



DEPARTMENT OF AUTOMOBILE ENGINEERING,
GOVERNMENT POLYTECHNIC,
MANESAR, GURUGRAM, HARYANA, INDIA

TRACTOR AND SPECIAL PURPOSE VEHICLES



CHAPTER-1

TRACTOR

DEFINITION

The agricultural tractor is one of the class of mobile machines that involves the 'traction' process. The word 'traction' and name 'tractor' come from the word to 'draw' or 'pull' so a tractor is basically a machine for pulling; other mobile machines such as locomotives are in the same class. Vehicles like road trucks and even motor cars, which are essentially vehicles for carrying loads, also involve the traction process. The tractor is also in the class of machines that involves operation under what are known as 'off-road' conditions. Others in this class include machines used in earth moving, mining and military work, also four-wheel drive motor vehicles for cross - country operation.

Development of tractor

- The tractor evolved in the second half of the 19th century and first half of the 20th into its present, conventional, two wheel drive form and four wheel drive variation. This form owes much to history but also the fact that it is an inherently logical arrangement.
- Designers followed early tractor designs that were simply replacements for horses or other draught animals.
- (ii) The layout takes advantage of the transfer of weight to the main driving wheels at the rear, as the drawbar pull on the tractor increases.
- (iii) The layout is inherently stable in the horizontal plane because the implement commonly being pulled behind the tractor tends to follow the latter and to pull it into straight line operation.
- (iv) Rear mounted implements offer a minimum of offset loading and moment in the horizontal plane; this contrasts with, for example side mounted implements.

TRACTOR CLASSIFICATION

- Two-wheel drive
- Four-wheel drive
 - Front wheel assist
- Articulated tractors



TRACTORS Two wheel drive

- Front- wheel assist
- Four wheel drive (articulated)
- Tracked tractors

On the basis of purpose, wheeled tractor is classified into three groups:

General purpose tractor: It is used for major farm operations; such as ploughing, harrowing, sowing, harvesting and transporting work. Such tractors have (i) low ground clearance (ii) increased engine power (iii) good adhesion and (iv) wide tyres.

(b) Row crop tractor: It is used for crop cultivation. Such tractor is provided with replaceable driving wheels of different tread widths. It has high ground clearance to save damage of crops. Wide wheel track can be adjusted to suit inter row distance.

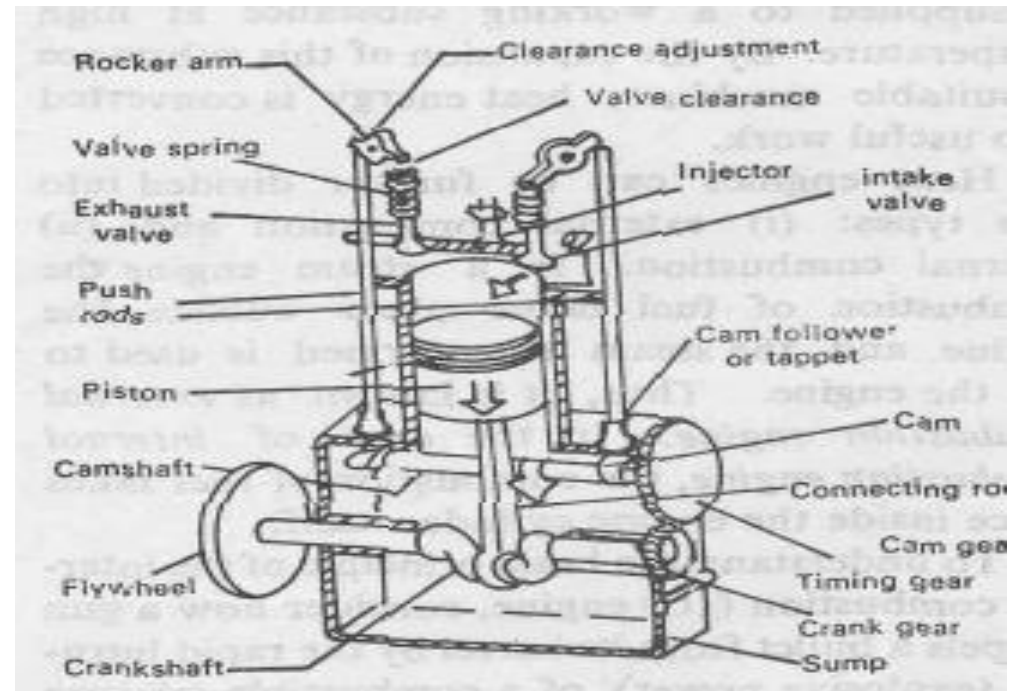
(c) Special purpose tractor: It is used for definite jobs like cotton fields, marshy land, hillsides, garden etc. Special designs are there for special purpose tractor.

Main tractor assemblies

- (1) I. C. engine, (2) Clutch (3) Transmission gears (4) Differential unit (5) Final drive (6) Rear wheels (7) Front wheels (8) Steering mechanism (9) Hydraulic control and hitch system (10) Brakes (11) Power take-off unit (12) Tractor pulley and (13) Control panel.

Types of engine used

- Every tractor is fitted with an I. C. engine, the engine may be carburettor type or diesel type but nowadays almost all the tractors are diesel engine tractors.



Trends in Tractor Design

Trends in Tractor Design

With all the developments in the last hundred years, most tractors today still look much like small steam traction engines. The growth, however in power and weight of tractors will probably not continue at the same rate as in the past. The reason for limiting the increase in size of future tractors is due to increase in soil compaction affecting soil conservation as well as plant growth. The future will see more sophisticated tractors with greater reliability, manoeuvrability, comfort, and safety. Gradual evolution in design is more likely than radical change. Currently, more number of speeds with faster highway towing speeds, comfort, safety, more information systems are being developed for tractors. The modern farm tractor has become a marvel of engineering with features that would be beyond the imaginations of early tractor designers. How could they have imagined a future operator sitting in an air conditioned cab, using an internet-connected computer to check crop prices while a GPS signal guided the tractor across the field. Further, the tractor has transformed agriculture.

SELECTION OF TRACTOR

- (1) Land holding: Under a single cropping pattern, it is normally recommended to consider 1 hp for every 1 hectares of land, In other words, one tractor of 20-25 hp is suitable for 20 hectares farm.
- (2) Cropping pattern: Generally less than 1.0 hectare/hp have been recommended where adequate irrigation facilities are available and more than one crop is taken. So a 30-35 hp tractor is suitable for 25 hectares farm.
- (3) Soil condition: A tractor with less wheel base, higher ground clearance and low overall weight may work successfully in lighter soil but it will not be able to give sufficient depth in black cotton soil.
- (4) Climatic condition: For very hot zone and desert area, air cooled engines are preferred over water-cooled engines. Similarly for higher altitude, air cooled engines are preferred because water is liable to be frozen at higher altitude.
- (5) Repairing facilities: It should be ensured that the tractor to be purchased has a dealer at near by place with all the technical skills for repair and maintenance of machine.
- (6) Running cost: Tractors with less specific fuel consumption should be preferred over others so that running cost may be less.
- (7) Initial cost and resale value: While keeping the resale value in mind, the initial cost should not be very high; otherwise higher amount of interest will have to be paid.

SOME TECHNICAL TERMS CONNECTED WITH TRACTORS

- Wheelbase:
- Wheel base is the horizontal distance between the front and rear wheels of a tractor, measured at the ground contact.
- Ground clearance:
- It is the height of the lowest point of the tractor from the ground surface, the tractor being loaded to its maximum permissible weight.
- Track:
- Track is the distance between the two wheels of the tractor on the same axle, measured at the point of ground contact.
- Turning space:
- It is the diameter of the smallest circle, described by the outermost point of the tractor, while moving at a speed, not exceeding 2 km/hr with the steering wheels in full lock.
- Cage wheel:
- It is a wheel or an attachment to a wheel with spaced cross bars for improving the traction of the tractor in a wet field. It is generally used in paddy fields.

Human factor in tractor design

- **HUMAN FACTORS IN TRACTOR DESIGN**

- The design of modern tractor includes following human factors consideration:
 - Riding comfort
 - Visibility
 - Location and arrangement of controls
 - Ease of operating controls
 - Design for thermal control, and
 - Sound Control
- These factors when properly incorporated in design, allow the operator to perform many complex with
 - Efficiency
 - Safety, and
 - Minimum of fatigue
 - **Operator Exposure to Environmental factors**
- Tractors are used under varied geographical and climatological conditions. Environmental factors to which operator is directly exposed are
 - Temperature
 - Humidity
 - Wind
 - Thermal radiation
 - Dust, and
 - Chemical
- Design of a suitable enclosure for the tractor operator minimizes the effects of above factors. Table 1 defines comfort and bearable zones for humans.

