Two and Three Wheeler Technology

MODULE : 3

Contents:

- Trail, Castor angle or Rack angle, wheel base. Steering column ConstructionHandle bar types and construction.

- Springer forks suspension, Girder forks suspension, Trailing and leading link suspension, telescopic fork suspension. Single link type front suspension, Double link type front suspension. Hardtail type rear suspension. Swing arm type rear suspension.

- Layout of two wheeler and three wheeler transmission system. Belt, chain and gear drive. Multi - plate clutch, centrifugal clutch. Assist slipper clutch. Gear box - Constant mesh gear box with ball lock mechanism. Sequential gear box. CVT - Continuous variable transmission Cush drive.

STEERING GEOMETRY

The steering geometry of two wheelers includes definite values for various parameters. These parameters are trail, rack angle, front offset, wheelbase etc. These all parameters, together, decide the dynamic characteristics of vehicle with respect to handling, stability and road holding. Figure shows various steering geometry for motorcycle

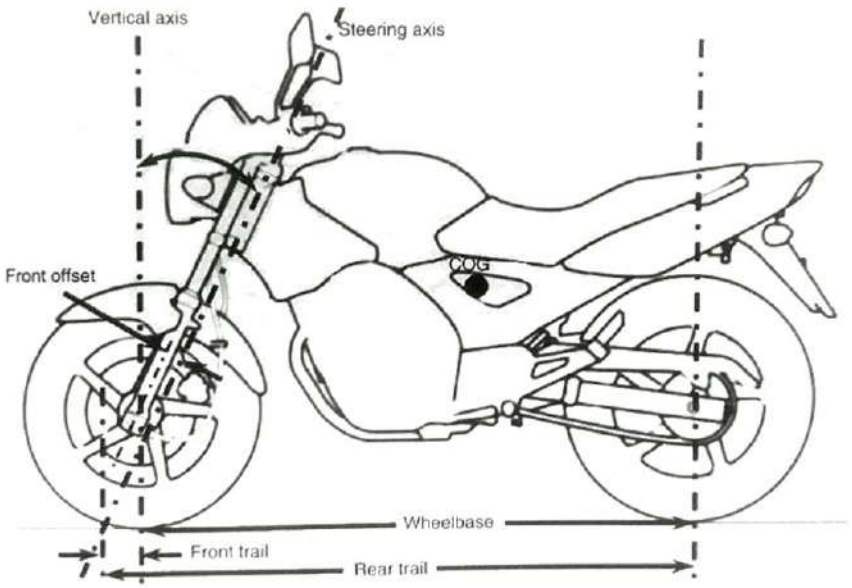


Figure 10.1 Steering Geometry

- **Trail** : It refers to the distance between the imaginary point where the steering axis intersects the ground and the centre of the tyre contact patch. The measured length between the imaginary point and the centre of front tyre contact patch is known as *front trail*. The distance between the imaginary point and the centre of rear tyre contact patch is known as *rear trail*.

Amount: Front trail-50 mm to 100, Rear trail-1300 mm to 1500 mm

- **Castor or Rack angle** : It is the angle provided between an imaginary centre line passing through the steering head and imaginary vertical line passing through the front wheel centre.

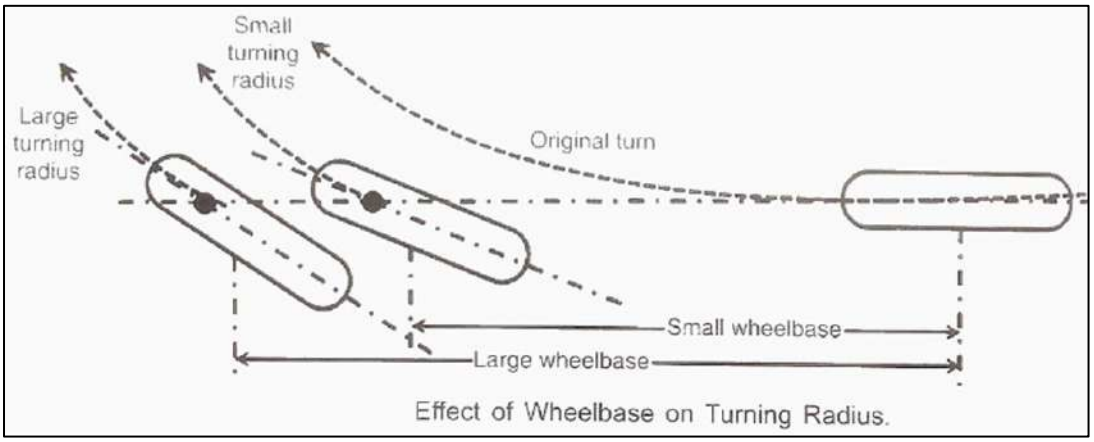
Amount: 15° to 30°.

- **Wheelbase** : The distance between the wheel centres, when measured parallel to ground, is known as wheelbase. Wheelbase affects handling and turning ability. Generally, longer wheelbase gives maximum directional stability.

Amount: 1100 mm to 1600 mm

EFFECTS OF WHEELBASE

Large wheelbase gives better directional stability and small load transfer while short wheelbase gives quick handling and maneuverability.



Effect of Wheelbase on Turning Radius.

The very first drawback of large wheelbase is **Large turning radius**. When vehicle takes turn, the vehicle with large wheelbase needs to be **turned more** while vehicle with short wheelbase can complete the same turn with small radius. Also, the driver has to steer the wheel more to complete the turn within the available radius.

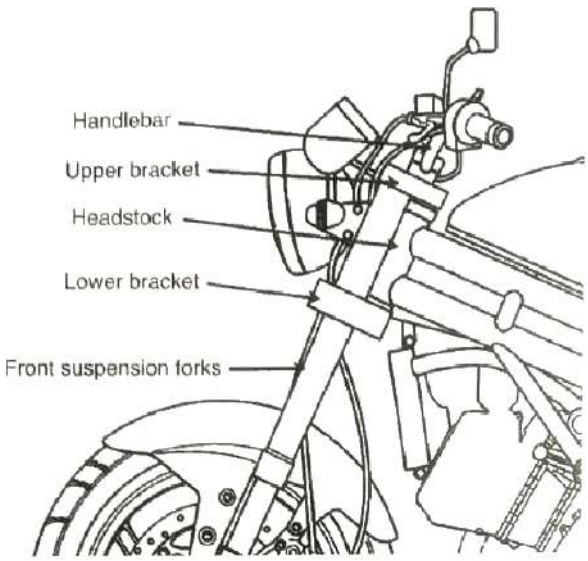
The corrective torque increases as the slip angle increases due to larger steering angle. Therefore, the **effort required to turn the vehicle also increases**.

The lateral displacement of the rear wheel is smaller in the case of large wheelbase. This small lateral movement of rear wheel gives **more directional stability**. Therefore longer wheelbase gives greater directional stability than short wheelbase.

