SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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DEPARTMENT OF AUTOMOBILE ENGINEERING

19AUE302 – AUTOMOTIVE SAFETY & INFOTRONICS

III- YEAR V SEM

UNIT 1 – INTRODUCTION

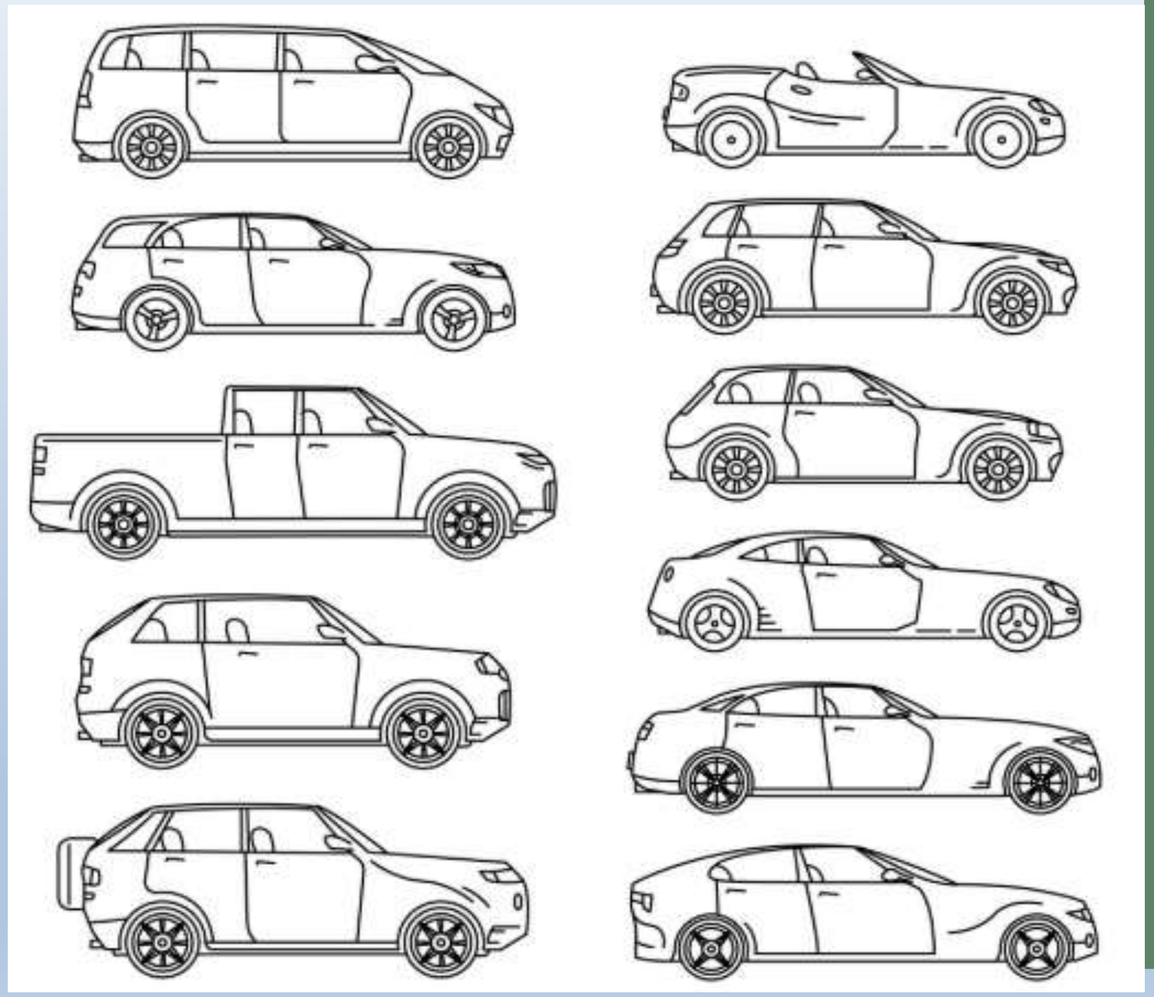
TOPIC 1 – DESIGN OF THE BODY FOR SAFETY

PRESENTATION OUTLINE

- Introduction
- Types of Bodies
- Necessary features of a safe vehicle body
- Design Techniques / Strategies
- Crush Zones

INTRODUCTION

- The safety of a vehicle and its passengers can be improved by properly designing and selecting the material for vehicle bodies.
- The vehicle body structure is subjected to static and dynamic service loads during the life cycle.
- It also has to maintain its integrity and provide adequate protection in survivable crashes.
- At present there are two designs of vehicle body constructions:
- Body over frame structure and
- Uni body structure.



