

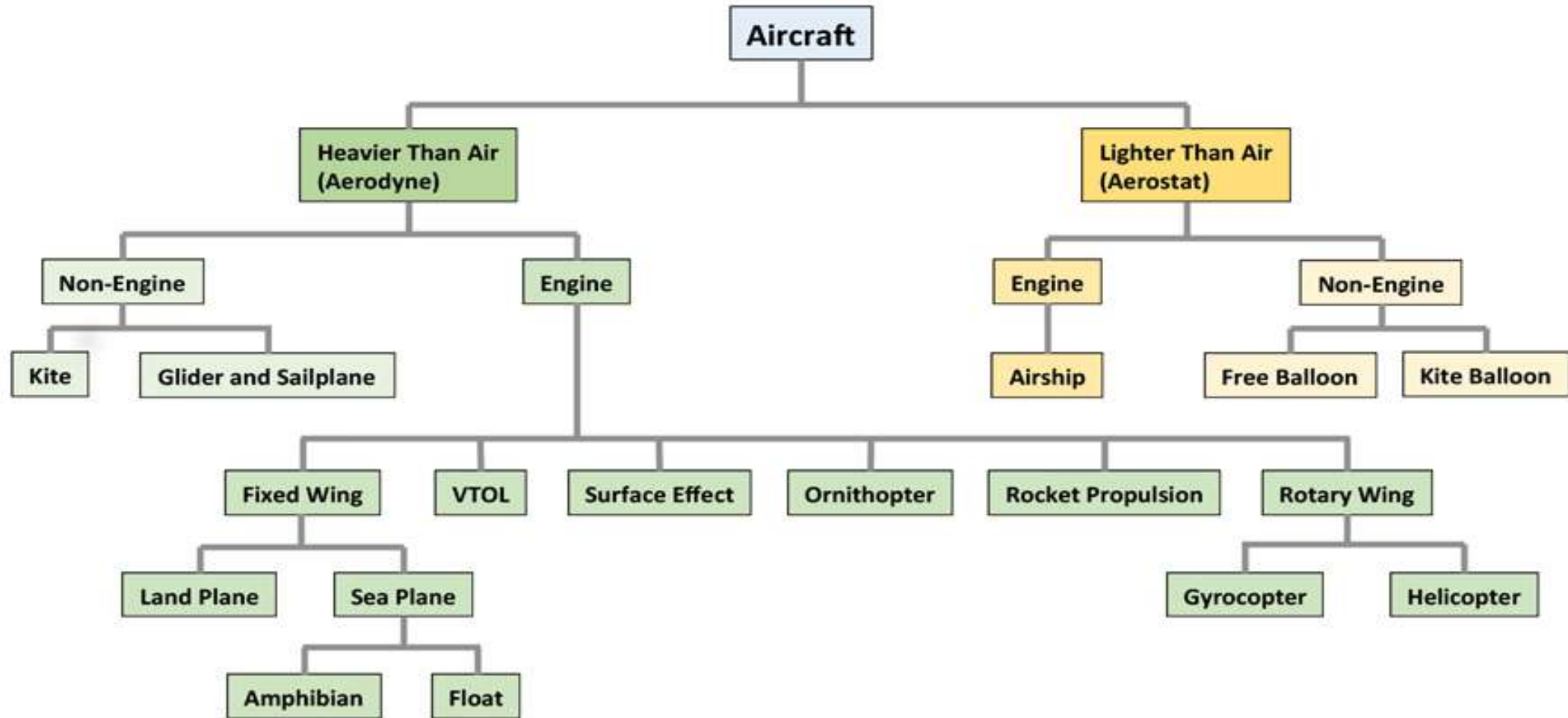
PRESENTATION ON AIRCRAFT STRUCTURE



✘ PRESENTED BY :- MR. ABHISHEK BHARDWAJ

**(FACULTY, PG DIPLOMA-AEROSPACE TECHNICAL PUBLICATION,
SHRI VISHWAKARMA SKILL UNIVERSITY)**

CLASSIFICATION OF AIRCRAFT



AIRCRAFT CAN ALSO BE CLASSIFIED BASED ON FOLLOWING :-

- × **Mach Number**
- × **Purpose**
- × **Types of Engines**
- × **Range**
- × **Source of power**

