

AIRCRAFT LIGHTNING PROTECTION

It is estimated that every passenger aircraft in the U.S. is struck by lightning at least once each year. It is also estimated that there are over 3,000 commercial airliners in the U.S., and that a typical passenger airliner lifespan is 20 to 30 years. That is a lot of lightning strikes on each aircraft.

A lightning strike is not uncommon; in fact, it is expected. The incident is of far less worry now than it has been. New airliners fly off the assembly line with several features intended to minimize or eliminate the damage once incurred by lightning strike. As a result, the last airline crash that was directly attributed to a lightning strike was in 1967 when a spark generated by lightning ignited a fuel tank explosion.

However, the absolute prevention of all effects of a lightning strike on an airplane has yet to be achieved, but almost all incidents that occur to large commercial passenger airliners are minor compared to the 1967 catastrophe. Now, other than still seeing a bright flash just as is seen on the ground, and loud noise, the damaging effects are minimized to brief electrical interference and flickering of lights.

The skin of most aircraft is made of aluminum sheets, which is very conductive. Aircraft design engineers have learned that as long as gaps are eliminated from panel to panel in the construction of the aircraft, the current will remain on the exterior skin and will typically cause no damage even if the current travels, as it often does, from an extremity like a wing, along the length of the fuselage to the tail.

However, the nose of the aircraft typically carries the radar equipment essential for navigation. This equipment will fail to function if surrounded by a conductive skin, so the nose is now also equipped with lightning diversion strips along the nose to divert the flow of current away from the nose.

Because the last fatal accident due to lightning strike was by ignition of a spark that exploded the fuel tank, design engineers have addressed the issue with several solutions. First, the skin around fuel tanks has a thicker skin than usual in order to prevent burn through in case of a strike. All caps and filler tubes and pipes to fuel the airliner and to deliver fuel to the engines are protected against lightning strike to prevent the spark that took down the 1967 airliner. Finally, airline fuel has been re-engineered to reduce explosive vapors.

Modern passenger airliners contain extensive wiring and electronic equipment that is now shielded from power surges and transient currents caused by lightning strikes. The outward appearance of these corrections is that the visual results from

lightning strike are limited to the brief interference and flickering lights instead of shutting these systems down.

With modern lightning prevention treatment in commercial passenger airliners, you are more likely to suffer from a lightning strike to your car than you ever will suffer from a strike on an airliner. Travel with confidence.

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