lubrication is done by using graphite and mica. Graphite often with oil to lubricate automobile springs. The use of these types depends upon the work required and the surface to be lubricated.

Splash Lubrication System

The lubrication system used in the engine is splash lubrication system. In this system, oil is splashed over different working parts of an engine. Oil is contained in a through or sump. The big end of connecting rod is provided with a 'spoon or dipper' or 'scoop'. When the piston is at the bottom of its stroke, the big end of connecting rod and crankpin dip into oil. The dipper picks up oil and as the crankshaft rotates, oil is splashed up due to centrifugal force.



The splashed oil is in the form of a dense mist sprayed into fine particles over surfaces in contact. Small cups are provided close to the bearing of the crankshaft. There are small holes in these cups. The splashed oils fills up these cups from where it is supplied to the bearing.

Oil that is splashed onto cylinder walls speeds well when piston reciprocates while the piston rings scarp the oil and get themselves lubricated. Drops of splashed oil drip from the inner side of the piston and lubricate the gudgeon pin and bearings. The crankshaft bearings, valve mechanism and timing gears are also lubricated by splashed oil.

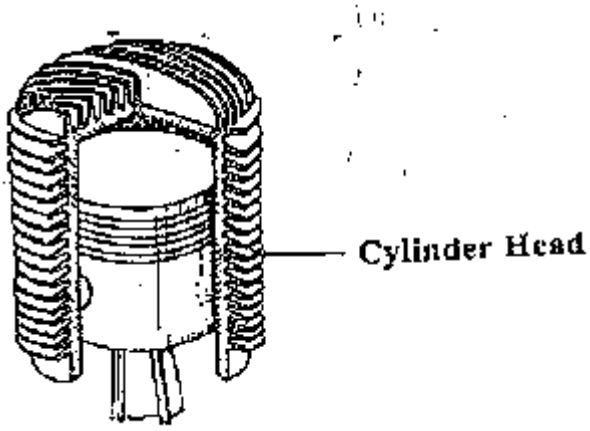
5.4 COOLING SYSTEM

A lot of energy is produced due to the combustion of fuel inside the engine cylinder. Only 30% of heat energy is converted into mechanical work. Out of the remaining heat (about 70%) about 40% is carried away be exhaust gases into the atmosphere. The remaining part of heat energy (about 30%) is absorbed by engine cylinder, cylinder head, piston and engine valves. It causes thermal stress in the engine parts, reduces strength of the piston, decomposition of lubrication oil, burning of valves and it also reduces the volumetric efficiency of the engine.

In order to avoid the harmful effects of over heating, it is essential to provide some cooling system for IC Engines. Generally, there are two

main types of cooling system. Water cooling and air-cooling. In two-stroke petrol engine, air-cooling system is employed.

Air Cooling



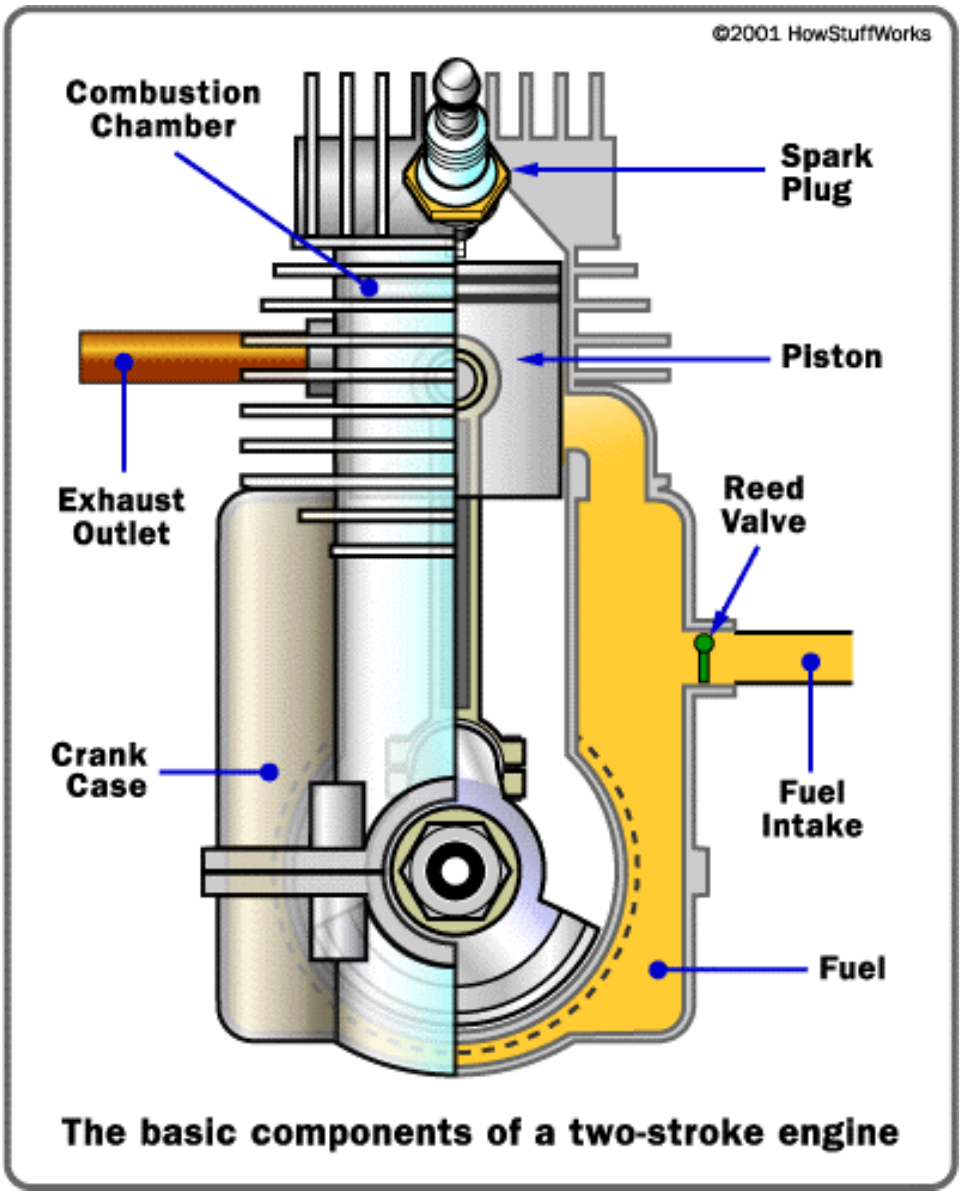
AIR COOLING

For this cylinder is cast with a number of fins around the cylinder. This type of cylinder is used by motorcycles and scooters and also in go-karts. The air from the atmosphere dashes against these fins and remove the heat from the cylinder.

WORKING OF 2-STROKE PETROL ENGINE

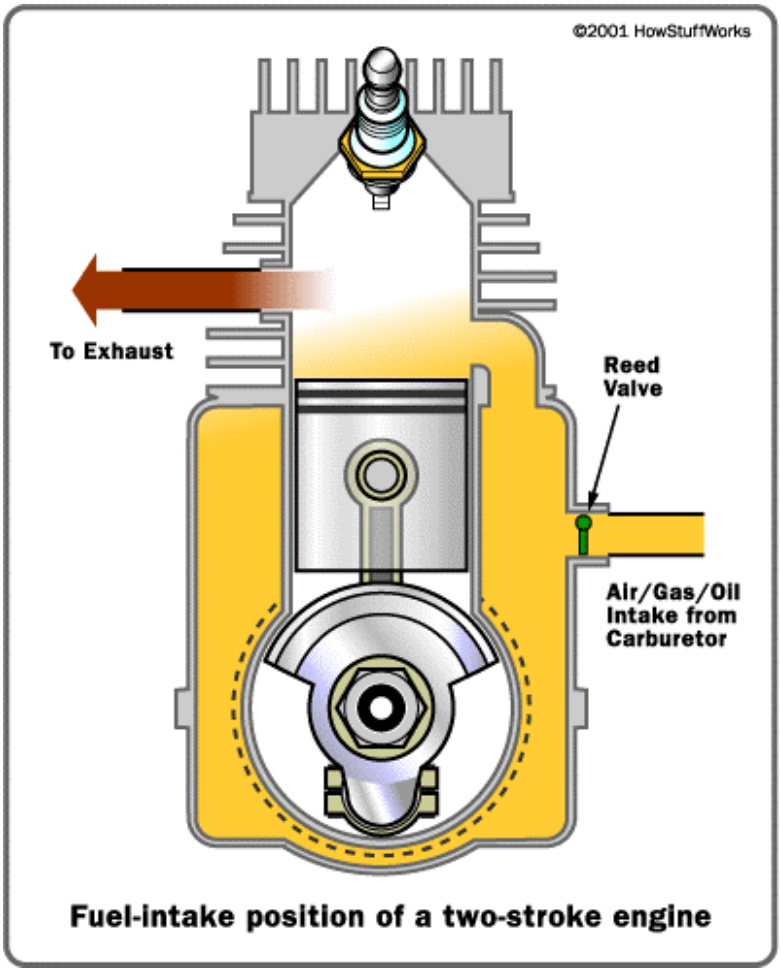
6. WORKING OF TWO STROKE PETROL ENGINE

The engine we used in this kart is a 2-stroke petrol engine. The 2-stroke 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.



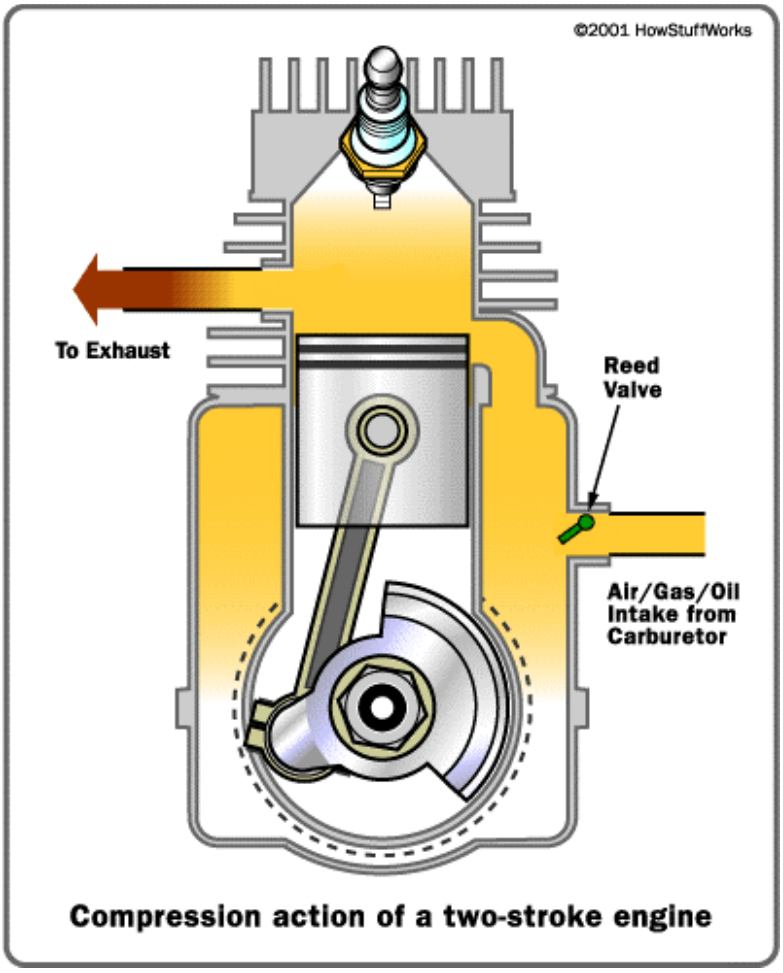
1st Stroke: Suction and Compression

The piston compresses the fuel-air mixture in the combustion chamber as it travels towards the TPC position.



