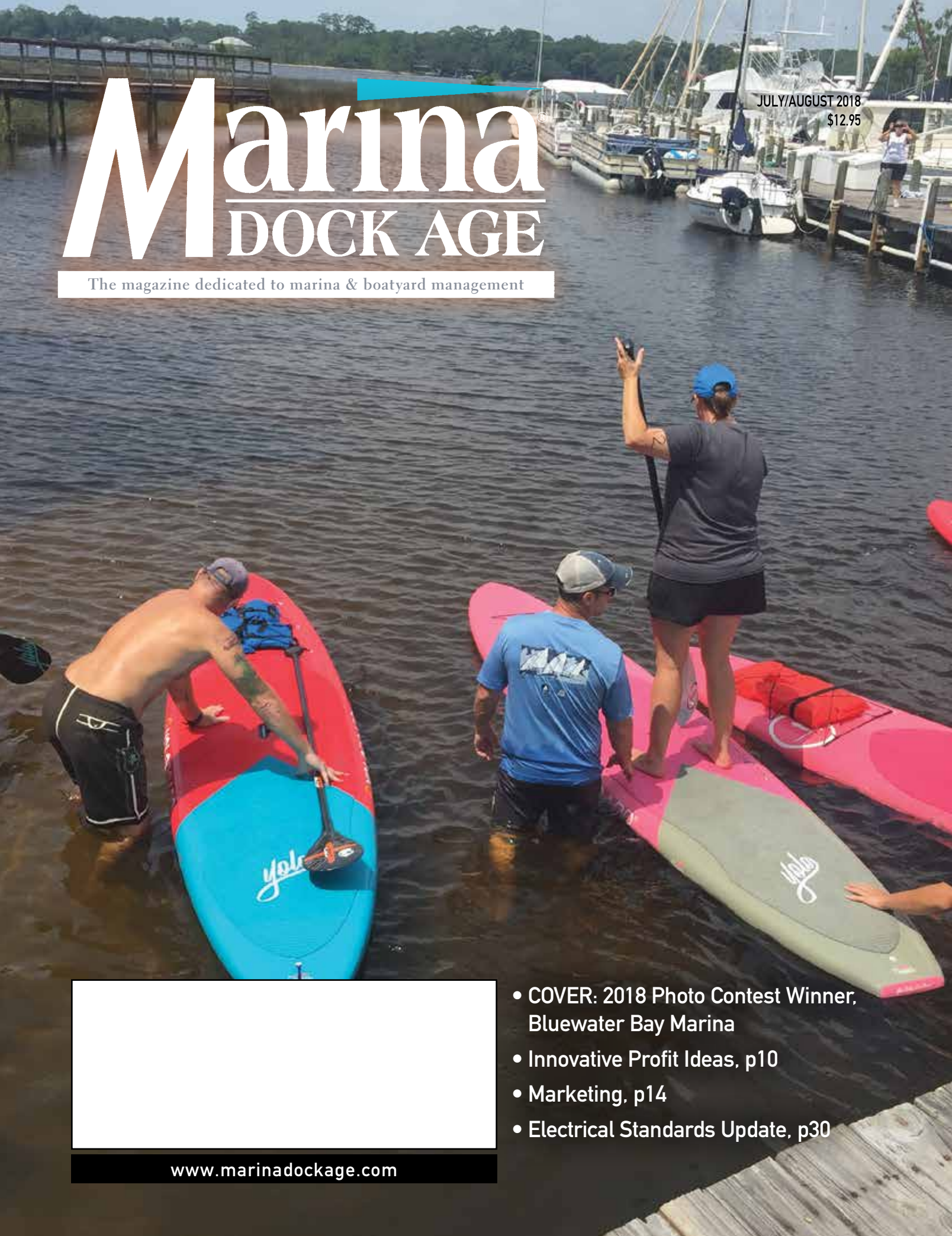

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Wave Attenuator Feasibility Modeling: Easy, Fast and Free