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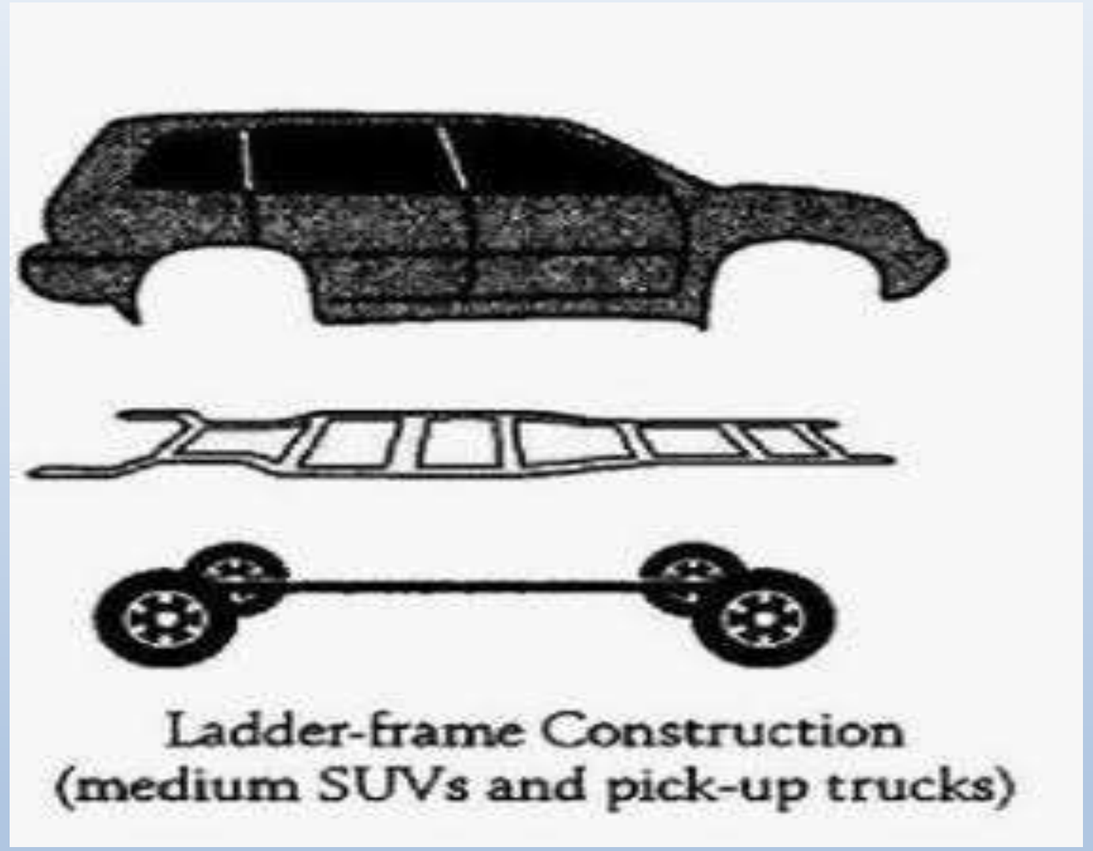
- ✓ 2. Uni body structure.