Fuel-intake position of a two-stroke engine

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.

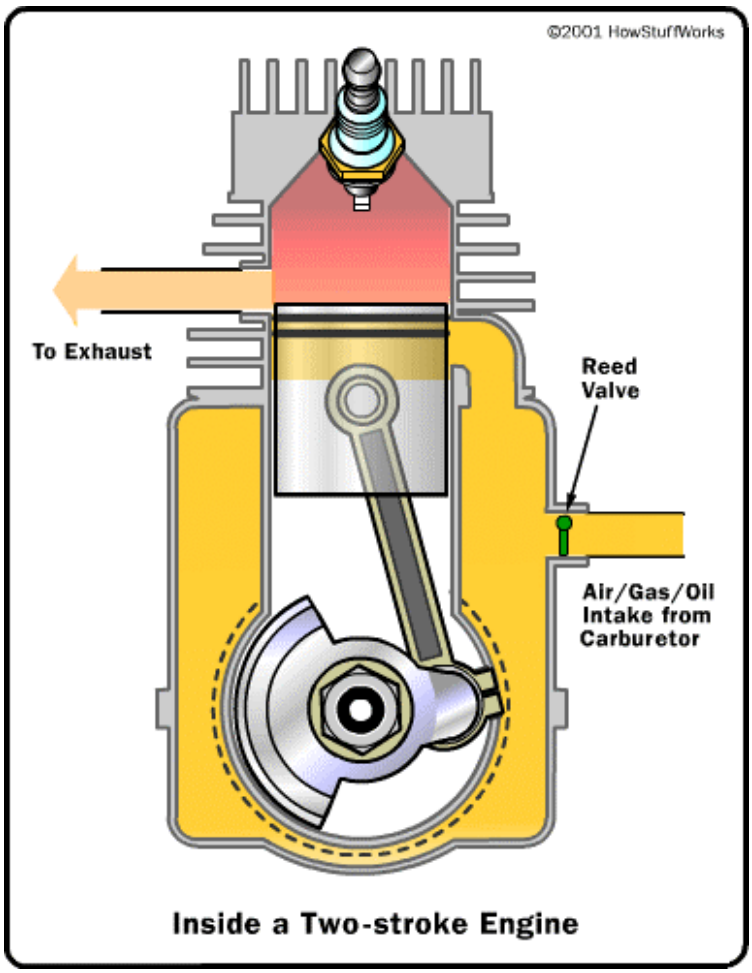


Compression action of a two-stroke engine

2nd Stroke : Expansion and Exhaust

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.

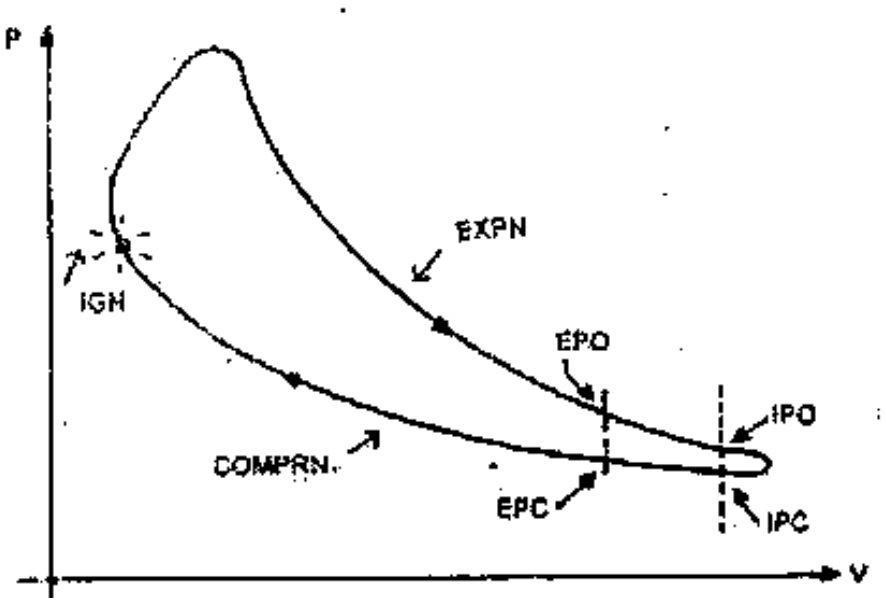
We conclude that during the second stroke, two operations, viz. expansion and exhaust are completed. The crankshaft moves through the

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 four-stroke engine completes this cycle of operations in two revolutions of crankshaft.

It is expected from this argument that a two-stroke engine must produce nearly double the power of a four-stroke engine of the same dimensions. The difficulties encountered by the two stroke engines, i.e. mixing of fresh charge with exhaust gases, loss of some fresh charge to the atmosphere and incomplete scavenging, reduces to a great extent, the brake horse power of the engine.

The PV diagram is shown in following figure.



p – V Diagram of 2 – Stroke Petrol Engine

WORKING OF AUTOMATIC TRANSMISSION

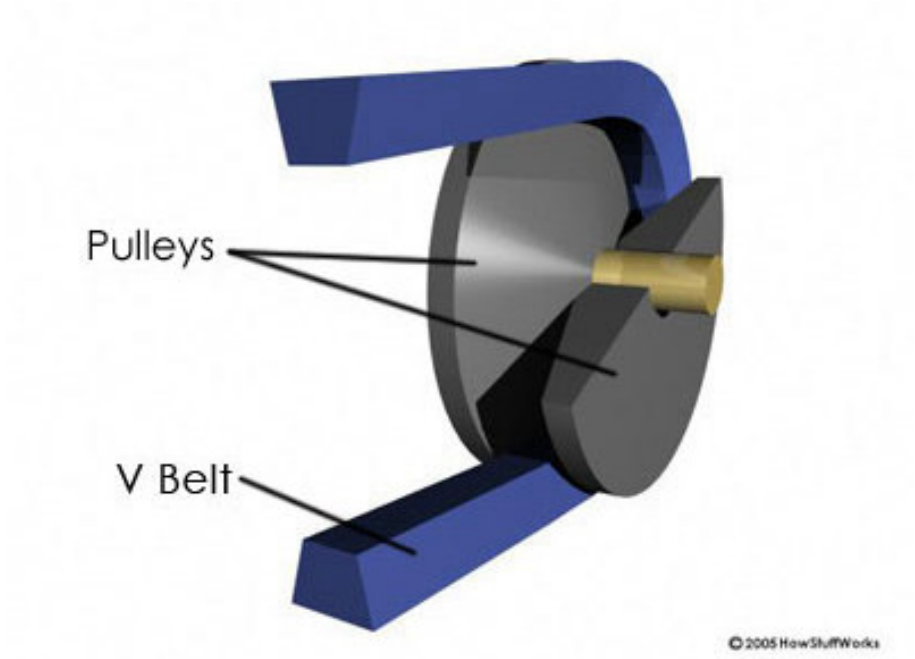
7. WORKING OF AUTOMATIC TRANSMISSION

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

This type of CVT uses pulleys, typically connected by a metal-levered rubber belt. A chain may also be used. A large pulley connected to a smaller pulley with a belt on chain will operate in the same manner as a large gear meshing with a small gear. Typical CVTs have pulleys formed as pairs of opposing cones. Moving the cones in and out has the effect of changing the pulley diameter, since the belt or chain must take a large diameter path when the conical pulleys halves are close together. This motion of the cones can be computer controlled and driven for example, by a servomotor. However in the light weight VDP transmissions used in automatic motor scooters and light motor cycles, the change in pulley diameter is accomplished by a variator, an all mechanical system that uses weights and springs to change the pulley diameters as a function of belt speed.

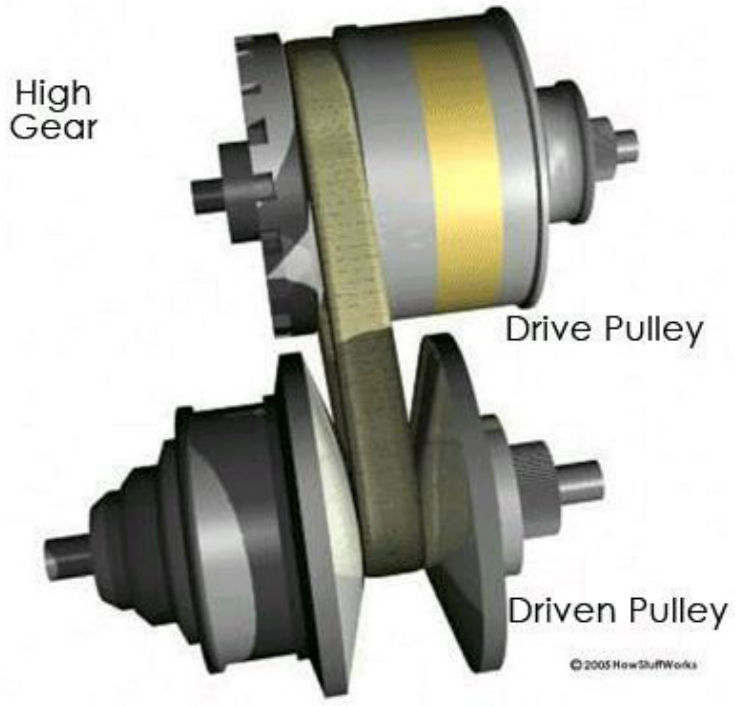
The variable-diameter pulleys are the heart of a CVT. Each pulley is made of two 20-degree cones facing each other. A belt rides in the

groove between the two cones. V-belts are preferred if the belt is made of rubber. V-belts get their name from the fact that the belts bear the V-shaped cross-section, which increases the frictional grip of the belt.