AIRCRAFT ARE CLASSIFIED BASED ON THEIR MAXIMUM MACH NUMBER:-

- × Subsonic ($M < 1$)
- × Transonic ($M \sim 1$)
- × Supersonic ($M > 1$)
- × Hypersonic ($M \gg 1$)

AIRCRAFT ARE MAINLY CLASSIFIED BASED ON THEIR PURPOSE AS FOLLOWS:-

- × **Passenger Transport**
- × **Buisness jets**
- × **Cargo Transport**
- × **Experimental aircraft**
- × **Military aircraft**
 - **Fligheters**
 - **Bombers**
 - **Medical/Rescue aircrafts**

AIRCRAFT ARE CLASSIFIED BASED ON THE TYPE OF ENGINE AS FOLLOWS :-

- × Propeller
- × Turboprop
- × Turbofan
- × Turbojet
- × Ramjet

AIRCRAFT ARE CLASSIFIED BASED ON THEIR RANGE AS FOLLOWS :-

- × Short range (<500 km)
- × Medium range (<3000 km)
- × Long range (>3000 km)

AIRCRAFT ARE CLASSIFIED BASED ON THEIR SOURCE OF POWER AS:-

- × Oil
- × Solar power
- × Electric power
- × Nuclear Power (quite rare)

FIXED WING AIRCRAFT

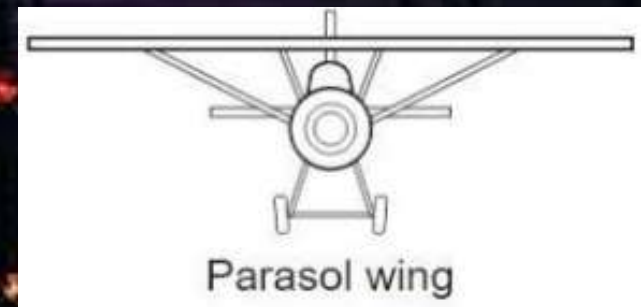
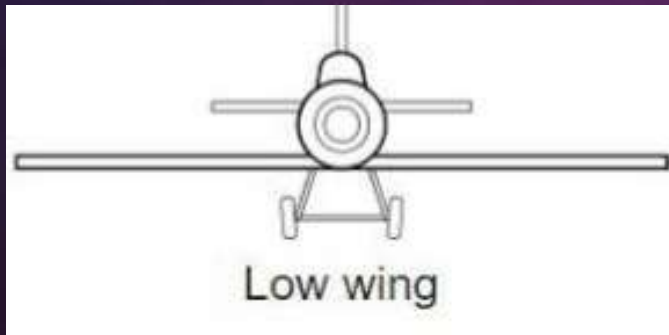
✘ A heavier than air aircraft capable of flight Whose lift is generated not by wing motion relative to aircraft , but by forward motion through the air .

