

UNIT

1

## Chassis Frame and Body

### Structure

- 1.1 Introduction of chassis frame
- 1.2 Layout of chassis and its main components
- 1.3 Functions of the chassis frame
- 1.4 Types of chassis frame
- 1.5 Various loads acting on the chassis frame
- 1.6 Different bodies used in Automobiles
- 1.7 Requirement of bodies for various types of vehicles.

### Learning Objectives

After studying this unit the student will able to learn about

- Requirement of chassis frame
- Types of Chassis frame
- Loads acting on chassis frame
- Layout of chassis and its parts
- Different types of automobile bodies

## 1.1 Introduction of Chassis Frame

Chassis frame is the basic frame work of the automobile. It supports all the parts of the automobile attached to it. It is made of drop forged steel. All the parts related to automobiles are attached to it only. All the systems related to automobile like powerplant, transmission, steering, suspension, braking system etc are attached to and supported by it only.

## 1.2 Layout of Chassis and its main components

“Chassis” a French term which means the complete Automobiles without Body and it includes all the systems like power plant, transmission, steering, suspension, wheels tyres, auto electric system etc. without body. If Body is also attached to it then it is known as the particular vehicle as per the shape and design of the body.

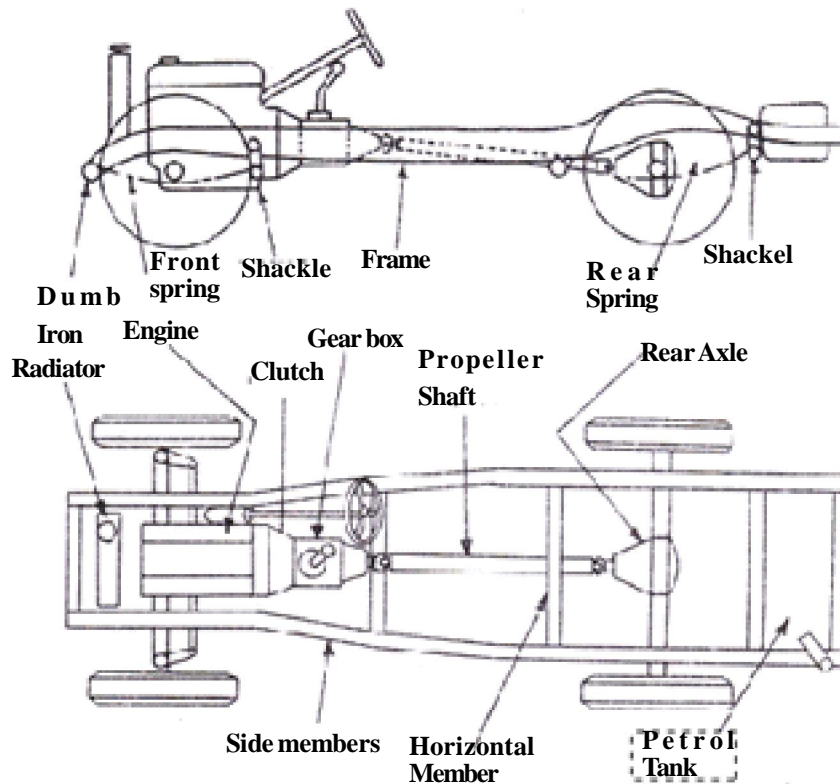


Fig 1.1 Chassis

### 1.3 The Functions of the Chassis frame

1. To carry all the stationary loads attached to it and loads of passenger and cargo carried in it .
2. To withstand torsional vibration caused by the movement of the vehicle
3. To withstand the centrifugal force caused by cornering of the vehicle
4. To control the vibration caused by the running of the vehicle
5. To withstand bending stresses due to rise and fall of the front and rear axles.

### 1.4 Types of Chassis frame

There are different types of chassis frame sections

1. Channel section



2. Box section



3. Tubular section



The conventional frame is also known as Non-load carrying frame. In this type of frame, the loads on the vehicle are transferred to the suspension by the frame which is the main skeleton of the vehicle.