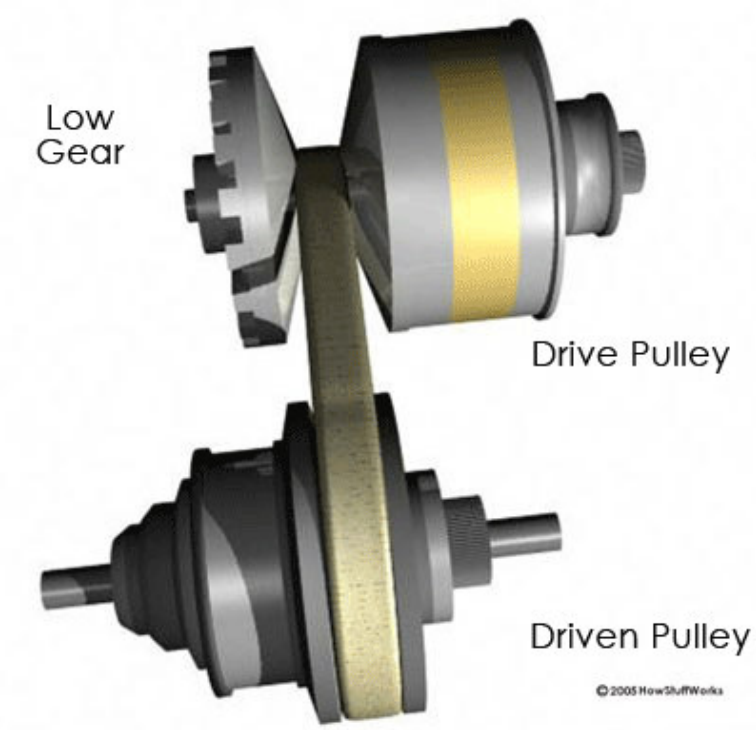
When the two cones of the pulley are far apart (when the diameter increases) the belt rides lower in the groove, and the radius of the belt rides lower in the groove, and the radins of the belt loop going around the pulley get smaller. When the cones are close together (when the diameter decreases) the belt rides tighter in the groove, and the radius of the belt loop going around the pulley gets larger. CVTs may use hydraulic pressure, centrifuged force or spring tension to create the force necessary to adjust the pulley halves.

Variable-diameter pulleys must always come in pairs. One of the pulleys, known as the drive pulley (or driving pulley), is connected to the crankshaft of the engine. The driving pulley is also called the input pulley because it is where the energy from the engine enters the transmission. The second pulley is called the driven pulley because the first pulley is turning it. As an output pulley, the driven pulley transfers energy to drive shaft.



The distance between the centers of the pulleys to where the belt makes contact in the groove is known as the pitch radius. When the pulleys are far apart, the belt rides lower and the pitch radius decreases. When the pulleys are close together, the belt rides higher and the pitch

radius increases. The ratio of the pitch radius on the driving pulley to the pitch radius on the driven pulley determines the year.



When one pulley increases its radius, the other decreases its radius to keep the belt light as the two pulleys change their radii relative to one another, they create an infinite number of gear ratios-from low to high and everything in between. 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

8. SPECIFICATIONS OF A GO – KART

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

DESIGN & DRAWINGS

9. DESIGN AND DRAWINGS

Chassis

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

Axle

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

Brake

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

Sprocket

Type of Material	= M S
Outer radius of sprocket	= 80 mm
No. Of Teeth	= 44

Fuel Tank

Material	= Plastic
Capacity	= 1 Litre

Steering Spindle

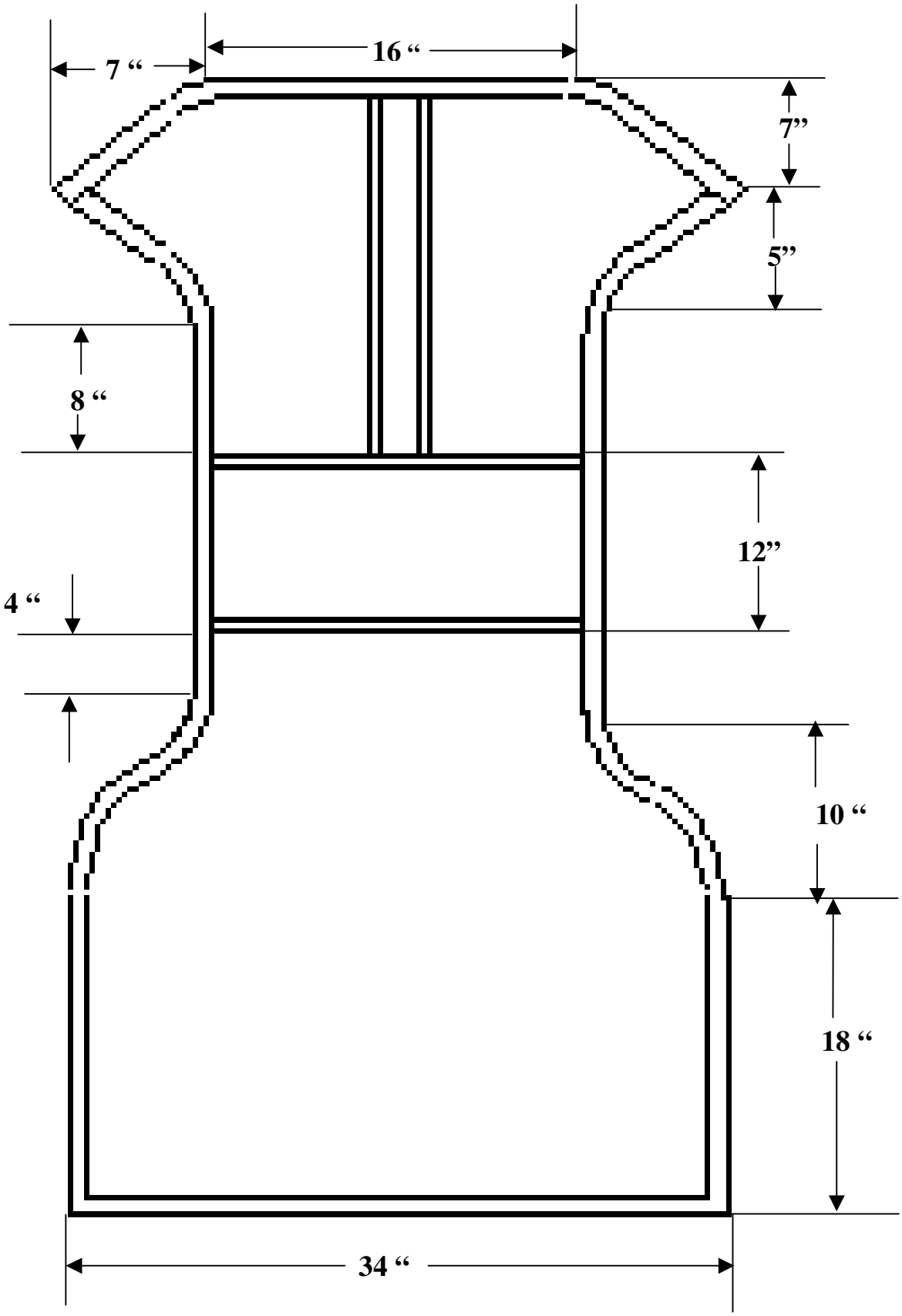
Dia of tube	= 1 inch
Material	= GI

Pedal

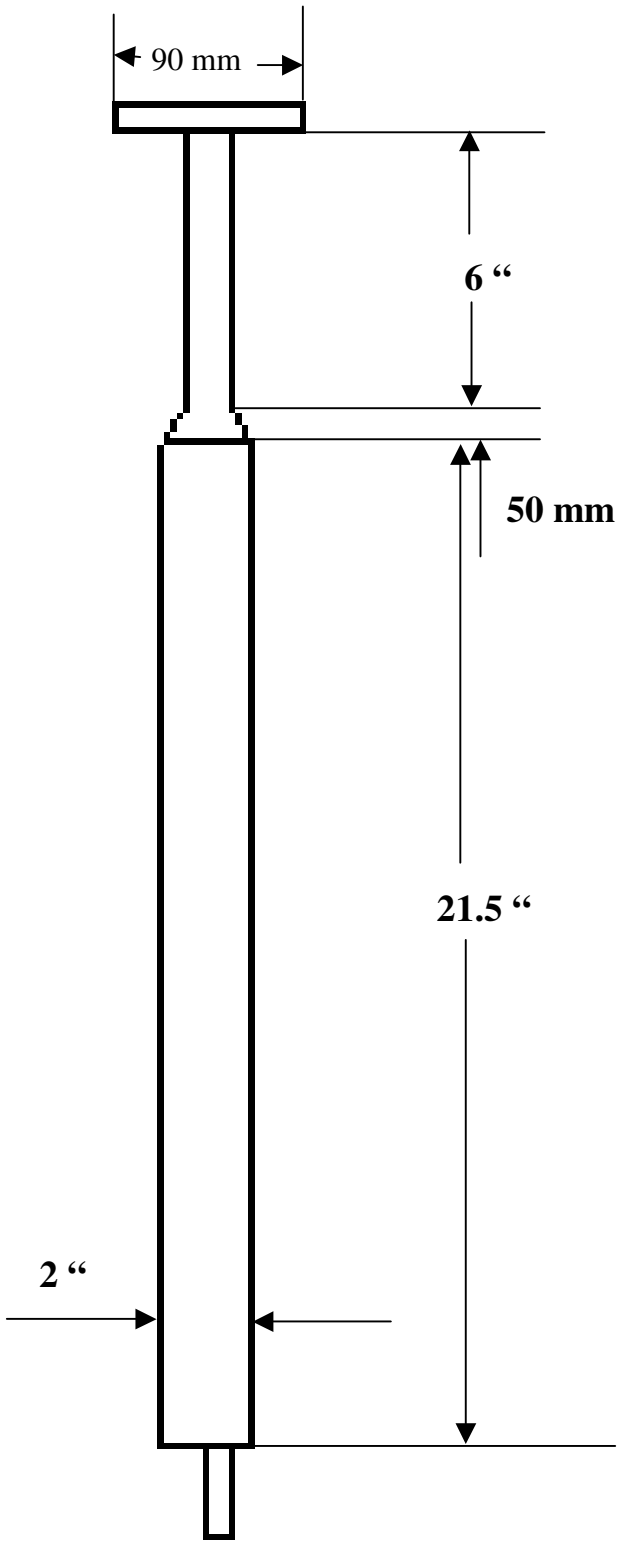
Type of material	= M S
Dia of Rod	= 5/8 inch

