Wing Rising After Touchdown

In all the proper landing techniques except the soft field, the nose is lowered after the front wheel touches to put a negative AOA on the wing and keep the WSC aircraft on the ground. However, there may be instances when landing in a crosswind that a wing wants to rise during the after-landing roll. This may occur whether or not there is a loss of directional control depending on the amount of crosswind and the degree of corrective action.

Any time an aircraft is rolling on the ground in a crosswind condition, the upwind wing is receiving a greater force from the wind than the downwind wing. This causes a lift differential. Also, as the upwind wing rises, there is an increase in the AOA which increases lift on the upwind wing rolling the aircraft downwind.

When the effects of these two factors are great enough, the upwind wing may rise even though directional control is maintained. If no correction is applied, it is possible that the upwind wing rises sufficiently to cause the downwind wing to strike the ground.

In a crosswind, the windward wing should be lowered slightly as a preventive measure to avoid it from lifting. But in the event a wing starts to rise during the landing roll, the pilot should immediately lower the nose while lowering the wing. The wing should be lowered as soon as possible. The further a wing is allowed to rise before taking corrective action, the more wing surface is exposed to the force of the crosswind.

Hard Landing

When the aircraft contacts the ground during landings, its vertical speed is instantly reduced to zero. Unless provisions are made to slow this vertical speed and cushion the impact of touchdown, the force of contact with the ground may be so great it could cause structural damage to the aircraft.

The purpose of pneumatic tires, shock-absorbing landing gears, and other devices is to cushion the impact and to increase the time in which the aircraft's vertical descent is stopped. The importance of this cushion may be understood from the computation that a 6-inch free fall on landing is roughly equal to a descent of 340 feet per minute. Within a fraction of a second, the aircraft must be slowed from this rate of vertical descent to zero without damage.

During this time, the landing gear together with some aid from the lift of the wings must supply whatever force is needed to counteract the force of the aircraft's inertia and weight. The lift decreases rapidly as the aircraft's forward speed is decreased and the force on the landing gear increases by the impact of touchdown. When the descent stops, the lift is almost zero leaving only the landing gear to carry both aircraft weight and inertia force. The load imposed at the instant of touchdown may easily be three or four times the actual weight of the aircraft, depending on the severity of contact. After a hard landing, the WSC carriage and wing should be inspected by qualified personnel for airworthiness.

Chapter Summary

All landings should consist of evaluating the wind and conditions so a proper base and final are planned to land at or beyond the intended point. After the final approach to the runway, the roundout is started about 10 to 15 feet high and is a gradual descent until the rear wheels are inches above the surface. The rotation is continued as the speed bleeds off to maintain the wheels one to two inches above the runway until minimum controlled airspeed at which the WSC aircraft settles to the ground. A roundout that is too fast, or ballooning where altitude is gained during the landing, is a common mistake and should be avoided.

The best landing technique for light wind conditions is with power brought to idle during the downwind leg of the pattern before the turn to base. Proficiency in power-off accuracy landings with 90° turns, 180° turns, 360° turns, and circling from above are all important safety procedures.

Crosswinds or landing in turbulence requires more energy, including power-on approaches with higher airspeeds. In these conditions, the WSC aircraft can be flown into the ground above the stall speed. Go-arounds are normal procedures and should be performed if there is any question as to the successful outcome of any landing.