The channel section is used in long members and box section in short members. Tubular section is used now-a-days in three wheelers, scooters, matadors and pickup vans.

The frames should be strong enough to bear load while sudden brakes and accidents.

### 1.5 Various loads acting on the Chassis frame

The loads acting on the chassis frame are as follow

1. Stationary loads namely the loads of permanent attachment like all the parts of the chassis, body etc.
2. Short duration loads while turning, braking etc.
3. Momentary loads while quick acceleration, sudden braking etc.
4. Loads applied while crossing roads of irregular and uneven surfaces
5. Loads caused by sudden accidents, head on collisions etc.
6. Loads caused by irregular and overloading of vehicle.

### 1.6 Different Bodies used in Automobiles

The automobiles bodies are designed according to the requirement of the vehicle. According to design and requirement of the vehicle , there are different types of Automobiles bodies. Some of them are listed as below :

- (i) Car
- (ii) Straight truck or Punjab truck body
- (iii) Truck with half body
- (iv) Platform type truck
- (v) Tractor
- (vi) Tractor with articulated trailer
- (vii) Tanker
- (viii) Bus
- (ix) Dumper truck
- (x) Delivery van
- (xi) Station wagon
- (xii) Pick up van
- (xiii) Jeep
- (xiv) Long wheel base truck etc

### 1.7 Requirement of Bodies for various types of vehicle

According to requirement , automobile bodies are classified mainly into different types namely private vehicle, commercial vehicle, fleet transport vehicle, passenger transport vehicle, Ambulances vehicle used for transport of Army personal, Ammunition etc., different types of tanker vehicle etc. If it is a private vehicle, the vehicle is used for luxury personal travelling , private cargo transport etc, namely car , mini van , Omni bus, matador etc.

If it is commercial vehicle the vehicle is used for transportation of goods some other vehicles, freezer boxes etc. If it is tanker, it is used to transport milk , water, edible oils, petroleum products , gases , acids etc. The tanker bodies are designed according to the relevant requirement .

If it is an army vehicles, the vehicle are separately designed namely Arm truck, heavy long wheel base cargo trucks , long platform trucks etc. These are exclusively used to carry the army personal, arms and ammunitions etc.

Some automobiles manufacturing companies are using long wheel base trucks with closed body structure for transporting of the vehicle produced in their factories to different market outlets.

The private vehicles used in different fields namely Buses of different types, air conditioned Buses, station Wagons etc, Usually Road Transport organization of a state is a fleet organized jointly by the state Government an exclusive body which is to operate buses for travelling of passenger to various places within the state as well as Inter-State travelling also the Road transport corporation organization is having differently designed buses namely ordinary body buses, Deluxe buses , semi luxury buses, Air conditioned buses and also buses with sleeper coach etc.

## Summary

- Chassis is the basic framework of the automobile. It supports all the parts of the automobile.
- It has to withstand centrifugal force while cornering and bending stresses due to rise and fall of front and rear axles.
- Different types of chassis frames are i. Channel section ii. Box section iii. Tubular section.
- The loads acting on chassis frame are
  - i. Stationary loads of permanent attachments.
  - ii. Short duration loads while turning, braking etc.
  - iii. Loads applied while crossing irregular and uneven surfaces.
  - iv. Loads caused by irregular and overloading of the vehicle.
  - v. Loads caused by sudden accidents.
  - vi. Momentary loads while quick acceleration, sudden braking etc.

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## Short Answer Type Questions

1. Define chassis.
2. Mention the types of chassis frame.

3. What is the purpose of chassis frame?
4. Mention any eight types of automobile bodies.

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**Long Answer Type Questions**

1. List out the functions of chassis frame.
2. Mention various loads acting on chassis frame.
3. Discuss about the requirements of different automobile bodies.