



AUGUST/SEPTEMBER 2018

HANDS-ON SAILOR

PRACTICAL SOLUTIONS *and* TECHNIQUES

1

Hurricanes 101

PAGE 69

2

Safe Shoreside Storage

PAGE 74

3

Cyclone Safe Havens

PAGE 78

4

Smooth Shifting

PAGE 82

① HURRICANE WHOLE

A year after historic hurricanes wreaked havoc throughout the Eastern Caribbean, a legendary voyager imparts advice on how to prepare for the ultimate worst-case scenario. BY DON STREET

SEVERE WEATHER

Hurricane losses to the yachting industry and its insurers in the Eastern Caribbean have increased astronomically over the past 60 years. In the 1950s, the number of yachts in the Caribbean was quite small, but beginning in the 1970s, the number began to grow rapidly, as did the onshore industry supporting the yachts. Since the mid-1990s, yachting activity has skyrocketed, and so have insurance losses resulting from hurricanes, graphically illustrated by photographs of the trail of destruction left by hurricanes Irma and Maria in 2017.

I have been selling insurance to yachtsmen in the Eastern Caribbean for more than 50 years, so I am not just a spectator to this carnage. After Hurricane Hugo in 1989, I wrote “Reflections on Hugo,” which was first printed in 1990 in *Street’s Guide to Puerto Rico, the Spanish, U.S. and British Virgin Islands*. It was two pages. Subsequently expanded to six pages, it



While most sailors will recall the scenes of carnage from the 2017 hurricanes, many boats also emerged unscathed, such as these at the Catamaran Marina on Antigua.

was inserted in all four of my guides to the Eastern Caribbean. I followed it up with about a dozen articles written in an attempt to minimize losses due to hurricanes.

If sailors, marina and yard managers, marine insurance companies, and Lloyd’s underwriters had followed the advice given in “Reflections on Hugo” and the subsequent

articles, they could have avoided tens of millions of dollars in marine insurance claims and hundreds of boats would not have been lost.

Grenada is a good example

of how the expansion of yachting has led to heightened exposure to losses for underwriters over the years. A hurricane hit the island in 1892, when there was no yachting. The next hurricane, Janet, hit 63 years later, in 1955. The Grenada Yacht Club, a wooden building on the steamer pier, was swept away, a couple of small local sloops converted to yachts were sunk, and a dozen locally built Mosquito dinghies were demolished — a small loss to marine underwriters, if any at all.

A half century later, Hurricane Ivan cost marine underwriters a bundle. Yachting had expanded to the point that about 175 boats were stored ashore for hurricane season and probably another 100 were in commission in the water. In one yard, 100 boats blew over; a video of the destruction was viewed worldwide. Of the boats in the water, about 20 followed my recommendations and sailed south to Trinidad or Margarita: no damage, no claims. The others were secured in various so-called “hurricane holes,” with disastrous consequences. A very high percentage suffered major damage or were total losses.

I estimate that in 2018, more than 700 boats will be laid up ashore in Grenada and about 600 or more afloat in commission. The three yards in Grenada took the lesson from Ivan to heart and claim that all the boats they store ashore are now properly chocked and tied down to a dead-man anchor, sand screws or 1-ton concrete blocks, and that they will withstand a hurricane. I doubt that the 600 or more boats in commission or stored afloat will fare as well, even those in the lagoon at St. George’s. The docks at both Port Louis and Grenada Yacht Club will be underwater in a 3-foot tidal surge, and because the shoal that formed a natural breakwater has been dredged out, the lagoon will become untenable for any boats that stay there if a hurricane strikes Grenada.

Boats can survive a hurricane with an acceptable percentage of loss to insurers



There is an art and science to strapping down boats on jack stands and cradles, as marine surveyor Todd Duff explains in “What Went Wrong” beginning on page 74.

in well-designed marinas and when laid up ashore and properly secured. This was proved at Puerto del Rey, Puerto Rico.

