The Empire State Building is struck by lightning about 100 times every year. Millions of volts of electricity hit the skyscraper, but it doesn't suffer any damage. That's because its tall spire, covered in broadcast antennas, has a lightning rod at the very top of it.

Lightning can set fire to a building, electrocute the people inside, and fry the electrical and computer systems. But a lightning protection system, which consists of a metal lightning rod and some wires, keeps the building safe.

When Lightning Strikes

As a scientist, Benjamin Franklin was fascinated by lightning and electricity, and spent years studying them. As an inventor, he wanted to find ways to protect people and buildings from lightning. His solution was the lightning rod, a metal pole designed to save buildings from the "most sudden and terrible mischief" of a lightning strike.

A lightning rod is a pole attached to the roof of a building. It's made of metal—usually copper—because metal is a good conductor. That means electricity flows through it freely and easily, without meeting a lot of resistance.

The rod is attached to a copper cable that runs down the side of the building and into the ground. When lightning strikes the rod, the dangerous electrical charge is instantly conducted down the rod, through the wire, and into the ground.

Non-metals such as wood are not good conductors. Electricity does not flow through them freely. If lightning hits a barn with no lightning rod, the current will not travel through it easily. It will meet a lot of resistance as it travels through wood, and that can result in massive heat damage—in other words, fire.

Benjamin Franklin invented the lightning rod in 1749. His invention is still protecting buildings all over the world.

Photo: Dan Nguyen