By Robert Wilkes

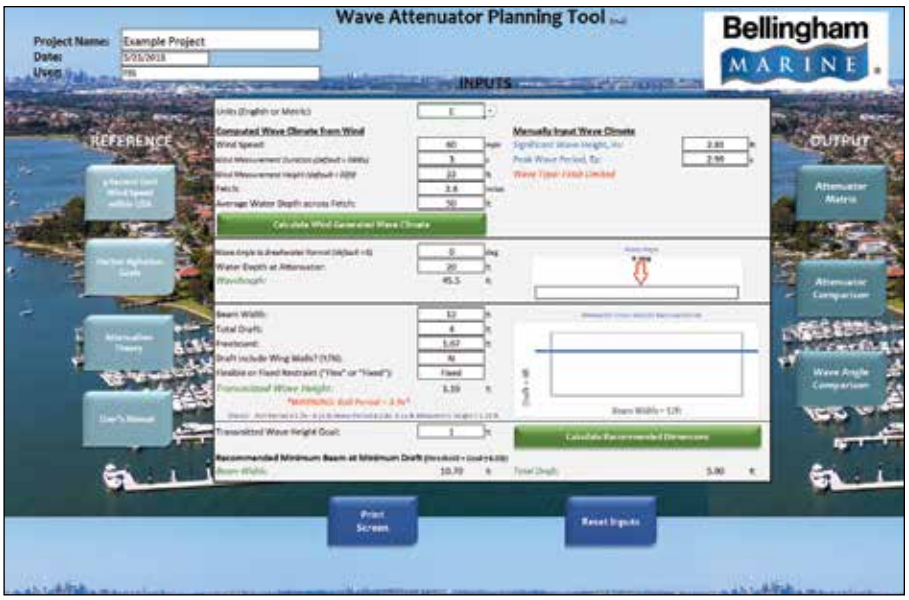
For an owner thinking of building a marina or rebuilding an existing marina, the new Attenuator Planning Tool developed by Bellingham Marine and SmithGroupJJR is a sensible way to kick off or accelerate the project. Why so? It saves time and money; a lot of time and money.

A pre-construction evaluation process would normally take weeks and run up a tidy number of engineering hours. Using the Attenuator Planning Tool takes about four to five minutes and is free. The tool answers key questions about wave attenuation in normal and extreme weather conditions. The resulting data is directly related to the cost and feasibility of the project.

Technology Development

The system was a cooperative project by Bellingham Marine and SmithGroupJJR. The computational models were custom built by coastal engineers Jack Cox and Margaret Boshek of SmithGroupJJR. Jack Cox has 40 years of experience in marina and harbor engineering and wrote a book on floating wave attenuators. He's also one of the authors of "Planning and Design Guidelines for Small Craft Harbors," the current standard for marina layout and design.

Margaret Boshek is also an accomplished and comprehensively trained coastal engineer with a talent for building computer-based analysis tools. She encoded the system and created the user-friendly interface for both the Attenuator Planning Tool and the Wind/Wave Analysis Program. The system allows the user to change the variables and test multiple design choices quickly. Once the required data is loaded in, the user can vary a number of factors and see the effects a few seconds later.



While the underlying physics is complex, the interface is user friendly. Owners are guided through the process by a Bellingham Marine representative.

The Bellingham Marine and SmithGroupJJR engineering tools integrate three disciplines: coastal engineering, structural engineering, and meteorological wind and wave analysis. The tools are software "black boxes," so to speak. Wind, water depth and fetch data are fed in and a robust suite of charts and data emerge to help evaluate the relative cost and efficacy of a marina's planning decisions.

The modeling process hinges on the "transmitted wave;" the wave that, in worst case conditions, is allowed to pass through the wave attenuator to the inside of the marina. For example, if the project chooses to limit the transmitted wave to 2 feet, the software will calculate a range of wave attenuator solutions that meet that criteria.

If readers are shocked at the thought of a 2-foot wave tossing boats in their marina, it's helpful to remember that the tool is designing for events that may occur once in 50 or 100 years. Boats may rock, but the boats and the marina will likely survive. The real picture is more sanguine; for most of the life of a marina its tenants will live in peaceful tranquility.

The expression "black box" simplifies the description, but it trivializes the technology and sheer effort that went into creating the tool. Wave science isn't brain surgery, but it's close. As one of the thorniest problems in physics, wave prediction and wave attenuation is never pure and simple. Factors include wind direction, refraction, surface current, shallow bottom conditions, variable tides, the chances of flood waters, wave length and wave period among others. If a project's problem includes waves produced by ships or ferry traffic, it is possible to estimate the nature of the waves as they reach the marina and use the Wave Attenuator Planning Tool to calculate solutions just as it does with natural waves.