BODY ON FRAME

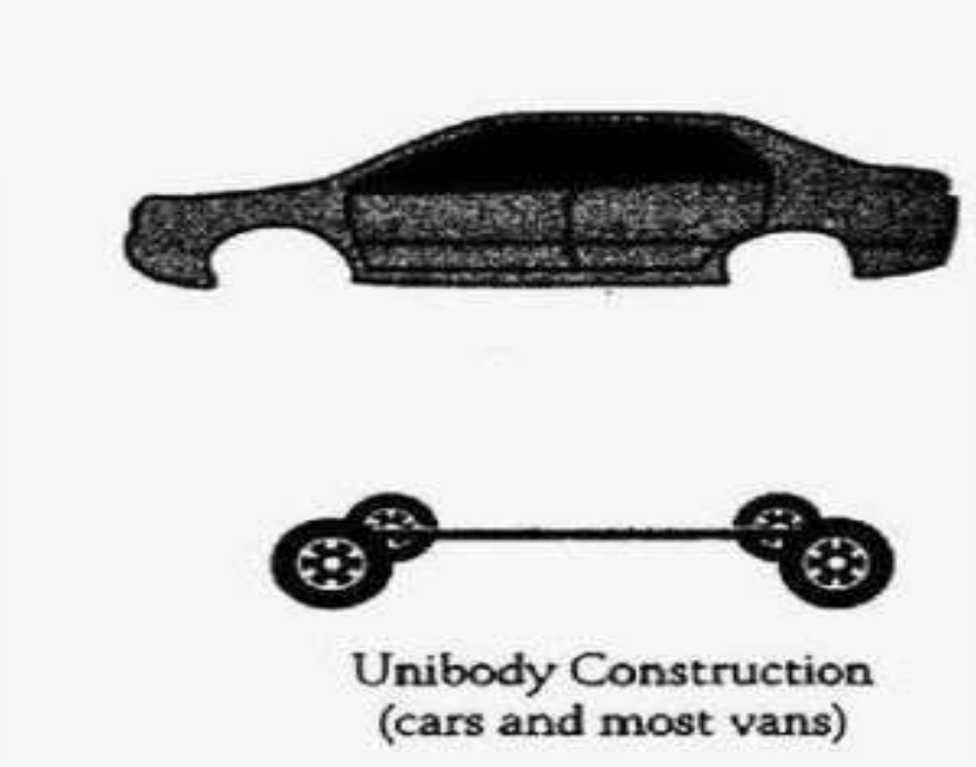


Ladder-frame Construction
(medium SUVs and pick-up trucks)

- The Body on Frame construction dates all the way back to when the first cars arose in the 19th Century.

- This construction essentially consists of two major components, a rigid ladder-like frame network that carries the engine and drivetrain and a separate body construction that is mounted on it.

UNIBODY



- The Monocoque Frame, on the other hand, has a unitized frame and body construction.
- Here the entire frame network bears the load of the vehicle’s components unlike the Body on Frame Construction where only the ladder section takes the brunt

ADVANTAGES OF MONOCOQUE FRAMES

- Light and Fuel Efficient
- Better Ride Dynamics
- Higher Safety

ADVANTAGES OF BODY ON FRAME

- Perfect Off-Roaders
- High Torsional Rigidity
- Easy to Repair

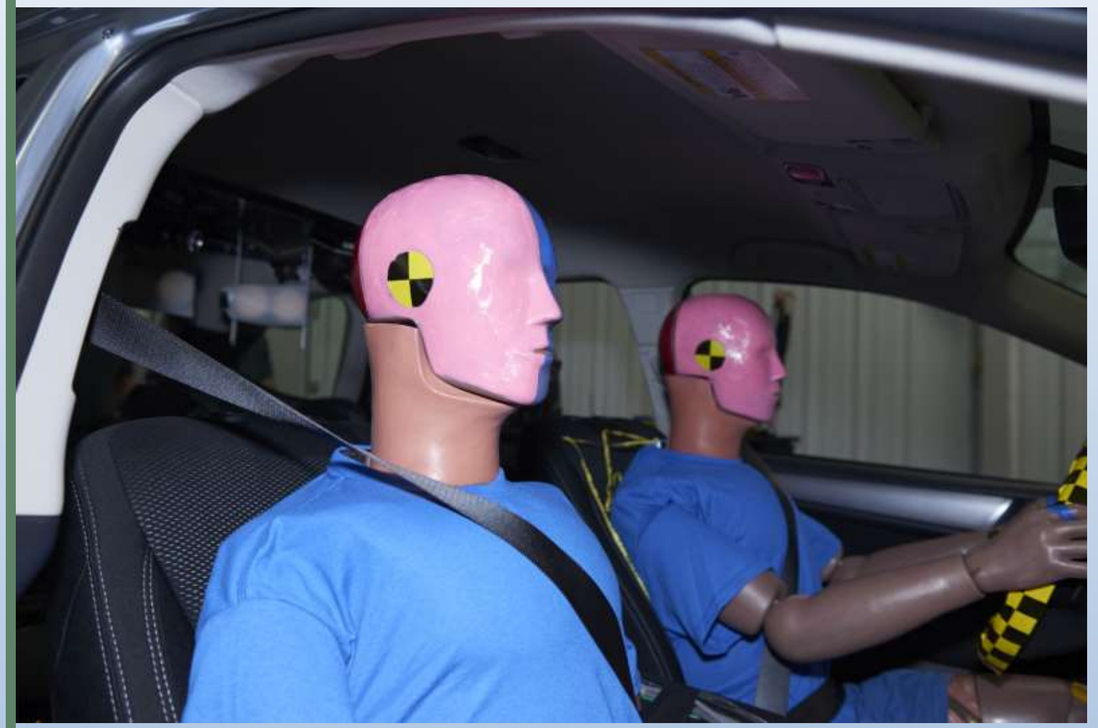
NECESSARY FEATURES OF A SAFE VEHICLE BODY

