

॥ नमस्ते ॥

# TYPES OF FUSELAGE

# Fuselage

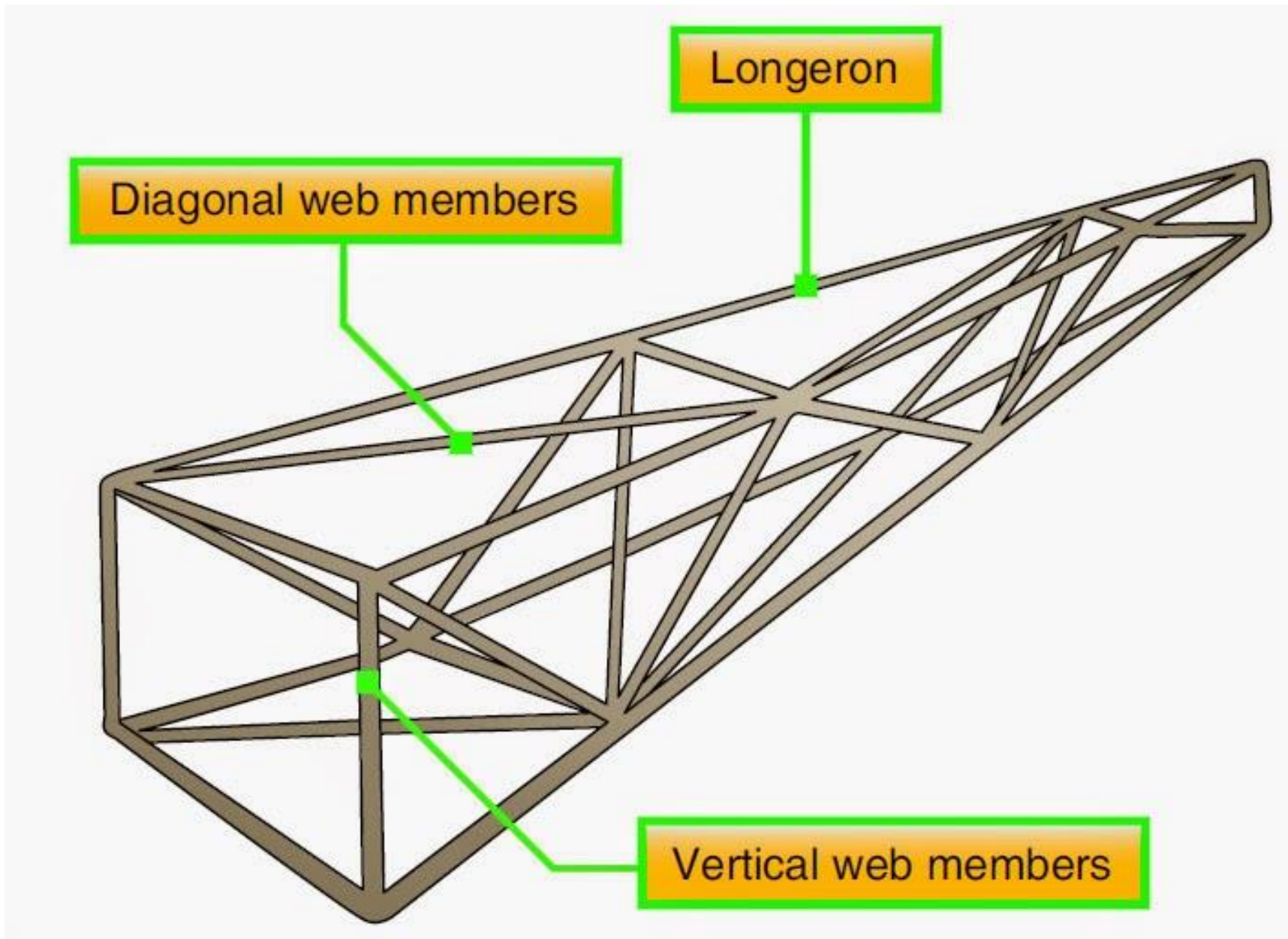
- **Fuselage**, central portion of the body of an airplane, designed to accommodate the crew, passengers, and cargo. It varies greatly in design and size according to the function of the aircraft. In a jet fighter the fuselage consists of a cockpit large enough only for the controls and pilot, but in a jet airliner it includes a much larger cockpit as well as a cabin that has separate decks for passengers and cargo.

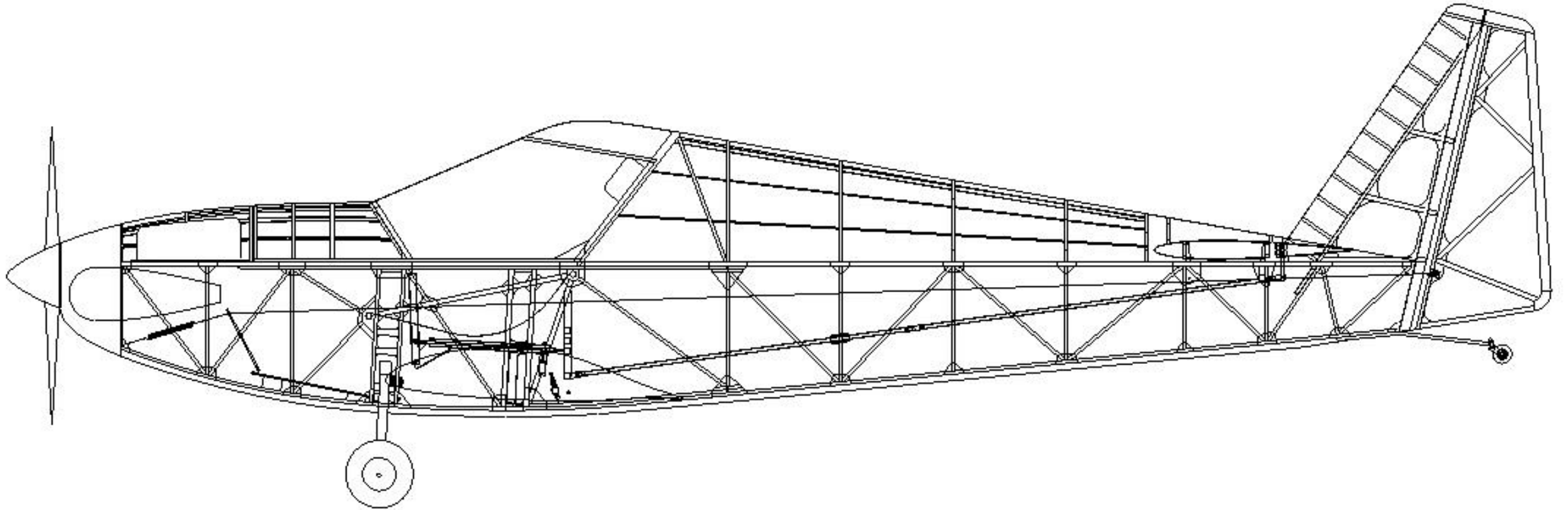
# Types of Fuselage

- 1. Truss**
- 2. Geodetic**
- 3. Monocoque**
- 4. Semicoque**

# 1. TRUSS/FRAME TYPE FUSELAGE

- This consists of light gauge steel tubes which **form a frame triangular shape to give the most rigid of geometric forms.** Each tube carries a specific load, the magnitude of which depends on whether the aircraft is airborne or on the ground.
- This type of fuselage is commonly found on the first few generations of aircraft. They are strong, moderately easy to manufacture, but **did not necessarily implement the concept of aerodynamic.**
- A box frame made up of a series of vertical, horizontal, diagonal and longitudinal tubular steel pipes
- **Design produces a square profiled fuselage**
- Used in old aircraft and light modern aircraft
- **Frame takes up all the loads**