A fixed wing aircraft can have number of wings:-

1. Monoplane
2. Biplane

FIXED WING AIRCRAFT

Fixed wing aircraft can have different number of wings



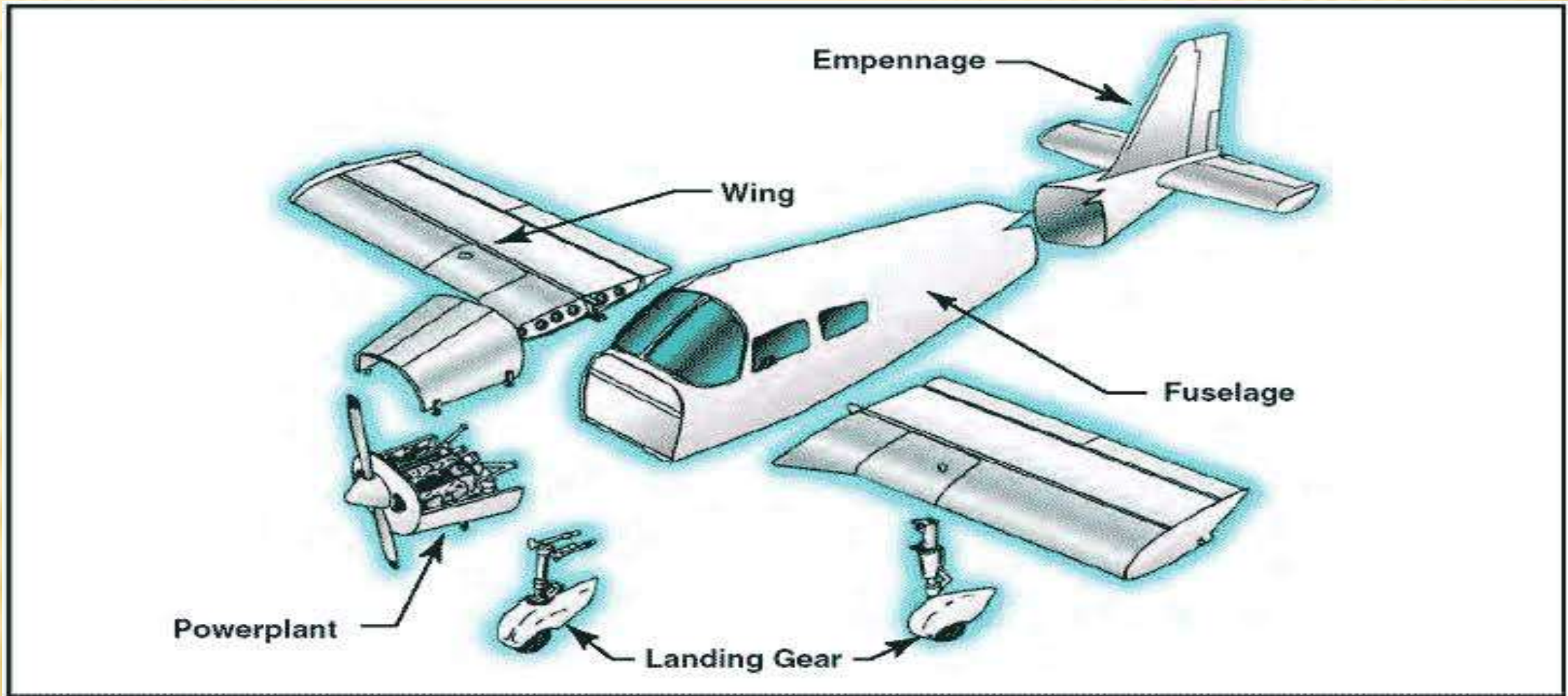
ROTARY WING AIRCRAFT

- ✘ A rotorcraft or rotary-wing aircraft is a heavier-than-air aircraft with rotary wings or rotor blades, which generate lift by rotating around a vertical mast .

DIFFERENCE BETWEEN ROTARY AND FIXED WING AIRCRAFT

Key differences	Rotary Wings	Fixed Wing
1. Powered	These are powered by Rotating blades such as helicopter	It include the propeller driven and wings that don't move
2. Distance	Shorter distance	Longer distance
3. Spacious	Not as much Spacious	More spacious
4. Altitude	Can't fly at higher altitude	Fly at higher altitude
5. Types	Autogyros	Unmanned gliders

AIRCRAFT PRINCIPLE STRUCTURE



FUSELAGE

- The fuselage is the principal structural unit of an aircraft .
- The fuselage is designed to accommodate the crew, passenger , cargo , instruments , and other essential equipment .

