

# **LANDING GEAR OREO STRUT**

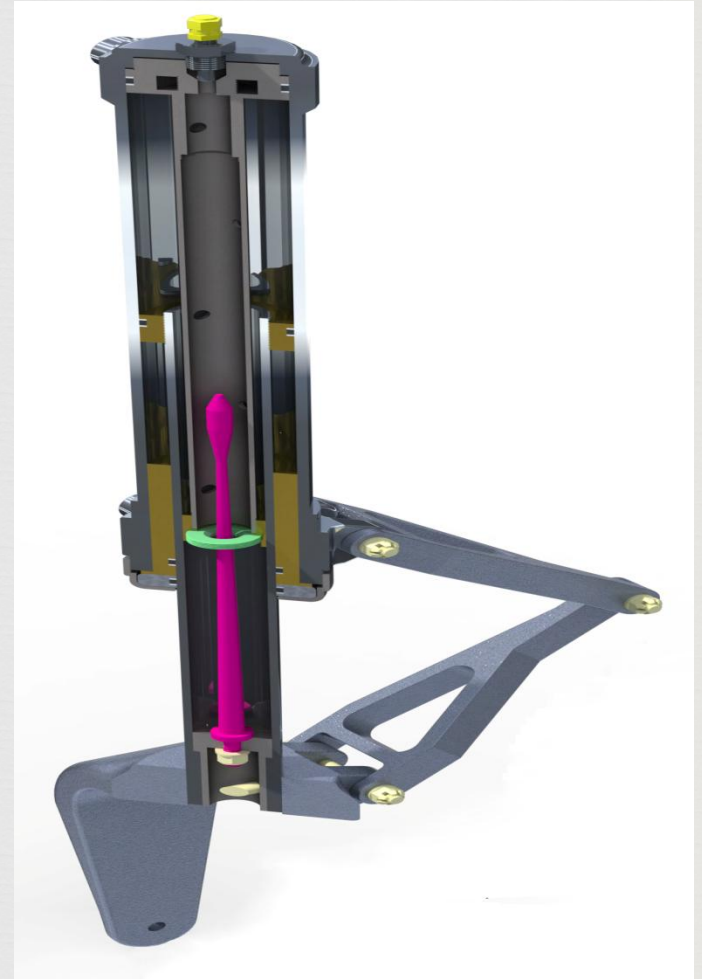
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# INTRODUCTION



- Oleo-pneumatic (oil/gas) shock struts, or oleo struts, are shock absorbers that cushion forces associated with aircraft landings and ground maneuvers such as taxiing.
- Oleo struts are critical elements of aircraft landing gear, connecting an aircraft's wheels to the airframe to provide the main path
- Through this path the load forces are transmitted from the ground to the airframe.
- The design cushions the impacts of landing and damps out vertical oscillations