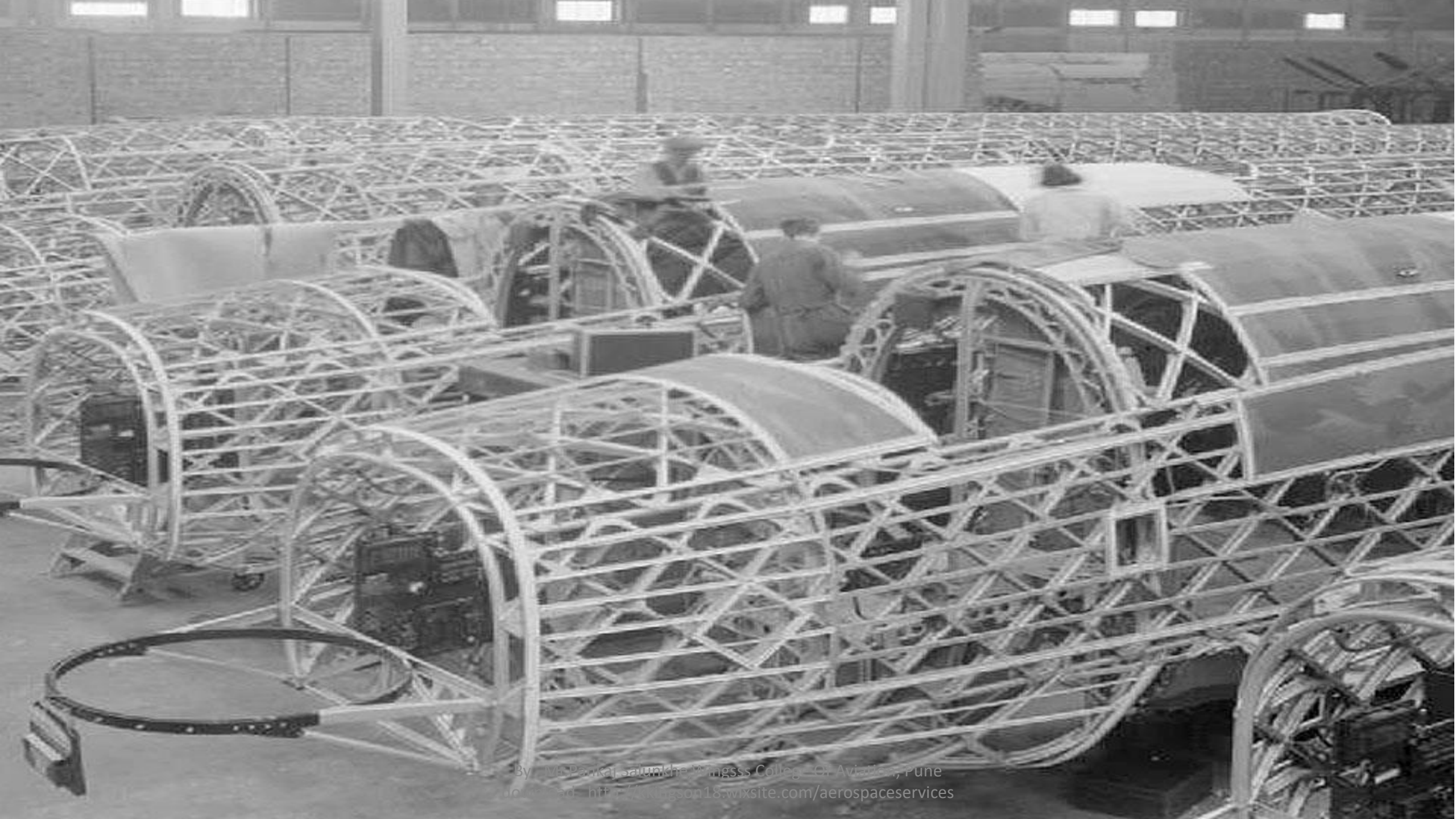


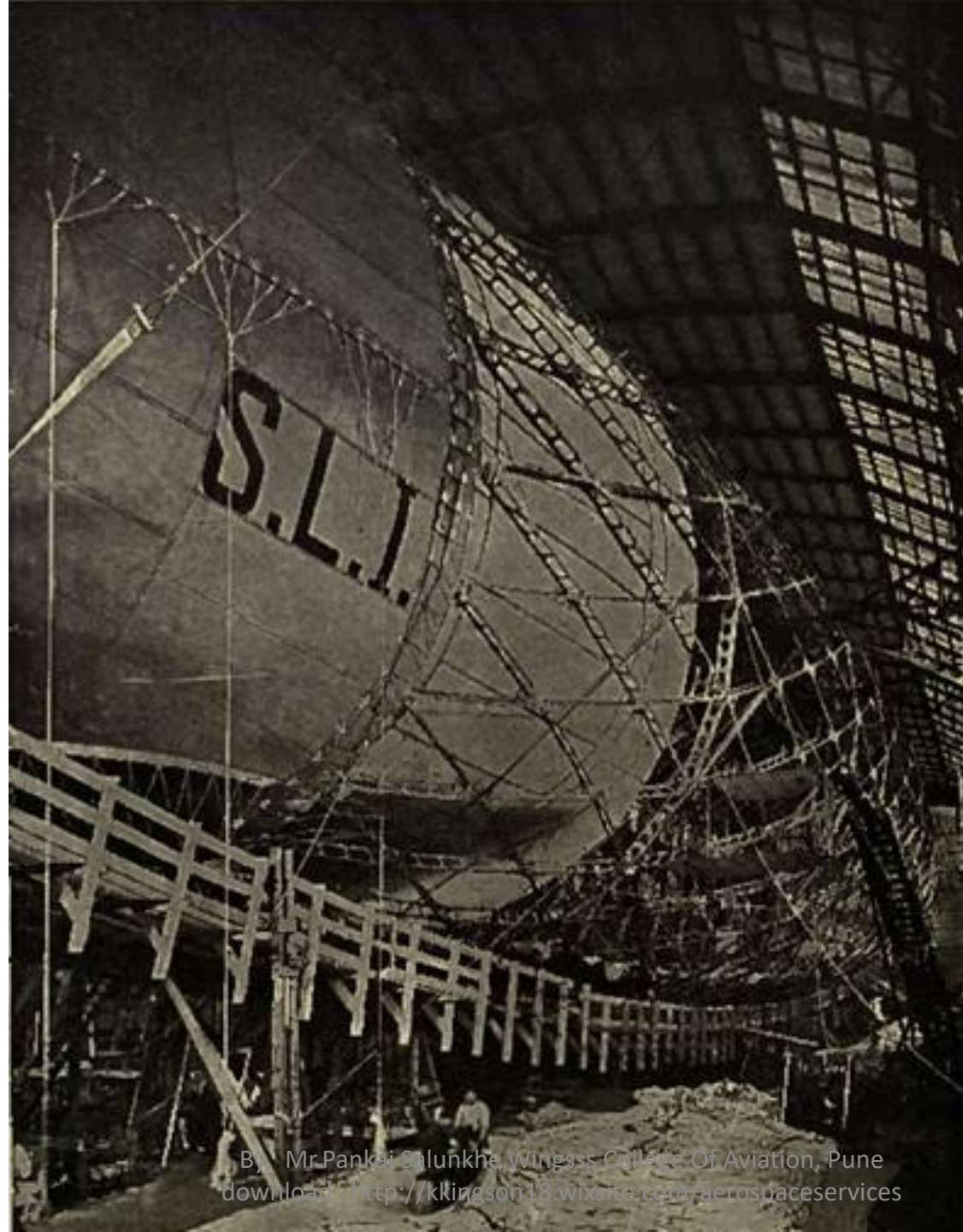


# **2.Geodetic Fuselage**

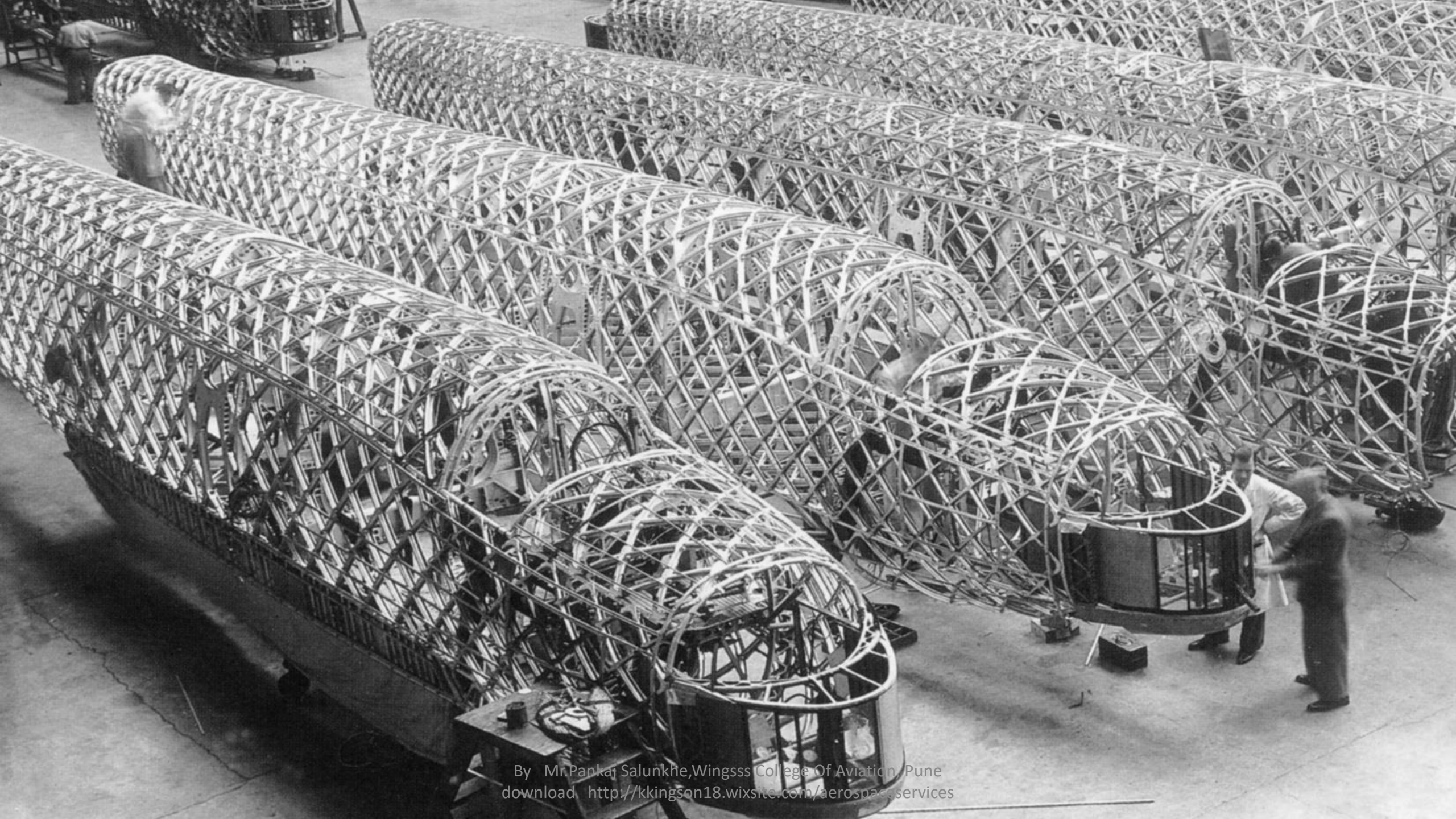
- Rather than building an aircraft structure on the principle of a beam, which supports an external aerodynamic skin, developed a new type of structure which had the **structural members formed within the aerodynamic shape itself.**
- This required the structural members to follow the curved outer shape of the fuselage and wings.

- A Geodetic (or Geodesic) airframe makes use of a space frame formed from a **spirally crossing basket-weave** of load-bearing members.
- By having the geodesic curves form two helices at right angles to one another, the members became mutually supporting in a manner that **the torsional load on each cancels out that on the other.**