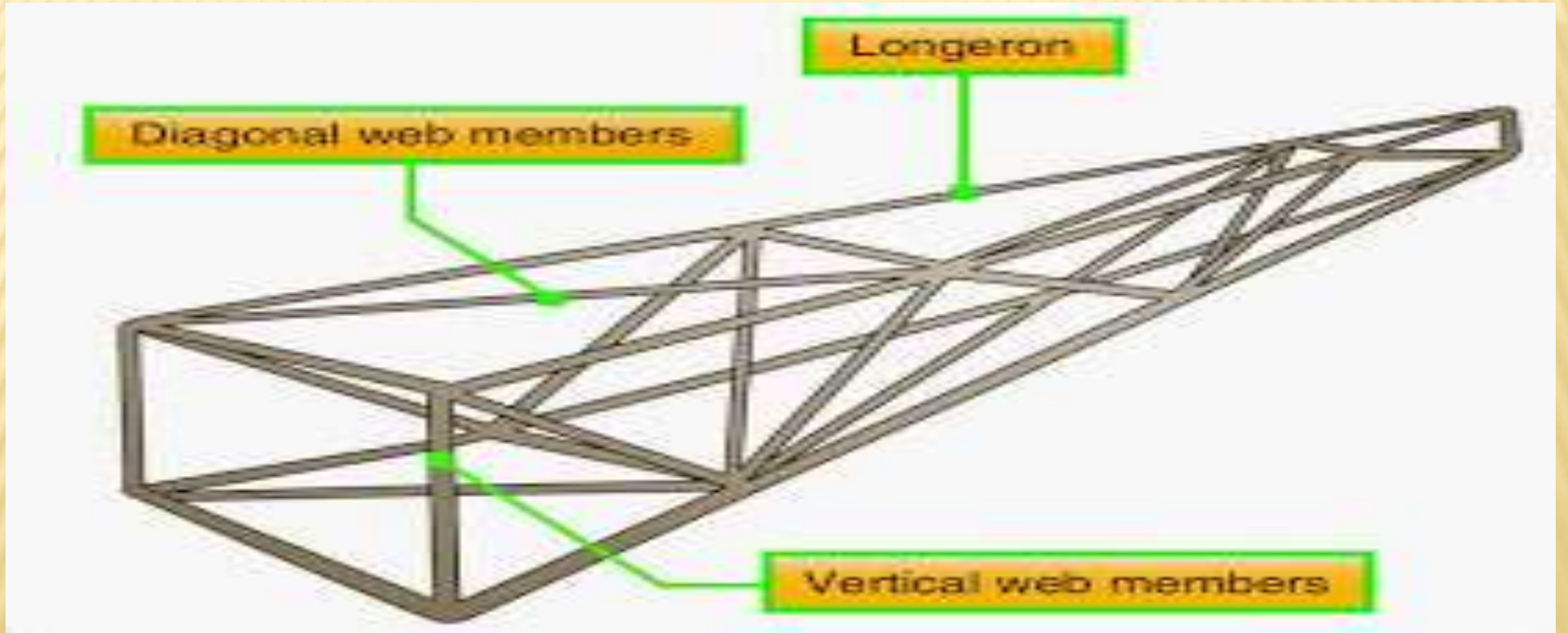


FUSELAGE

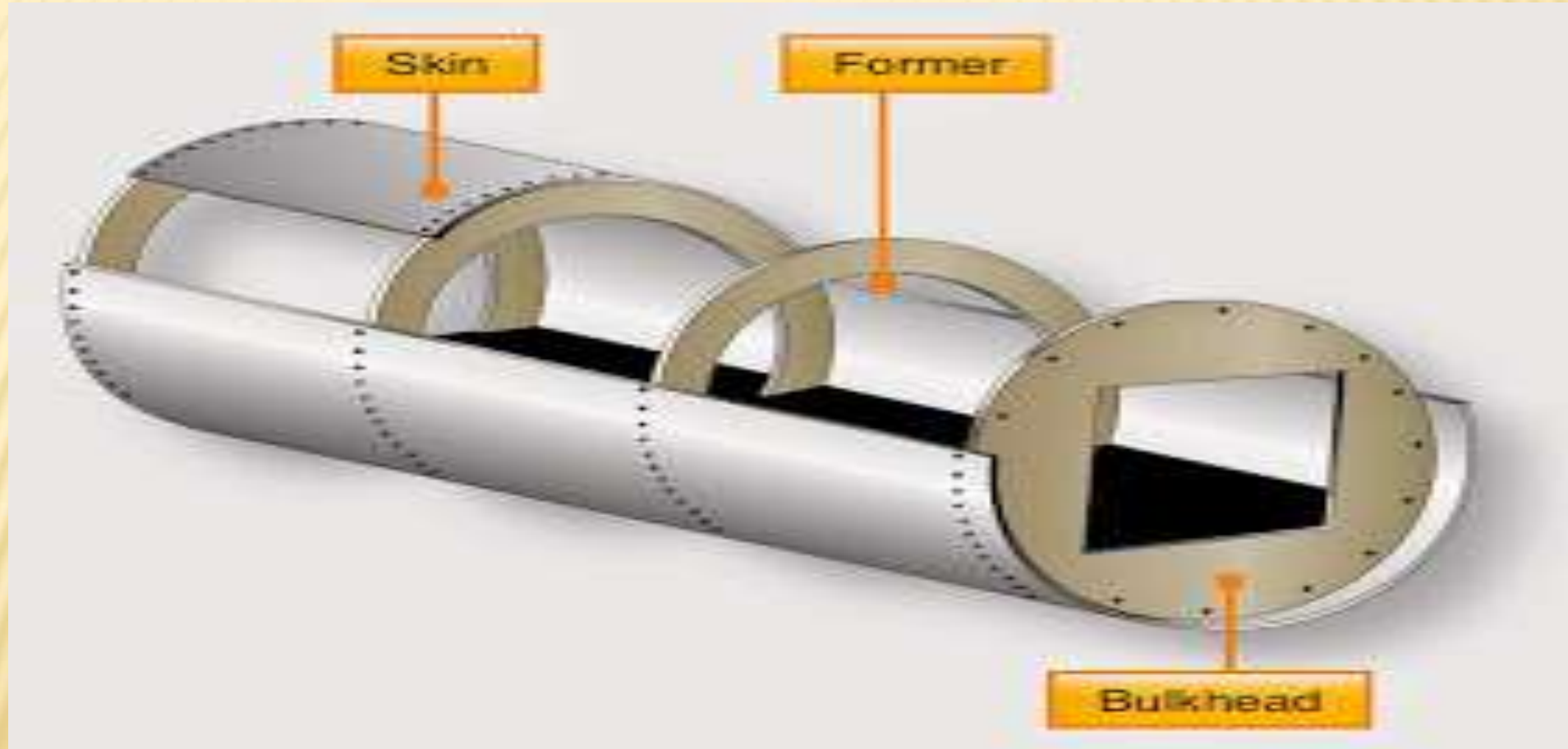
TYPES OF FUSELAGE CONTRUCTION

- ✘ The construction of aircraft fuselages evolved from the early wood truss structure arrangements to monoque shell structure to the current semi- monoque shell structure.
 1. Truss structure
 2. Monoque structure
 3. Semi – monoque structure