# WHY USE THE OLEO STRUT?

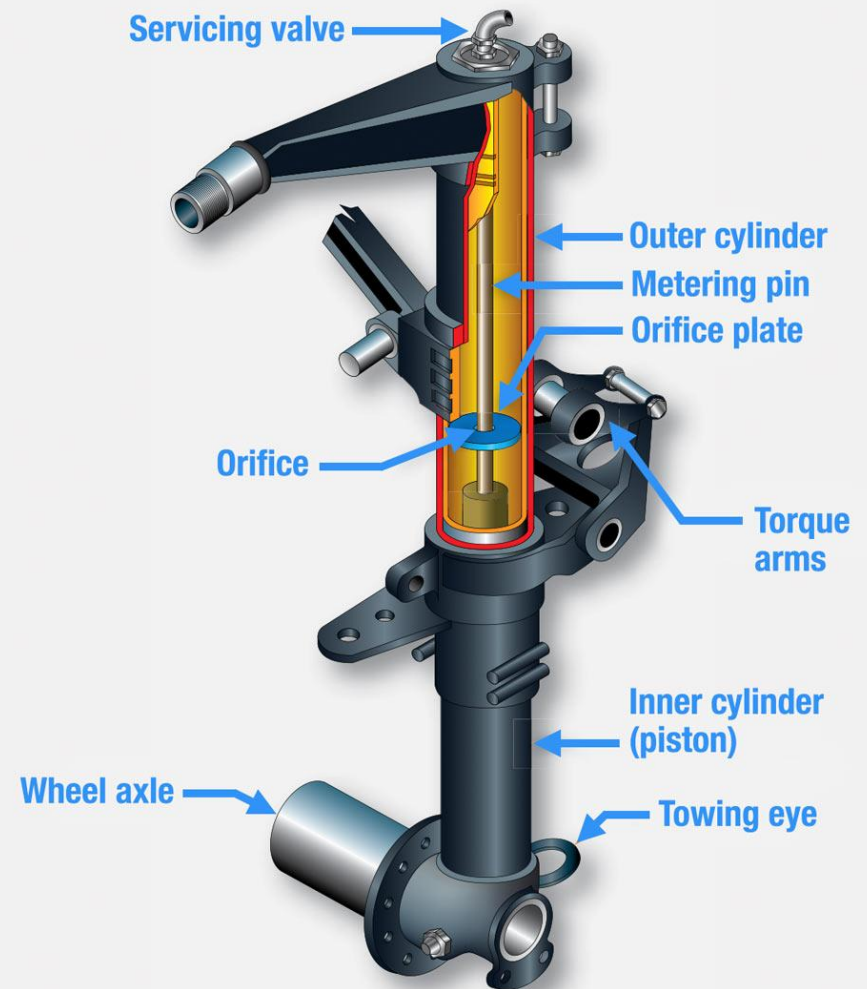
- It is undesirable for an airplane to bounce on landing as it could lead to a loss of control, and the landing gear should not add to this tendency.
- A steel coil spring stores impact energy from landing and then releases it, while an oleo strut instead absorbs this energy, reducing bounce.
- They minimize the accelerations experienced by the airframe and its occupants as the aircraft makes contact with the runway surface during landing – including damping the recoil to reduce bounce – and as it travels along the ground during taxiing maneuvers.
- By converting a portion of the aircraft's kinetic energy to heat, oleo struts absorb and dissipate forces associated with landing



