

30.1 Wheels

- Aircraft wheels are typically made of aluminum or magnesium alloy and are designed in two pieces (split-wheel design) to facilitate tyre changes.
- ☐ Creep: The tendency of the tyre to rotate slightly around the wheel rim on landing. Creep marks (a white line on the tyre and wheel) are used to monitor this.
- ☐ Fusible Plugs: These plugs are fitted in the wheels of transport aircraft. If the brakes overheat, the core of the plugs melts at a set temperature, allowing the tyre to deflate in a controlled manner, which prevents a dangerous tyre explosion.

30.2 Tyres

- Aircraft tyres are designed to withstand very high loads and speeds. They are typically inflated with nitrogen because it is inert and does not support combustion.
- ☐ Construction: Built with multiple layers of fabric (plies) embedded in rubber. The ply rating is an index of the tyre's strength, not the actual number of plies.
- ☐ Tread: The tread is often ribbed with circumferential grooves to channel water away and prevent aquaplaning (when a wedge of water lifts the tyre off the runway surface, causing a loss of braking and directional control).
- ☐ Aquaplaning Speed: The minimum speed at which aquaplaning can occur can be estimated by the formula: $\text{Speed (knots)} = 9 \times \sqrt{\text{Tyre Pressure (PSI)}}$.

30.3 Brakes

- ☐ Multi-Disc Brakes: Large aircraft use brakes consisting of a stack of alternating rotating discs (rotors, keyed to the wheel) and stationary discs (stators, keyed to the axle). Hydraulic pressure from pistons squeezes this stack together, creating immense friction.
- ☐ Brake Materials: The discs are made of steel or, more commonly on modern aircraft, carbon-carbon composites. Carbon brakes are lighter, can absorb much more heat, and are

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- more effective at high temperatures.
- ☐ Anti-Skid System: Similar to ABS in a car, this system prevents the wheels from locking up during heavy braking.
- Operation: A wheel speed sensor on each wheel detects if a wheel is decelerating too rapidly (indicating an impending skid). The anti-skid control unit then commands a hydraulic valve to momentarily release and reapply brake pressure to that wheel, maintaining maximum braking effectiveness without skidding.
- ☐ Autobrake System: This system automatically applies the brakes upon landing or during a rejected takeoff (RTO). The pilot can select a desired deceleration rate (e.g., LOW, MED, MAX), and the system modulates the brake pressure to achieve it.

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