of Engineers, the Coast Guard, or local harbormasters, that have specific authority over the waterways.

(3) Portable Power Cables.

(a) Where portable power cables are permitted by 555.34(A)(2), the installation shall comply with the following:

(1) Cables shall be properly supported.
(2) Cables shall be located on the underside of the pier.
(3) Cables shall be securely fastened by nonmetallic clips to structural members other than the deck planking.
(4) Cables shall not be installed where subject to physical damage.
(5) Where cables pass through structural members, they shall be protected against chafing by a permanently installed oversized sleeve of nonmetallic material.

(b) Where portable power cables are used as permitted in 555.34(A)(2)(2), there shall be a junction box of corrosion-resistant construction with permanently installed terminal blocks on each pier section to which the feeders and feeder extensions are to be connected. A listed marina power outlet employing terminal blocks/bars shall be permitted in lieu of a junction box. Metal junction boxes and covers, and metal screws and parts that are exposed externally to the boxes, shall be of corrosion-resistant materials or protected by material resistant to corrosion.

Δ **(4) Protection.** Rigid metal conduit, intermediate metal conduit, reinforced thermosetting resin conduit (RTRC) listed for aboveground use, or rigid polyvinyl chloride (PVC) conduit suitable for the location shall be used to protect wiring to a point at least 2.5 m (8 ft) above docks, decks of piers, and landing stages. The conduit shall be connected to the enclosure by full standard threads or fittings listed for use in damp or wet locations, as applicable.

555.35 Ground-Fault Protection of Equipment (GFPE) and Ground-Fault Circuit Interrupter. For other than floating buildings, ground-fault protection for docking facilities shall be provided in accordance with 555.35(A) through (D).

N **(A) Feeder.** Listed GFPE, rated not more than 100 milliamperes, shall be provided for feeders installed on docking facilities. Coordination with downstream GFPE shall be permitted at the feeder overcurrent protective device.

Exception: Transformer secondary conductors of a separately derived system that do not exceed 3 m (10 ft) and are installed in a raceway shall be permitted to be installed without ground-fault protection.

This exception shall also apply to the supply terminals of the equipment supplied by the transformer secondary conductors.

N **(B) Branch-Circuits**

N **(1) Receptacles Providing Shore Power.** Listed GFPE, rated not more than 30 milliamperes, shall be provided for receptacles installed in accordance with 555.33(A).

According to U.S. Coast Guard studies and industry standards, 30 milliamperes represents an acceptable level to prevent a majority of electrical shock drowning incidents while remaining practical enough to minimize unnecessary tripping. For more information, see the report "Assessment of Hazardous Voltage/Current in Marinas, Boatyards and Floating Buildings," commissioned by the Fire Protection Research Foundation and conducted by the American Boat & Yacht Council Foundation, Inc. The report can be found at www.nfpa.org/news-and-research.

See also

555.53 and its commentary regarding ground-fault protection of the main overcurrent device for floating buildings

N **(2) Outlets for Other than Shore Power.** Outlets supplied by branch circuits not exceeding 150 volts to ground and 60 amperes, single phase, and 150 volts or less to ground, 100 amperes or less, three phase, shall be provided with GFCI protection for personnel.

Exception to (B): Low-voltage circuits not requiring grounding, not exceeding the low-voltage contact limit and supplied by listed transformers or power supplies that comply with 680.23(A)(2) shall be permitted to be installed without ground-fault protection.

The characteristics of the branch circuits covered by this requirement are similar to the parameters of 210.8(B) for GFCI protection of receptacles installed in or at other than dwelling units. An important distinction between this requirement and that of 210.8(B) is the use of the term *outlet*. An *outlet* includes a point in a wiring system at which a receptacle is installed and also includes locations in the wiring system where power is taken to supply utilization equipment using other than a cord-and-plug connection, such "hard-wired" or "direct-wired" connections.

N **(C) Boat Hoists.** GFCI protection for personnel shall be provided for outlets not exceeding 240 volts that supply a boat hoist installed at docking facilities. GFCI protected receptacles for other than shore power shall be permitted to supply boat hoists.

Compliance with this GFCI requirement can be accomplished through the use of a device installed at the outlet or a device installed in the branch circuit supplying the outlet. Specifying GFCI protection "for outlets" that supply a boat hoist extends this requirement to direct- or hard-wired models as well as cord-and-plug-connected models.

(D) Leakage Current Measurement Device. Where more than three receptacles supply shore power to boats, a listed leakage current measurement device for use in marina applications shall be available and be used to determine leakage current from each