# PARTS OF OLEO STRUT

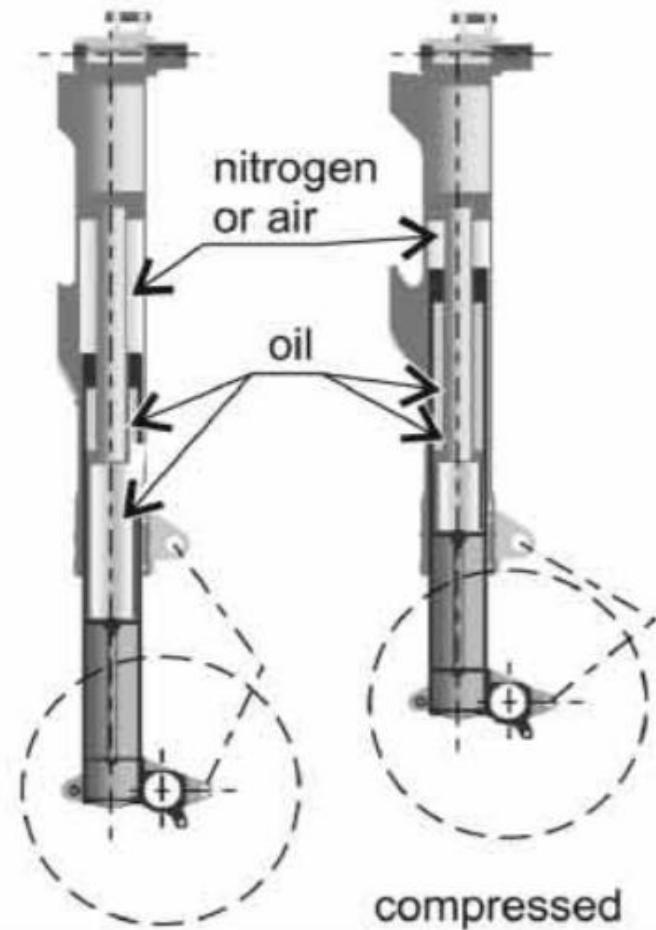
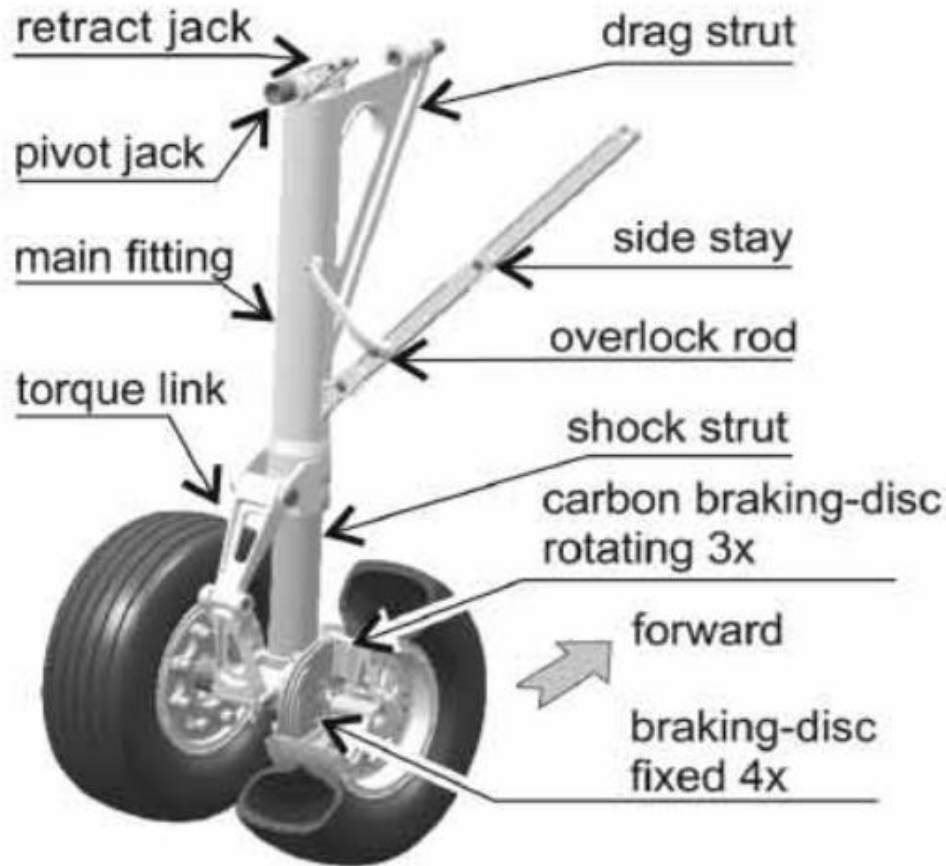
- OUTER CYLINDER
- INNER CYLINDER
- TAPERED METERING PIN
- WHEEL AXLE
- SERVICING VALVE
- TORQUE ARMS

## Oleo Strut



- Tapered metering pin – It is used for controlling the rate of flow of hydraulic fluid through the orifice
- Wheel axle – Provision for connecting aircraft wheels
- Servicing valve – It provides a means for filling hydraulic fluid or air
- Torque arms – It is provided for keeping the piston and wheels aligned