Applications of tractors

- The most common use of the term "tractor" is for the vehicles used on farms. The farm tractor is used for pulling or pushing agricultural machinery or trailers, for plowing ,tilling, disking, harrowing, planting, and similar tasks.
- A farm tractor used to power a pump for irrigating a plot of land
- A variety of specialty farm tractors have been developed for particular uses. These include "row crop" tractors with adjustable tread width to allow the tractor to pass down rows of corn, tomatoes or other crops without crushing the plants, "wheatland" or "standard" tractors with fixed wheels and a lower center of gravity for plowing and other heavy field work for broadcast crops, and "high crop" tractors with adjustable tread and increased ground clearance, often used in the cultivation of cotton and other high-growing row crop plant operations, and "utility tractors", typically smaller tractors with a low center of gravity and short turning radius, used for general purposes around the farmstead. Many utility tractors are used for nonfarm grading, landscape maintenance and excavation purposes, particularly with loaders, backhoes, pallet forks and similar devices. Small garden or lawn tractors designed for suburban and semirural gardening and landscape maintenance also exist in a variety of configurations.
- A tractor with a chaser bin
- Some farm-type tractors are found elsewhere than on farms: with large universities' gardening departments, in public parks, or for highway workman use with blowtorch cylinders strapped to the sides and a pneumatic drill air compressor permanently fastened over the power take-off. These are often fitted with grass (turf) tyres which are less damaging to soft surfaces than agricultural tires.

CHAPTER-2

TRACTOR CHASSIS

- *INTRODUCTION
- *TRACTOR CHASSIS
- *HYDRAULIC SYSTEM
- *BRAKING SYSTEM
- *SUSPENSION SYSTEM
- *MAINTAINANCE OF TRACTOR

TRACTOR CHASSIS

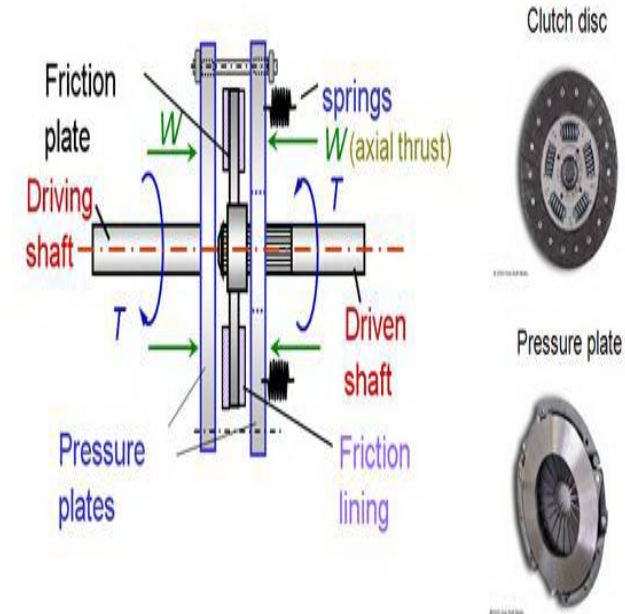
A **tractor** is an engineering vehicle specifically designed to deliver at a high traction (or torque) at slow speeds, for the purposes of hauling a trailer or machinery used in agriculture or construction. Most commonly, the term is used to describe a farm vehicle that provides the power and traction to mechanize agricultural tasks, especially (and originally) tillage, but nowadays a great variety of tasks. Agricultural implements may be towed behind or mounted on the tractor, and the tractor may also provide a source of power if the implement is mechanised.

TRACTOR CHASSIS

- **What is Tractor Chassis**
- Definition:
- Chassis is called the base or frame of a tractor.
- Types of Tractor Chassis Frames
- Chassisless Tractor
- Tractor having Chassis Frame.

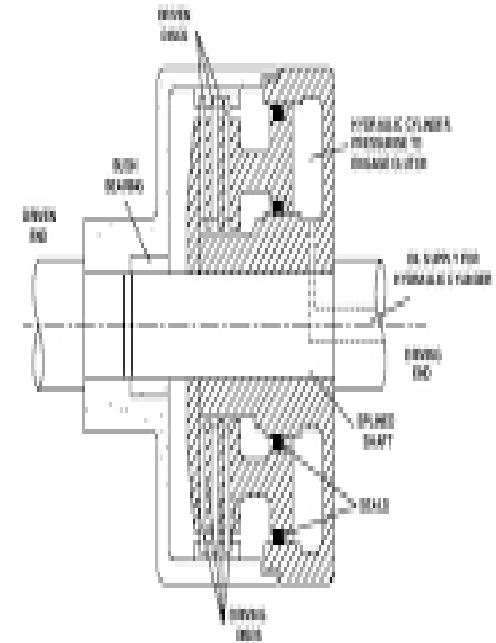
Types of clutch used in tractors

- Tractor Clutch types:
- Its task is to create a releasable connection between the engine crankshaft and the other parts of the power transmission unit.
- Single-plate Friction Clutch:
- The friction clutch creates a connection between the crankshaft and the drive shaft of the clutch and the cog-wheel of the gears with one clutch disc or with two in the case of larger engines. Its connected components are the flywheel which is ulinked to the crankshaft, the axially movable pressure plate and the friction plate between them, which is made of a thin steel disc. There is a ring shaped friction lining riveted and glued on both sides of the latter which is made of a friction increasing, heat resistant material. The pressure plate that rotates together with the flywheel and the friction plate situated between them are pushed together by compression springs. At their other end, the springs are supported by the clutch case. These compressions exert the pressure force required for shifting.
- **Figure Shown The Single-plate Friction Clutch**



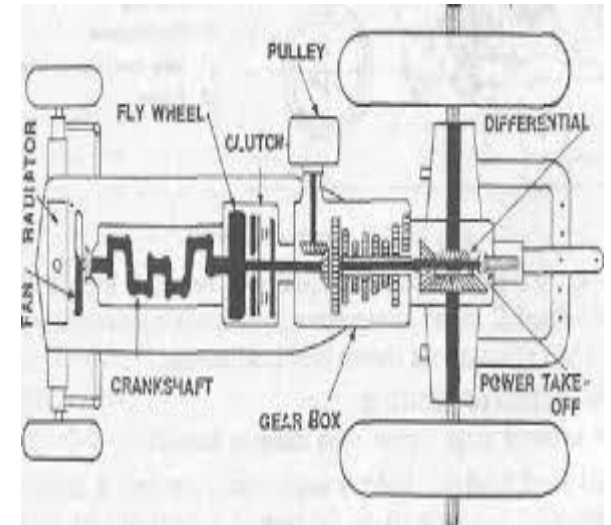
- Double-plate Friction Clutch: (Dual Clutch)
 - Front plate: driven shaft differential
 - Rear plate: PTO shaft
- Multiple plate clutches
- The hydrodynamic clutch:
 - Operates automatically, therefore it provides a smooth start. It transmits a small torque at small rpm after start; but it is capable of providing significant torque at high rpm. Its efficiency at low rpm is poor, but it improves with the increase of speed.
- Centrifugal clutch:
 - It is used in garden tractors. With the increase of revolutions per minute the flyweights – beating spring force – are pressed against the inner wall of the drum transmitting the torque of the engine.

