

## ***Harbor Assistance***

The Harbor Department staff will be prepared to assist each and every boat owner. As we approach completion of the new South Harbor float project, we will be available to test your boat shore power connection for excessive ground current. Please contact the Harbor office for information:



## ***Tony Schinella, Harbormaster***

Phone: 907-424-6400 Office Hours: 8am - 5pm. Mon-Fri



# **Cordova Port & Harbor South Harbor Replacement Project**

## ***Electrical Ground-Fault Protection***

The Cordova Port & Harbor is adopting a new practice to resolve the “Electrical Ground Current in Our Harbor”. With the renovation of the electrical systems, the current in the water will be reduced, if not eliminated. South Harbor, Floats will be renovated with this new electrical configuration.

### ***Harbor Implementations***

With the construction of our new facilities.

Floats G,H,I,J,K,L ground fault protection will be incorporated into the electrical systems. This protection will include circuit breakers with integral ground fault relays in the shore power pedestals.

### ***Design Strategy***

The relays for the 120 volt, 30 amp receptacles will be set to open the circuit breaker with ground currents in excess of 30 milliamperes (mA). Additional protection will be incorporated to monitor and open the circuit breakers that protect the feeders to the shore pedestals. These relays will be set to operate with higher ground currents.

**Ground Current – What is it?** “Ground Current” in the harbor is the electricity that flows through the water. Ground current can be caused by improperly wired vessels or damaged cables or conductors in the floats. The effect of the ground current is a life safety concern as well as a degradation of boats and harbor hardware in the water.

**What does this mean to you?** The latest National Electrical Code (NEC)\* requires the Cordova Port & Harbor to install Ground-Fault Current Relays in the electrical systems serving its harbor. With the new harbor electrical installation, there will be two tiers of relays sensing ground current. The feeder circuit breakers within the panelboard will trip the associated feeders to the shore-tie pedestals; removing power to them. This protects the cables in the floats. The second tier of relays will sense excessive ground current at each individual shore power receptacle. These will trip the associated receptacle circuit breaker if there is a ground current from the boat. The relays at the shore power pedestals are more sensitive than those at the panelboard, and thus will react more quickly. By limiting the affected vessels and working with patrons to identify boats with electrical problems, the Harbor Department seeks to limit effects on neighboring vessels.

**What will be Required?**

Vessel owners will be required to be tested for, and repair ground current problems before they are allowed to connect to the power pedestal at their new slip where the electrical system has been upgraded. In other words, if a boat is found to be producing ground current, it will not be authorized to connect to the power pedestal until repairs are completed.

**What is it going to cost me?**

Repair costs will be different with each boat. Harbor Staff will be prepared to assist each and every vessel owner to identify power issues. Harbor Staff highly recommends that each vessel owner contact a qualified electrician if they are unsure of their electrical systems’ vulnerability to cause ground current. Unless only minor wiring repairs are needed, the typical method to address vessels with ground fault problems may be to install an isolation transformer on board the vessel. These transformers take the shore power and energize the boat, but prevent the transmission of ground current to the harbor. They protect the vessel at any harbor so they are a wise investment for longevity of the vessel.

**Why is it important?**

The update to the NEC code came from multiple deaths in fresh water marinas around the country. Ground current in fresh water is extremely dangerous as it can cause severe injury or death from electric shock drowning \*\*. The risk of electric shock drowning in saltwater marinas is somewhat less because of the higher conductivity of salt water, but the danger still exists.

In addition to the risk of death, ground current in a harbor is very damaging to metal vessels and zinc anodes. The current is known to strip significant amounts of metal and zinc off a boat in a matter of months.

**\*\*Electric Shock Medical Facts**

Current	Effects
1 mA to 8 mA	Tingle, sensation of shock, not painful, muscle control not lost
8 mA to 15 mA	Painful shock, muscle control not lost
15 mA to 20 mA	Pain shock, muscle control is lost, paralysis / inability to swim occurs, labored breathing
50 mA to 100 mA	Ventricular Fibrillation possible
100 mA to 200 mA	Ventricular Fibrillation occurs
200+ mA	Burn marks may appear, chest muscles clamp heart

**The Code \***

The configuration and construction of the electrical systems for marinas is regulated by the National Fire Protection Association, National Electrical Code and the Fire Protection Standard for Marinas and Boatyards.

Protection from ground faults is stipulated per the following paragraph from the NEC:

**555.3 Ground-Fault Protection.** *The main overcurrent protective device that feeds the marina shall have ground fault protection not exceeding 100 mA. Ground-fault protection of each individual branch or feeder circuit shall be permitted as a suitable alternative.*