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# Marina & Dock Power: Safe and Successful Cable Installations

BY SAM FRIEDMAN, DIRECTOR, TECHNICAL SERVICES — CAROL® BRAND CORD PRODUCTS — GENERAL CABLE

Electricity and water can be a deadly mix. It's a core principle we learn almost from the onset of conscious thought, alongside other vital lessons such as "fire is hot" and "don't run with scissors." So encountering these two opposing forces in an installation environment can be an extremely daunting proposition. By following the specialized code requirements and cable selection guidelines for marine-environment power applications — like those found in a marina or dockside setting — you can ensure the success of your installation and, most importantly, the safety of your installers and customers.

Not surprisingly, many of the questions we receive in the Carol engineering department concern marina and dock power applications. No one should take wet-environment installations lightly, and we're dedicated to helping our customers complete their projects safely and efficiently. The best place to begin is with a thorough review of the National Electric Code (NEC), which will help identify the correct cable for the specific application. Developed to provide direction for both trained professionals and end users, these codes establish the foundation for the design and inspection of electrical installations. For example, with marina and dock power applications, it is essential to pay close attention to Article 555, which addresses the use of portable power cables, and Article 250 for equipment grounding. With that being said, it is also imperative for installers to make certain the cable selected for their project meets all local and national building codes required in their jurisdiction. Where uncertain, please consult with your local inspector.

Planning for specific application considerations is especially important in a marine environment. Accounting for a cable insulation's moisture resistance and a jacket's sunlight/UV resistance, oil/gasoline resistance, chemical resistance and abrasion resistance at the beginning of a project will add years to every installation. Following specialized electrical code requirements for cable construction, therefore, helps ensure long cable life and maximizes productivity. When an installation requires a more rugged product, for instance, 2000 volts, Type W, G and G-GC cables are specified.

Understandably, minimizing physical damage to the cable — including scrapes, impact loading, abrasion, corrosion and cuts — is of the utmost importance in a wet location and can mean the difference between success and disaster. Protecting terminations from corrosion caused by fresh and salt water, chemicals, and atmospheric exposure is also crucial. Finally, it's vital to consider factors like cable flexibility when designing a pier or moveable dock installation. Constant motion combined with regular water contact means cable integrity must never be compromised. In such applications, extra-hard-usage cables may be employed for permanent installations.

When the cable application requires that it be submersed in water, the wet ratings of Type W, G, and G-GC cables make them the optimal choice for such applications. A significant concern facing underwater installations is the amount of pressure the cable, and especially the connectors, can withstand. Depth of submersion can be a tricky issue to overcome — connections that do not permit water entry at sea level could leak when submersed in water. Always keep in mind that the deeper the application's immersion, the higher the water pressures it will encounter.

If the connections are sound, the next-most-common cause of failure in submersed installations is water infiltration allowed by cable jacket damage. It goes without saying that it's critical to maintain cable integrity and prevent water entry at all costs, whether through the connectors or through the cable jacket itself. This underscores the necessity of having a qualified engineer review installation plans and details for code compliance prior to the start of the assignment.

Some marina/dock project sites are classified as hazardous due to the proximity of fueling operations. Typically categorized as a Class I, Division 2 location, the NEC requires special precautions be taken in these environments to minimize the risk of fire or explosions caused by flammable gases or vapors, flammable liquids, and other volatile elements. NEC Section 505.17 permits the use of extra-hard-usage portable cord for connection of flexible utilization equipment. Note that installations in hazardous locations require the incorporation of an equipment grounding conductor.

So where does all this information lead us? Contrary to the accepted wisdom, electricity and water don't have to be a dangerous combination. By following the established codes and standards set in place to guarantee a safe and successful installation, marina and dockside applications can be as straightforward and secure as any other electrical endeavor. It's all in how you handle the mix.

**Still need help?** Carol Brand's Wire Wizards are ready with first-class customer support, printed catalog materials and detailed product specifications. Please give us a call at 1.800.243.8020, send us an email at [info@generalcable.com](mailto:info@generalcable.com) or visit [www.generalcable.com](http://www.generalcable.com).



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