Multiple disc clutch



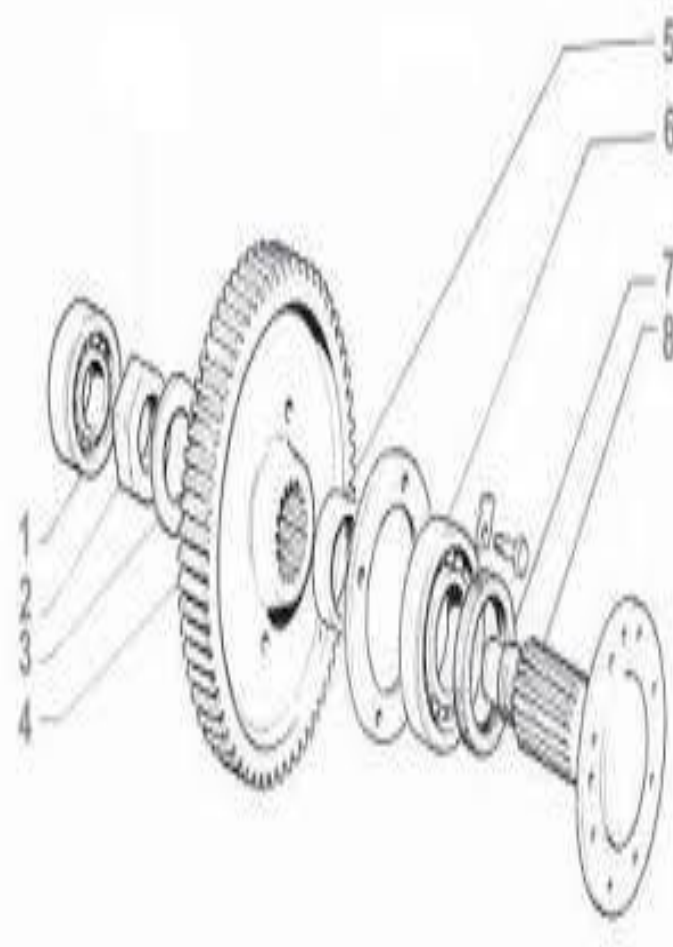
Transmission system

Transmission is a speed reducing mechanism, equipped with several gears (Fig.). It may be called a sequence of gears and shafts, through which the engine power is transmitted to the tractor wheels. The system consists of various devices that cause forward and backward movement of tractor to suit different field condition. The complete path of power from the engine to the wheels is called power train.



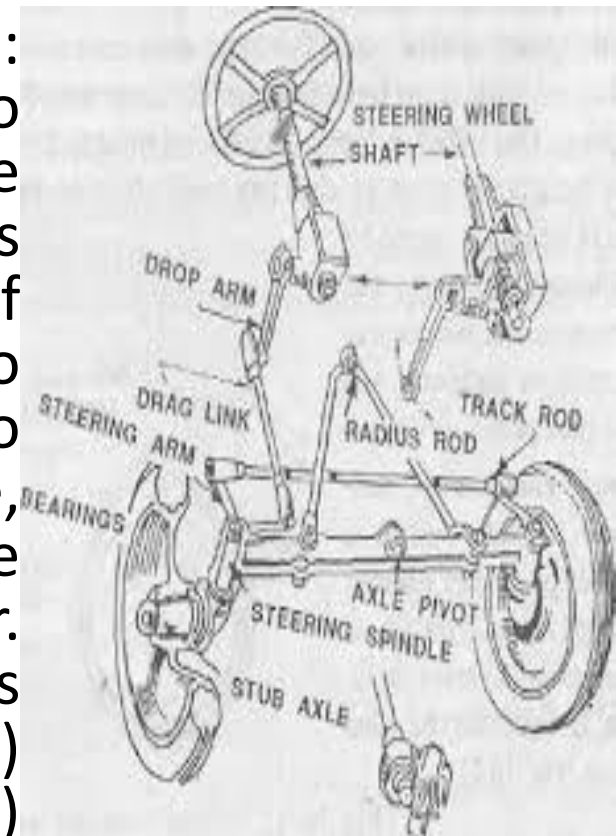
Finaldrive

Final drive is a gear reduction unit in the power trains between the differential and the drive wheels. Final drive transmits the power finally to the rear axle and the wheels. The tractor rear wheels are not directly attached to the half shafts but the drive is taken through a pair of spur gears. Each half shaft terminates in a small gear, which meshes with a large gear called bull gear. The bull gear is mounted on the shaft, carrying the tractor rear wheel. The device for final speed reduction, suitable for tractor rear wheels is known as final drive mechanism.



transmission system buyout

- Function of power transmission system:
(i) to transmit power from the engine to the rear wheels of the tractor, (ii) to make reduced speed available, to rear wheels of the tractor, (ii) to alter the ratio of wheel speed and engine speed in order to suit the field conditions and (iv) to transmit power through right angle drive, because the crankshaft and rear axle are normally at right angles to each other. The power transmission system consists of: (a) Clutch (b) Transmission gears (c) Differential (d) Final drive (e) Rear axle (f) Rear wheels. Combination of all these components is responsible for transmission of power.

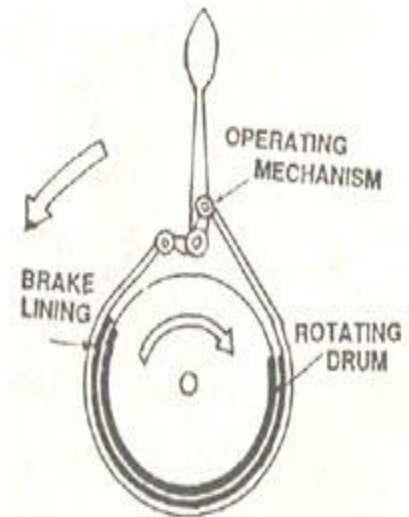


Classification of brake

- **Classification of brake:** Brake can be classified as:
 - (1) Mechanical brake and
 - (2) Hydraulic brake.
- Mechanical brake can be:
 - (a) Internal expanding shoe type
 - (b) External contracting shoe type and
 - (c) Disc type.

Tractor brake system

- Brake is used to stop or slow down the motion of a tractor. It is mounted on the driving axle and operated by two independent pedals. Each pedal can be operated independently to assist the turning of tractor during the fieldwork or locked together by means of a lock.
- **Principle of operation:** Brake works on the principle of friction. When a moving element is brought into contact with a stationary element, the motion of the moving element is affected. This is due to frictional force, which acts in opposite direction of the motion and converts the kinetic energy into heat energy.



Operator seat design in tractor

- 1. Safety, comfort and convenience of the operator.
- 2. Location and construction of the operator's work place.
- 3. The work place should be located on the machine so that visibility in the driving position is good without requiring the operator to work in an awkward, tiring position.
- 4. The operator should be able to change his working position easily.
- 5. Levers, pedals and instruments should be conveniently and logically located.
- 6. The work place should fit both tall and short operators.
- 7. The work area should be free of sharp edges and obstruction such as transmission cases.



CHAPTER-3.

Supplementary System

- take off shaft, draw bar working, double clutch system traction control unit, belt pulley three point linkages

power take-off shaft

- A **power take-off** or **power takeoff (PTO)** is any of several methods for taking power from a power source, such as a running engine, and transmitting it to an application such as an attached implement or separate machines.
- Most commonly, it is a splined drive shaft installed on a tractor or truck allowing implements with mating fittings to be powered directly by the engine.



PTO safety

The PTO and its associated shafts and universal joints are a common cause of incidents and injury in farming and industry.

The first industry standard for PTO design was adopted by ASAE (the American Society of Agricultural Engineers)in April 1927. The PTO rotational speed was specified as 536 ± 10 rpm; the direction was clockwise. The speed was later changed to 540 rpm.[[]



Draw bar working in tractor

A **drawbar** is a solid [coupling](#) between a hauling vehicle and its hauled load. Drawbars are in common use with tractor, rail transport, road trailers, both large and small, industrial and recreational, and with agricultural equipment.



double clutch system traction control unit

- A **dual-clutch system (DCT)** (sometimes referred to as a **twin-clutch transmission** or **double-clutch transmission**) is a automated automotive transmission, closely related to a manual transmission. It uses two separate clutches for odd and even gear sets. It can fundamentally be described as two separate manual transmissions with their respective clutches contained within one housing, and working as one unit.
- A two-stage clutch allows the PTO to engage and turn the output shaft before the wheels move. The first half of the clutch pedal travel is dedicated to the PTO clutch, the last half operates the wheel drive clutch.

You can check to see if the tractor has a two-stage clutch by watching the engaged PTO stub shaft as you let the clutch pedal out. If it begins to turn well before the tractor itself moves, you have a two-stage clutch.

Three point linkagesbelt pulley

Key components and measurements on a three-point hitch

1 Upper Link 2 Lower Links 3 Upper Link Hitch Point, ULHP 4 Lower Link Hitch Points, LLHP 5 Upper Link Point, ULP 6 Lower Link Points, LLP 7 Upper Hitch Attachment 8 Lower Hitch Attachment 9 Upper Link Attachment 10 Linch Pin 11 Lift Rods 12 Mast 13 Mast Height 14 Mast Height 15 Leveling adjustment 16 Lower Hitch Point Span 17 Linch Pin Distance 18 Movement Range 19 Transport Height 20 Lower Hitch Point Clearance



Components

Drawbar Cage (1):

The drawbar cage mounts the crossbar which gives extra support to the drawbar in accordance with



CHAPTER-4-WHEEL AND TYRES

Tractor Wheels and Tyres (06 hrs)

Salient features of wheels, tyres, and wheel base/wheel tracks. Specifications of wheels and tyres, dual versus tendum tyres, tread design, effect of tyre inflation.

differential lock

CHAPTER-4-Introduction

- Features of tyre
- Features of wheel
- Features wheel base/ wheel track
- Specification of wheel and tyre
- Tread design
- Differential lock

Feature of tyre



- Tyre should not skid or slip on the road surface.
- Tyre should be able to carry the vehicle load.
- Tyre should be balanced dynamically and as well as statically.