Muffler

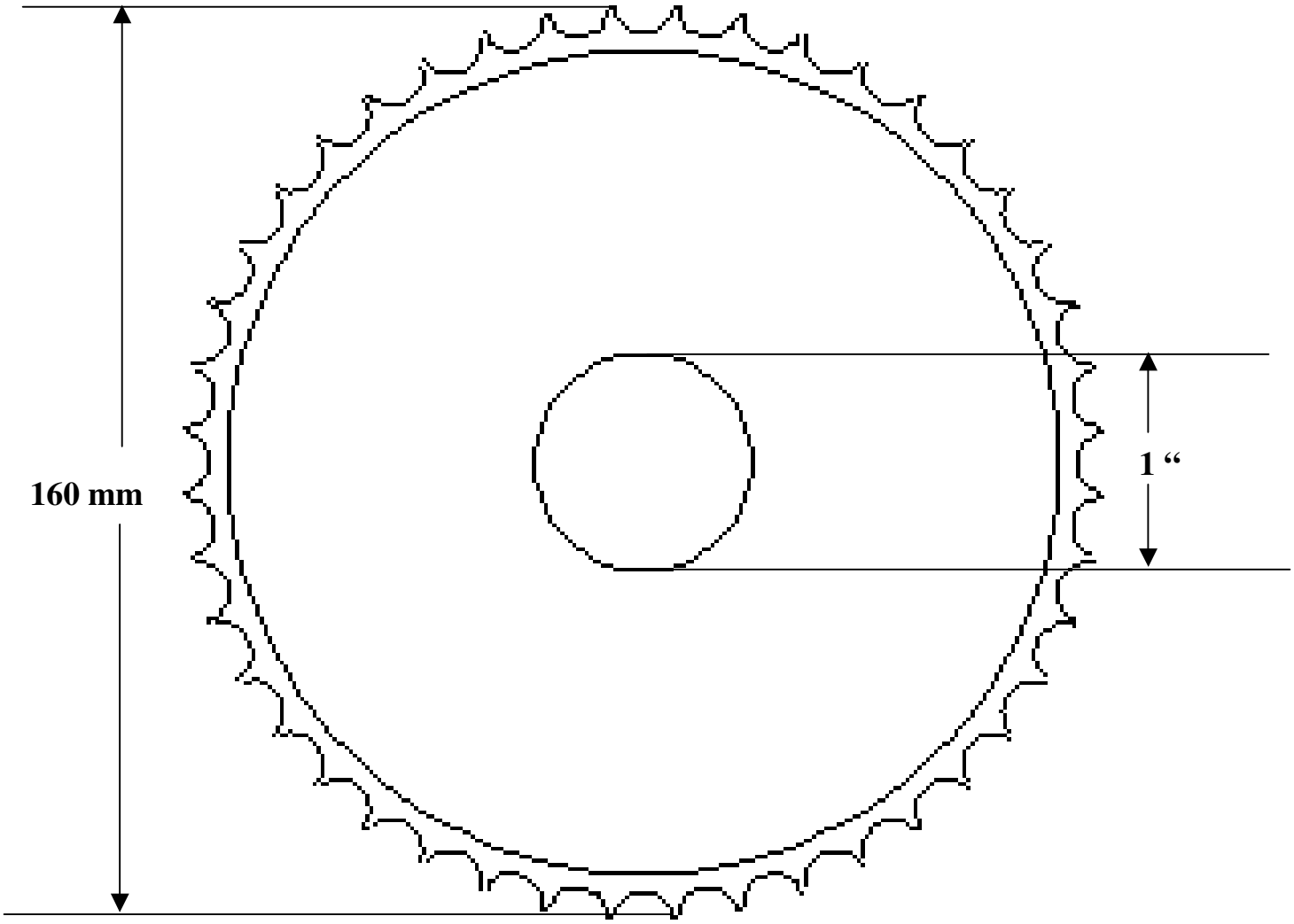
Material	= Aluminium
Greater diameter of muffler	= 2 inches
Total Length	= 27.5 inches
Smaller diameter of muffler	= 1 inch



CHASSIS

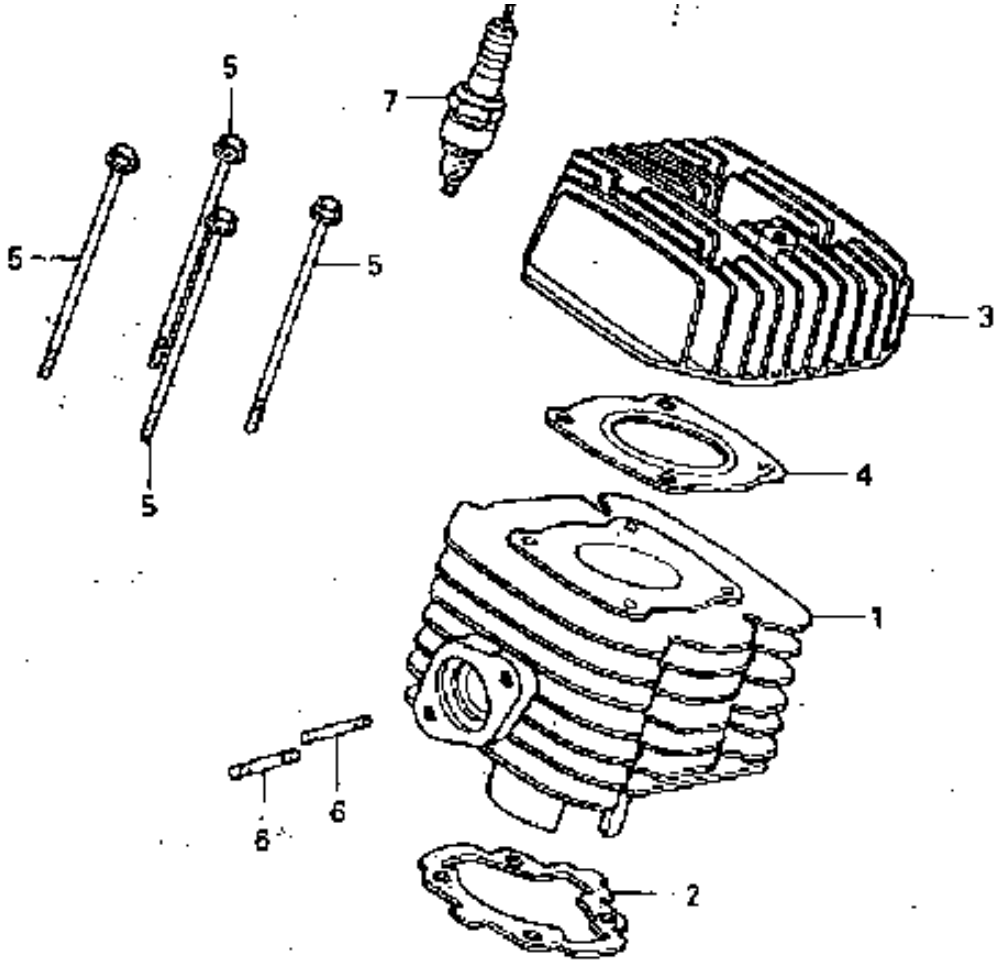


MUFFLER



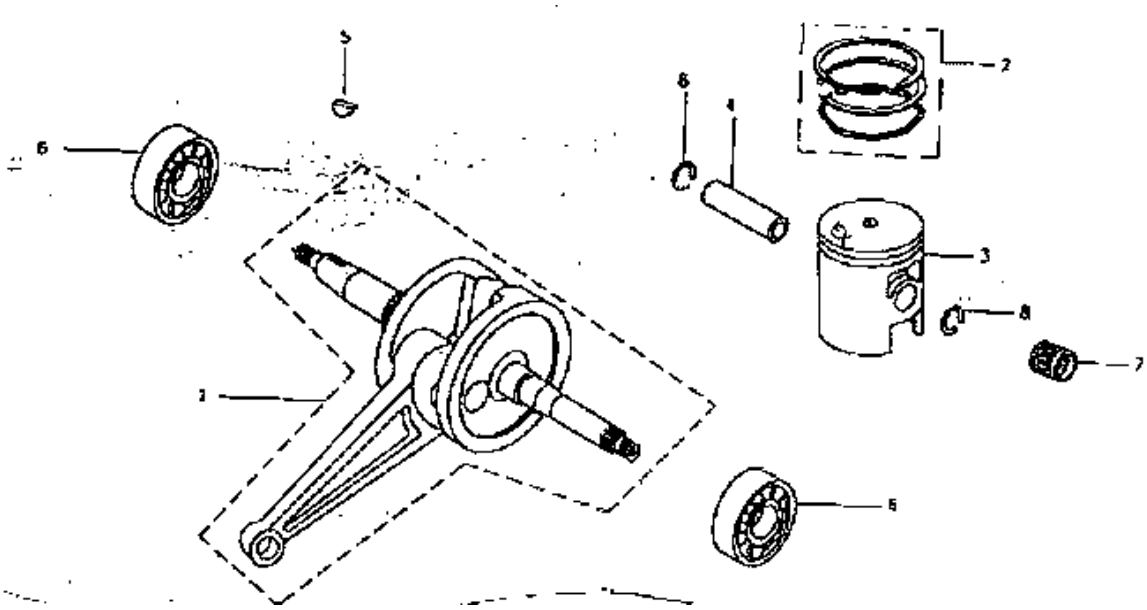
SPROCKET

DRAWINGS OF ENGINE



CYLINDER, CYLINDER HEAD

1. Cylinder	2. Gasket	3. Cylinder Head	4. Gasket
5. Bolt	6. Stud	7. Spark Plug	



CRANKSHAFT, PISTON

1. Crankshaft Components
2. Piston Rings
3. Piston
4. Piston Pin
5. Woodruff Key
6. Ball Bearing
7. Bearing Connect Rod End
8. Piston Clip Pin

FABRICATION

10. FABRICATION

CHASSIS

First of all, the chassis is constructed. The GI pipe is taken as per dimensions and bends in required places using bending machine. Then the pipes are welded rigid

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

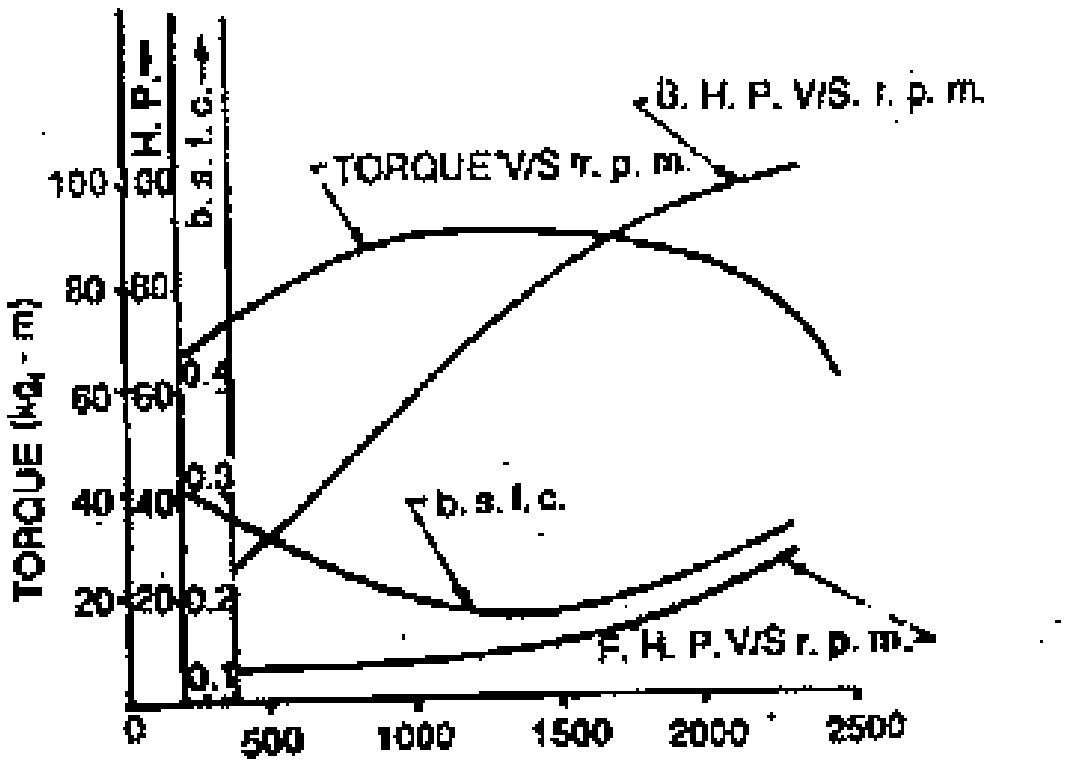
The painting is done to increase the appearance to the kart. The chassis, steering and steering spindle, wheels, seat, muffler, engine cover etc are painted using different colors. The pedals are also painted.