In the late 1980s, Dan Shelley had Puerto del Rey and its shoreside facilities designed so that boats in the marina and stored ashore would stand a good chance of surviving a hurricane with minimal damage. The north-south breakwater is 1,575 feet long and topped by a wall 12 feet above high water. The finger piers are high enough to cope with a 3-foot tidal surge. When I visited the marina with *Iolaire* shortly after it was built, I pointed out to Shelley that, if he did not extend the main north-south breakwater with a 100-yard dogleg to the northwest, he was going to have a problem with a bobble in the marina whenever the wind went into the northeast in the winter, and a disaster when the wind went northeast during a hurricane. His engineers insisted such a dogleg was not needed, but in the mid-’90s, the breakwater was extended with a 460-foot dogleg to the northwest.

In 2017, hurricanes Irma and

Maria both struck Puerto del Rey. Of the 552 boats afloat in the marina, 4 percent were total losses and 2 percent suffered major damage. Of the 237 boats stored ashore, 3 percent suffered major damage and none were total losses. Everywhere else from St. Barts to and including Puerto Rico, a region known as “Hurricane Alley” because of the frequency with which it is affected by named storms, it was a different story.

LAYING UP ASHORE
Hurricane Ivan in 2004 showed how vulnerable boats stored ashore can be to a strong hurricane. In December 2017, I asked every yacht-storage facility in Antigua, St. Lucia and Grenada to describe its storage facilities and procedures for laying up boats during hurricane season. With some variations, they all replied that they strap boats down to suitable anchors. With the exception of Puerto del Rey and Bobby’s Marina in St. Maarten, no yard in Hurricane Alley had strapped boats down.

Following the carnage of 2017, all boat owners (and

their insurance agents) should insist that their boats, and the boats to either side of them, are properly stored for hurricane season, and obtain from the yard manager a signed assurance that this is the case. Absentee owners should hire a surveyor to supervise the process and submit a report certifying that it was done properly.

When laying up a boat for hurricane season, everything should be done to minimize windage. The dodger, Bimini and sails must be removed, and all halyards except the main halyard run up to the top of the mast. Deep keels should be in pits, and all boats chocked with a jack stand each side for every 8 feet of waterline length, with plywood pads under the feet so they do not sink into soft, rain-soaked ground. The jack stands must be tied together port and starboard, with rebar welded to the stands and the handles wired so the screws cannot unwind.

I’ve heard about several owners who returned to their boats after a hurricane to find them with rainwater above the floorboards, so a precaution worth

CATAMARAN MARINA (ABOVE); ILLUSTRATION COURTESY OF THE NATIONAL HURRICANE CENTER

taking is to pull a through-hull so water has a way to drain out. To stop rats from getting into the boat (it happens!), the outside of the drain should be secured with wire mesh.

A decision yards must face is whether to store boats with their masts in or out. Removing masts requires yards to provide protected storage for them, which Bobby’s Marina does. Other yards that offer this same safe practice are the Catamaran Marina in Antigua and Grenada Marine on the island of Grenada.

A 60-foot mast and its rigging have significant windage, and wind pressure increases with the square of the wind velocity. When the wind speed doubles, the pressure quadruples. For example, at 60 mph, the wind pressure is about 9 pounds per square foot; at 120 mph, it is 37 pounds per square foot; and at 180 mph, it is 83 pounds per square foot.

For an average 60-foot mast, the total wind load on the mast at 120 mph is 2,245 pounds — about the same as 24 mph of wind on 1,100 square feet of sail. At 180 mph, the wind load is 5,450 pounds. If the wind is blowing on the side of the boat and that force is centered 30 feet above the deck, what are the chances the boat will stay upright on its jack stands or in its cradle if it is not tied down to anchors in the ground?

As far as marinas are concerned, properly secured boats stored afloat in a marina should survive a hurricane if the marina is built like Puerto del Rey, fully enclosed so that no sea can build up inside, and with well-constructed concrete finger piers high enough to handle a 3-foot tidal surge. Crews Inn in Trinidad and, possibly, the marina in Virgin Gorda Yacht Harbour meet these criteria. Marinas that use floating piers are best avoided because floating piers have a tendency to break loose.

ANCHORING IS FOLLY
The same wind-pressure calculation applies to boats anchored or left on moorings. The frontal area of just the hull of a modern 45-foot cruising sailboat with 6-foot freeboard and 14-foot beam is 84 square feet. Then there’s the mast, boom, rigging and superstructure. When the boat sheers to one side, the exposed area is even greater. Catamarans have vastly more windage.