# WORKING OF OLEO STRUTS



- A typical pneumatic/hydraulic shock strut uses compressed air or nitrogen combined with hydraulic fluid to absorb and dissipate shock loads. It is sometimes referred to as an air/oil or oleo strut.
- A shock strut is constructed of two telescoping cylinders or tubes that are closed on the external ends. The upper cylinder is fixed to the aircraft and does not move. The lower cylinder is called the piston and is free to slide in and out of the upper cylinder.
- Two chambers are formed. The lower chamber is always filled with hydraulic fluid and the upper chamber is filled with compressed air or nitrogen. An orifice located between the two cylinders provides a passage for the fluid from the bottom chamber to enter the top cylinder chamber when the strut is compressed



➤ During the compression stroke, the rate of fluid flow is not constant. It is automatically controlled by the taper of the metering pin in the orifice.

➤ When a narrow portion of the pin is in the orifice, more fluid can pass to the upper chamber. As the diameter of the portion of the metering pin in the orifice increases, less fluid passes.

➤ Pressure build-up caused by strut compression and the hydraulic fluid being forced through the metered orifice causes heat. This heat is converted impact energy. It is dissipated through the structure of the strut.

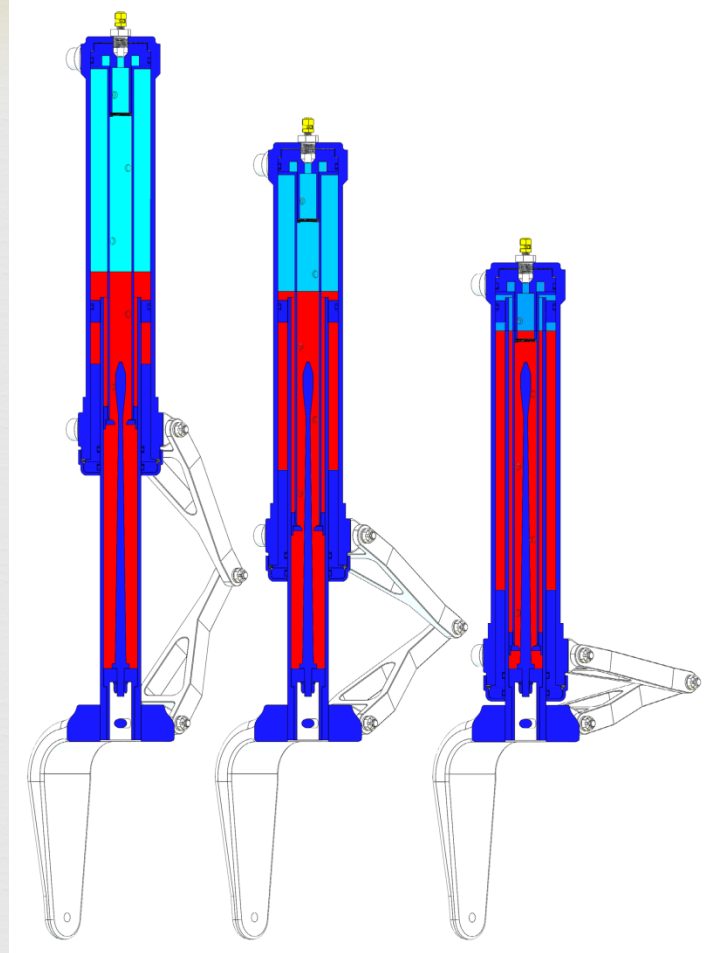
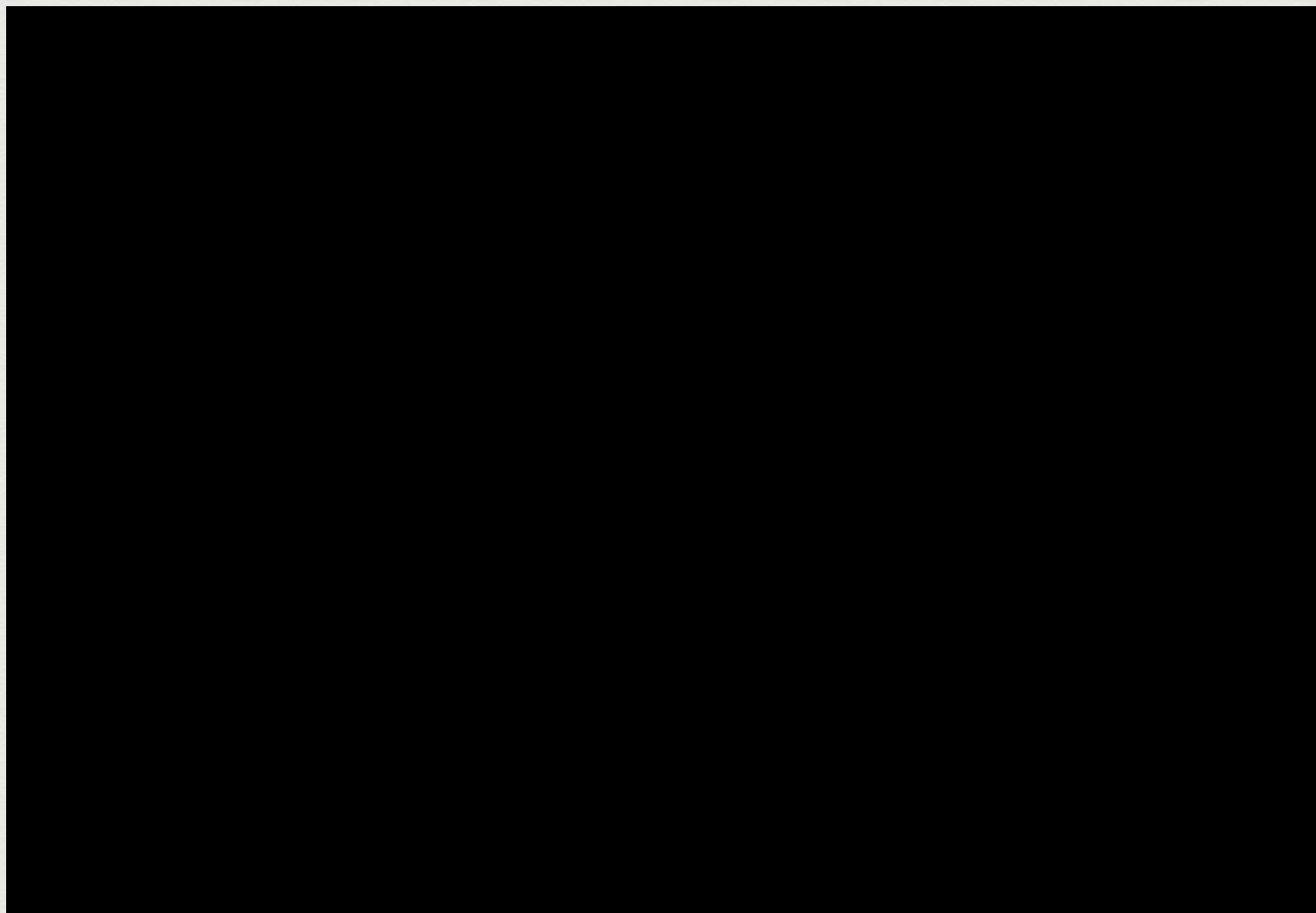


Diagram illustrating the interaction between the gas (light blue) and hydraulic fluid (red) in an oleo strut during compression of the strut.



# APPLICATIONS

- Oleo-pneumatic strut had become the most common type of shock absorber in use upon modern aircraft.
- In particular, the oleo strut has seen heavy use amongst the largest cargo airplanes in the world, such as the Antonov An-124 Ruslan it reportedly provides for a rough-field landing capacity while carrying payloads of up to 150 tons.
- The Quadro range of motor scooters use the oleo strut, which is claimed to give favourable low speed lean characteristics

**THANK YOU**