PERFORMANCE STUDY

11. PERFORMANCE STUDY

First of all, we say that this is not a performance machine. We are taking a two – wheeled engine and connected to four wheels. So the performance also deferrers. We tested this vehicle at standard conditions.

Engines are tested to find out the variations of Brake Horse Power, Torque, Fuel Consumption, Frictional Horse Power and Specific Fuel Consumption at different engine speeds.



PERFORMANCE CURVES

1. **Torque Vs RPM**

From the graph, we see that during medium speeds, torque increases with speed. The volumetric efficiency being higher during this

period (cylinders get enough fuel – air mixture to burn), higher combustion pressures produce more power.

At high speed, engine cylinders induce less amount of fuel – air mixture reducing combustion pressures and hence the torque, the curve drops down.

2. **BHP Vs RPM**

From the graph, we see that the brake horsepower of an engine steadily increases with the increase of engine rpm. At a certain engine speed, the bhp drops down instead of increasing. This is due to two reasons.

1. At high speeds, the volumetric efficiency of the engine decreases considerably, i.e. it takes in decreased quantities of fuel – air mixture producing lower combustion pressures and hence lowers engine power.
2. We also know that frictional losses in an engine increase five times as the engine speeds up from 1000 to 3000 rpm, decreasing the brake horsepower.

3. **FHP Vs RPM**

Frictional Horse Power increase in speed. Frictional loses are lower at low engine speeds. These losses increase considerably with the increase in rpm. The horsepower lost due to friction increases five times as the engine speed increases from 1000 to 3000 rpm.

The frictional losses in an engine may be due to friction between rings and cylinders, valves and valve guides, timing gears, bearings, hydraulic resistance of inlet and exhaust valves etc.

The major source of friction loss in an engine is between piston rings and cylinder, which contributes to 70% of the total engine friction.

4. Specific Fuel Consumption Vs RPM

The specific fuel consumption decreases with the increase of engine rpm. The fuel consumption per hp/ hr in the case of diesel engines is less at all engine speeds.

As shown in the graph, at engine speeds above 2,500 rpm, the specific fuel consumption increases in both petrol and diesel engines.
When engine load decreases, the specific fuel consumption increases slightly.

Therefore, we conclude that brake fuel rate is higher for slow speed engines, increases a little for medium speed engines and increases more for high-speed engines. This is because at low and maximum speeds, a rich mixture is required.

SERVICE AND MAINTANANCE

12. SERVICE & MAINTANANCE

Servicing

a) Only qualified service personnel should carry out servicing activities on this machine.

b) Always use standard engine components as specified.

c) Servicing must be done at regular intervals.

Maintenance Schedule

a) Daily

i) Check the lubrication oil in the sump. Tap up necessary.

ii) Keep the fuel tank full. The tank should be fitted in completely with clean petrol at the end of the day's work.

iii) Check the tyre pressure. The pressure must be at least 18 psi.

iv) Clean the engine at the end of day's work, if there are any leakages, dust will collect at the leaky spots during next day work. Such leakages should be attended properly.

b) Every 50 kms

i) Inspect fuel lines, throttle operation, brake shoe, wheels and tyres, etc.

ii) Adjust throttle operation, carburetor, valve clearance, etc.

iii) Clean the carburetor, air cleaner, spark plug, etc.

c) Every 250 kms

i) Lubricate the braking system.

ii) Check all bolts and nuts.

d) Every 500 kms

i) Replace fuel filter

e) Every 750 kms

i) Thoroughly clean out the fuel tank and refill fresh fuel.

ii) Knock out soot from the exhaust silencer.

iii) Remove the cylinder head and de-carbonize.

f) Every 1000 kms

i) Adjust carburetor

ii) Replace spark plug.

TROUBLE – SHOOTING

a) Engine does not start

Lack of petrol	Check that chock is operated when starting engine from cold.
Too much petrol (Engine flooded)	a strong smell of petrol will be present near the carburetor and the outside of the carburetor may be quire wet. The trouble is that the mixture drawn is not been fired by the plug. Check as for next.
Lack of spark	Take out plug and see if wet (condition previous above) or excessively dirty. Clean plug and readjust points, if necessary. If engine is already flooded, kick over smartly half a dozen times before replacing plug. If plug is still not sparking, remove again and hold against side of engine and kick engine over. Spark jumps the plug: check that the spark jumps the plug about ¼ in. to engine casing. If lead sparks but plug does not, fit a new plug. If load does not give proper spark, check under ignition fault.

Ignition trouble (Other than plug)	Remove flywheel domed cover and check points for (a) incorrect gap (b) points dirty or worn. Adjust or correct, as necessary.
	Check for broken, bread or disconnected leads to coil (green wires) or earth lead (black) broken off from crankcase.

b) Engine starts but soon after turn off

Lack of petrol	If the petrol tap is not turned on, the engine may start on the petrol in the carburetor but will run of fuel very soon after.
Ignition fault	Check wires for loose connection.

c) Engine runs badly (Idling and moderate speeds)

Incorrect mixture	Adjust idling screws on carburetor.
	Check that throttle slide in carburetor is not sticking.
Mixture too lean	Check for air leaks, e.g. carburetor top loose, gaskets faulty, etc.
Mixture too rich	Check that chock has not been left out.
	Check the atomizer jet is not enlarged.

Check that carburetor flat has not stuck or become 'holed' and sunk.

Ignition fault — Check plug first then contact breaker.

Observe plug to see if type is matched to engine.

d) Engine runs badly (Engine speeds)

Poor Carburetor — Check as above. Check also that carburetor is vertical, not displaced, causing float to stick.

Ignition fault — Check as above.

Check that contact breaker arm is not seized or stiff on its pin.

Check that contact-breaker spring is intact and not too weak.

Condenser may be faulty. Check it in garage and change sparking plug which may be defective. In such a case not fault will be felt at low speed but as the road speed increases, erratic running of the engine will be felt and unpleasant sound from the exhaust will be heard. Change spark plug. To check that the fault is because of the spark plug, replace it with a new or

used spark plug and run the vehicle. If no fault is observed then original spark plug needs changing. The test for condenser may also be done in the same fashion.

e) Engine lacks pulling power

Poor Carburetor Check as above.

Ignition fault Check as above

Engine Blocked with carbon

Engine and silencer needs decarbonizing (not before 500 kms on a new machine or 1000 kms, if the machine is driven hard.

Mixture too rich Check if choke is on.

PROJECT PLANNING

13. PROJECT PLANNING

INTRODUCTION

The kind of small-scale industry that we are intending to start is an assembling industry. We are sure to manufacture the product according to the customer's require ments. We are not making only go- karts in this industry. Only secondary production is kart. Primary production is motorcycle with the same engine. The manufacturing of karts will be according to orders. Our manufacturing shop will be well equipped with all machines such as lathe, drilling machine, grinding machines, milling machine, power hacksaw, welding machine, etc. So that we can do any production work in connection with replacement of worn out parts of the job.

We can also provide job opportunities for 6 technical and 3 managerial staff.

Using present equipment either it may be loss of our valuable energy and time or otherwise it may be loss of money. Our venture is a solution for that.

In near future we plan to develop our industry and increase the production according to customer requirements.

MARKET SURVEY

Before establishing our plant we conducted a market survey to know the trend of the market. Since our project is one which gives much important to time saving and energy loss main customers are attracted. Hence our survey was made to collect the opinions and suggestions from those who in racing field. The points we have covered during our survey were:

a) Methods of present system

b) Advantages of present system

c) Disadvantages of present system

d) Expense of present system

e) Suggestion of new systems from them

f) Presentation of our project before them

g) Their opinion about the proposal

h) Feasibility of the project in their work

i) Convincing them of our reliability

SUMMARY OF MARKET SURVEY REPORT

Survey reveals the attitude of customers towards the projects. 70% of them were against the present system because the present system may either be energy and time consuming or it may be costly. So wastage of money and valuable time is a problem. 10% of them were satisfied with the present system, because they have the ability to bear the cost. The next 10% of them were satisfied by the cheap equipment because of their poor living condition. The remaining 10% were indifferent to this question because they don't have enough knowledge in this field. Anyhow 100% of the customers welcomed the new proposal. They guaranteed their extreme co-operation.

PLANT LAYOUT

Plant layout means the disposition of the various facilities (equipment, material, manpower, etc.) and service of the plant within the area of the site selected previously. Plant layout begins with the design of the factory building and goes up to the location and movement of a worktable. All the facilities like equipment, raw materials, machinery, tools, fixtures, workers, etc. are given a proper place. In deciding the place of equipment, the supervisors and workers who have to operate them should be consulted.

OBJECTIVES OF GOOD PLANT LAYOUT

In a good plant layout:

1) Material handling and transportation is minimized and efficiently controlled.

2) Bottlenecks and points of congestions are eliminated (by line balancing) so that the raw material and semi-finished goods move fast from one workstation to another.

3) Workstations re-designed suitably and properly.

4) Suitable spaces are allocated to production centres and service centres.

5) The movements made by the workers are minimized.

6) Waiting time of the semi-finished products is minimized.

7) Working conditions are safer, better (well ventilated rooms, etc.) and improved.

8) There is increased flexibility for changes in product design and for future expansion.

9) There is the utilization of cubic space (i.e. length, width and height).