- In addition to being comparatively light and strong, the fact that the geodetic structure was all in the outer part of the airframe meant that **the centre was a large empty space, ready to take payload or fuel.**
- Geodesic frames are **good in** transferring both **bending and shear loads..**









By Mr.Pankaj Salunkhe,Wingsss College Of Aviation ,Pune  
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**EJ200**

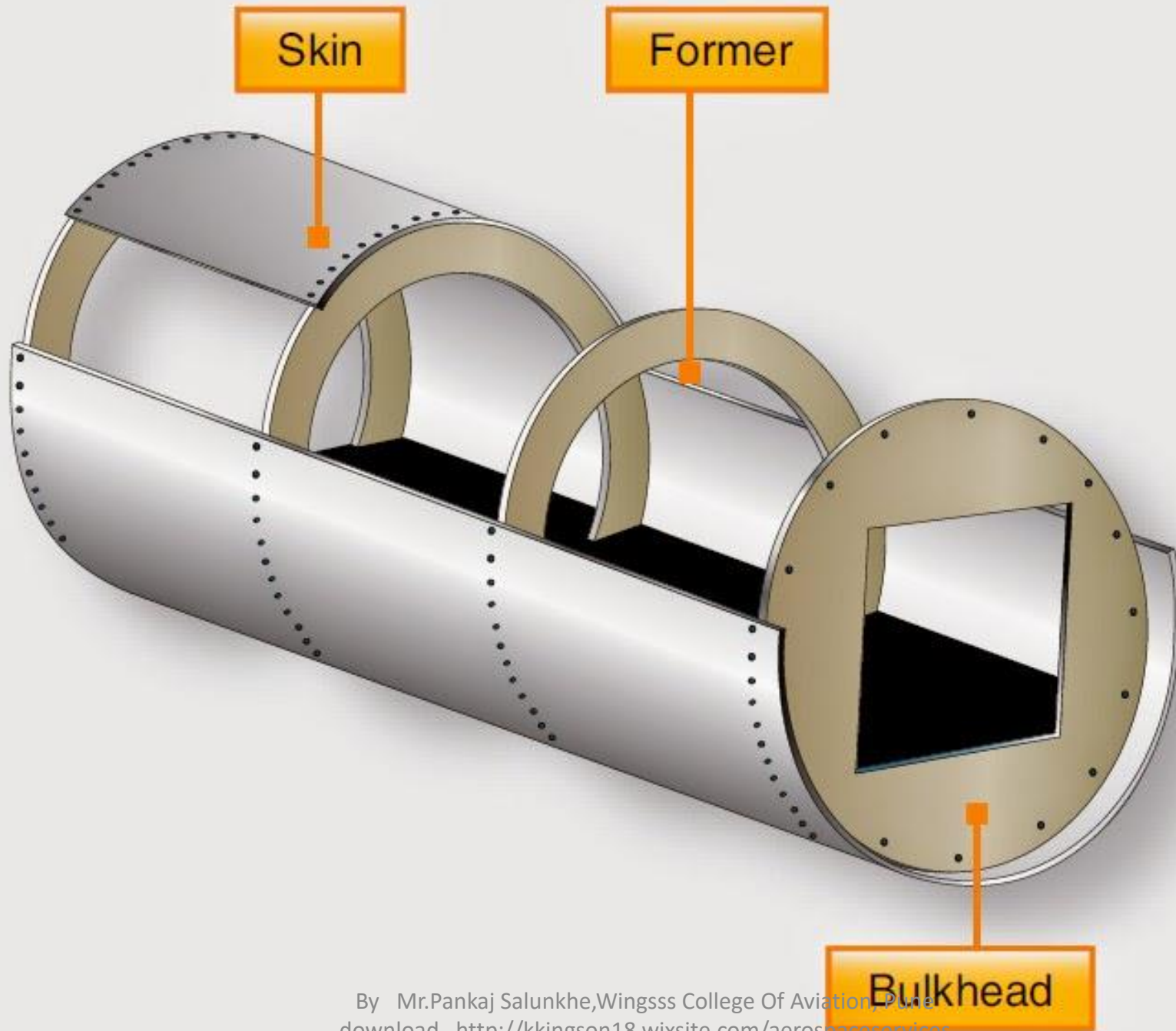
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# 3. MONOCOQUE TYPE



- **'Monocoque'** is a French word meaning **'single shell'**.
- **All the loads are taken by a stressed skin with just light internal frames or formers to give the required shape.**
- Although it practically can carry more load, the drawback of this type is that it may **require maintenance more** compared to the other designs, as the structure needs to be reinforced in order to maintain the structural integrity.