As another example, with a site on a shoreline, lakeshore, or in a basin, a pre-construction feasibility study will indicate whether a breakwater, a floating wave attenuator, or perhaps no special wave attenuation is needed. If the water is too deep or the fetch too long, it may show that there is no affordable solution. Better to know this early in the process before committing time and money to a project.

In many cases, a floating concrete wave attenuator is the right solution. The Attenuator Planning Tool provides preliminary dimensions for beam width and the depth, which directly relate to cost. The system has application in lakes and rivers, where wave conditions are usually milder. Such sites may find that rather than a purpose-built wave attenuator, a standard-duty concrete

floating dock at the perimeter of the marina will provide the needed wave protection. In well-protected areas, no wave protection may be needed for the marina.

The Attenuator Planning Tool is offered free to owners and developers. With a little data about the site, such as wind, water depth and fetch or the actual wave parameters, such as wave height and period, that may be enough to go on. A Bellingham Marine project development manager will help guide the process. Without wind and wave environment data, a companion module that uses geographic coordinates, fetch and wind direction can generate design wave data sufficient for pre-construction feasibility planning.

No Guesswork

There are other benefits to using the tool. It takes a lot of the guesswork out of evaluating bids from an RFP. Often, a site-specific design tailored to the site's conditions is more cost effective in the long run. The tool can help identify a design that would lead to an underperforming marina, if the structure is under designed or underbid. Or, a manufacturer may steer developers toward an off-the-shelf, one-size-fits-all product that won't work for the project.

Moreover, the modeling tool arms developers with practical knowledge to envision the full potential of a site for the market it intends to serve.

Once the project is a go, the actual specifications and wave criteria from the final design and engineering phase will require a more in-depth analysis of the site's conditions.

The information from the pre-construction analysis, using the Planning Tool and companion module, is an early window to understanding a marina's exposure and likely resilience in extreme weather. Down the line, this information can help negotiate insurance rates, train staff, manage risk, protect property and ensure the tenant safety.

A Proprietary System

At the heart of the system are proprietary formulas and algorithms. To protect both companies' investment and proprietary intellectual property, Bellingham Marine and SmithGroupJJR do not allow the owner direct access to the software. Instead, a company representative will guide the process through a webinar platform such as GoToMeeting or a face-to-face meeting. Developers will have a chance to see the interface and the solutions on the company representative's computer screen.

To take advantage of the free service, contact any Bellingham Marine manager of project development. If wind and wave data is needed Bellingham Marine will coordinate with SmithGroupJJR who will then determine the worst-case conditions at the site using the Wind/Wave Analysis companion module. Developers will provide geographic coordinates for the site, and the system makes use of data from the closest meteorological station. Neither tool takes more than a few minutes to use because the time-consuming engineering work has been automated.

The Attenuator Planning Tool will ask a series of questions related to the site to provide wave attenuator design dimensions for pre-construction planning. These are not, however, final specifications. Final specifications are the product of the formal design and engineering of the marina. The pre-construction data, however, is the basis for feasibility and budgetary decisions in the planning stage.

Owners are invited to use the tools with no cost or obligation. Nothing gets a project moving like data. Whether you're seeking financing, looking for investors or just wanting to get the project into high gear, practical data will give everyone involved more confidence.

Contact Bellingham Marine to set up a session. ⚓

Robert Wilkes writes about the marina industry from Bellevue, Washington.

NEWS

Marine Travelift Partners with Suntex Marinas

Through its partnership with Suntex Marinas, Marine Travelift will deliver two M5200H (52,000 lb. equivalent capacity) Hydro M_Drive marine forklifts to Suntex's Riviera Beach and St. Petersburg properties. A third forklift will be delivered to Snook Bight Marina in Estero Bay. All three machines are scheduled for delivery in summer 2018.

The M5200H Hydro M_Drive will feature a hydrostatic drive system with faster lowering speeds, rear backup cameras, and standard wireless remote control. Marine Travelift said these features will help lower operation and maintenance costs. When designing the M5200H, the sales and engineering groups teamed up with several boat manufacturers to understand each boat's dimensions and characteristics.

For the Suntex order, customer feedback played an important role to ensure the marinas were getting the right piece of equipment and service. The Marine Travelift factory built a center cab mock-up to send to Florida to incorporate direct feedback from the operators and tailor the design to meet their exact needs.

Suntex Marinas is one of the largest marina operations in the country, owning and operating more than 40 properties across the United States. ⚓