Feature of wheel

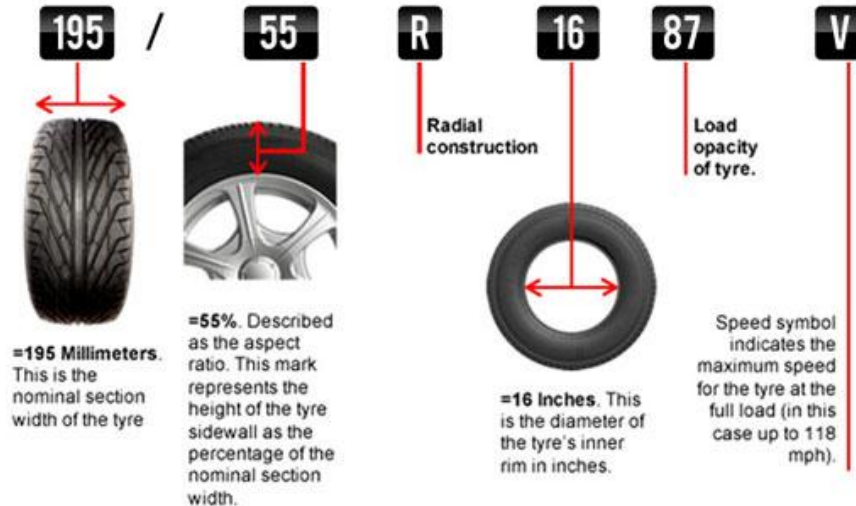


- The wheel strong enough to withstand the weight of the vehicle.
- Flexible to absorb the road shocks.
- Able to grip the road surface.
- Light and easily remarkable.

Feature of wheel base / wheel track

- Wheel base should be better flotation.
- Wheel base should be smoother ride on rough field.
- More stability on hillside and able to maintain traction.
- Easier implement hook up.

Specification of tyre



Specifications of wheel

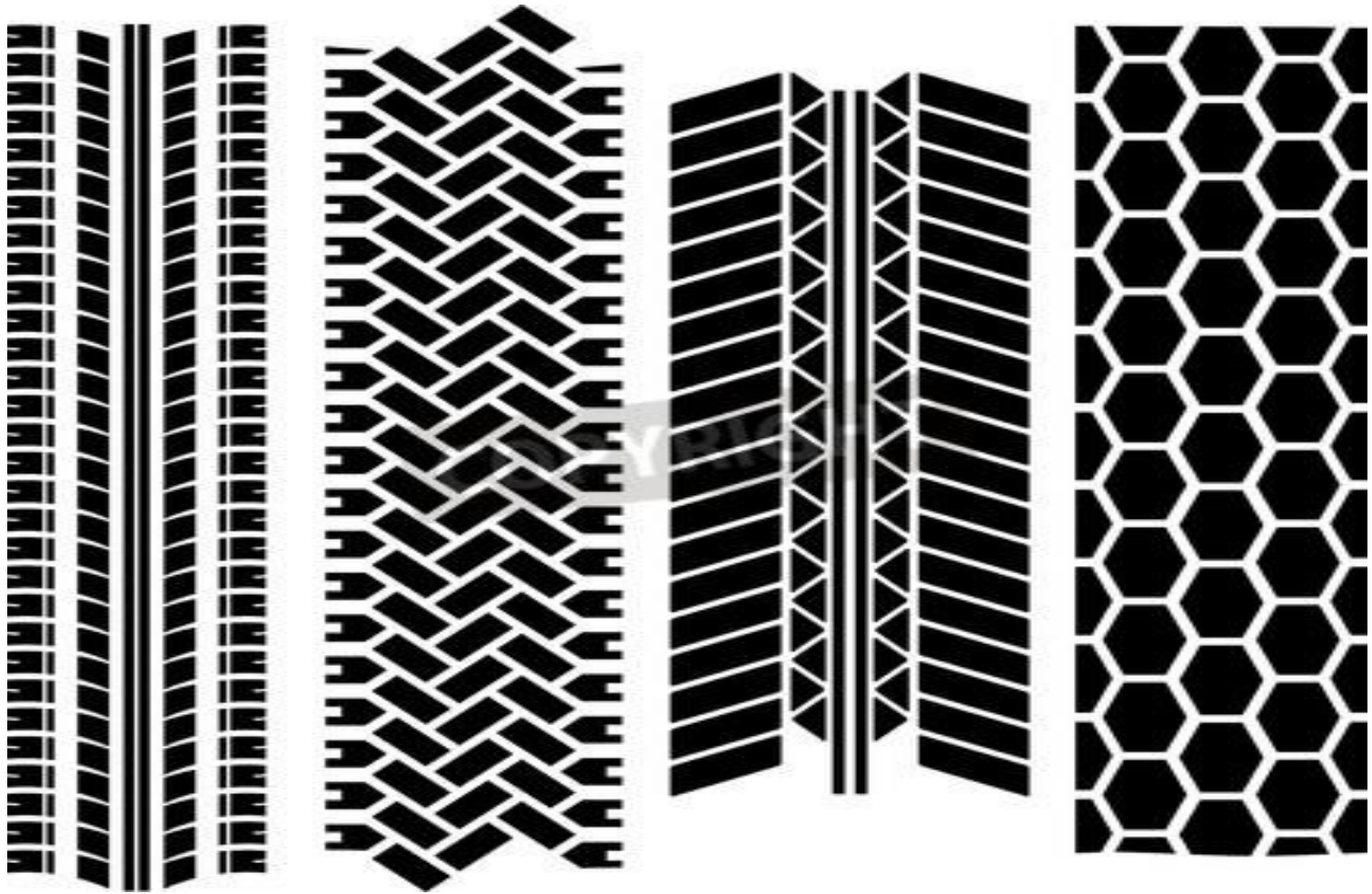
- Wheel side : 15x6
- PCD : 4x100/108.5x100/114.3
- Off Set : 32

