

Pathfinder

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Flash!



AAF Photo

GROUNDED. Zeus still rules.

In 1942 the Army decided it needed gliders—lots of them. Because metal was scarce, it ordered wooden ones, to be towed with nylon ropes.

But the idea brought dismay to members of the National Advisory Committee on Aeronautics. They recalled the worst bugaboo of early aviators—lightning. To most modern aircraft, made of high-conducting metal, thunderbolts are harmless. To old-time, non-conducting, inflammable, wood-and-wire “crates,” they were sure death.

Who could make plywood gliders “lightning-proof”? NACA hunted around, finally chose the high-voltage experts at the National Bureau of Standards. For three years these men shot thousands of volts through ropes, plywood, paints, cables, guinea pigs—even their own arms and fingers!—to devise safeguards against flaming death for glider troops and post-war plywood-plane owners. Their findings were made public last week.

Peril. To wooden aircraft and their crews, one danger is blast. Lightning’s super-heat may expand air in cabins or boil water in wood-cells, blow the fuselage to pieces. Second peril is direct electric shock (though for a microsecond, it was found, a man can stand five times the Sing Sing death-house current).

Third comes induced current, generated by the lightning’s magnetic field inside human bodies. Some frequencies can trigger heart-nerve impulses prematurely, throw the heart out of rhythm—fatally. Another menace (with gasoline fumes present) is “side flash”: The static charge unloaded into the plane by lightning distributes itself by “sparking” across the craft’s interior.

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Gliders

Armor. Against these, the Standards scientists advised "bonding" the plane's outside with metal strips to "detour" the lightning. Sprayed aluminum worked best.

All the bonding, said the experts, should be connected with the inner (control and electrical) wiring. And pilots really bent on penetrating thunderheads should wire themselves to the assembly of the plane.

Duck! Cloud-to-cloud bolts are weaker than cloud-to-earth flashes, the experts found, but still carry upwards of 100 million volts. Anywhere within "a few miles" of a thunderstorm is a danger zone. Even if no bolts flash, a "slow" flow of electricity floods the air. If this funnels through a glider-train, textile tow-ropes will burst into flame.

A metal cable won't burn, but it will suck in more current. St. Elmo's fire will burn around the cable and the aircraft's tail and wing-tips. Radio communication will fail. Sometimes the metal rope will attract a bolt, melt in two.

Cagey. Final choices were (1) textile rope covered with conducting graphite paint, or (2) an insulated metal rope covered with metal braid. The braid would melt, but not the core.