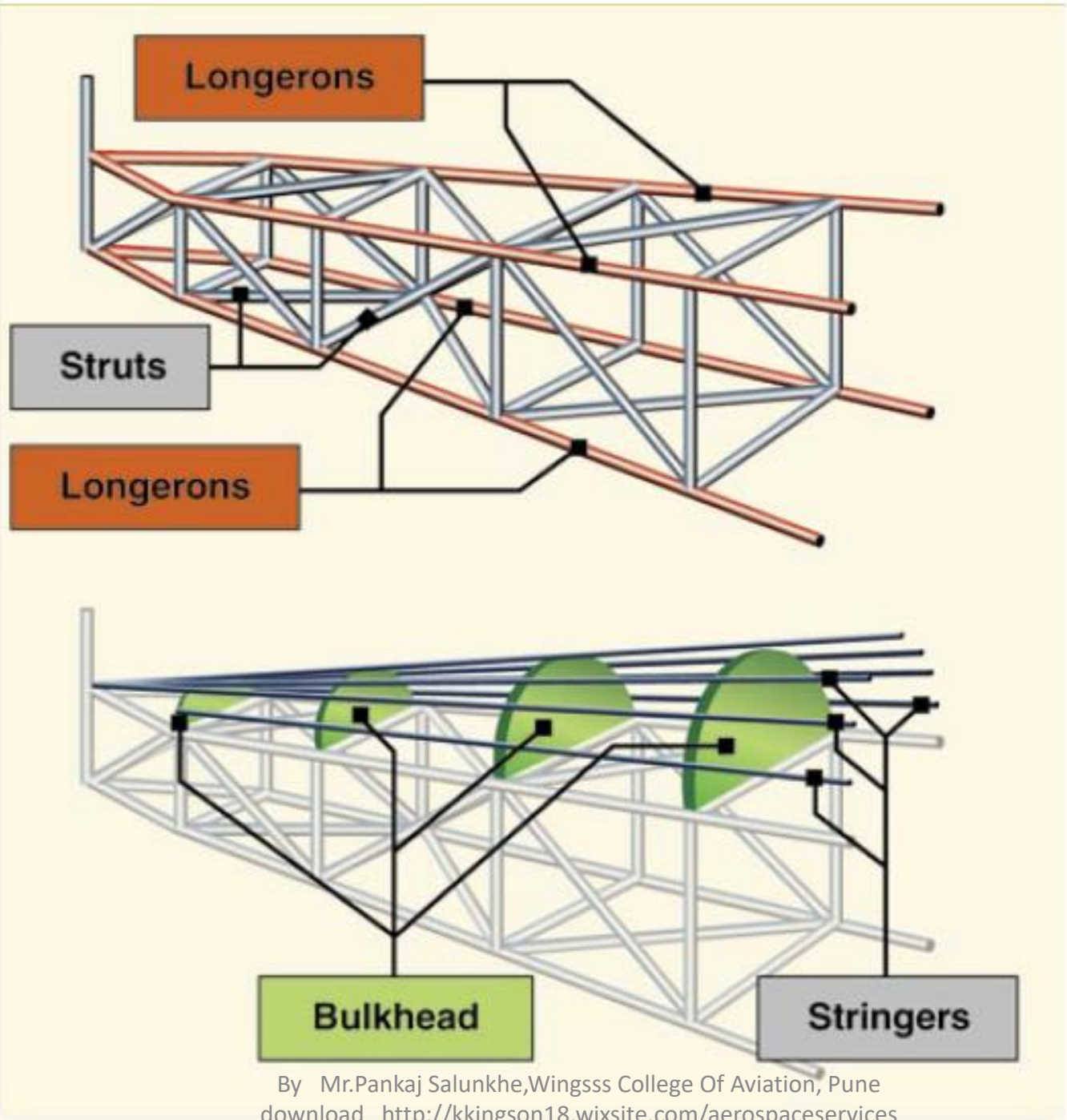
- Skin takes up all flight and ground loads and shape gives structure its rigidity
- Any damage to skin directly affects its load carrying capacity
- **Complications in designing doors windows and hatches**