effect of tyre inflation in tractor

UNDER-INFLATED
SIDES WEAR



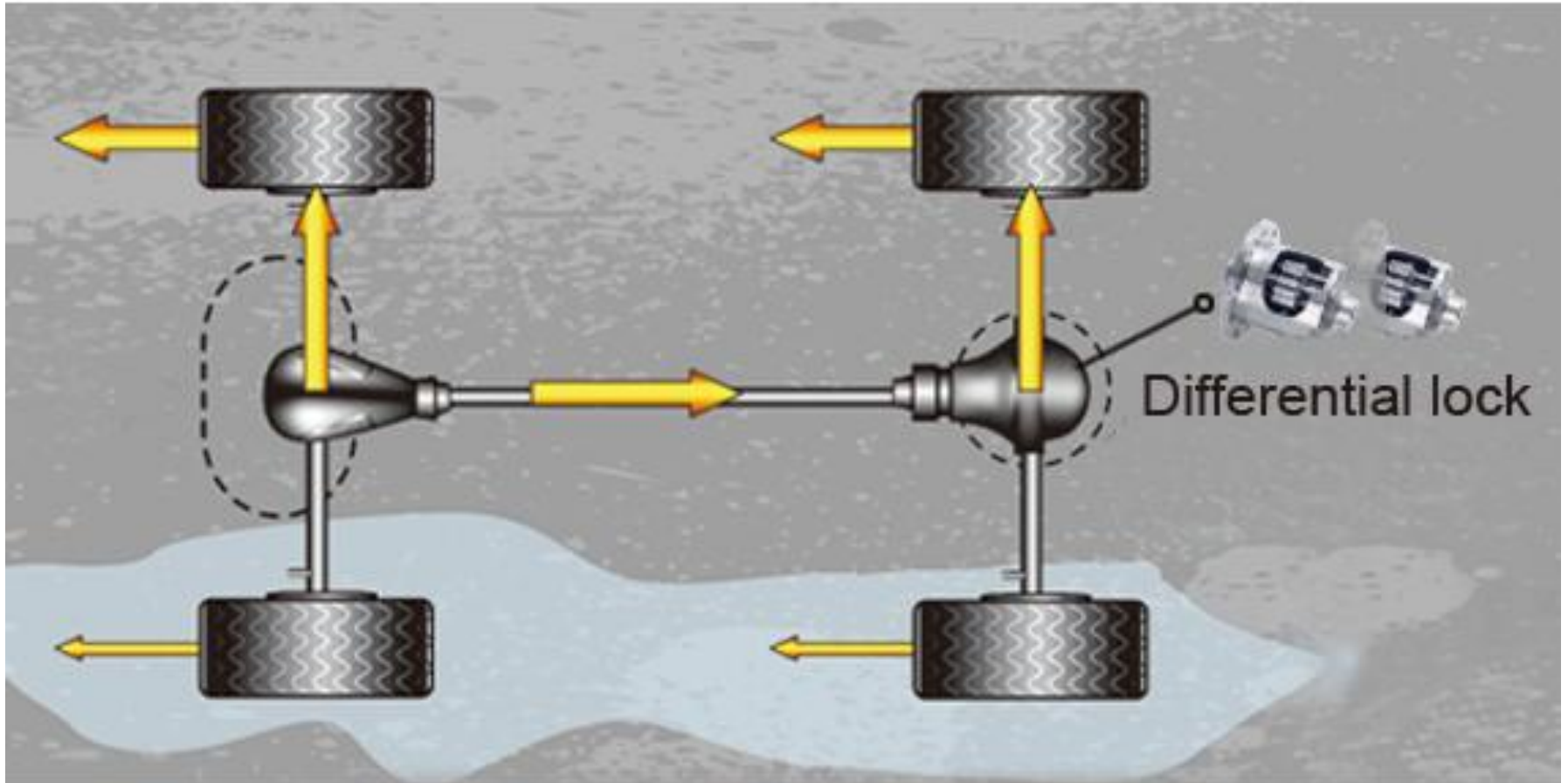
Tread design



Differential lock

- A **locking differential, differential lock, diff lock** or **locker** is a variation on the standard automotive **Differential**. A locking differential may provide increased traction compared to a standard, or "open" differential by restricting each of the two wheels on an axle to the same rotational speed without regard to available traction or differences in resistance seen at each wheel.

Differential lock



CHAPTER-5-Hydraulic system

- Functions of hydraulic system, hydraulic system layout, various components of hydraulic system and their functions. Methods of attaching implements, various control systems – depth control, position control, draft control, combination control. Working of hydraulic control levers, other uses of hydraulic control system



The term **hydraulics** is

Hydor+aulos

Hydor –means water

Aulos- pipe

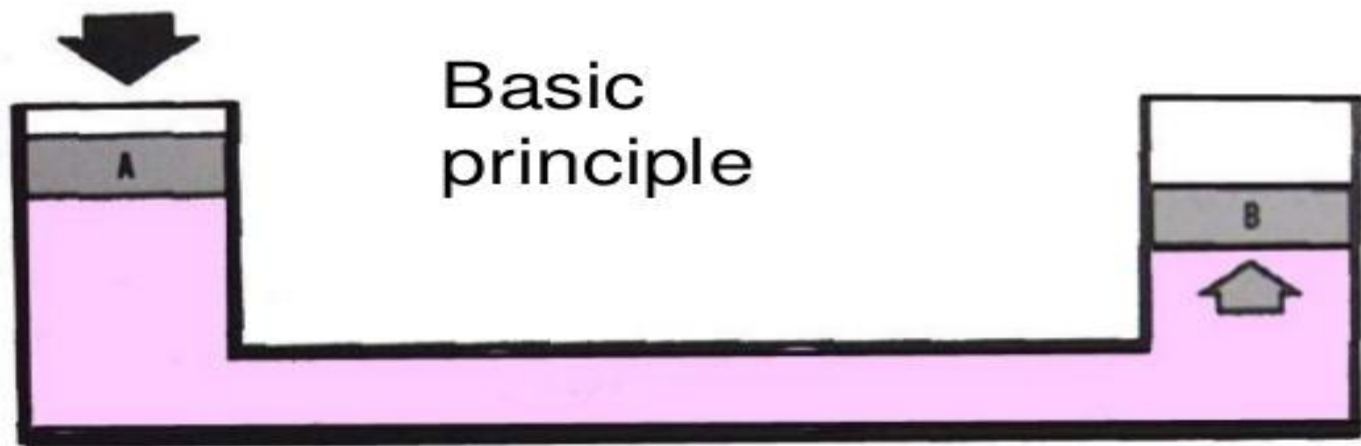
Necessity of hydraulics:

1.To lift or load the implement

2.To set the draft at the time of tillage operations

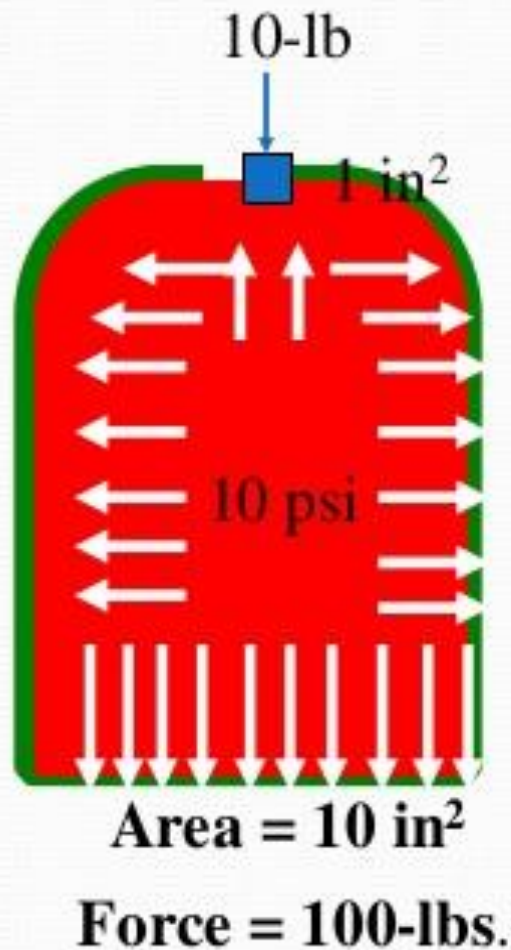
Pascal's Law

Pressure exerted at any point on a confined liquid is transmitted undiminished in all directions.



Pressure applied to piston "A" is transferred equally to a piston of the same size "B" because PSI is the same throughout the system.

Pascal's Law



- Pressure applied to a confined fluid is:
 - transmitted undiminished in all directions,
 - acts with equal force on equal areas, and
 - acts at a right angle to the walls of the container.

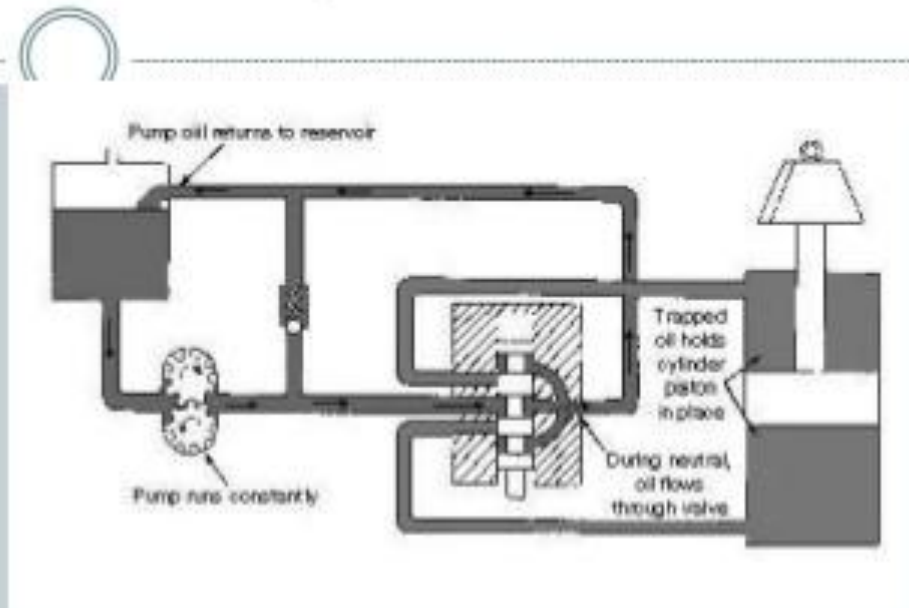
Parts of hydraulic system



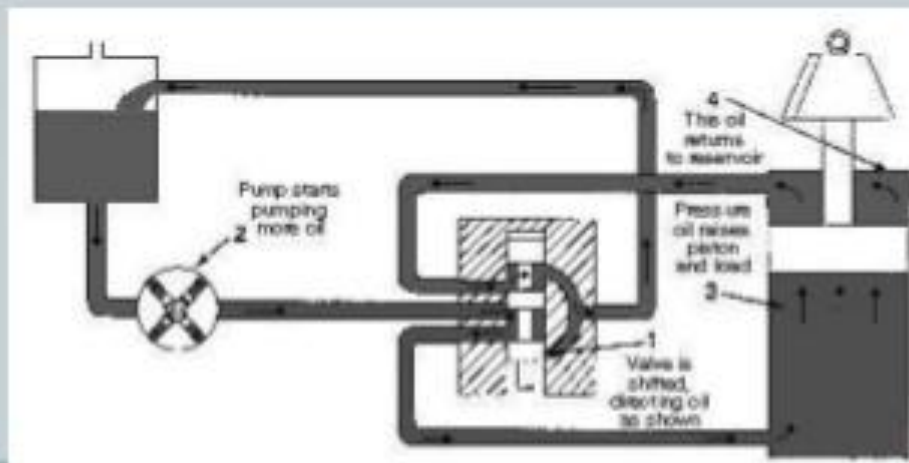
- Reservoir
- Pump
- Valves
- Fluid
- Motor
- Hose
- Filter
- Cylinder
- Accumulator

