# Flight Training Fundamentals – Landing Gear

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Landing gear - or undercarriage - is the structure that supports an aircraft on the ground and allows it to takeoff, land and taxi. It is the portion of the aircraft consisting of the wheels, tires, brakes, energy absorption mechanism, and drag brace. Additional components attached to and functioning with the landing gear may include retracting mechanisms, steering devices, shimmy dampers, and door panels.

A flight training student will need to know all about the mechanics of landing gears and how they operate. The flight student will also learn about “gear-up” landing incidents and how dangerous and costly they can be.

The landing gear supports the aircraft on the ground and provides a means of motion. It also serves as the primary means of absorbing the large amounts of energy in the transition from flight to ground roll during a landing approach. The brakes, normally located in the main wheels, are used to stop the forward motion of the aircraft on the ground and may also provide some control in the steering of the aircraft. In most modern aircraft the landing gear is designed to retract into the aircraft so that it is out of the airstream and drag is reduced.

Early aircraft and many small aircraft use a tail-wheel (or skid) in a conventional, or tail-dragger arrangement, in which the main landing gear is located ahead or forward of the center of gravity of the aircraft. Modern aircraft use a “tricycle” landing gear arrangement with the main gear located behind or aft of the center of gravity, and a nose gear located forward which carries about 20% of the static weight of the aircraft. Large aircraft like Boeing 747’s, Airbus A380’s and military transport aircraft use multiple-wheeled “bogies” (the chassis or framework that that carries the wheels) to support their huge weight.

## Landing Gear and Accidents

Malfunctions or human errors (or a combination of these) related to retractable landing gear have been the cause of numerous accidents and incidents throughout aviation history. Distraction and preoccupation during the landing sequence is the main reason for the approximately 100 gear-up landing incidents that occurred each year in the United States between 1998 and 2003. A gear-up landing incident is an accident that may result from the pilot simply forgetting, or failing, to lower the landing gear before landing or a mechanical malfunction that does not allow the landing gear to be lowered. Although rarely fatal, a gear-up landing is very expensive, as it causes massive airframe damage. For propeller driven aircraft it almost always requires a

complete rebuild of the engines because the propellers strike the ground and come to a complete stoppage if they are running during impact.

A flight student will need to learn all about an aircraft – from the nose to the tail. This part about landing gear is one of the most important elements for your flight school training and career.
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