# 4. SEMI-MONOCOQUE TYPE

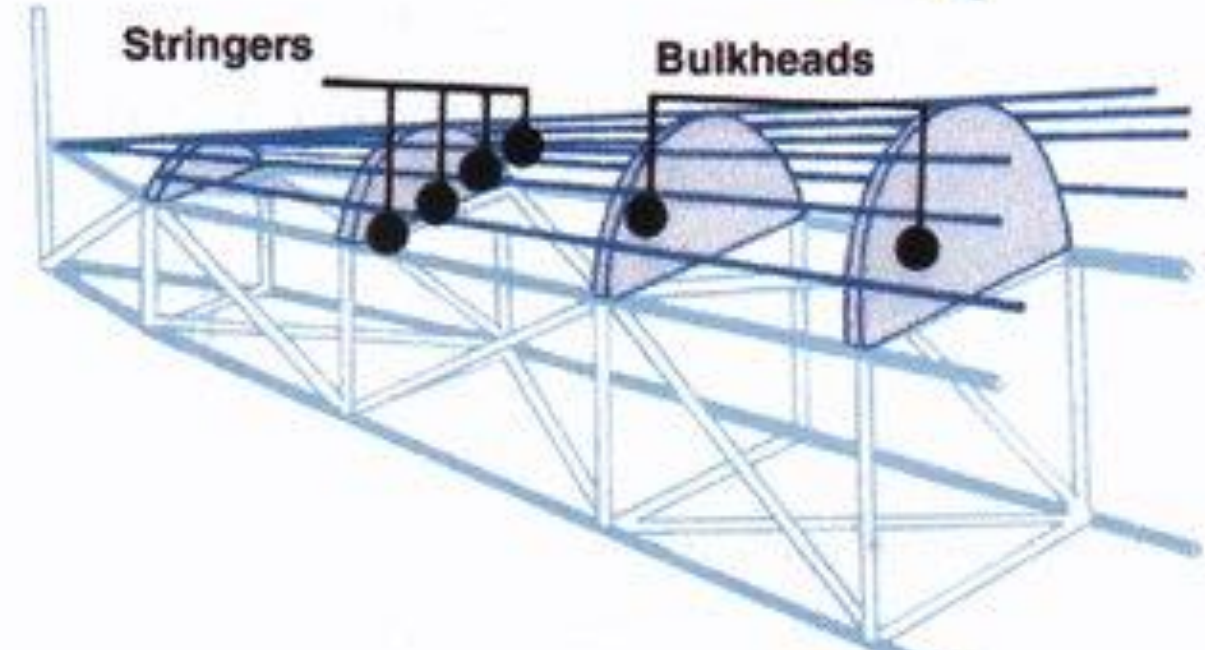
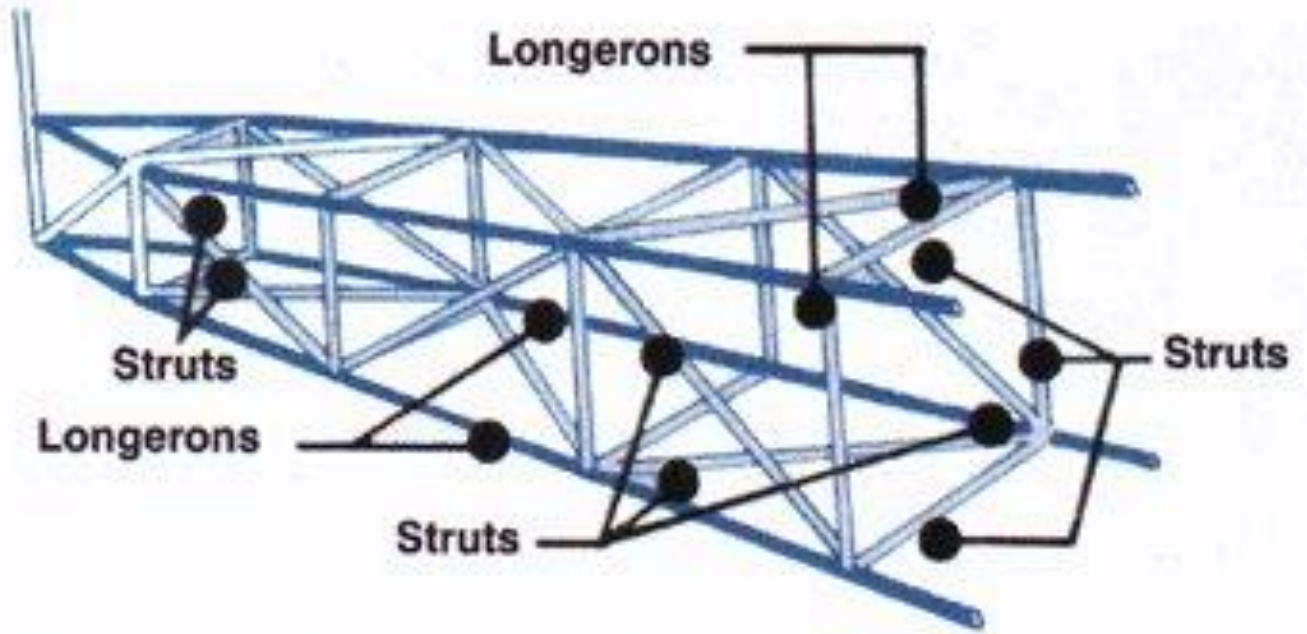
- As aircraft became larger, the pure Monocoque was found not to be strong enough.
- Designers came with a new concept to make fuselage stronger; **the Longerons run lengthwise along the fuselage joining the frames together.**
- **The light alloy skin is attached to the frames and longerons by riveting or adhesive bonding.**
- Doublers are required when cut-outs are made to provide access panels, doors or windows.

- Bulkheads isolate different sections of the aircraft, for instance the engine compartment from the passenger compartment.
- **Bulkheads are of much stronger** construction than frames or formers, as the loads upon them are so much greater.
- This concept is widely used both in military and also in the commercial industry. In military, this concept is believed **to enable planes to gain more speed**
- **Loads shared by skin, frames, stringers and formers**
- **Tolerant to damage Good strength to weight ratio**