Types of hydraulic systems

- Open centre system



- Close centre system



Methods of attaching implements

The working unit for both field work and transportation consists of a tractor and the implement, which are connected together by components which are called the *hitches*. The tractor and the implement influence each other with regard to function, and consequently the method of connecting them has important influences on the effectiveness of the entire working unit.



When selecting or designing a hitching system the following factors should be considered: 1. Maximum efficiency in power utilization should be achieved for the entire working unit. 2. Switching from one implement to another should be performed as easily as possible.

The hitching system should be effective both during work and during transport. 4. The hitching system should be capable of accommodating a wide range of implements on the same tractor.



Draft and depth control

- Provision for depth and draft control is made in the hydraulic system to ensure automatic of plough when it hits a hard ground.
- **Position control:** In this system, constant depth of ploughing is maintained by automatic adjustment of draft of tractor. In this system the control valve can be operated directly by the driver to raise lower or hold an implement, mounted on the linkage at any chosen height.
- **Draft control:** In this system, the working depth of any implement can be controlled continuously without the need for a depth wheel on the implement. The hydraulic control valve reacts to changes in the loading in either the top or lower links which arc due to changes in the draft or pull required by the implement. If any implement goes too deep its draft increases. This increase is sensed through the top link or lower links. The control system then raises the implement until the draft is back to the present level and the implement is at the original depth again using the draft control system

Mixed position and draft control



It is also possible in some tractor (viz. HMT, Ford etc.) to suitable blend the response through interlink mechanism so that a desired depth of ploughing is maintained within closed limits and draft control too is allowed to function for better traction

HYDRAULIC SYSTEM

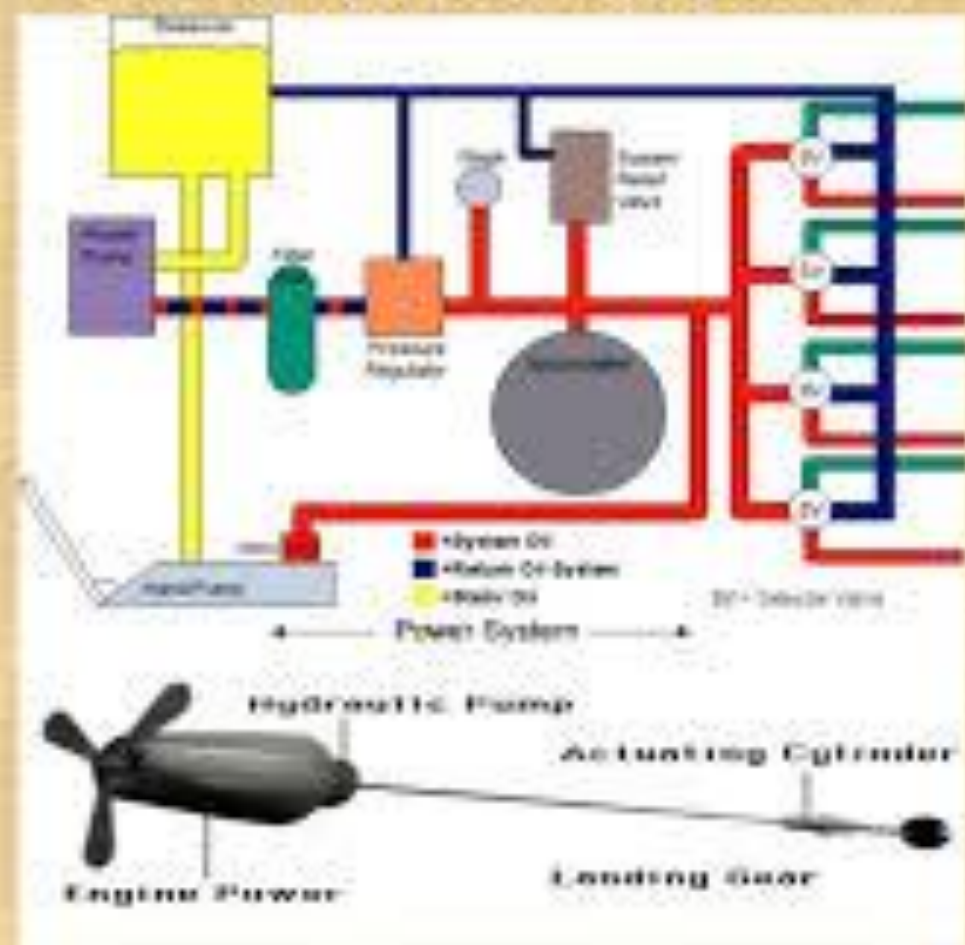
Principle of hydraulic drive system:

Pascal's law is the basis of hydraulic drive systems. As the pressure in the system is the same, the force that the fluid gives to the surroundings is therefore equal to pressure \times area. In such a way, a small piston feels a small force and a large piston feels a large force.

The same principle applies for a hydraulic pump with a small swept volume that asks for a small torque, combined with a hydraulic motor with a large swept volume that gives a large torque. In such a way a transmission with a certain ratio can be built.

Most hydraulic drive systems make use of hydraulic cylinders. Here the same principle is used — a small torque can be transmitted into a large force.