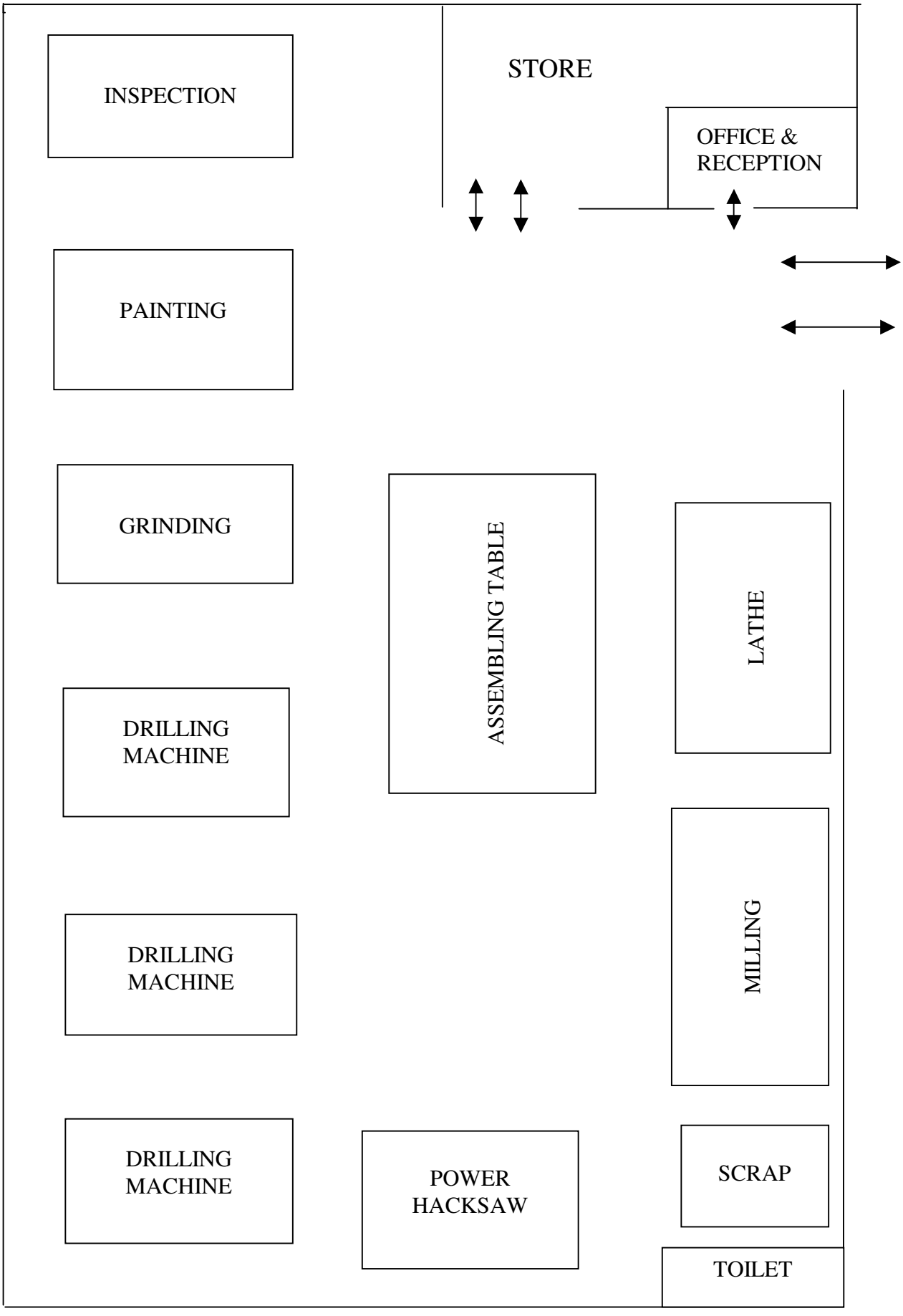
10) There are improved work methods and reduced production cycle types.

11) Plant maintenance is simpler.

12) There is increased productivity and better product quality with reduced capital cost.

13) A good layout permits materials to move through the plant at the desired speed with the lowest cost.

PLANT LAYOUT



PLANT LOCATION

Hardly any location can be ideal or perfect. One has to strike a balance between various factors affecting plant location, which is discussed below.

Concept and Factors Governing Plant Location

A plant is a place, where men, materials, money, equipment, machinery, etc. are brought together for manufacturing products.

The problem of plant location arises when starting a new concern or during the expansion of the existing plant. Plant location means deciding a suitable location, area, place, etc. where the plant or factory will start functioning. Plant location involved two major activities. First, to select a proper geography region and second, selecting a specific site within the region. Plant location plays a major role in the design of a production system the cost of

a) Getting suitable raw material

b) Processing raw material to finished goods; and

c) Finished products distribution to customers.

Hardly any location can be ideal or perfect. One has to strike a balance between various factors affecting plant location, which are discussed below:

1. Nearness to Raw Material

It will reduce the cost of transporting raw material from the vendor's end to the plant. Which consume raw material in bulk, or raw material is heavy, is cheap but loses a good amount of its weight during processing (trees and saw mills), must be located close to the source of raw material.

2. Transport Facilities

A lot of money is spent both in transporting the raw material and the finished goods. Depending upon the size of raw material and finished goods, a suitable method of transportation like roads, rails, water or air is selected and accordingly the plant location is decided. One point must be kept in mind that cost of transportation should remain fairly small in proportion to the cost.

3. Nearness to Markets

It reduces the cost of transportation as well as the chances of the finished products getting damaged and spoiled in the way (especially

perishable products). Moreover plant being near to the market can catch a big share of the market and can render quick service to the customers.

4. Availability of Labour

Stable labour force, of right kind, of adequate size (number), and at reasonable rates with its proper attitude towards work are a few factors which govern plant location to a major extent. The purpose of the management is to face less boycotts, strikes or lockouts and to achieve lower labour cost per unit of production.

5. Availability of Fuel and Power

Because of the wide spread use of electric power, in most cases fuel (coal, oil, etc.) has not remained a deciding factor for plant location. Even then steel industries are located near source of fuel (coal) to out down the fuel transportation costs.

It is of course essential that electric power should remain available continuously, in proper quantity and at reasonable rates.

6. Availability of Water

Water is used for processing, as in paper and chemical industries, and is also required for drinking and sanitary purposes. Depending upon the nature of plant, water should be available inadequate quantity and

should be of proper quality (clean and pure). A chemical industry should not be set up at a location, which is famous for water shortage.

7. Climatic conditions

With the developments in the field of heating, ventilating and air-conditioning, climate of the region does not present much problem. Of course, control of climate needs money.

8. Financial and Other Aids

Certain states give aids as loans, feed money, machinery, built up sheds, etc. to attract industrialists.

9. Land

Topography, area, the shape of the site, cost, drainage and other facilities, the probability of floods, earthquakes (from the past history), etc. influence the selection of plant location.

10. Community Attitude

Success of an industry depends very much on the attitude of the local people and whether they want work or not.

11. Presence of Related industries

12. Existence of hospitals, marketing centres, schools, banks, post offices, clubs, etc.

13. Local bye-laws, taxes, building ordnances, etc.

14. Housing facilities

15. Security

16. ***Facilities for expansion***

LOCATIONAL ECONOMICS ANALYSIS

1. Locations considered

a. Location - 1

It is Veli, situated 12 Km from Thiruvananthapuram city. It is a sub-urban area.

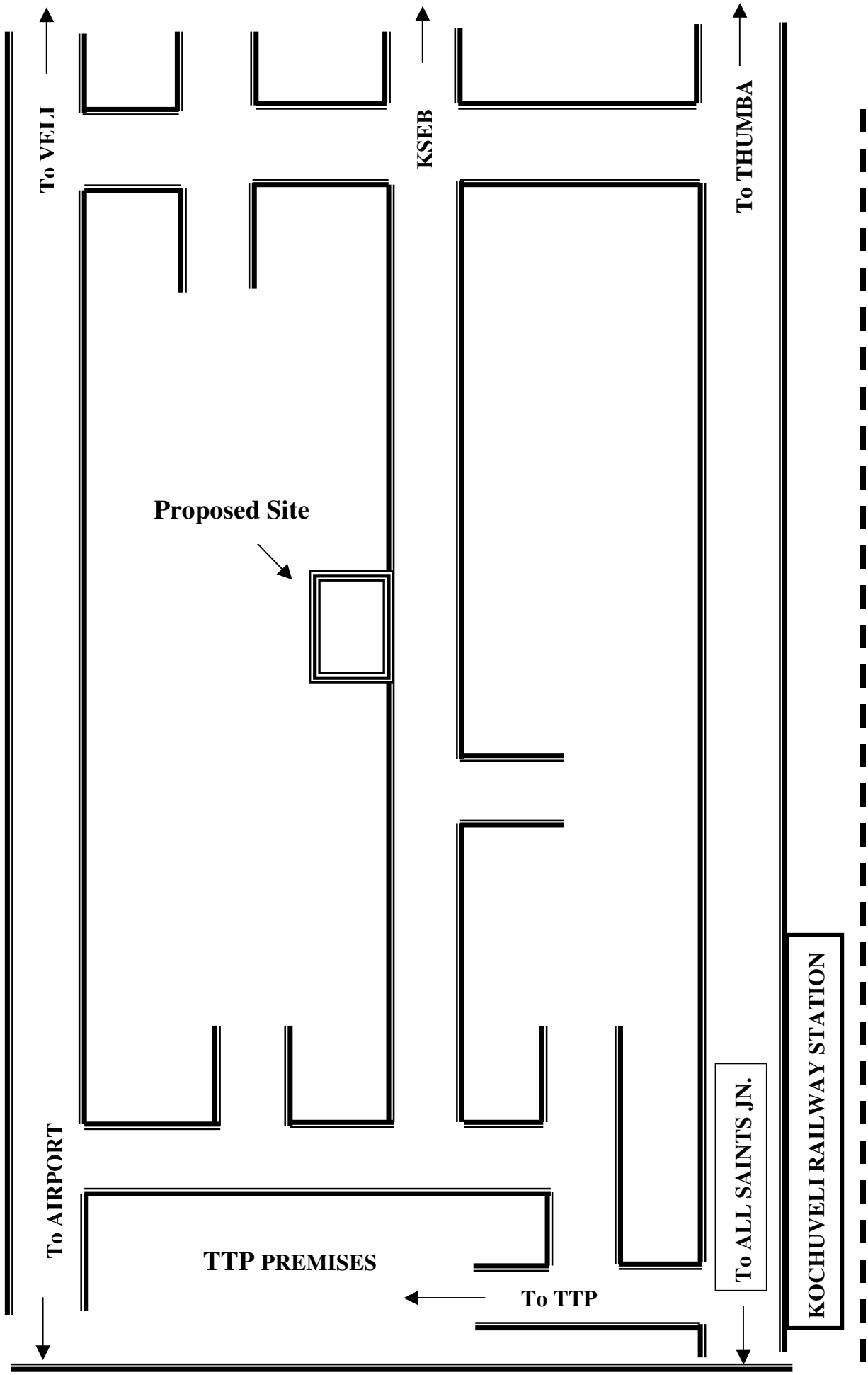
b. Location - 2

It is Kamaleswaram, situated 2 Km from Thiruvananthapuram city. It is an urban area.

Factors Cost of	**Location – 1 (Veli)**	**Location – 2 (Kamaleswaram)**
Land 20 (cents)	10,000 (Rent)	25,000 (Rent)
Water	Less	More
Power	Less	More
Labour	Less	More
Transportation	More	Less
Taxes	Less	More
Community facilities	Good	Good
Community attitude	Encouraging	Indifferent
Housing facility	Medium	Very Good
Cost of Living	Medium	Large
Community Size	Medium	Large

Studying the data obtained by locational analysis we can see that transportation charges for location-2 is less than that of location 1. But all other situation favors location-1. Hence location-1 seems to be a better choice.

Veli is 12 Km away from Thiruvananthapuram City. We will be obtaining a shed from here at a rent of Rs. 600/- month. The shed is well suited for the proposed maintenance concern. Electric supply is already there and water is already available. Transportation will be available here. The area of building is 4,500 sq.feet, which is very much to accommodate. Climatic and atmospheric conditions are very good.


To VELI
KSEB
To THUMBA
Proposed Site
To AIRPORT
TTP PREMISES
To TTP
To ALL SAINTS JN.
KOCHUVELI RAILWAY STATION

ESTIMATION AND COSTING

14. 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:

a) To help the producer in deciding the manufacturing and selling policies.

b) To help in filling up tender enquiries.

c) To decide the amount of overheads, this helps in comparing and checking the actual overheads of the factory.

d) To decide the wage rates of the workers after carrying out a time study.

e) It helps to decide whether a particular material should be purchased from the market or to be manufactured.

f) It helps in improving the designs, which may reduce the cost of production.