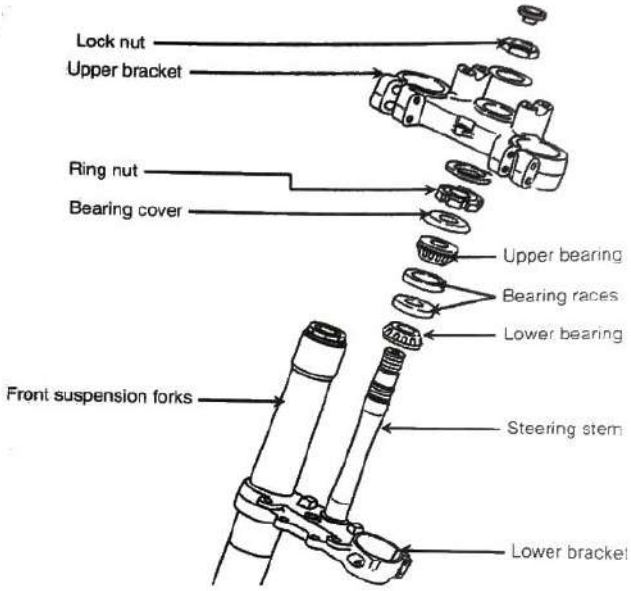
The long wheelbase also helps to **reduce the weight transfer during braking and acceleration**.

STEERING COLUMN CONSTRUCTION

In most two wheelers, the steering column is constructed by front suspension forks. These forks are mounted on the steering headstock, which is an integrated part of the frame. The forks and the head tube are connected through an arrangement called triple tree. Figure shows the components of steering column.

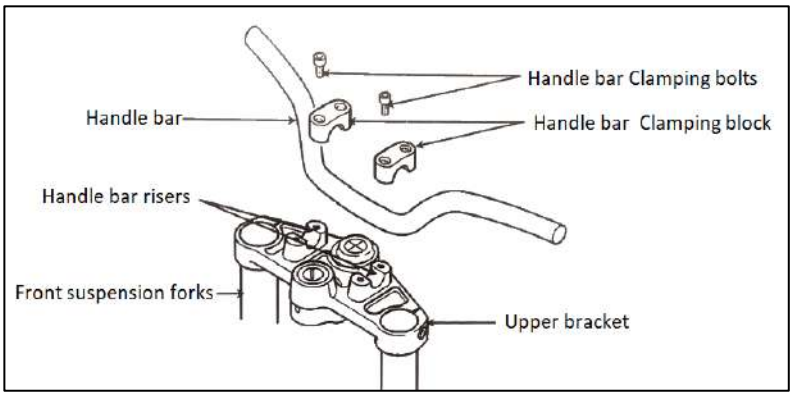


Components of steering column



The triple tree

The triple tree contains three components: ***Upper bracket, Steering Stem and Lower bracket.*** The front suspension forks are inserted through the lower bracket and bolted to the upper bracket. The upper bracket also known as handlebar crown as it contains raisers to assemble the handlebar. Sometimes, it also covers the steering lock mechanism. The steering stem is rigidly connected with the lower bracket. It forms a link which ties upper and lower bracket together. The steering stem is inserted through the headstock and locked with the upper bracket. Two bearings help to generate a free movement of the stem inside the head stock. Bearing race covers prevent entering of dust inside the headstock stem assembly

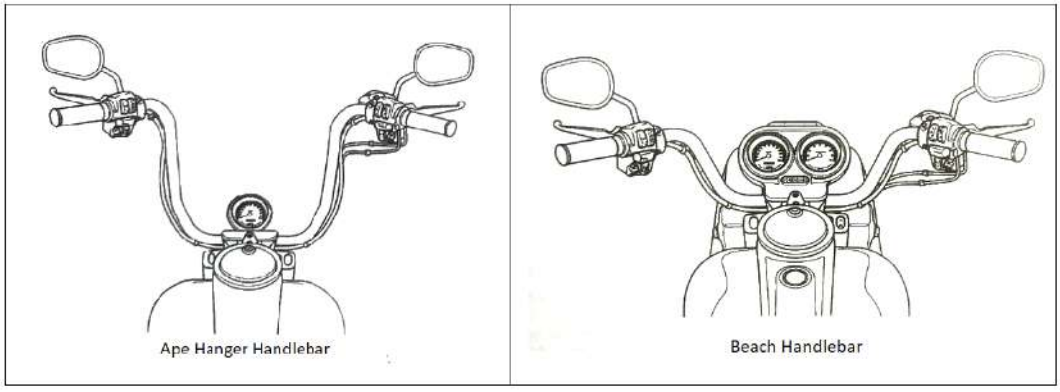


HANDLEBAR-TYPES

- ❖ Ape hanger Handlebars
- ❖ Beach Handlebars
- ❖ Drag Handlebars
- ❖ Clip-ons Handlebar

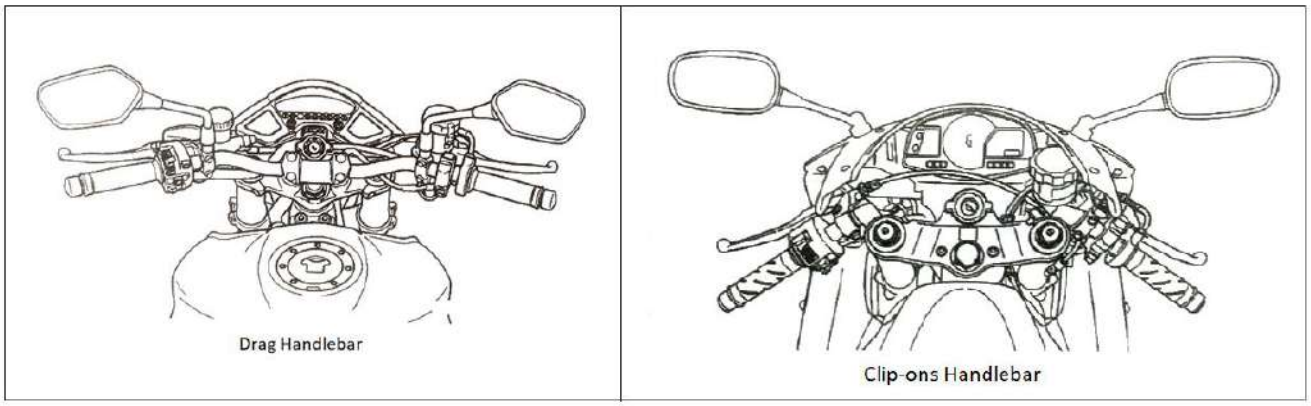
- **Ape hanger Handlebars:** Ape hanger handlebars are only for styling purpose, which are vertically raised far above from the upper bracket. They are mostly used on custom chopper motorcycles. The rider has to raise his hands towards front, which gives unsuitable riding posture for long distance travelling. The diameter of handlebar pipe is large enough to damp the vibration as well as to minimize the trail effects. Overall height of the ape hanger handlebar is larger than the other types. This height affects adversely and increases the rider's effort during turns, causes fatigue. Some handlebars can go up to the heights of 20 inches

- **Beach Handlebars:** This handlebar is first slightly raised and then bent backward. They are mostly used on cruiser motorcycles. The rider slightly leans backward which gives appropriate riding posture for long distance travelling. Overall width of the beach handlebar is larger than the other types of handlebars. This width is used to reduce the effort of rider during turning. The diameter of handlebar pipe is large enough to damp the vibration as well as to minimize the trail effects



- **Drag Handlebars:** Drag bars are nearly straight tubing. This arrangement creates a minor forward leaning for the rider which is helpful to achieve aerodynamic riding position. Forward leaning of rider helps to locate centre of gravity nearer to middle of vehicle. It also increases weight distribution towards front resulting as better load transfer during braking and acceleration. Smaller rack angle can be used with the drag bars which facilitates easy maneuvering through the streets

