

STATIC ELECTRICITY

By Richard Sorokin

To understand static electricity you have to know a little about atoms and molecules.

Atoms are made up of three types of particles. In the center of the atom are protons and neutrons. The neutron has no electrical charge but the proton does. It carries a positive charge. Circulating around the center of the atom (its nucleus) are the electrons. Electrons carry a negative charge. As in magnets opposite charges attract while similar charges repel. The electrons are attracted to the nucleus by the opposite charged protons.

When the number of electrons equals the number of protons, they balance each other and no electrical charge is present.

To create a static charge the electrons have to move. Only electrons can move. Usually some form of friction will remove or add electrons to the atoms. Walking across a rug, combing one's hair, rubbing a balloon with a cloth, the wind over an object all can cause electrons to move creating an imbalance of protons and electrons. This imbalance creates an electrical charge. If the material is a non conductor or there is no place for the electrons to move you have a static charge. Static meaning not moving. When a path or conductor presents itself the electron will move creating a current of electricity. Walk the rug and touch a door knob.

Benjamin Franklin did a lot of experimenting with static electricity. He invented the lightning rods that we use today to protect our building from lightning (wind static electricity). A lightning rod is made up of a metal rod driven into the ground, about 6 to 10 feet... Attached to the rod is a heavy wire that goes up to the roof of the building to an antenna like piece of metal. If the cloud is carrying extra electrons and is negatively charged the lightning rod will provide a path for the extra electrons to escape down the wire into the ground without damaging the building. If the opposite is true, too few electrons and positive charged, the rod will provide a path for electrons to come from the ground and neutralize the cloud. Because a lightning rod is attached to the ground we call it grounding. Grounding is an escape route of a supply route for electrons to balance the atoms involved.

When dealing with boats on the water the only supply of electrons or escape route is to and from the water. There must be good contact with the water. On metal boats nothing special is needed. The entire hull is the ground due to its contact with the water. You can ground on any hull fitting. Fiberglass is a non conductor. On glass boats a metal plate fixed to the hull is needed to give easy passage for the electrons. Glass sail boats, with their metal masts, must have the mast connected by metal cable to a grounding plate in contact with the water to avoid damage by lightning.

In summary, static electricity is caused by friction and results in unbalanced electrons on matter. Current electricity occurs when these electrons move.