- Deformable yet stiff front structure with crumple zones to absorb the crash kinetic energy from frontal collisions
- Deformable rear structure to safeguard rear passenger compartment and protect the fuel tank Properly designed side structures and doors to minimize intrusion in side impact and prevent doors from opening due to crash loads
- Strong roof structure for rollover protection
- Properly designed restraint systems with working in harmony with the vehicle structure
- Accommodate various

Necessary features of a safe vehicle body

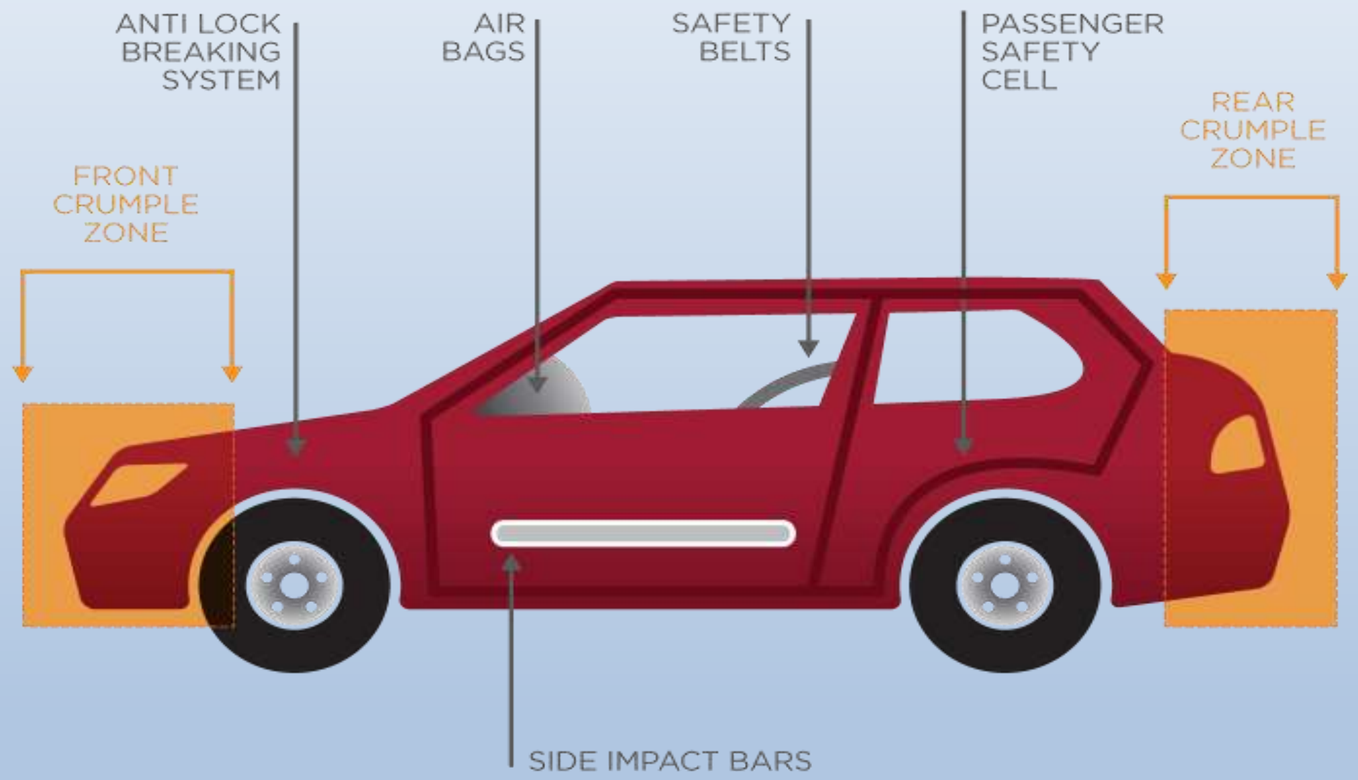
1. Deformable yet stiff front structure with crumble zones to absorb the crash kinetic energy from frontal collisions
2. Deformable rear structure to safeguard rear passenger compartment and protect the fuel tank
3. Properly designed side structures and doors to minimize intrusion in side impact and prevent doors from opening due to crash loads
4. Strong roof structure for rollover protection
5. Properly designed restraint systems with working in harmony with the vehicle structure
6. Accommodate various chassis designs for different power train locations and drive train configurations.

DESIGN TECHNIQUES / STRATEGIES



- Desired dummy performance
- Stiff cage structural concept
- Controlled progressive crush and deformation with limited intrusion

CRUSH ZONES



- Soft front zone
- Primary crush zone
- Secondary crush zone
- Weight efficient energy absorbing structures