- **Clip-ons Handlebar:** These are widely used on sport bikes, in which two separate short handlebars are assembled directly to the front fork tubes instead of a single tube with risers. Generally, the upper bracket is locked with the steering stem after inserting the clip-ons on the front fork. Clip-ons generates more forward leaning for the rider which is helpful to achieve perfect aerodynamic riding position. Two separate handlebars give great flexibility in positioning the steering according to rider's ease. On the other side, steering damper would essentially require to damp the vibrations which are directly transmitted to the individual handlebars through the front forks



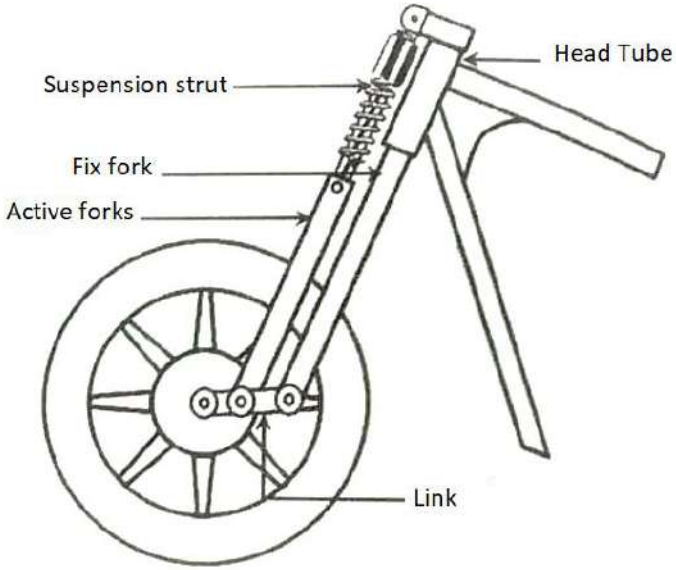
Function of suspension system

- It prevents the vehicle body and frame from road shocks
- It gives stability to the vehicle
- It safeguard the passengers and goods from road shocks
- It gives good road holding while cornering and braking
- It gives cushioning effect
- It provides comfort

SPRINGER FORKS SUSPENSION

This is the first generation of front suspension system of two wheelers. Here the rigid front suspension was altered to work with some flexibility in the upward direction. Springer forks also incorporated fixed forks. Conventionally, the fixed fork is assembled with the triple tree to provide steering. A link is pivoted on the other end of the fix fork. The front wheel is also mounted on the same link.

Suspension strut point of the active fork remains in-between wheel spindle and link pivot point to generate required leverage for operating the suspension. The active fork incorporates suspension strut on the upper side which is assembled with the upper bracket of triple tree. Generally, shock absorber is not used with springer forks as the allowed wheel travel is very small. The main drawback of springer forks is the increased weight. The higher inertia makes the steering system difficult to rotate

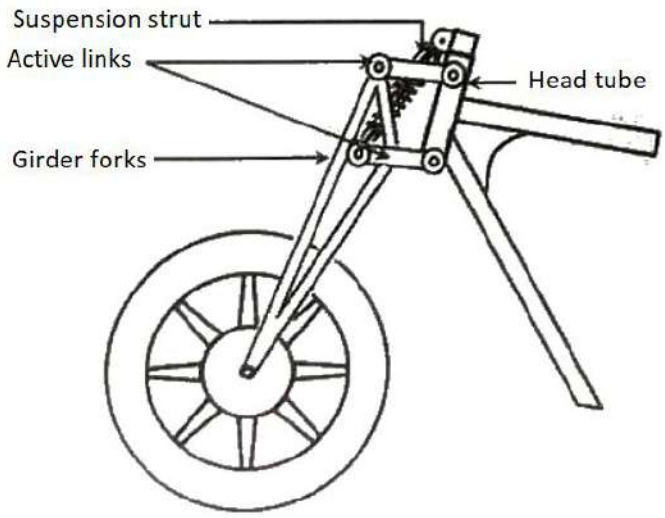


Springer forks

GIRDER FORKS SUSPENSION

This can be termed as second generation of front suspension system of two wheelers. They are known for better structural rigidity during dynamic condition. It has a rigid structure and it containing triangulation of steel tubes or steel bars. These are known as girders forks. Two active links are pivoted on the upper and lower brackets of the triple tree. These active links, on the other end, are pivoted on the girder. A suspension strut is mounted between girder and head tube. The road shocks are transmitted to the suspension strut through girders and active links restrict the motion of the girder. At the time of steering, the complete assembly containing

front wheel, girders, active links and suspension strut rotate with the triple tree. Very small amount of wheel travel limits the use of girder forks. Girder forks are not suitable where vehicle has to face huge wheel travel due to uneven road surface.



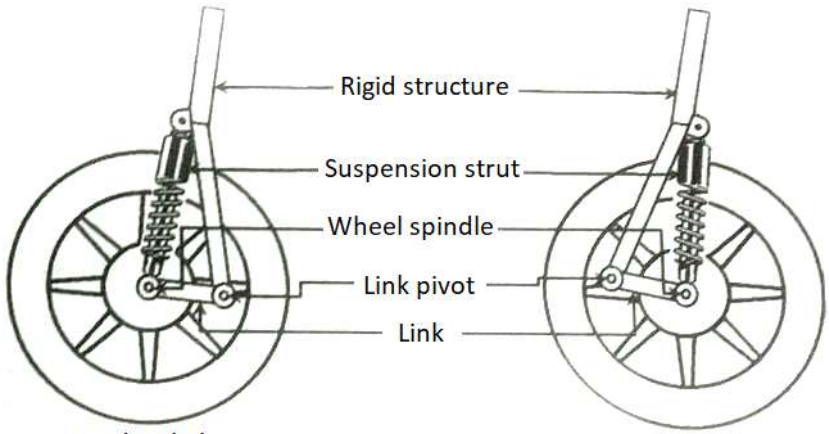
Girder Fork

TRAILING AND LEADING LINK SUSPENSION

These suspensions use a pivoted link which oscillates to generate suspension effect. The spring and shock absorber assembly is fitted between oscillating link and rigid tubular structure.

Leading link type suspension : The link pivot point is always remains behind the wheel spindle i.e. the wheel spindle always leads the link pivot.

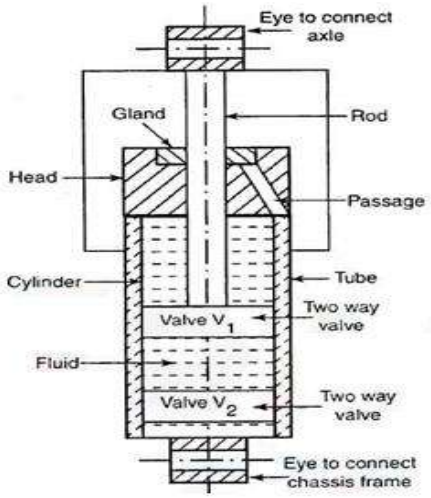
Trailing link type suspension : The link pivot point is always remains in front of the wheel spindle, i.e. the wheel spindle always trails the link pivot.



In both type of suspension, the tubular rigid steel structure is connected to the steering column. The link is pivoted on the other end. A suspension struts is connected in between rigid structure and pivoted link to form a triangle.