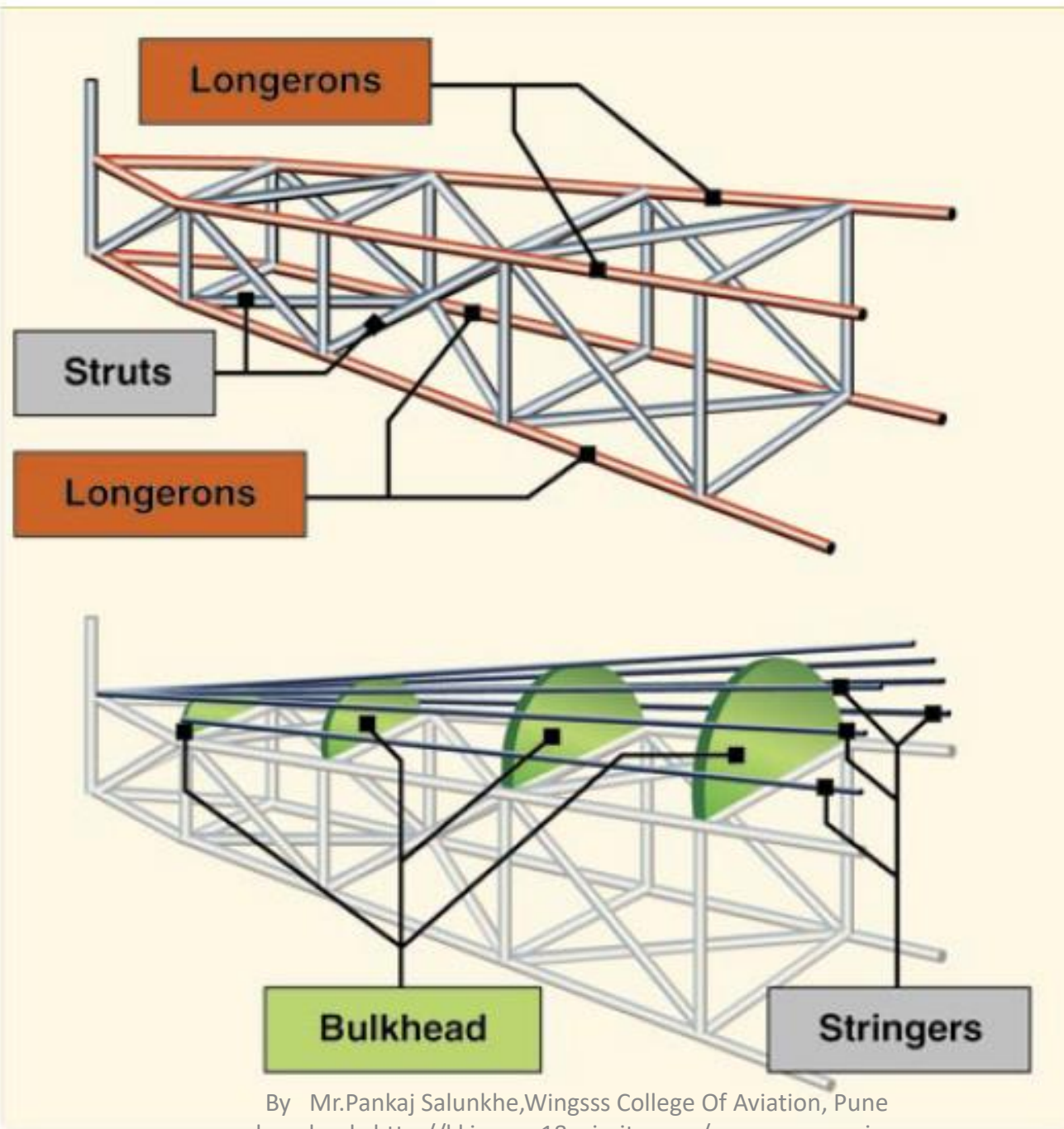


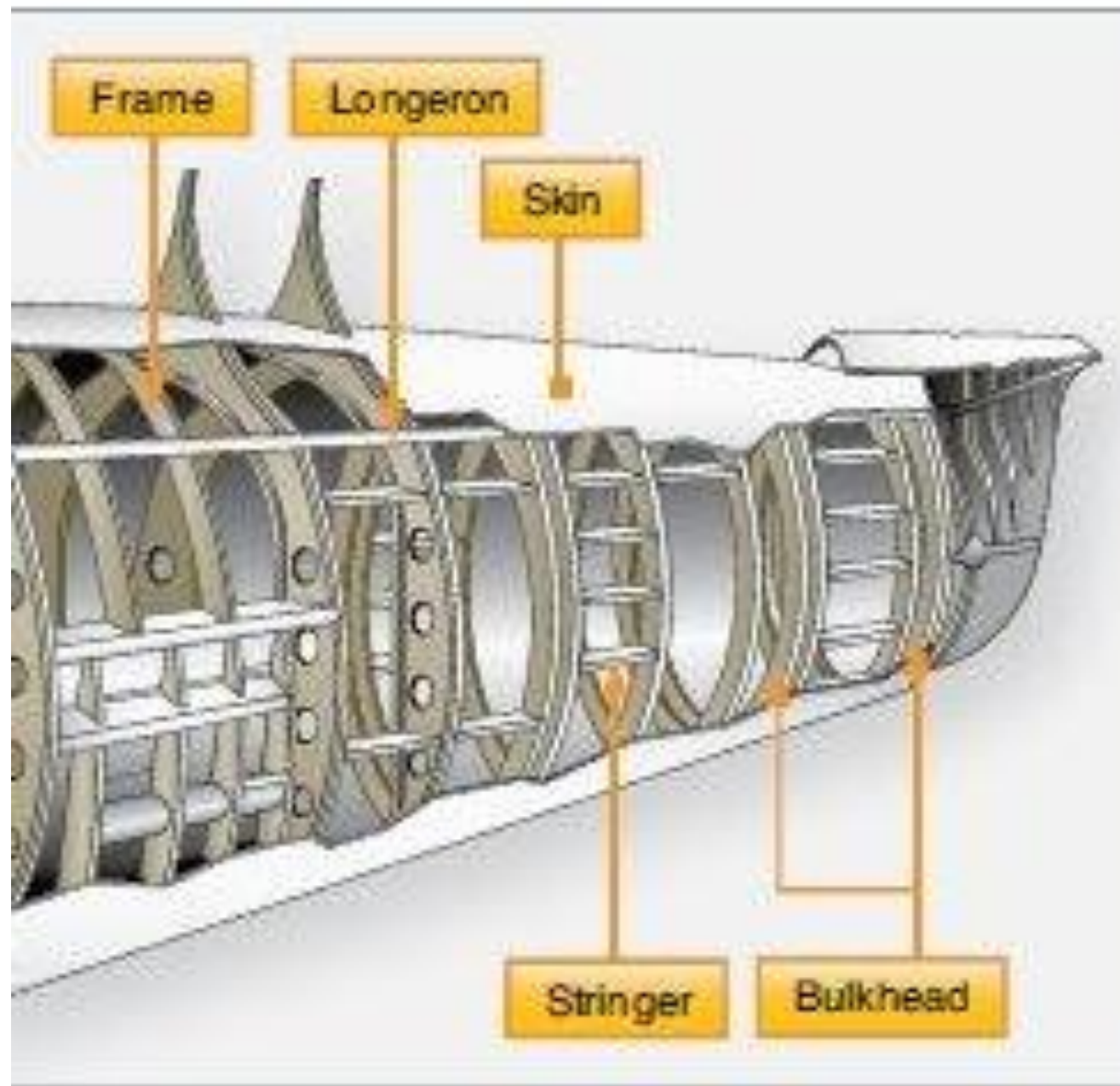
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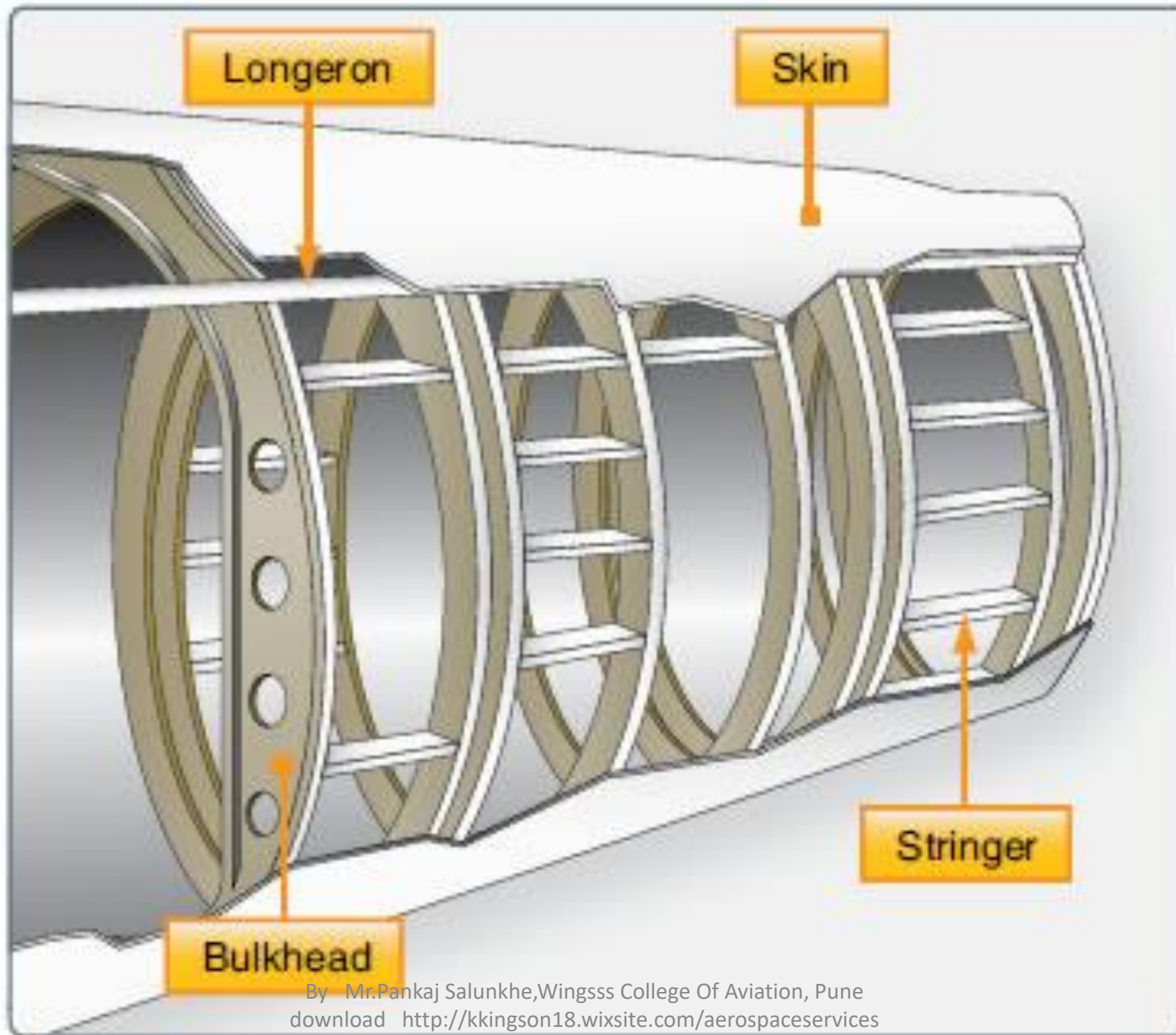