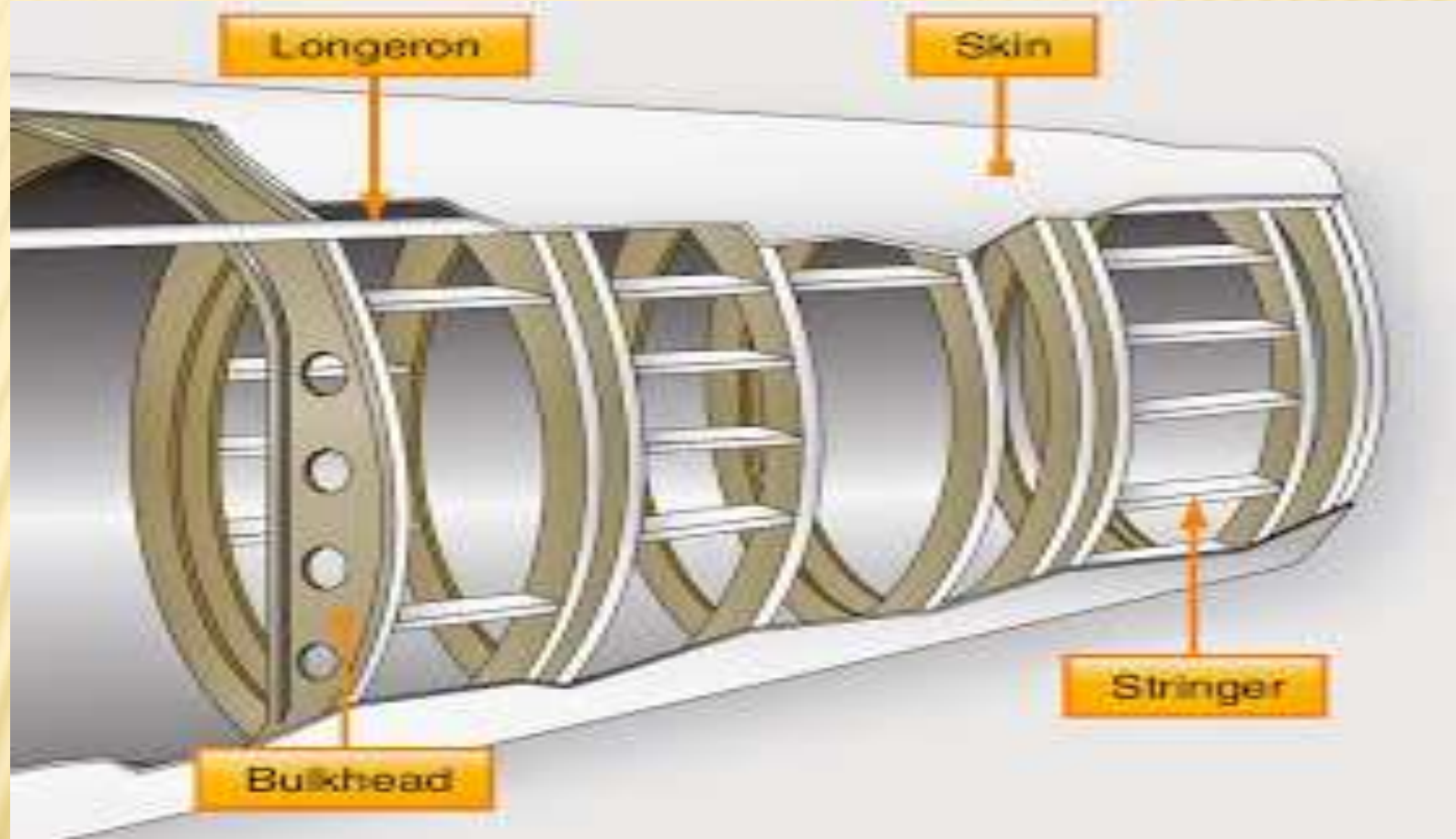
TRUSS STRUCTURE



MONOQUE STRUCTURE



SEMI- MONOQUE STRUCTURE



WINGS

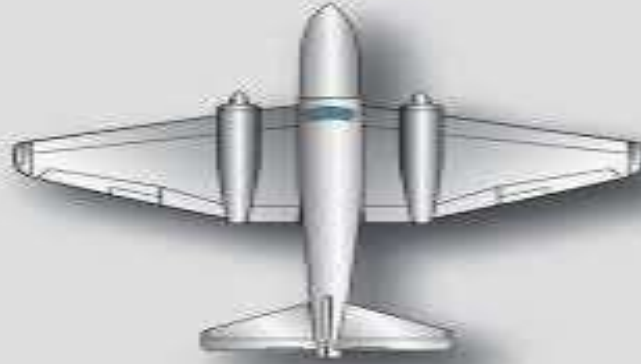
- ✘ Wings are airfoils that , when moved rapidly through the air create lift . They are built in many shape and sizes .