The wheel spindle moves in an arc with respect to the link pivot point. This in results generates huge difference in trail during bumps and potholes. Therefore these suspensions are generally not suitable for the large wheel movement like motorcycles. The COG of steering system is also located far from the steering axis which makes the steering bit hard to handle

TELESCOPIC SUSPENSION



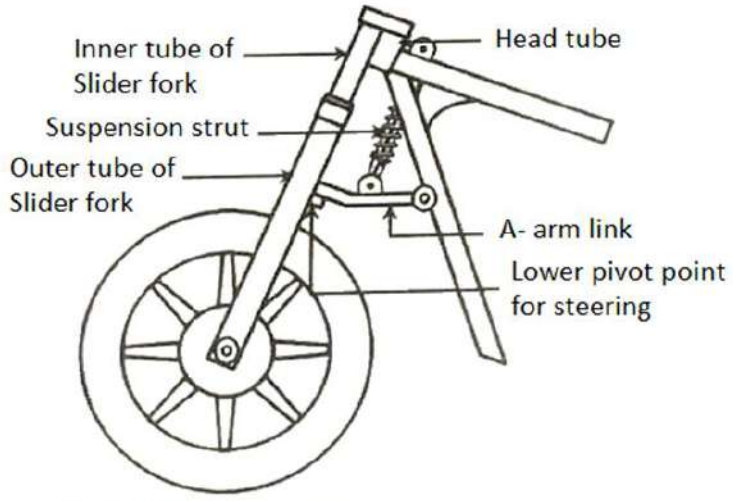
Telescopic shock absorber

In telescopic suspension, the damping action utilizes a series of orifices and valves through which oil is forced to pass. The other tube contains the oil seal, dust cover, bushes, drain plug and axle mounting eye.

When the vehicle comes across a bump, the lower eye will move up. So, the fluid follows from the lower side of the valve V1 to the upper side. Due to less volume of the space above valve V1 than the volume of the rod, the pressure is exerted on valve V2 Thus, the damping force is produced by this pressure of the fluid. The fluid will flow from the upper side of the valve V1 to the lower side when the lower eye moves down and from the lower side of the valve V2 to its upper side. When a car absorbs shocks from the road surface, the suspension springs will compress and expand because the spring has the characteristic of continuing to oscillate for a long time of oscillation to stop. So, a riding comfort will be poor even the damp oscillation is supplied. Shock absorbers provide better road-holding characteristics and improved steering stability to tires.

SINGLE LINK TYPE FRONT SUSPENSION

Single link type front suspension is used to avoid load transfer to the handlebar. This system increases the ride comfort.



Single Link type Front suspension

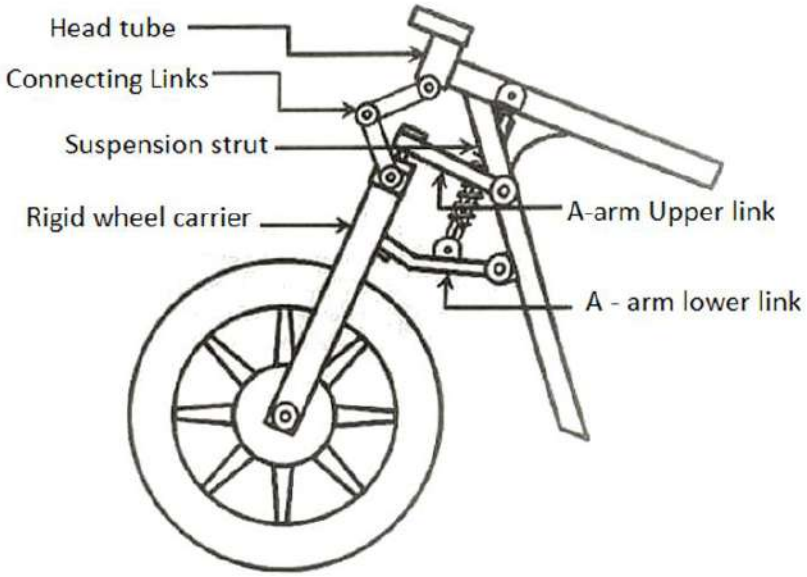
The fork have two struts with inner and outer tubes holds the front wheel stiffly. The inner tube slides inside the outer tube to ensure the required geometry. These forks are supported on the frame through the head tube which also forms the upper pivot point for the steering. A-arm type link is attached to the frame. It also supports the forks at lower pivot point of the steering. A centrally mounted suspension strut is responsible for suspension and damping effects.

Steering system pivoted at Two points, gives easy operation. Also, ball joint at the lower pivot point efficiently transmits all the loads to the A-arm link.

Benefits of this design with A-arm link is that it use small diameter tubes so lightweight steering system with better reactive performance. The superior road contact is assured by low unsprung masses and the quick reaction of the suspension system. The design of the single link type suspension efficiently decreases compression of forks under braking.

DOUBLE LINK TYPE FRONT SUSPENSION

The double link front suspension have the highest level of riding accuracy, high riding comfort, easy steering and directional stability. It is geometrically a double wishbone type suspension system.



Double Link type Front suspension

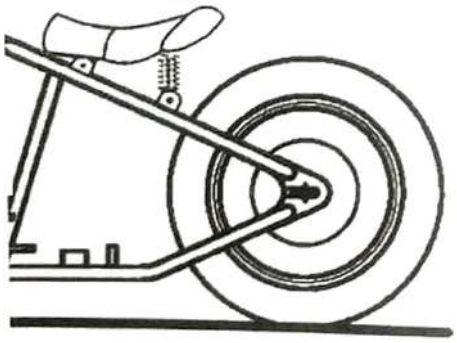
This system has highly rigid wheel carrier. The two A-arm links support the wheel carrier through ball joints. The single suspension strut is pivoted between the lower arm link and the frame. This suspension strut is responsible for the suspension and damping action. In double link suspension, the arm links and suspension strut are not steered. The set of connecting links from the handlebars to the wheel carrier transmits the steering movements. Therefore, the front suspension is completely independent of the steering system.

The advantage of this system is that various forces do not affect the front wheel. The rigid wheel carrier also avoids lateral and longitudinal twisting. The two A-arm links absorb various forces. Another benefit of double link suspension is the anti-dive characteristics. The proper geometrical design of the double link type suspension efficiently decreases the compression of central suspension strut under braking. This allows the rider to commute through the turns without losing the directional stability.

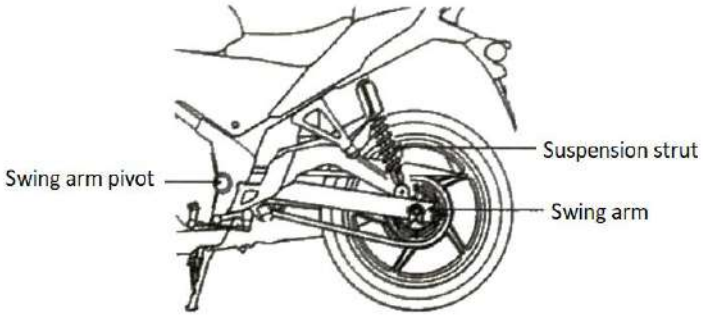
HARDTAIL TYPE REAR SUSPENSION

The hardtail suspension was characteristics of early two wheelers and still used on some cruisers and custom bikes. This suspension system depends on the dampening effect of rear tyre and the seat spring to absorb the road shocks. The hardtail suspension is popular for its simple construction and some unique characteristics.

The rear axle is mounted directly to the frame. The seat is also mounted on the frame through small compression springs. This results as lower ride height. Due to the lowered position of COG increases the balancing characteristic, the absence of a rear suspension makes it challenging to control. Even a small disturbance can lift the rear wheel from the road. Moreover, as the rear wheel lacks in holding the road properly, it would also have less traction on the road.