Functions of Cost Estimation

a) To determine the cost of material to be purchased from outside.

b) To determine the cost of tools, equipments, etc. to be purchased from.

c) To determine different overhead charges including selling.

d) To determine selling price after adding due profit to the total cost.

e) To conduct time and motion study.

f) To refresh one-self with modern methods and equipments used in manufacturing their products.

g) To keep the previous records of estimates in a systematic way for future reference.

h) To keep contact with other departments regarding methods of quality of material and products, etc.

i) To keep control over selling expenses with the help of sales.

j) To find the most economical procedure for the design.

k) To submit estimates to the sales department for selling.

Sl. No	Description	Quantity	Cost in Rs.
1.	Chassis	1	3500/-
2.	Engine (Kinetic Honda)*	1	5000/-
3.	Steering System	1	750/-
4.	Wheels and tyres	4	1500/-
5.	Brake (Drum)	1	400/-
6.	Rear Axle	1	300/-
7.	Transmission System	1	1200/-
8.	Fuel Tank	1	100/-
9.	Seat	1	100/-
10.	Electro Plating		1500/-
11.	Muffler	1	500/-
12.	Extra Fittings		650/-
13.	Painting		300/-
14.	Labour Cost**		2000/-
15.	Indirect Material Cost***		200/-
		TOTAL	***Rs. 18,000 /-***

* Kinetic Honda Engine with whole fuel system

** Labour cost includes cost for welding, boring, drilling, lathe work etc.

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

The whole cost producing one kart is Rs. 18,000/-

After taking 25% profit, the cost will be Rs. 22,500/-

After giving discounts and commissions, we can sell a go – kart at

Rs. 22,000/-

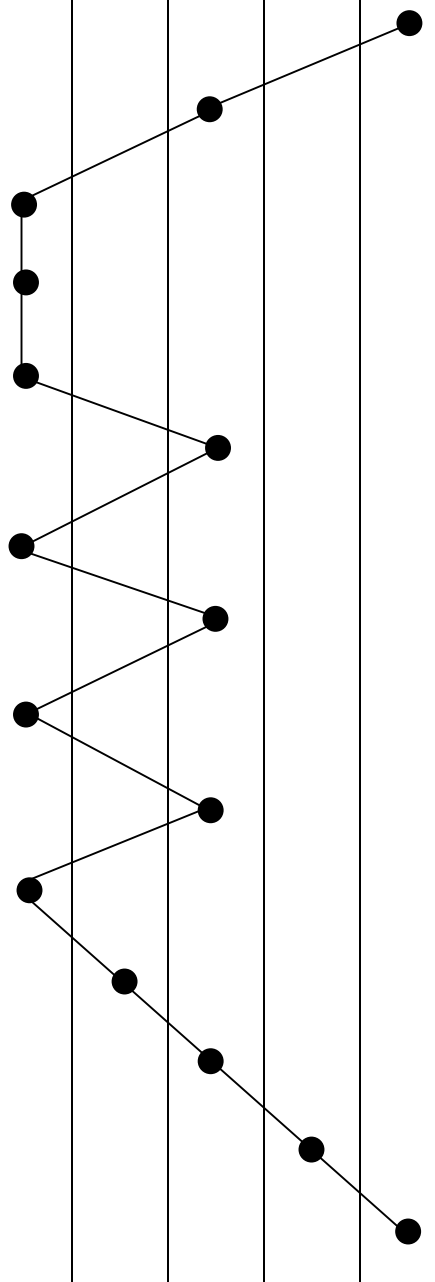
FLOW PROCESS CHART

15. FLOW PROCESS CHART

Part Name : Chassis **Part No : 1**

Total Time : 348 minutes

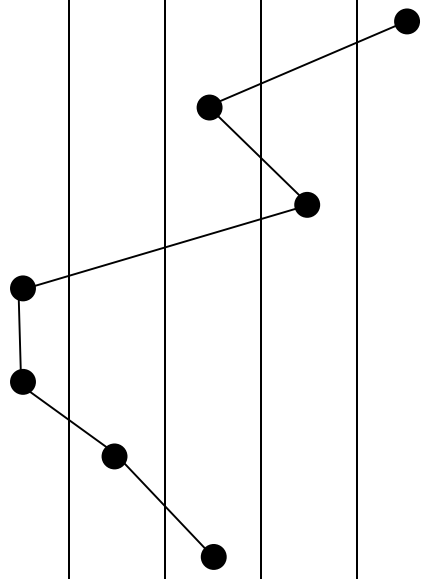
Sl No.	Activity	Time in Minutes	○	□	⇨	D	▽
1.	Materials lying in the store						
2.	Moving to marking table	2					
3.	Marking	10					
4.	Cutting	90					
5.	Bending	60					
6.	Moving to drilling Machine	2					
7.	Drilling	60					
8.	Moving to welding section	2					
9.	Welding	70					
10.	Moving to grinding Machine	2					
11.	Grinding	40					
12.	Inspection	5					
13.	Move to assembly shop	2					
14.	Waited for assembly	3					
15.	Store						



Part Name – Axle **Part No : 2**

Total Time : 102 minutes

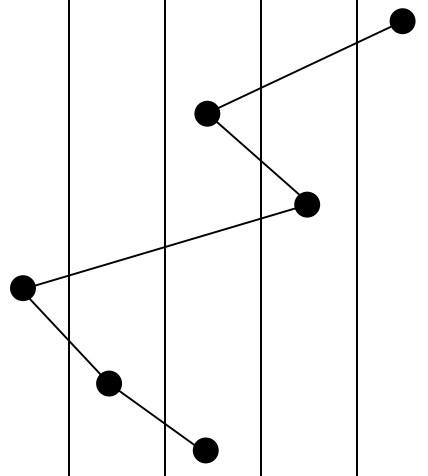
Sl No.	Activity	Time in Minutes	○	□	⇨	D	▽
1.	Materials lying in the store						
2.	Taken to lathe	2					
3.	Held the rod	3					
4.	Turning is done	40					
5.	Thread cutting is done	50					
6.	Inspection	5					
7.	To assembly shop	2					



Part No – Sprocket **Part No : 3**

Total Time : 50 minutes

Sl No	Activity	Time in Minutes	○	□	⇨	D	▽
1.	Materials lying in the store						
2.	Taken to lathe	2					
3.	Fix the sprocket	5					
4.	Thread cutting is done	35					
5.	Inspection	5					
6.	To assembly shop	3					



ENTERPRENERSHIP

16. ENTERPRENERSHIP

An entrepreneur is defined as an agent of charge. He is the most critical factor. In the economic development of any region, he plays a very important and catalytic role in activating the factors of production leading to the overall economic development. This is the view of economists on entrepreneurship. Entrepreneur should posses judgment perseverance, knowledge of the world and business and also the ability to superintend and administrator. He is often described as engineer of industrial progress and chief agent of production.

To summarize entrepreneurship can be described as a creative and innovative response to the environment such response can take place in any field of social endeavor business, industry, agriculture, education, social work and life.

An analysis of the above viewpoints on entrepreneur behavior highlights the following features.

a) Entrepreneurial behavior is a result of an interaction of individual factors and situational factors and situational factors of psychological factors and experimental factors.

b) Individual differ in their potentiality for entrepreneurship.

c) Even a high differ in their potential need not invariable result in entrepreneurial success.

d) Factors such as training and institutional support and other factors assume importance in entrepreneurship development.

Entrepreneurial Characteristics

a. Need for Achievement

The need to sell known as achievement is the single psychological factor that has been extensively researched of in relation to entrepreneurship. Mr. Clelland had demonstrated that achievement notice is a critical factor for entrepreneurship. Entrepreneurship are people with high drive and high activity level, constantly struggling to achieve something which they could call their own accomplishment. They are moderate risk takes at the same time they avoid high risks. They work long hours, most of them assess their own strengths and weakness and opportunities and threat from the environment.

b. Sense of Efficiency

A sense of effectiveness is yet another important psychological dimensions that contributes to successful entrepreneurship. They solve problems instead of avoiding it. They will show initiative rather than

conformism confidence and action, orientation is their essential characteristics. They should have clear goals for the future and tend to live in the present with involvement. Entrepreneurs are basically inclined to test out their capabilities whenever an opportunity arises and are open to feedbacks from such tests.

Time Orientation

The entrepreneur is neither completely future oriented nor completely past oriented. He is programmic, he looks into the future, uses his past experience but lives intensively the present.

c. Competition

Entrepreneurs are certainly competitive in their orientation. They collaborate well with other parties when they see such collaboration is to their advantage. Their competition is against the goals set by themselves rather than with the goals set by others.

d. Flexible Authority Relation

An entrepreneur has to show different leadership styles at different stages of growth of the enterprise. To the employees he will be benevolent in the initial period and dispensing later once the employees have built up legally to the organization.

Social Consciousness

The concern for society for the good of other people pre-supposes a certain kind of social consciousness. Entrepreneurs should be able to appreciate the sources and reasons for socio-economic backwardness and underness and understand the significance of employment and underness and industrialization in the context of social change.

e. Saving for Future

Successful entrepreneur shows high sense of dignity of manual labour and have tendency to save for future and to invest for further development. They have along term involvement with their goals.

f. Development of Entrepreneurs

Entrepreneurship Development Programmes (EDPs) have been widely recognized as an effective measure in promoting small-scale industry in our country.

Entrepreneurship is a function of several factors. At least four sets of factors which mainly influence it could be identified they are:

i. The individual

ii. The socio-cultural factors

iii. The Support system

iv. The Environment.

i. The Individual

The individual constitutes the mode important element in entrepreneurship. He takes; the decision to start an enterprise and it is the he who strives to make it a success. It is necessary, therefore to understand the various factors which influence an individual. Three main factors influence behavior are:

- His / her motivational factors
- The skill that entrepreneur posses
- His / her knowledge of several relevant

Motivational factors may be considered as most crucial to entrepreneurship. It has three major elements.

- The entrepreneurs motivation
- Personal efficiency
- Copying capability

The following skills are also found most crucial contributing to entrepreneurship.

- Project development
- Enterprise management
- Enterprise building
- Knowledge and environment
- Choice of industry
- Knowledge of technology

ii. Socio-Cultural Factors

Socio-cultural factors like family background and the names and values of the immediate social circle contribute substantially to entrepreneurial developments the individual worker under some pressure of the values inherited from this behavior which reflect inclinations towards initiative and risk taking dependence or independence. Working with one's own hands on tasks requiring man, manual handling, etc.

The following aspects of normative behavior are relevant to entrepreneurship.