VARIOUS WINGS DESIGN SHAPE



Tapered leading edge,
straight trailing edge



Tapered leading and
trailing edges



Delta wing



Sweptback wings



Straight leading and
trailing edges

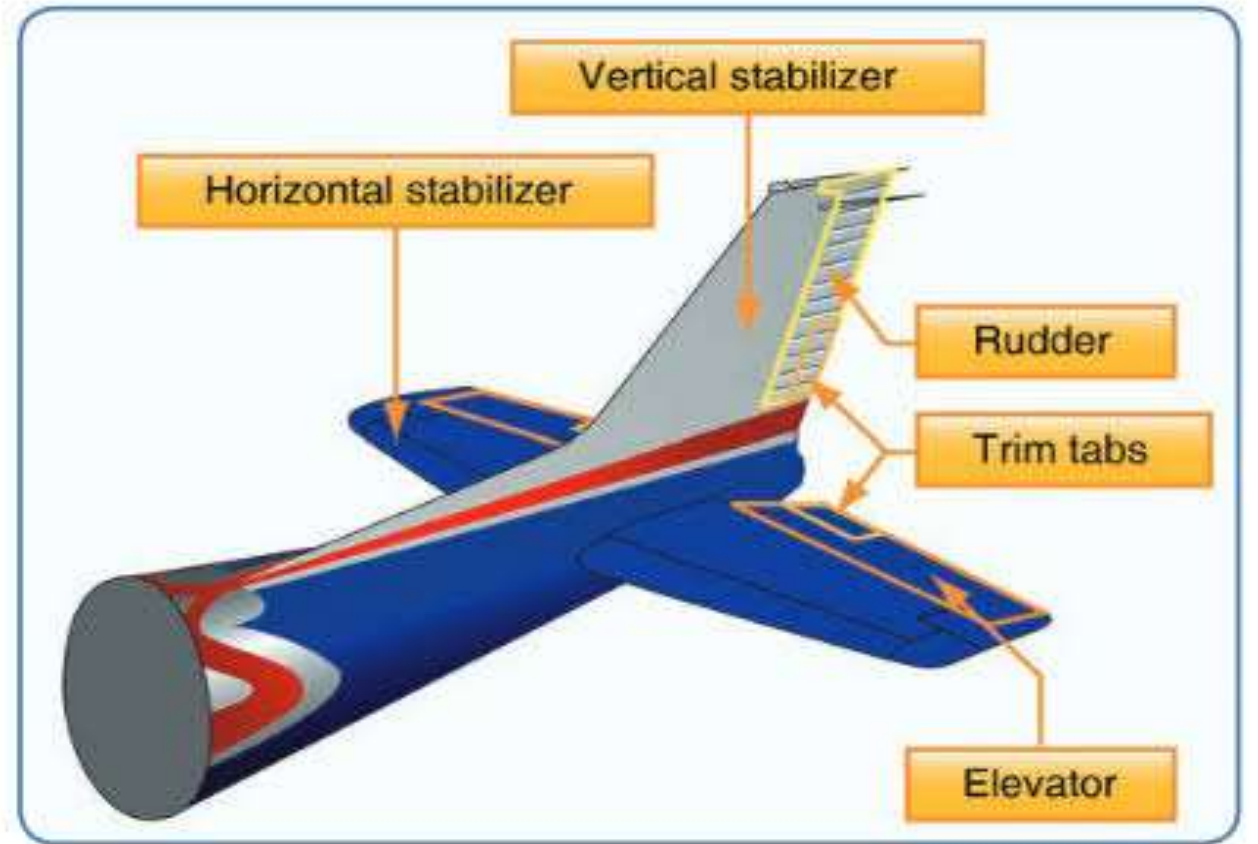


Straight leading edge,
tapered trailing edge

EMPENNAGE

The empennage Of an aircraft is also known as the tail section.

It provides stability and directional control to aircraft.



Empennage components

FLIGHT CONTROL SURFACES

- × **Primary** :- Ailerons , elevator, rudders .
- × **Secondary** :- movable trim tabs located on the primary flight control surfaces.
- × **Auxillary** :- wing flaps , spoilers speed brakes and slats .

Thank You!
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