Hardtail Rear Suspension



Swing arm Suspension

SWING ARM TYPE REAR SUSPENSION

The swing arm type rear suspension is used almost universally today. it has a pivoted arm or fork. the one end of this arm is pivoted in the lower part of frame just behind the transmission. The other end mounts the rear wheel. The swing arm can be a single sided or dual sided. The suspension strut is fixed between the swing arm and the frame. The rear wheel is driven either by belt, chain or shaft drive. In addition to structural advantages, swing arm arrangement gives great freedom at the design stage The swing arm is either fabricated with circular and rectangular steel tubing or die-casted from alloys. Mainly, the swing arm incorporates various mountings and clamps for suspension strut, chain tensioner, brake caliper, brake pipes etc.

TRANSMISSION SYSTEM

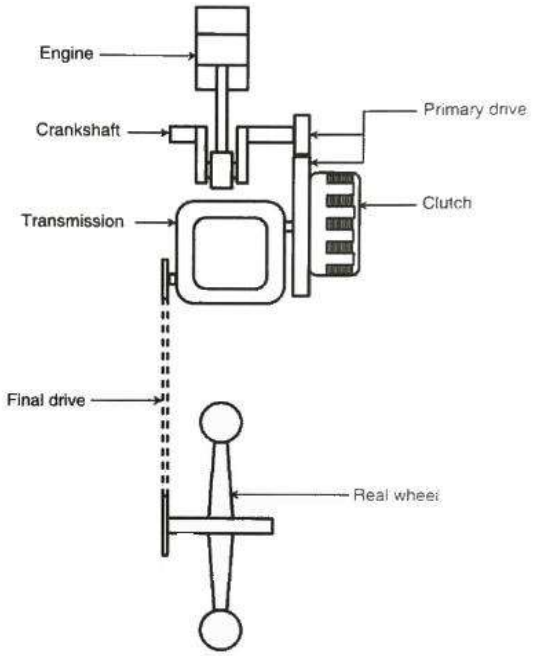
The transmission system transmits the power from engine crankshaft to driving wheels.

The main functions which are performed by the transmission system are

- The main function of transmission system is to vary the torque ratio between engine and driving wheels under different running conditions
- The transmission system helps to reduce high speed of engine to optimum speed at which vehicle can run safely.
- The transmission system also provides neutral position so that the engine can be disconnected from the driving wheels even with the clutch in the engaged position.
- The transmission system provides a flexible link to transmit torque and power to the rear driving wheel even under continuous fluctuation.

LAYOUT OF TRANSMISSION SYSTEM IN TWO WHEELERS

The transmission power train of any two wheeler fundamentally includes primary drive, clutch, transmission and final drive.

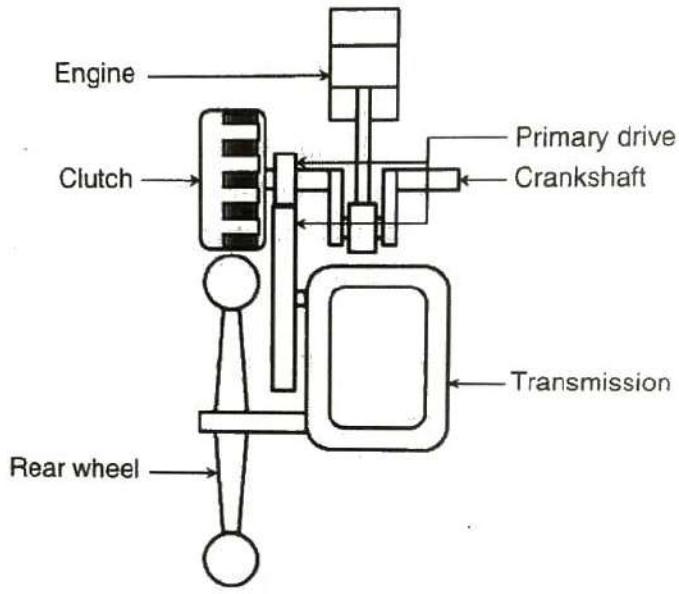


Layout of Transmission System for Motorcycle.

Figure shows layout of transmission system used in motorcycles. The engine crankshaft is connected to the clutch through primary drive. Primary drive helps in initial speed reduction. Various types of primary drive is used in two wheelers which includes belt drive, chain drive or gear drive. Clutch is used to disconnect the engine from the rear driving wheel as and when required. Fundamentally, two wheelers use either multiplate clutch or centrifugal clutch. The transmission, also known as gearbox, provide correct torque ratio as per the requirements. Basically, two wheeler can be equipped with either manual transmission or CVT. Generally, CVT is used in modern scooters while all motorcycles make use of manual transmission

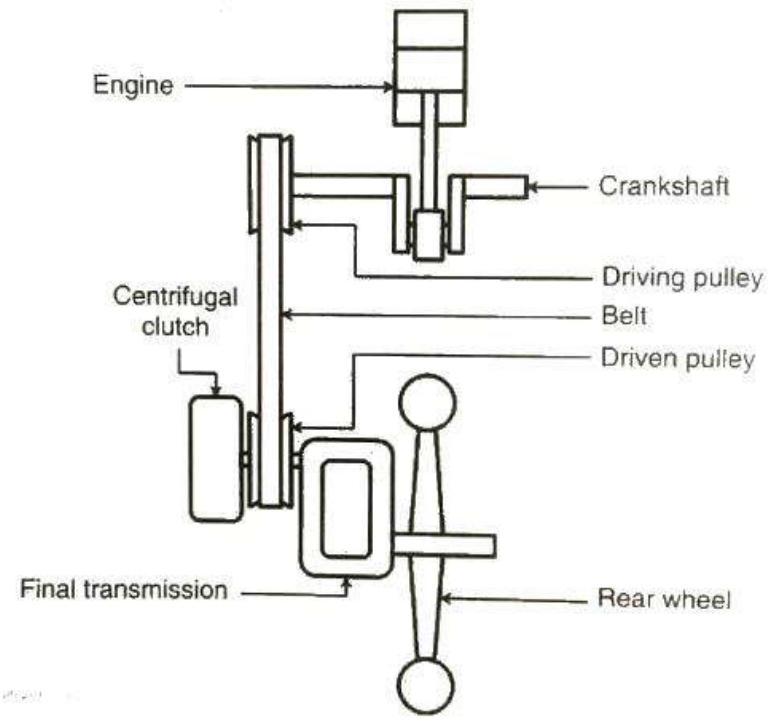
Layout of transmission for scooters with manual transmission

layout for scooters with manual transmission in which final drive is eliminated and output shaft of the gearbox is directly connected with rear driving wheel. The power to the primary drive is transmitted through clutch. Therefore, primary drive is also disconnected from the engine whenever the clutch is disengaged. All scooters with manual transmission use constant mesh gearbox. The same power train is used for cranking of the engine as explained in the previous chapter. Elimination of final drive makes the unit compact and becomes easy to accommodate within available space.



Layout of transmission for Scooter with manual transmission

Layout of transmission for scooters with CVT



Layout of Transmission for Scooter with CVT.

The crankshaft is connected to the driving pulley of CVT. The flexible metallic belt transmits the power to the driven pulley. Different torque ratio are achieved through varying diameters of both pulleys. The diameter of pulley is varied with the speed of engine crankshaft. The centrifugal clutch engages the CVT with final transmission due to centrifugal action. Two-speed automatic gearbox is used as a final drive to transmit required power and torque to the rear driving wheel.

