



How is a plane protected from lightning strikes?

Since the outer skin of most airplanes is primarily aluminium, which is a very good conductor of electricity; the secret to safe lightning hits is to allow the current to flow through the skin from the point of impact to some other point without interruption or diversion to the interior of the aircraft.

Estimates show that each commercial airliner averages one lightning hit per year but the last crash that was attributed to lightning was in 1967 when the fuel tank exploded, causing the plane to crash.

Generally, the first contact with lightning is at an extremity, the nose or a wingtip, lightning transits through the aircraft skin and exits through another extremity point, frequently the tail.

Another related problem is the effect on computers and flight instruments. Shielding and surge suppressors insure that electrical transients do not threaten the on board avionics.

Electricity finds it's way from one place to the other via what's called a "step leader". The sheer power of the cloud will start to attract electrons

from the ground. These electrons will gather on anything that gathers charge (like a fence) or sticks up in the air (like a person), or that does both (like a telephone pole). That electric charge will start to work it's way through the air, ionising it, until the leader working it's way down and the leader trying to get up finally meet. When they do, there's lightning. An aircraft will act as a conduit for step leaders.

The way an aircraft tries to dissipate these step leaders is through the use of a "static wick". A static wick is a piece of metal connected electrically to the frame of the aircraft, with one or two spikes or needles on the end. It is housed in a fiberglass rod to insulate it from the airplane. Because the spikes concentrate the electric charge around them, and they are connected to the airframe, they allow the airplane to dissipate any static electricity it may build up out into the air.

(Taken from <http://www.physlink.com/education/askexperts/ae568.cfm>)

EXCERCISES

1 True or false?

- a. According to estimates every commercial airliner receives several lightning hits per year. T F
- b. Generally, after the first hit, lightning transits through the aircraft skin and exits through another extremity point. T F
- c. A fence may gather electrical charge. T F
- d. A "static wick" is a piece of metal electrically connected to the aircraft. T F

2 Complete.

Electric starts it's way through the The electrons ionise the air, the leader working it's way, and the leader trying to get up meet, at this point we usually can see The aircrafts usually act as a for step leaders, because lightning through the aircraft, entering from a side and going out from

Aircrafts use a "static wick" to the electric charge of A "static wick" is a of metal connected to the frame of the It is placed in a rod that it from the airplane.

transits • fiberglass • electrically • lightning • charge • conduit • insulates • until • dissipate • air • skin • lightning • finally • down • another • aircraft • piece

3 Match questions and answers.

QUESTIONS		ANSWERS	
A	Are aircraft crashes due to lightning a common event?	1	It is a piece of metal, electrically connected to the aircraft.
B	What is a "static wick"?	2	Even though every commercial airliner averages at least one lightning hit per year the last crash due to lightning was in 1967.
C	Give some examples of common things that may gather electrons.	3	A fence, a person and a telephone pole are all examples of common things that may gather electrons.

A	B	C
---------	---------	---------