- Family expectations and pressure

- Risk taking
- Independence
- Work

Personality Characteristics of Entrepreneurs

Φ Creative

Φ Calculated risk taking

Φ Not too discouraged by failure

Φ Future oriented

Φ Hard working

Φ Persistent

Φ Take personal responsibilities

Φ Sets realistic goals

Φ Drive for power

Φ Drive for independence

Φ Desire for feedback and learns from experience

Φ Goal oriented

- Φ Ability to exploit situation
- Φ Willing to learn
- Φ Self confidence
- Φ Constantly under stress
- Φ Person for integrity
- Φ Likes to excel in work
- Φ Pleasant personality
- Φ Success oriented
- Φ Makes decisions
- Φ Non-structured
- Φ Opportunity seeker
- Φ Competitive
- Φ Positive attitude
- Φ Dreamer
- Φ Time conscious
- Φ Imaginative

- Φ Family and friends second to business
- Φ Courageous
- Φ Self starter
- Φ Take failure a step to success
- Φ Individualist
- Φ Multifaceted interests
- Φ Innovative
- Φ Takes challenges
- Φ Initiative and dynamic
- Φ Impatient
- Φ Sensitive and perceptive
- Φ Thinks to improves always
- Φ High tolerance of ambiguities
- Φ Good communicator
- Φ Hyperactive
- Φ Intensive

- Φ Ability to grasp quickly
- Φ Aggressive
- Φ Leader
- Φ Enjoys work play and living
- Φ Dissatisfied with general life
- Φ Average intelligence
- Φ Want to make a lot of money.

SMALL SCALE INDUSTRY

17. SMALL SCALE INDUSTRY

Procedure to start a Small Scale Industry

Starting of a small-scale industry is not a very task. At the same time it is not very difficult too, if different factors are considered before taking a decision to start it. For starting the first and most important work is to select a suitable site and then to make the proper scheme and give it approved.

Procedure to start small-scale industry consists of the following important steps.

a. Selection of industry

b. Preparation of schemes

c. Approval of scheme

d. Registration of small industry

Selection of industry

Selection of industry or product that is going to manufacture on the basis of

- Market survey
- Finance

- Technical know-how available
- Economic viability
- Stability
- Experience in the time

Market Survey

Before starting a business, market survey is very essential to know about what must be produced, how much to be produced, what will be the margin of profit, etc. It provides necessary statistic helpful or forecasting and planning a project.

Mainly the object of market survey is to inform the management as to what the future hold for its products and proposed products.

Finance

Government Assistance of Finance

Small-scale industries require financial assistance not only to purchase machinery and equipment but also for purchasing raw materials and working capital. Today various organizations are came forward for sufficient financial help for reasonable rate of interest.

i. National Small-Scale Industries Corporation
ii. State Directorate of Industries
iii. State Industry Development Corporation
iv. Finance Corporation
v. Public Sector and Other Bank

National Small-Scale Industries Corporation (NSIC)

It provides the following assistances

- Supply of machines on hire purchase
- Marketing assistance to small scale industries
- Encouragement of export of small-scale industries products.

State Directorate of Industries (SDI)

It provides the following assistances

- Granting of essentially certificate for import of raw material, components etc.
- Distribution of source and indigenous raw materials to the industry units.
- Allotment of industrial plots/sheds to entrepreneurs.
- Arrangement of water and power.
- Provision of technical guidance.

Subsidy

15% subsidy on fixed capital investment is admissible to new units set up in the backward area of certain districts such as Malabar, Idukky. The maximum subdivision admissible in the areas declared backward by the Govt. of India is Rs. 1 lakh. Wayanad is declared as non-industrial district and central investment subsidy in the district is 25% for all the other districts it is 10%.

Engineer entrepreneurships who set up their own small industrial units are eligible for interest subsidy. The difference between interest rate of 7% per annum and the normal rate of interest charged on the loans.

Loans and Concessional Rate of Interest

Loans are advanced to the small-scale industries under the state aid industries act and rules framed there under got construction of factory building purchase of machinery and equipment and working capital.

Procedure to Get Loan

a) An application for loan is submitted to the district industries officer / assistant director if industries in a prescribed form. In case of industrial co-operative societies the application should be submitted to the Assist and register co-operative societies who will forward the same with the recommendations to authorities concerned.

b) SBI has introduced a scheme of financial assistance to small scale units under which working capital is advanced against pledge of goods under lock and key on factory type. Advances are also made against hypothecation on goods and bills under sanction, as well as against personnel guarantees.

Degree or Diploma holders in engineering who pass three months entrepreneurship course from institution prescribed by Government of India are eligible for interest subsidy.

Technical know-how available

Owner should make him really converse with all acts, rules and literature which may help him in setting up and rolling a small scale industry literatures published by the state and central government are available for the help of interested person.

A large number of model schemes also available with the Manager of publications. Civil line direct of industries and civil supplies also helps in selection the products which have scope and which do not scope. Their lists are revised from time to time considering different factors changing with development of small-scale industry and demand.

Economic viability

The manufacture of the proposed product should be economically viable. The brake even of the level of product should be below 40 – 50% of the installed capacity to withstand the possible price cutting on other dislocation by the competitions. The proposed should have come out from the laboratory and pilot project level to commercial exploitation.

Stability

The proposed product should have stable sales all the year round otherwise the cost product may go up than making the product unstable.

SET UP AND MANAGE A SMALL SCALE INDUSTRY

Material

A manufacturing organization required of material which may consist not only raw material but also semi processed, semi assembled parts and components. It is advisable to have always make than one supplied for every material to ensure prompt and regular supply of quality material.

There should be minimum stock of various materials to avoid any stock out. In other words on the basis of the consumption rate and lead-time determine.

a) The maximum and minimum quantity of any material to be stored.

b) The re-order level and re-order quantity, that is when to place the order and for what quantity.

Marketing

It is normal responsibility to make goods available to people at price they can afford to pay at a time they need it. There should be sufficient sales to meet the entrepreneur's experience and to leave behind surplus. It is therefore essential to plan his marketing. It may also be difficult to plan any product and procurement programme. In such cases it

may be necessary to find out alternative uses for men, machinery and equipment during the slack reason preparation of schemes.

After deciding the product to be manufactured and that place of industry detailed is prepared. This scheme should contain the type of machines their approximate cost, quantity or raw materials and cost, details of land, building, number of workers, location proposed, infrastructure facilities available, factory layout, etc.

Management

The entrepreneurs should have initiative drive clarity of ideas and action and should be in a position to enlist the willing co-operation of the workers to achieve the common goal. That is successful management of his unit. The success of unit depends upon the attention the entrepreneur pays to the various problems like arrangements for regular supply of raw material scheduled production. proper management labour, timely arrangement of finance adhering to the delivery schedules and ascertaining the cost of product strategy.

Decide the size of market and the type of product we want of to offer. Also study the customers for who want to cater, the price and quality requirements of the customers. A study of the size of the market should also include the future growth prospect for the unit. Every product

has a definite life cycle introduction (infancy), growth (childhood) and adolescence maturity and decline.

In order to retain a reasonable return on our investment consistent with the growth of our units it is essential to plan in advance improvements strategy or our product. Satisfied consumers are the base for the survival of any organization.

Steps to Set Up a Small Scale Industry

1. Identification of a suitable product
2. Choice of location
3. Registration of the firm
4. Provisional registration
5. License from local administration
6. No objection certificate or license
7. Consent for electricity connection
8. Formulation of project report
9. Approval / license from other agencies
10. Approval of building plant

11.Apply for term loan

12.Land development and construction building

13.Ordering machinery

14.Application of margin money loan

15.Erection of machinery

16.Obtain service connection

17.Recruitment and training of personnel

18.Procurement of raw material

19.Trial run

20.Sales tax registration

21.Sales

22.Application for permanent registration

Facilities to Small Scale Industries

Government have also offered a number of facilities, incentives and concessions to the small industries to encourage the industrial development. Some of these are:

- Hire purchase of machinery
- Tax concessions
- Procurement of raw materials
- Power supply
- Water supply
- Market assistance
- Technical assistance
- Testing facilities
- Export promotion
- Import licenses
- Industries reserved for small scale sector
- Purchase programme
- Reservation of items
- Price preference

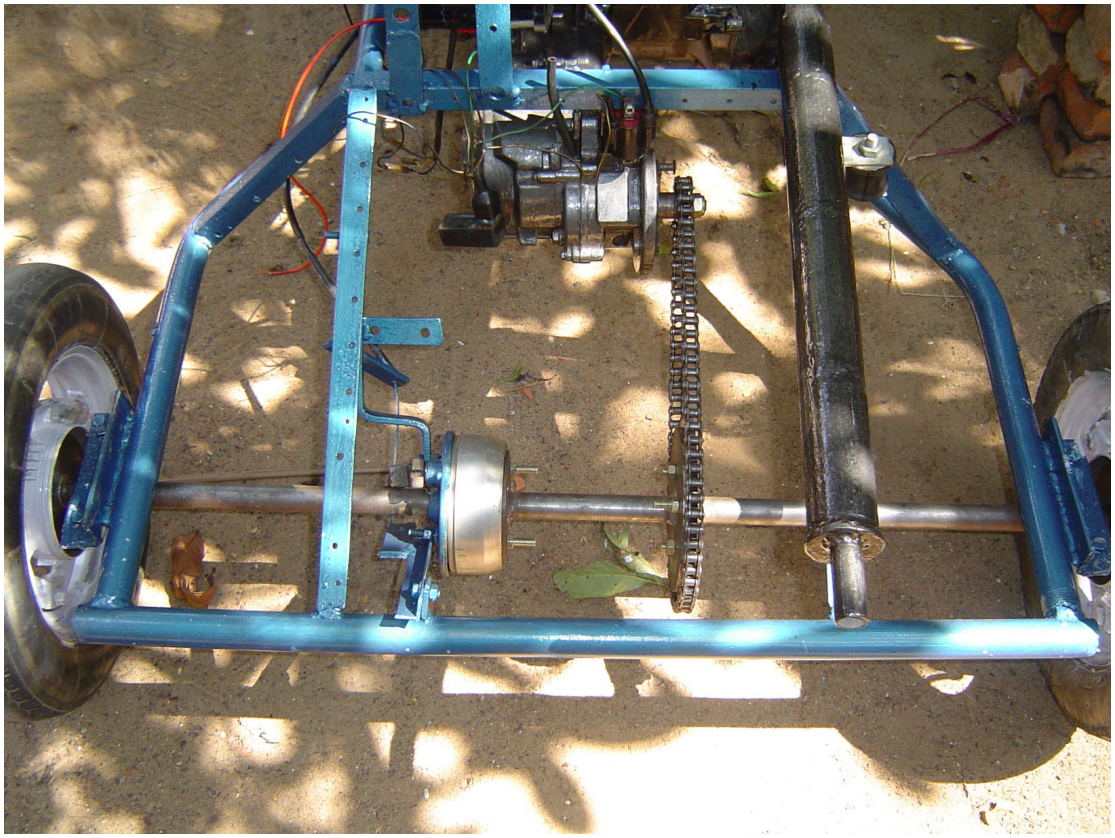
Advantages of Small Scale Industry

- It provides better and quick employment
- It is labour intensive and capital saving
- With small investment production can easily and quickly started
- No much sophisticate machines and modern technology is needed
- It attracts small savings and diverts them to productive channels
- It provides economic development by rapid industrialization
- It provides check in monopoly
- It reduces in balance of income property

PROJECT ALBUM

18. PROJECT ALBUM

GO - KART



CONCLUSION

19. 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 protype 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 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.

The project 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 line 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.

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