PRIMARY REDUCTION

Some two-wheeler engines can work up to the speed of 15000 RPM. So it becomes necessary to reduce the speed before the power flow reaches to the gearbox. Therefore, speed reduction is provided between engine and clutch. Generally, the reduction ratio is kept 3:1, i.e. engine crankshaft runs three times faster than the clutch. Clutch is mounted adjacent to crankshaft to avoid transmission losses.

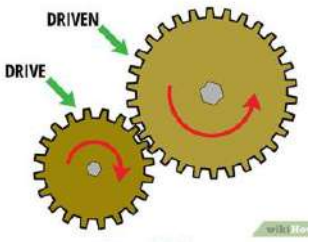
The pair which facilitates speed reduction between engine and clutch is known as primary reduction.

Following are some of the primary drive commonly used in two wheelers.

- Belt Drive
- Chain Drive
- Gear Drive

Belt Drive

Chain drive



Gear Drive

- **Belt Drive :** This system includes driving pulley, timing belt and driven pulley for power transmission. Timing belts have teeth on the contact side of the belt. These teeth match with the grooves provided on the driver and driven pulleys. Driver pulley is attached on crankshaft while driven pulley is mounted on clutch housing. Timing belts provide positive drive and can transmit high power. The major benefit from belt drive is that it does not require any lubrication and adjustment but the life of belt drive is very less. It requires frequent replacement due to wear of teeth or tearing of belt.

- **Chain drive :** The components of chain drive include driving sprocket, the chain, driven sprocket and chain tensioner. The drive sprocket is splined to the crankshaft.The driven sprocket is rigidly connected or integral part of the clutch housing As chain is made up of metal, it elongates with frequent use. Therefore, it becomes necessary to incorporate some device for setting tension in the chain. Generally, shoe or slipper plates are used between two sprockets to avoid chain slack The chain requires periodic lubrication, adjustment and cleanliness. Life of chain drive is much higher than the belt drive if maintained periodically.

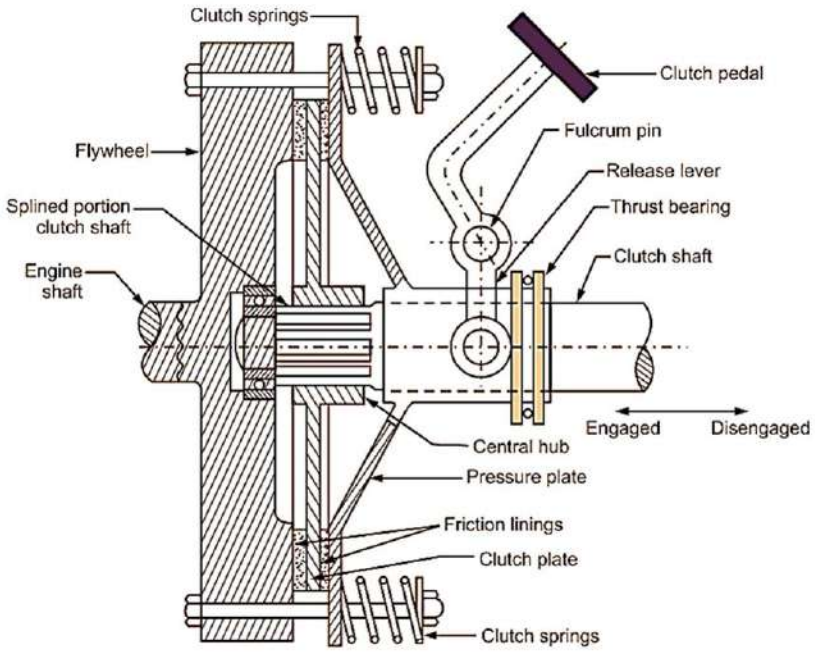
- **Gear Drive :** It consist of a set of gears. A small driver gear is splined to the engine crankshaft and larger driven gear is an integrated part of the clutch housing. The difference in size allows necessary speed reduction and allows crankshaft to rotate three times faster than the clutch. There are two types of gears used as primary gears: spur gears and helical gears. The spur gears are strong, efficient and cheap to manufacture while helical gears silent in operation but costly to manufacture. Gear drive does not require any adjustment but periodic lubrication helps to maintain efficient working of primary drive gears

CLUTCH

Function of Clutch:

- To engage and disengage the driver and driven shafts
- To disconnect or connect the engine from the rest of the transmission system without stopping the engine
- To disconnect the engine from the rest of the transmission system for engaging the first gear to start the vehicle from rest.
- To disconnect the engine from the rest of the transmission system for changing the gear ratio while vehicle is moving.
- To provide the drive without jerks at the time of starting the vehicle from rest position.
- To facilitate the gear shifting easily without noise and damage

SINGLE PLATE CLUTCH

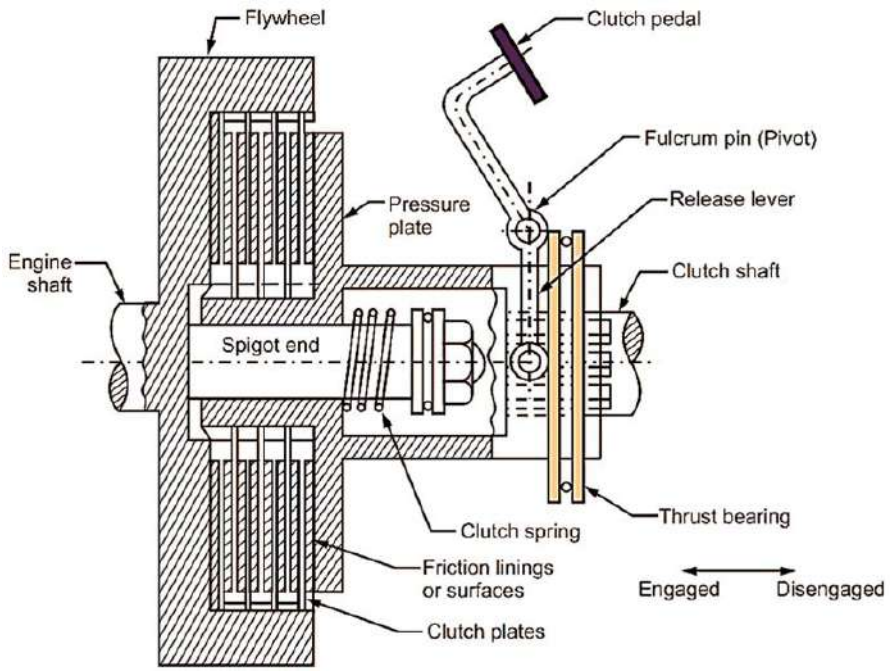


The flywheel is mounted on the driver shaft. The clutch plate having a splined hub is mounted on the one end of driven shaft having splines and free to slide axially on the driven shaft as well as rotates with driven shaft. The clutch plate has friction lining on its both sides. Two friction linings of special friction material are also riveted or bonded to flywheel and pressure plate. The presser plate is bushed internally so that it revolves freely on the driven shaft, the pressure plate is also free to slide axially. A number of springs are arranged around the clutch to exert the force on the pressure plate which presses the clutch plate firmly against the flywheel when the clutch is engaged. The clutch is engaged and power can be transferred from driver shaft to

driven shaft. If the operator presses the pedal, the pressure plate moves towards the left, thus the pressure on the clutch plate does not act. Now the power from the driver shaft is not transmitted to the driven shaft. When the foot is taken off the clutch pedal, it releases the pressure on the pressure plate and the spring causes the pressure plate to exert pressure on the clutch plate, thus the power transmission resumes.