Basic Hydraulic System

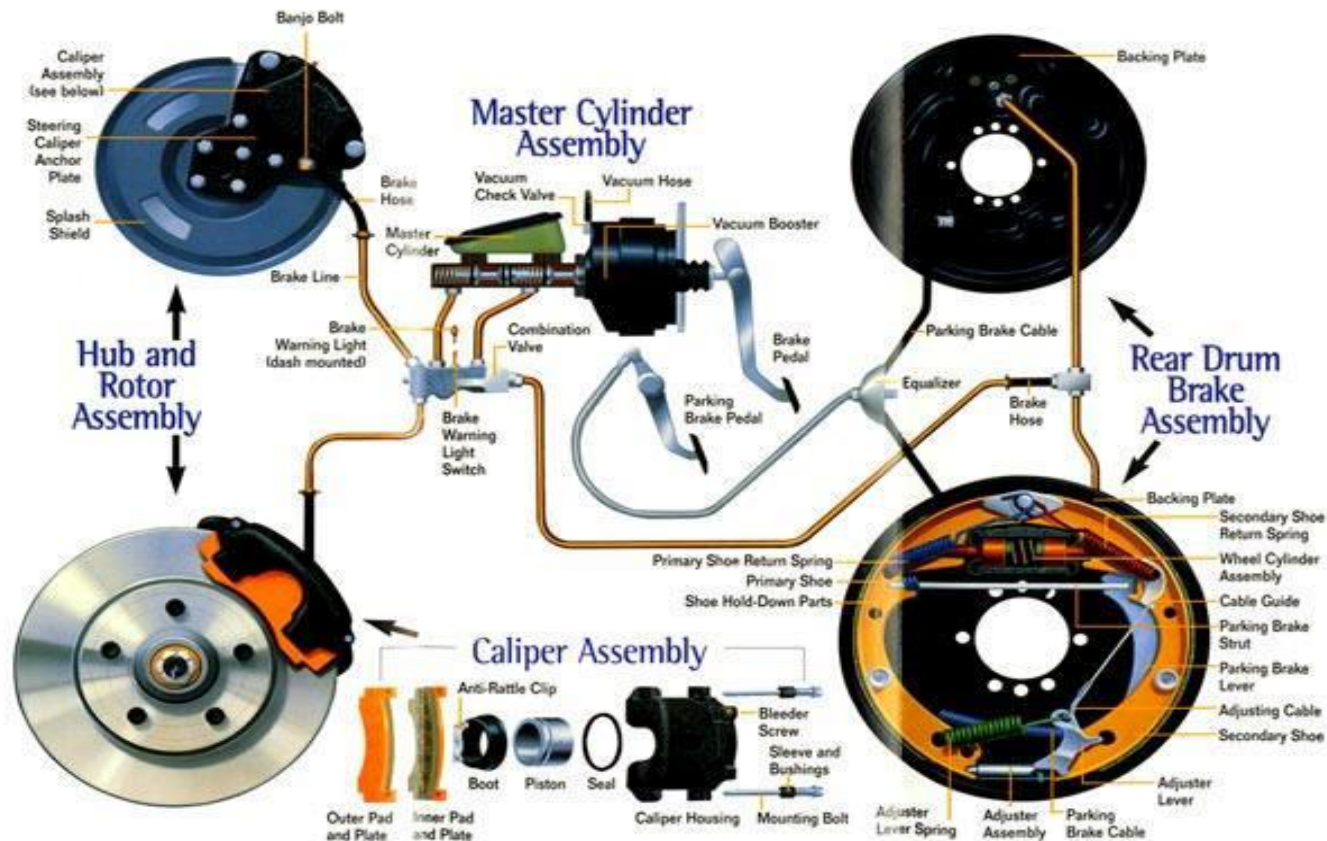


BRAKING SYSTEM

- That's why **brakes** use hydraulics: a **system** of fluid-filled pipes that **can** multiply force and transmit it easily from one place to another. When you press on the **brake**pedal, your foot moves a lever that forces a piston into a long, narrow cylinder filled with hydraulic fluid.

MEACHINICAL BRAKE STYSTEM

brake is a **mechanical** device that inhibits motion by absorbing energy from a moving system. It is used for slowing or stopping a moving vehicle, wheel, axle, or to prevent its motion, most often accomplished by means of friction.

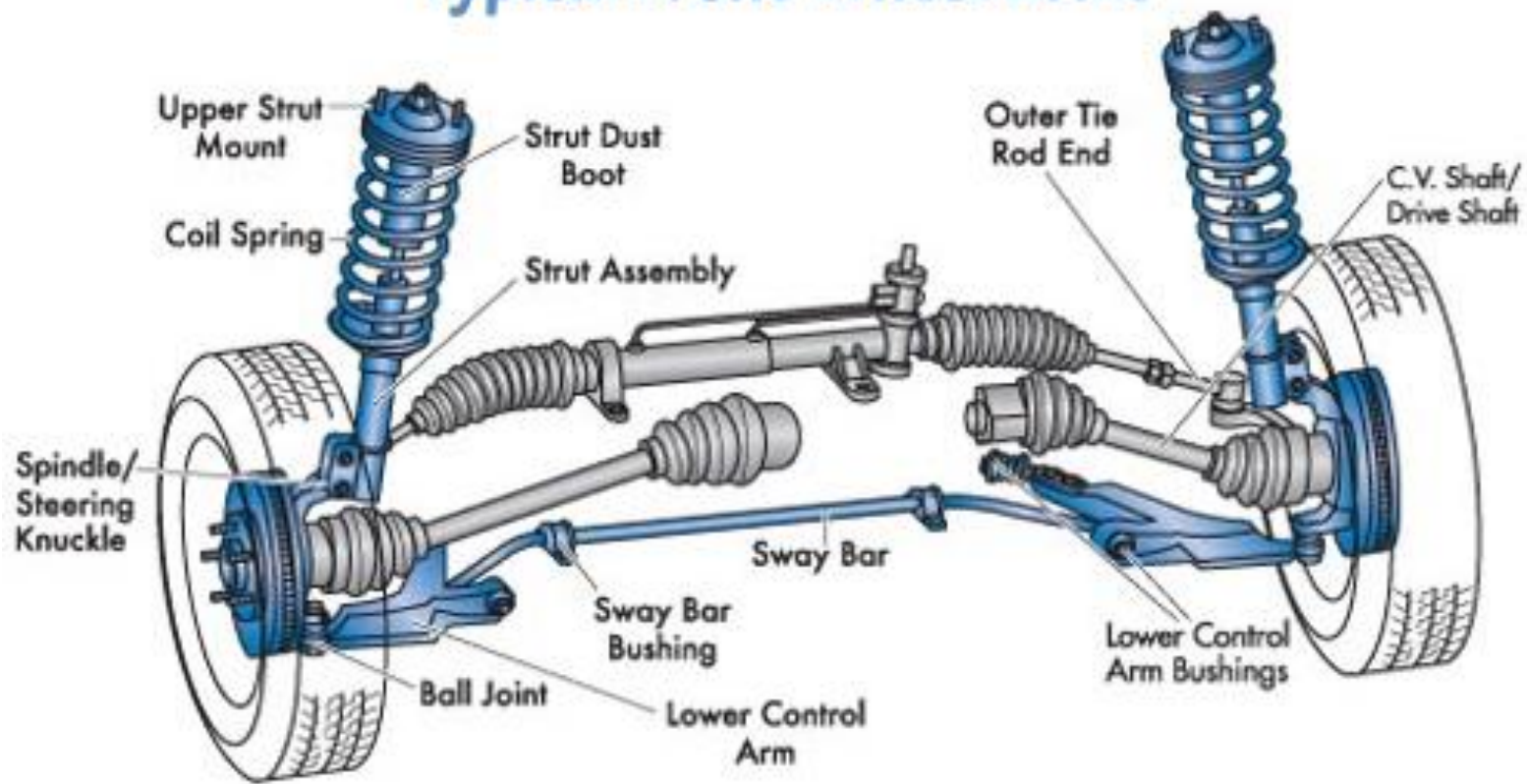


SUSPENSION SYSTEM

Suspension is the **system** of tires, tire air, springs, shock absorbers and linkages that connects a **vehicle** to its wheels and allows relative motion between the two.

The design of front and rear **suspension** of a **tractor** may be different.

Typical Front Wheel Drive



CHAPTER-6

Special purpose vehicle

Description and working principles of:

Bull Dozer

Fire station vehicle

Front end loader

Cranes

Bull Dozer

Typically, bulldozers are large and powerful tracked heavy equipment. The tracks give them excellent ground holding capability and mobility through very rough terrain. Wide tracks help distribute the bulldozer's weight over a large area (decreasing ground pressure), thus preventing it from sinking in sandy or muddy ground.

bulldozers are often used in road building, construction, mining, forestry, land clearing, infrastructure development, and any other projects requiring highly mobile, powerful, and stable earth-moving equipment.



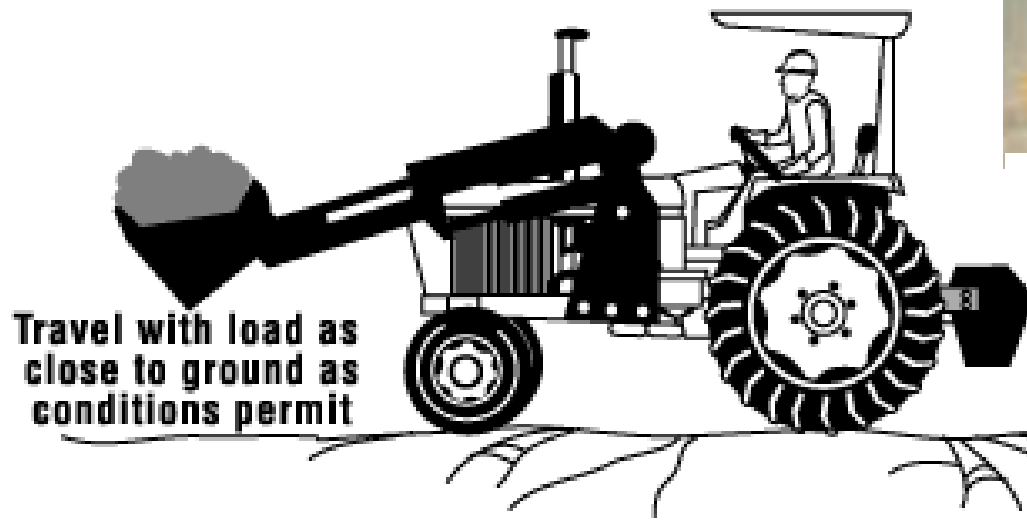
Fire station vehicle



- A **fire engine** (also known in some territories as a **fire truck** or **fire appliance**) is a vehicle designed primarily for firefighting operations. The terms "fire engine" and "fire truck" are often used interchangeably; however in some fire departments/fire services they refer to separate and specific types of vehicle.

