

# HARBOR MARINE

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## Electric Shock Drowning Incidents – Marinas June 2004

Low level ground fault leakage in the marina AC shore power system can cause lethal potentials to appear on any metal surface – either on a boat or on the dock. In fresh water the electric field surrounding this surface can paralyze a swimmer. There is no warning that this condition exists, and it has resulted in numerous drownings. Further, there is no post-mortem evidence that electric shock was the cause. Therefore, the fatalities listed below are only the *known* electric shock caused drownings, which were investigated because of circumstantial evidence, i.e., multiple deaths, eye witnesses, considerable distress, cries for help, shock sensation reported by rescuers, etc.

No database found that catalogs electric-shock drownings. The incidents listed below came from various sources. Dates and details are missing for some. There is no way to know what fraction of the total fatalities this listing represents, but it may be reasonable to assume that it could be small.

### ELECTRIC SHOCK DROWNINGS

1. Aug.3, 2003 Bull Shoals Lake, Bull Shoals, AK. Diver found Aug. 5 in shallow water 8 ft. from his dock, drowned. Incorrectly wired dock junction box caused 117 VAC to appear on metal dock components. Rescue diver reported feeling shock sensation 20 ft. from dock!
- 2 May, 2003 Cape Coral, Florida. Double drowning, section of re-bar driven through power cable to back yard boat lift caused line potential to appear on lift frame, salt water.
3. May, 2002 Lake Cumberland, Monticello, KY. Double drowning, fault on houseboat, fresh water. 125V plug at boat end of shore cord rewired by owner for 220V – L2 connected to “GR” pin - ground lead in 4 wire cord cut and taped off! Hull rose to line potential.
- 4 June 6, 2001 Residence, Timber Ridge Dr., Dumfries, VA, Lake Montclair. Two young boys entered water near pontoon boat. Battery chargers (2) connected to modified extension cord from house. Electric shock drowning – cause of energized hull not reported.
- 5 Sept.15, 2001 Farr Shores, Lake Hamilton, Hot Springs, AK. Girl in great distress, man attempting rescue drowns, fault on boat, fresh water.

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| 6  | April 10, 2001  | Whitman Hollow Marina, Norris Lake, LaFollette, TN. Two teenage boys swimming behind house boat. One boy climbed onto swim platform complaining of feeling severe shock – other boy fell back from ladder – his head <i>not</i> below water (ventricular fibrillation?). Damaged power cable to boat, black lead energized hull, ground wire burned in two – breaker did not trip due to incorrect connection (may not be exact sequence). |
| 7  | May, 2001       | New Orleans, Electrocution – Boy using conveyor to transfer shrimp – no ground, salt water.  |
| 8  | Sept. 30, 2000  | Tims Ford Lake, Winchester, TN. Two boys (21 & 22). Electric Shock drowning. Live wire in water near dock.   |
| 9  | July, 1999      | Lake Mohave, single drowning, fault on houseboat, fresh water.   |
| 10 | July 18, 1999   | Sligo Marina (B pier) Cedar Hill Lake, Smithville, TN. Two young boys, with flotation devices, were discovered in water, face down, a few feet behind a houseboat. 7 year old could not be revived – 8 year old recovered. Electric shock drowning suspected.  |
| 11 | July, 1999      | S. Carolina, single drowning – 3 feet of water, woman in great distress, husband attempts rescue and drowns, fresh water.  |
| 12 | Sept., 1998     | Lake Sonoma, CA. Single drowning, young girl in great distress, fault on dock, fresh water.  |
| 13 | July, 1997      | Lake Mead, NV. Single drowning, fault on houseboat, freshwater.  |
| 14 | Sept., 1993     | Oklahoma, single drowning, fault in submersible pump, fresh water.   |
| 15 | July, 1993      | Oklahoma, single drowning, fault in dock lights – energized dock frame, fresh water.   |
| 16 | July, 1991      | Oklahoma, single drowning, fault in dock wiring, fresh water.  |
| 17 | Dec., 1989      | Oklahoma, single drowning, fault in submersible pump, fresh water  |
| 18 | 1987 or 1988    | A) Gross Pointe Yacht Club, single drowning, diver, fresh water<br>B) Petoskey, MI, single drowning, diver, fresh water.<br>NOTE: Both incidents relayed 3 <sup>rd</sup> hand.   |
| 19 | 2000 or 2001    | Put-in-Bay, Ohio, Grand Banks 42, owner's prescription sunglasses went overboard. Young bystander disappeared while trying to retrieve glasses, electric shock drowning.   |
| 20 | Dates not known | Wisconsin, single drowning, felt tingle, disappeared, fault on boat, fresh water (from Boat US)  |
| 21 | Approx. 1994    | Texas, single drowning, fault on boatlift, salt water.   |
| 22 | Date Unknown    | Community swimming pool in Oklahoma, 10 year old   |