MULTI-PLATE CLUTCH

In multi-plate clutch, the number of clutch plates having friction lining and the metal plates are increased, so number of friction surfaces are also increased. It increases capacity of the clutch to transmit torque. Alternatively, the overall diameter of the clutch is reduced for the same torque transmission as a single plate clutch. This type of clutch is, used in some heavy transport vehicles where high torque is to be transmitted. Also it is used in scooters and motorcycles, where space available is limited.

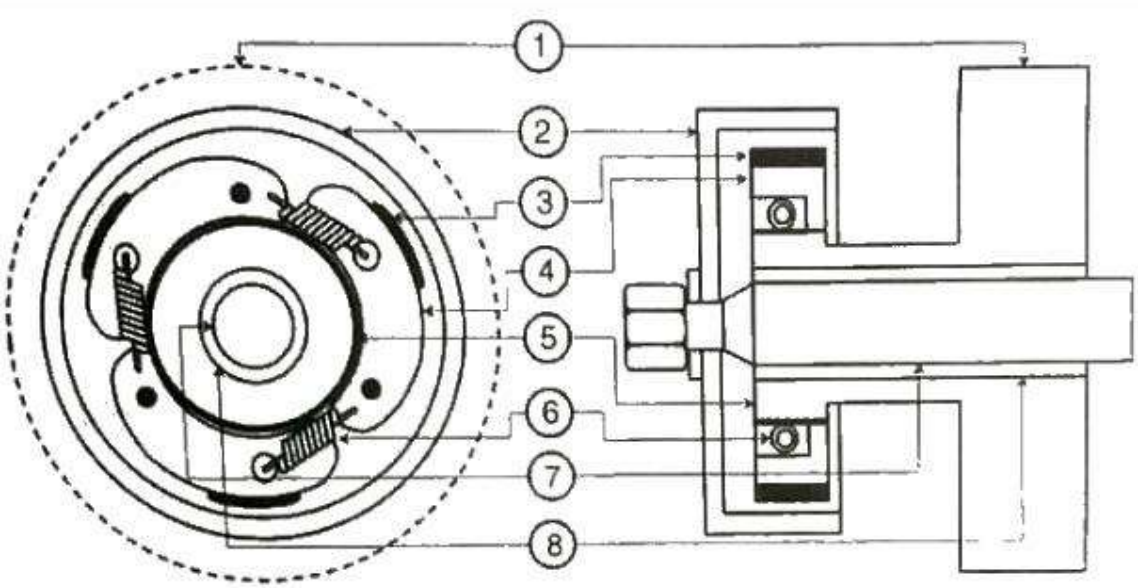


In engaged position the spring presses the sleeve towards left with a flange, it squeezes the clutch plates and metal discs or plates together so that friction between them transmits driving torque from the housing provided with the flywheel to sleeve and thus to the clutch shaft. If the operator pushes the clutch pedal, the sleeve along with the flange moves towards right against the spring force and pressure on the clutch plates and metal discs does not act, so there is no power transmission from engine crank shaft to clutch shaft.

CENTRIFUGAL CLUTCH

In the centrifugal type clutch, the centrifugal force is used to generate the axial force required for keeping the clutch in engaged position. Absence of friction plate, clutch plate and pressure plate makes this clutch assembly simple.

The advantage of the centrifugal clutch is that no clutch lever is required. The clutch is operated automatically depending upon the speed of the engine.



1. Transmission pulley
2. Clutch housing
3. Friction lining
4. Clutch mass
5. Driving plate
6. Clutch springs
7. Output shaft
8. Bearing

Centrifugal Clutch.

The **transmission pulley** is driven by the crankshaft through belt drive. This **driven pulley** is connected with the **driving plate** of the clutch.The transmission pulley and the driving plate are mounted on the **output shaft** of the clutch and can rotate freely with the help of bearing. This output shaft provides power to the final drive. The driving plate contains **three pivot points** for clutch masses, which are interconnected with the help of clutch springs. The clutch springs are tension springs which are used to retain position of the clutch masses. Clutch masses are lined with **friction material** on the outer periphery. The entire assembly is covered by the **clutch housing** which is bolted to the output shaft, so output shaft rotates as soon as the clutch housing rotates.

Working

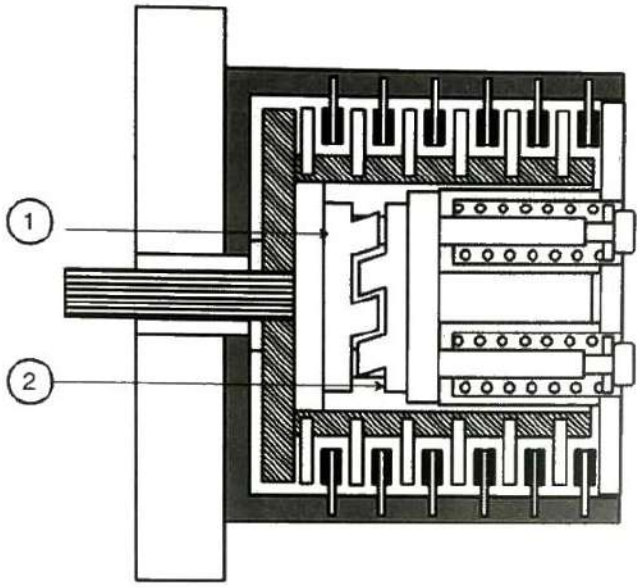
The centrifugal force on clutch mass increases with engine speed and overcomes the tension force of spring at designed value of RPM. As the engine speed reaches to designed value, the clutch masses glide outward due to increased centrifugal forces. The friction linings on the clutch masses are then rubbed on the inner face of clutch housing. Gradually friction increases between lining and the clutch housing and the clutch is engaged with final drive.

At idle speed of engine, clutch remains in disengaged position because the spring tension remains higher than the centrifugal force produced due to less speed. Proper ventilation on the clutch housing keeps the clutch at moderate temperature. Dry running of centrifugal clutch can damage the linings as well as the clutch housing

ASSIST SLIPPER CLUTCH

A slipper clutch is a specially designed multiplate clutch for high performance vehicles which helps to decrease the effort required to disengage the clutch from the engine. This partial disengagement takes place when riders decelerate through the corners.

Figure shows arrangements on slipper clutch.



1. Clutch boss cam 2. Pressure plate cam

Main components remain similar like normal multiplate clutch. It consists two additional components: **clutch boss cam** and **pressure plate cam**. Both cams are splined with the output shaft and rotate with it. The boss cam is fastened to the boss and rotates with it. The pressure

plate cam, however, can slide freely on the output shaft. It is also rotated due to positive engagement with the boss cam. During acceleration, both cams create positive engagement and turn together, provides drive to the whole drive line and acts as normal multiplate clutch. This action of clutch is denoted as assist clutching.

Under certain circumstances, like cornering, the rear wheel tries to drive the engine faster. This would normally makes a loss of traction in the rear wheel. The rear suspensions are also subjected to additional loading under this situation. Therefore, the slipper action is necessary to partially disengage the clutch.