- 1.1 Conventional fire apparatus
- 1.2 Aerial apparatus
- 1.2.1 Turntable ladder
 - 1.2.1.1 Tiller truck
- 1.2.2 Aerial platform
- 1.3 Technical rescue apparatus
- 1.4 Hazardous materials apparatus
- 1.5 Wildland and wildland–urban interface fire apparatus
- 1.6 Logistical support apparatus
- 1.6.1 Command support unit
- 1.7 Water carrying apparatus1.7.1 Tender truck
- 1.8 Airport crash tender1.9 Other apparatus

Front end loader

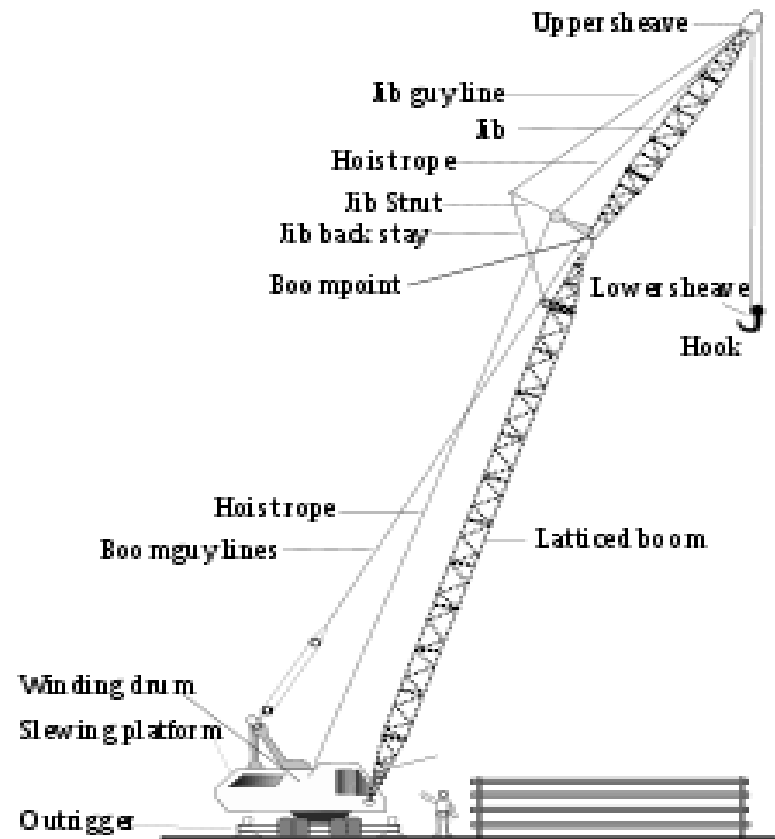


Front end loader

- A loader is a type of [tractor](#), usually wheeled, sometimes on tracks, that has a front-mounted square wide [bucket](#) connected to the end of two booms (arms) to scoop up loose material from the ground, such as dirt, sand or gravel, and move it from one place to another without pushing the material across the ground. A loader is commonly used to move a stockpiled material from ground level and deposit it into an awaiting dump truck or into an open trench excavation.
- The loader assembly may be a removable attachment or permanently mounted. Often the bucket can be replaced with other devices or tools—for example, many can mount forks to lift heavy pallets or shipping containers, and a hydraulically opening "clamshell" bucket allows a loader to act as a light dozer or scraper. The bucket can also be augmented with devices like a bale grappler for handling large bales of [hay](#) or [straw](#).

Crane

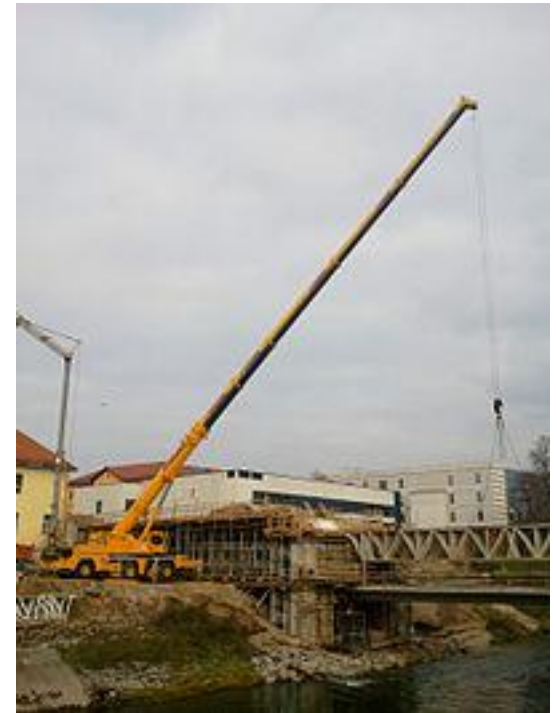
it exist in an enormous variety of forms – each tailored to a specific use. Sizes range from the smallest jib cranes, used inside workshops, to the tallest tower cranes, used for constructing high buildings. Mini-cranes are also used for constructing high buildings, in order to facilitate constructions by reaching tight spaces. Finally, we can find larger floating cranes, generally used to build oil rigs and salvage sunken ships. Some lifting machines do not strictly fit the above definition of a crane, but are generally known as cranes, such as stacker cranes and loader cranes.



Type of crane



Truck-mounted crane



Deployed truck-mounted crane

Types of crane



Floating crane

Crawler crane

Rough terrain crane

CHAPTER-7

Special purpose vehicle

MAINTENANCE OF TRACTOR

- Faults and their rectification in tractor and maintenance of tractor
- 1. FMP 211 Farm Power and Machinery (1+1)
- 2. MAINTENANCE OF TRACTOR
- 3. Study your owner's manual
- 4. The manufacturer has specific instructions for basic care of your tractor, and they have the expertise to give you the best advice on how to do it. This will tell you the intervals for routine maintenance, including chassis lubrication, engine, transmission, and hydraulic oil change, filter changes, and other maintenance items.
- 5. Obtain tools
- 6. Tractor maintenance requires numerous wrenches and other tools in larger sizes than for automobile maintenance, so plan to buy or borrow the tools you need.

7. Protect the tractor from the elements
8. Check fluids regularly
9. Check tire inflation
10. If tires run with excessively low tire pressure, tread wear increases dramatically. Adjust air pressure for the type of work planned for the day ahead. If road travel is expected, add a few pounds of pressure to each tire. If tillage is expected, reduce pressure by a few pounds.
11. Keep an eye on belts and hoses
12. Keep the brake linkages lubricated, and make sure the brakes are adjusted equally
13. Watch the gauges
14. Keep an eye on the temperature, oil pressure, and tachometer. The temperature gauge should be marked with a normal operating range, but any time the indicator says the temperature is over 220 °F (104 °C), the engine is running hot.

15. Check the filters regularly

16. Check the air filter often. Tractors are often operated in very dusty conditions, and in some cases, the filters must be cleaned daily or weekly. Clean the air filter with a shop vacuum or with compressed air, never by washing it. Replace the air filter when it cannot be cleaned satisfactorily, or if the filter is damaged.

17. Check the radiator screen

18. Tractors are often operated in conditions where debris may accumulate on the radiator, so they usually have a front screen or grill to prevent plant matter, insects, or pollen from clogging the radiator.

Top 10-Prominent makes of Indian tractors



- 1-Mahindra **Tractors**.
- 2-John Deere.
- 3-Escort Agri Machinery.
- 4-TAFE.
- 5-New Holland.
- 6-Sonalika International.
- 7-HMT Limited.
- 8- Balwan**Tractors**.
- 9- Standard Tractor
- 10- preet Tractor

Prominent makes of Indian tractors

[ACE Tractors](#)

[2Agri-King Tractors and Equipments Pvt. Ltd.](#)

[3Angad Tractors](#)

[4Balwan Tractors, Force Motors Ltd](#)

[5Captain Tractors Pvt. Ltd](#)

[6Crossword Agro Industries](#)

[7Eicher](#)

[8Escorts](#)

[9Farmer Tractor](#)

[10HMT Tractors](#)

[11Indo Farm](#)

[12John Deere](#)

[13Mahindra Gujarat Tractor Limited \(MGTL\)](#)

[14Mahindra Tractors](#)

[15Mars Group](#)

[16New Holland Agriculture](#)

[17Preet Tractors](#)

[18SAME Deutz-Fahr \(India\) Private Ltd.](#)

[19Sonalika](#)

[20Standard](#)

[21Swaraj Tractors](#)

[22TAFE](#)

[23VST Tillers](#)

The End