- electrocuted while inserting coins in a soda vending machine. Power cord damaged by one of the 4 legs, grounding pin on plug missing, machine chassis later measured at nearly line voltage, NO GFCI.
- 23    Approx. 1999    Rio Vista, CA. Several boys reported a tingle while swimming in this fresh water marina and got out of the water. A short time later two other boys, 8 – 10 years old, drowned at the same spot. Forty-year-old power wiring running under moored boats found to have substantial fault to ground because of insulation failure.
- 24    August 1993    Alexandria Bay, NY. Double drowning. Two teenage girls snorkeling near dock were paralyzed by electric shock and drowned. Fault thought to be in dock wiring, not confirmed. (Two bystanders attempted to enter water to lend assistance, but were unable to do so.)
- 25    June, 2003    Allatoona Lake, GA. Six fatalities, ducks!! Houseboat pulled away from the dock and still connected shore power cord separated in middle and fell into water. Six dead ducks found floating nearby.
- 26    Approx. 1990    Harrods Creek, Ohio River, Lexington, KY. Dog in water near houseboat, showing great distress, owner's wife enters water and is immediately in trouble, husband jumps in along with second dog, all four drowned. Cause of electric shock not reported.
- 27    Approx. 1998    AF Base, Washington, DC, boy walking on ice slipped and grabbed exposed wires on dock that were supposed to have been de-energized, electrocuted.
- 28    July, 1988    Park Township, MI, Lake Macatawa, Bay Haven Marina. 18-year-old boy falls off dock, in great distress, two attempts to assist thwarted because of severe electric shock as rescuers entered water.

### **ELECTRIC SHOCK – NEAR MISSES**

1.    July, 2002    Allatoona Lake, GA. Three swimmers in great distress near houseboat, by stander pulls shore cord, all saved, one spent several days in hospital, fresh water, and fault on boat.
2.    Fall, 2002    Lake Murray, SC. Swimmer reports strong tingle, hi-level fault currents in dock frame, fresh water.
3.    Date Unknown    Man jumps into water to rescue dog, feels high level tingle, cause unknown, fresh water.
4.    2002-2003    Florida, interviews with divers – many reports of high level tingle while cleaning bottoms, all salt water, and no fatalities.
5.    August, 2003    Green River Marina, Campbellsville, KY. Marina manager using Hioki clamp-on ammeter checking shore cords for leakage and discovered one houseboat with 4 amps on one of

two shore cords. Hull potential to dock ground 8 VAC and owner commented that one of his children reported a tingle in the water!! Boat had just been reassembled after being trucked from Texas and problems were being experienced with 120 VAC deck light. Deck lights were rewired and neutral / ground fault in inverter was cleared – leakage current no long exists.

6.    Date & location    Swimmer feels a tingle as his hand enters the A/C discharge  
      Unknown            stream. Caused not determined, salt water.

### **CODE VIOLATIONS**

1.    January, 1994    Oklahoma State Department of Health (OSDH) inspected eleven commercial docks and five private docks, and an earlier (1989) inspection of 116 commercial docks, found 96% not in NEC compliance; most common fault was **open** ground.