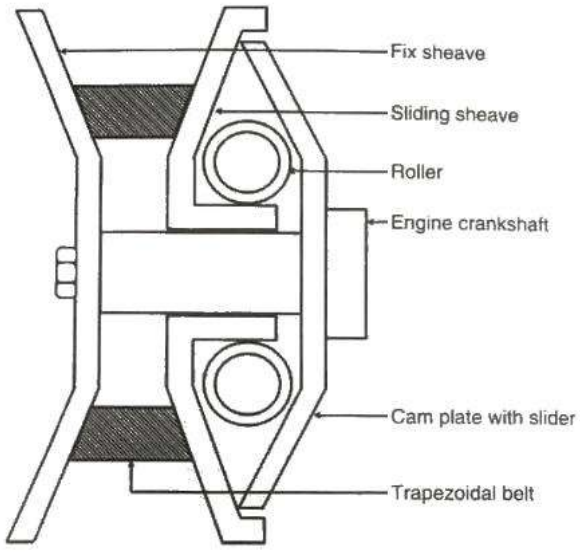
When drive comes back from the rear wheel, the output shaft and the boss try to rotate faster than the clutch housing. As a result, momentarily pauses the positive engagement between two cams. Hence the boss cam, forces the pressure plate cam to move outward and generate slip between mashing teeth. The outward movement of the pressure plate cam also forces the pressure plate outward. Consequently, springs are moderately compressed and clutch becomes partly disengaged. This action clutch is denoted as slipper clutching

CONTINUOUS VARIABLE TRANSMISSION { CVT }

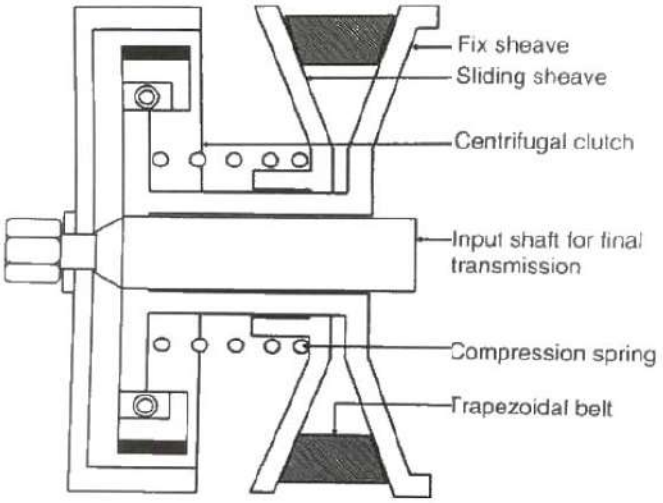
In CVT, various torque and power ratios are achieved through variable diameter pulleys.

The crankshaft rotates the driving pulley. The driving pulley is connected with the driven pulley through a metallic belt. The driven pulley drives the centrifugal clutch.

Figure shows construction of both pulleys. The arrangement is done in such a way that the diameter of pulley at which belt comes in contact increases with the engine speed.



Driving Pulley of CVT.



Driven Pulley of CVT.

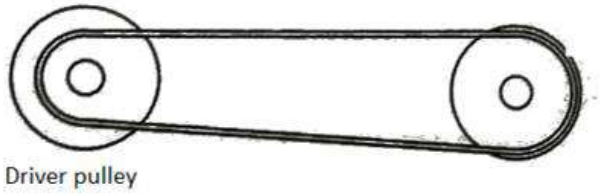
The pulley is separated into two sheaves. Stationary half is known as fix sheave and other half slides on the engine crankshaft knownas a sliding sheave. The sliding motion of sheave is controlled by the weight rollers.

As engine speed increases, the rollers move outward due to increased centrifugal force. Outward movement of rollers pushes the sliding sheave towards the fix sheave, as a result, distance between two sheaves decreases. Because of trapezoidal engagement, the belt smoothly slides outward between two sheaves and working diameter of driving pulley increases. The cam plate guides the outward and inward motion of the rollers.

The belt used in the CVT cannot elongate with the increased diameter of driver pulley. Therefore, to compensate the belt length, it is necessary to decrease the diameter of driven pulley. Consequently, opposite to driver pulley, the driven pulley diameter is reduced with increase in engine speed. The fix sheave of the driven pulley is rigidly connected with the driving plate of the centrifugal clutch. Thus, the centrifugal clutch and the fix sheave rotate with same speed.

Figure (1) shows the position of CVT at initial speed range of the engine. The small diameter at driver pulley and larger diameter at driven pulley provide necessary torque rise required to start the vehicle.

Figure (2) shows the position of CVT at higher speed range of the engine. The larger diameter at driver pulley and smaller diameter at the driven pulley helps to achieve maximum power transmission.



CVT in initial speed range of engine

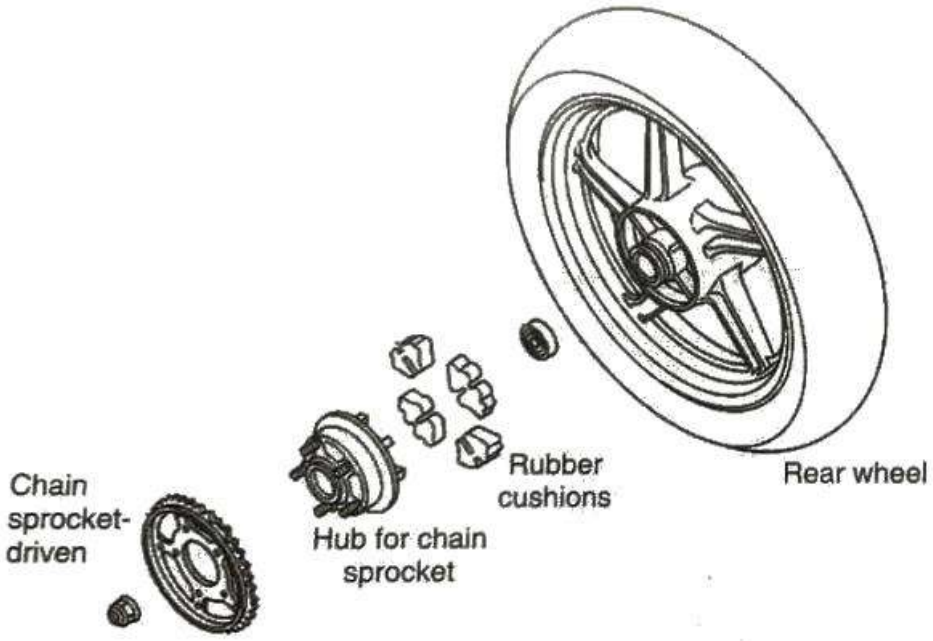
CVT in higher speed of engine

Therefore, CVT gives infinite number of gear ratios depending upon the diameters of the driver and the driven pulleys. Moreover, torque and power reduction take place instantly and continuously with varying engine speed. However, the maintenance cost of CVT is considerably high than a manual transmission. Moreover, operation of CVT is noisy due to constant sliding of pulleys and belt.

CUSH DRIVE

The cush drive is the final component of transmission system of any two wheeler. The rear sprocket sometimes bolts directly to the rear wheel, but in majority vehicles, it is bolted to a cushioning hub that helps to soften the load on the chain and sprockets. The cushioning hub takes the twisting load during sudden acceleration, braking and gear change. It helps to prevent damage to the metal components. Generally this device is simply two separate hubs with rubber bushing or cushions between them. One hub contains chain driven sprocket and other hub is rigidly connected the rear wheel. A rubber cushions are inserted between these two hubs to damp the sock loads. Rubber cushions are the parts of drive trains which are heavily subjected to wear and requiring repair. Sometimes, metallic springs are used as a cushioning device instead of rubber blocks.

Figure shows actual assembly of a cush drive.



Components of Cush Drive.