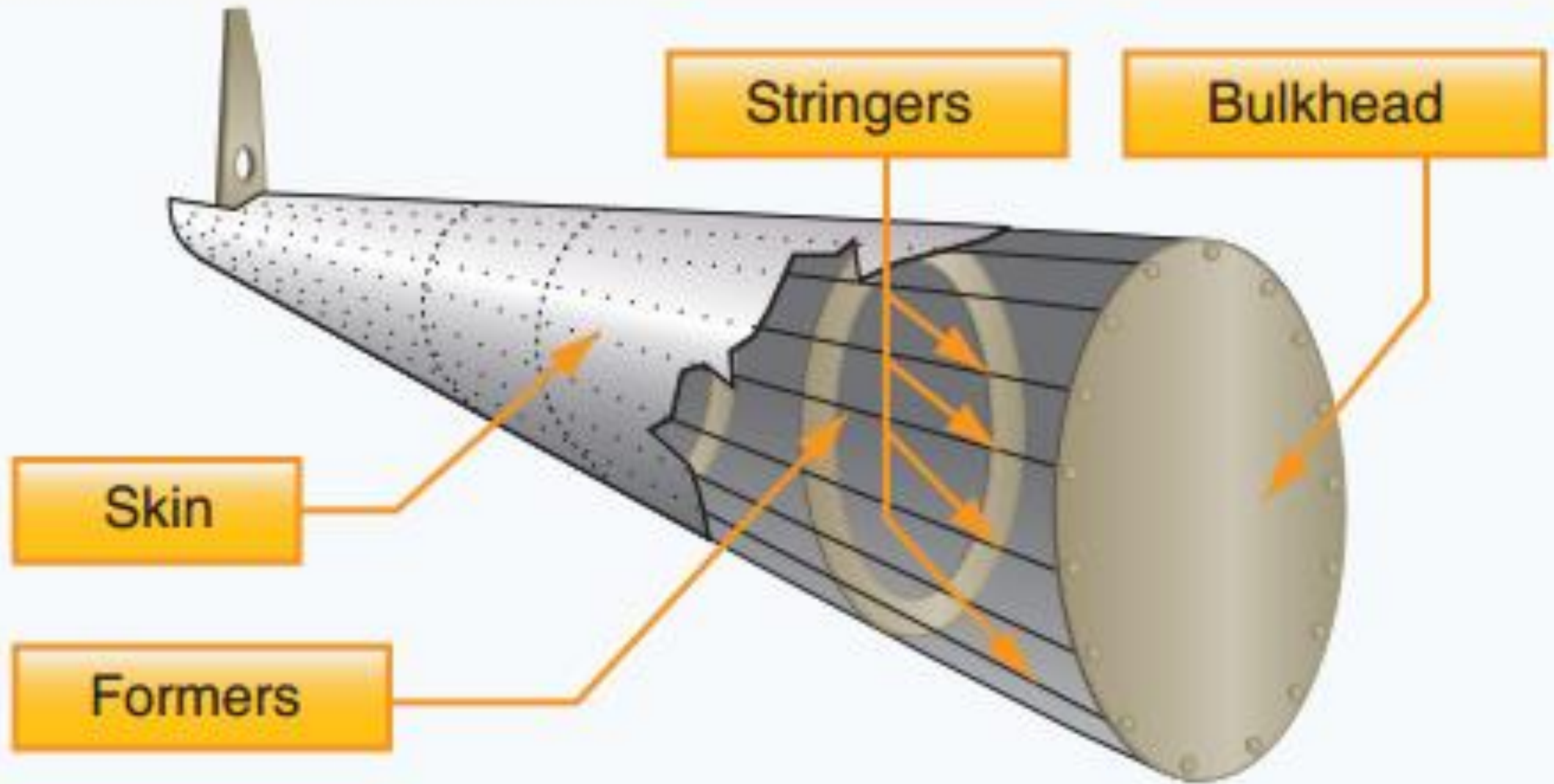


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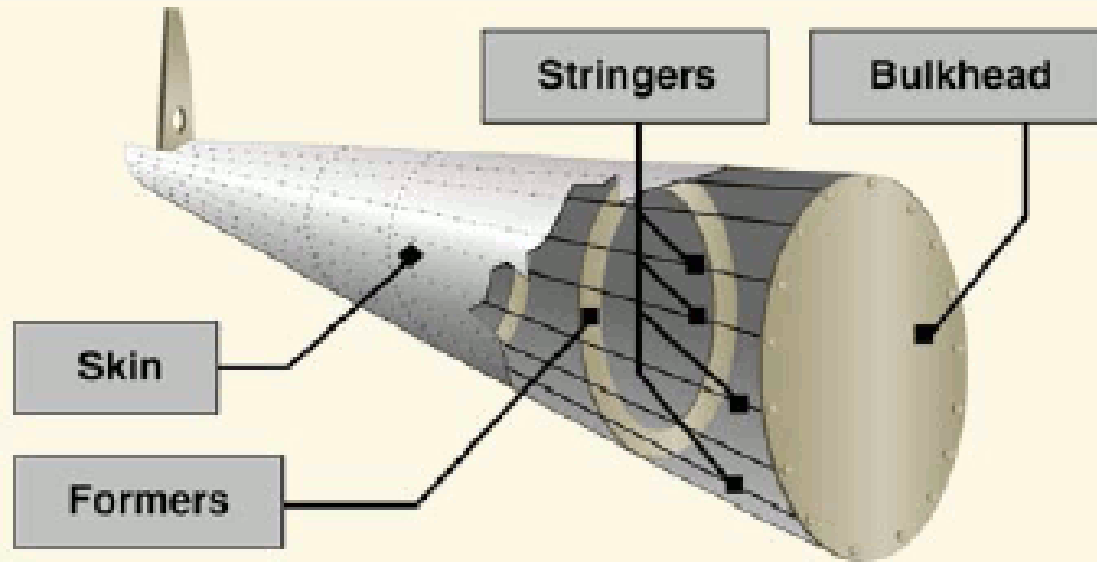




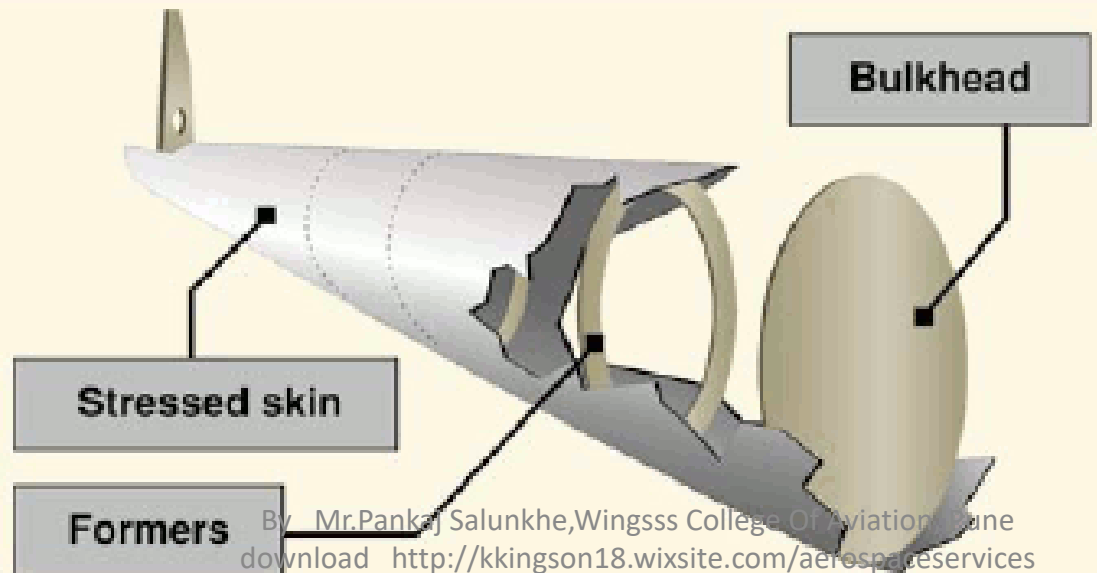
# Semimonocoque



## Semimonocoque



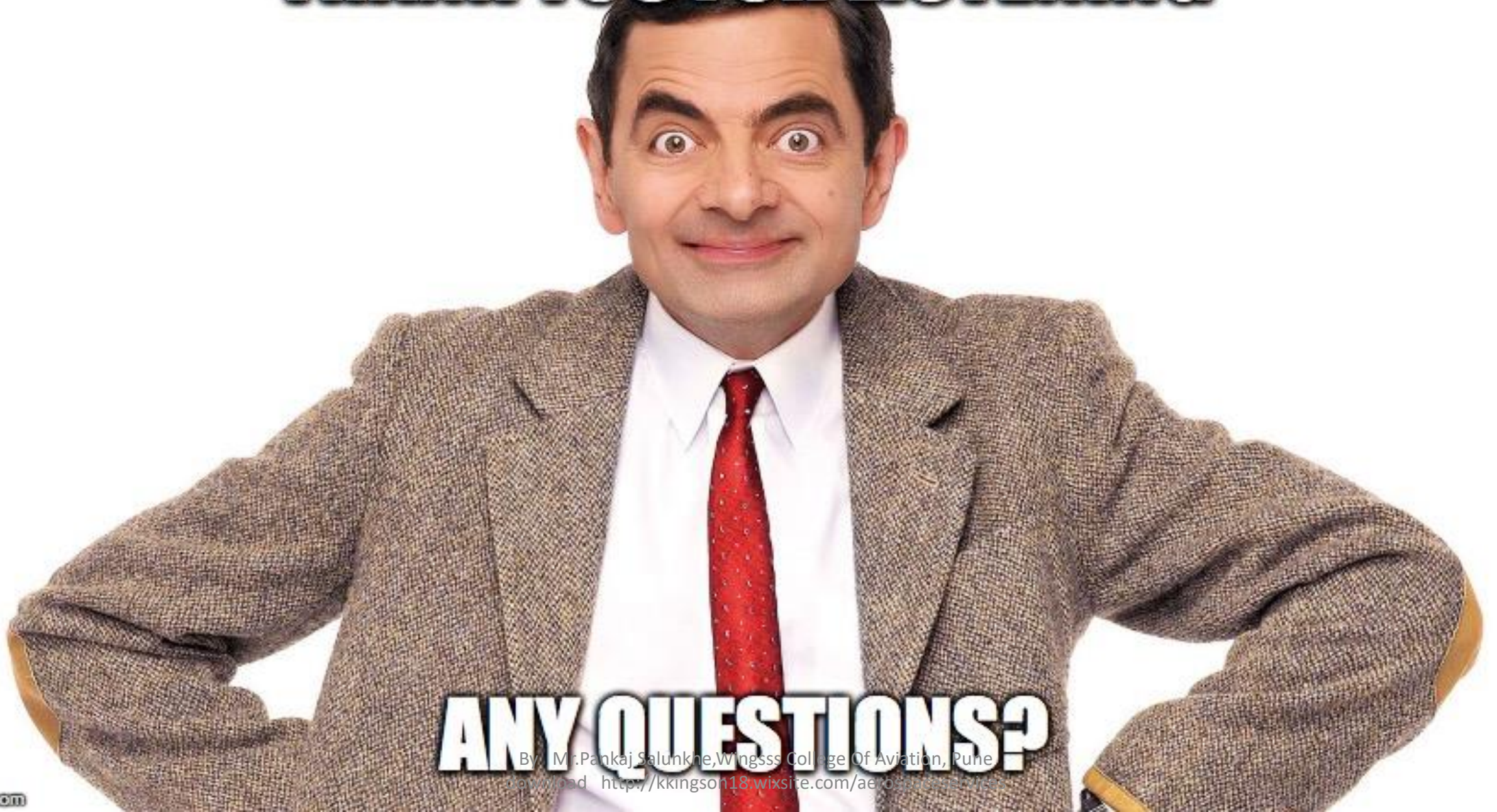
## Monocoque





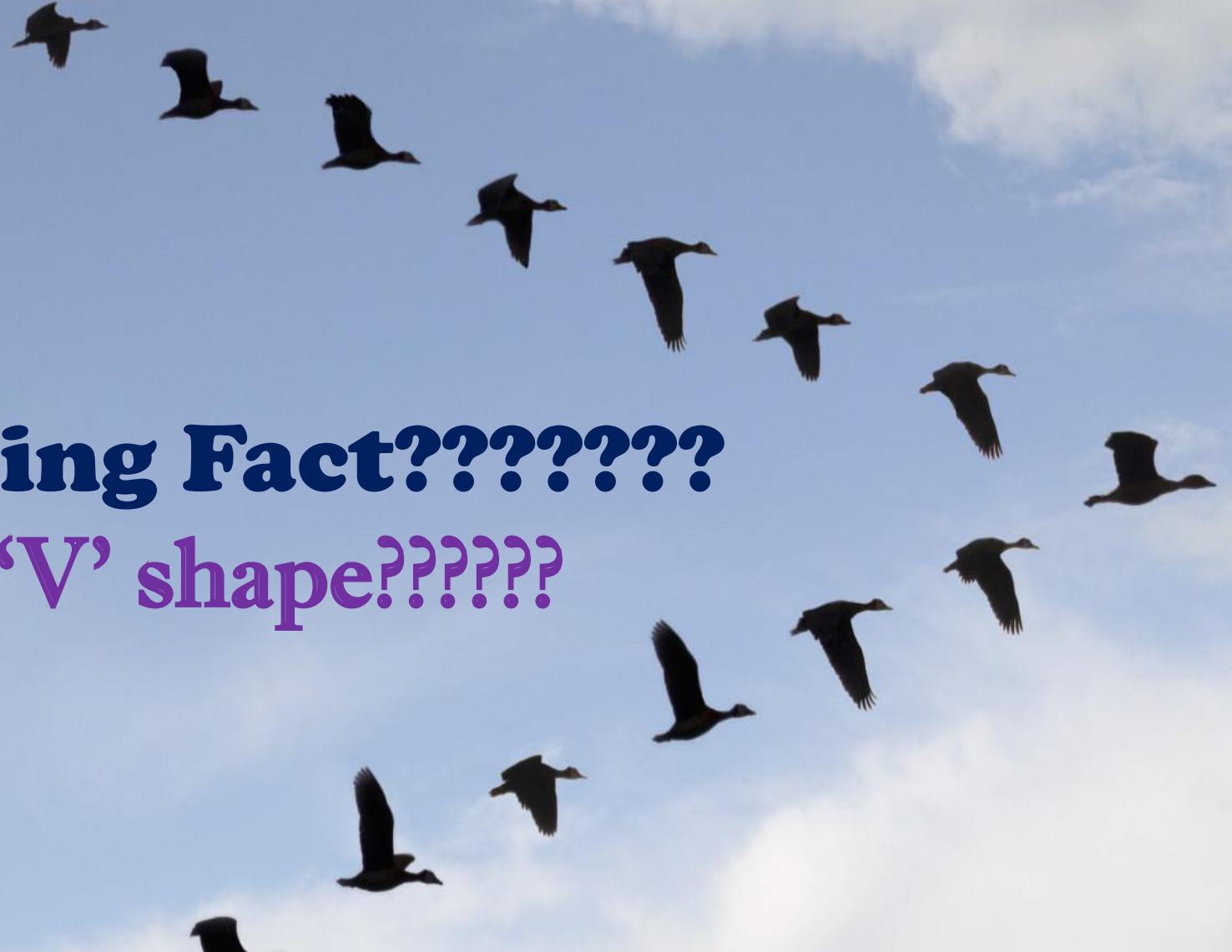


**THANK YOU FOR LISTENING**



**ANY QUESTIONS?**

By: Mr. Pankaj Salunkhe, Wingsss College Of Aviation, Pune  
Download: <http://kkingson18.wixsite.com/aerospace-services>



**Today's Amazing Fact???????**

why birds fly in 'V' shape??????



# धन्यवाद

**Prepared By  
Mr.Pankaj Salunkhe**