The majority of boats in the Eastern Caribbean will be anchoring on 3/8-inch chain or 3/4-inch nylon attached to a 3/8-inch chain leader shackled to an anchor. The breaking strength (BS) of common 3/8-inch BBB chain is 11,000

pounds, but the safe maximum working load is 2,650 pounds. For three-strand nylon rope, the BS is 17,150 pounds *dry*. Nylon loses about 20 percent of its strength when wet, and can lose another 15 to 20 percent of its strength in a splice or a knot. If the anchor holds, either the chain or the line will part once wind gusts approach 120 mph, perhaps sooner. The attachment point on deck might not even last that long. Some multihulls will become airborne.

From the above figures, it’s my guess that the vast majority of anchored boats will drag or break free in hurricane conditions. And it only takes one loose boat in a so-called

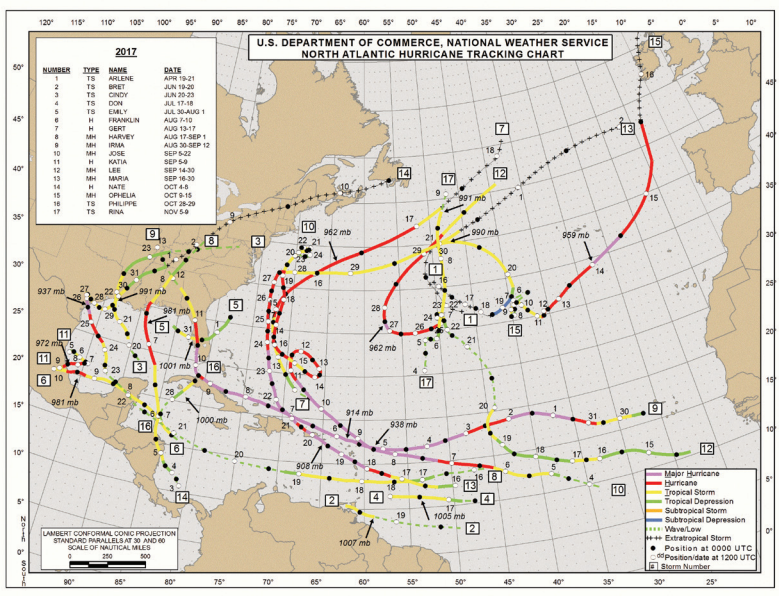
hurricane hole to cause havoc among the others. Ensenada Honda, Culebra, was considered a hurricane hole until Hurricane Hugo in 1989 put 60 or more boats on the beach. Some people must have forgotten that, because Irma and Maria put another 40 on the beach in 2017. It was the same story in Coral Bay, St. John.

The one true hurricane hole in the Caribbean is inner Egmont Harbour, Grenada. The entrance is only 100 yards wide, so no sea or surge can get in; it’s surrounded by 300-foot hills; and its shore is lined with mangroves, not rocks. In Ivan, fewer than a dozen boats sheltered in Egmont. The couple that dragged were easily

pulled from the mangroves and suffered little damage beyond gelcoat scratches. But the next time a hurricane bears down on Grenada, there probably will be 600 boats in the water, and far too many of them will head for Egmont, with predictable results.

HURRICANE AWARENESS
In 1984, *Iolaire* was caught on the north side of St. Maarten by Hurricane Klaus. Though I don’t recommend it today, we survived by using six of our seven anchors.

After that adventure, I obtained a copy of the National Oceanic and Atmospheric Administration “hurricane book,” which mapped the track of every hurricane and named storm from 1851 to 1980, and obtained updates each year. Following the disastrous 2017 season, I obtained the new hurricane book that covers all named storms from 1851 to 2008, as well as the loose pages that bring it up to date through 2017. I studied those hurricane tracks carefully and identified a general pattern for those that affected the Eastern Caribbean. Since 1851, only four



PREDICTING HURRICANE TRACKS
To visualize the potential track of a tropical storm or hurricane approaching the Eastern Caribbean from the east, start by plotting the latest position of the center of the storm. Then, draw forward from that position a 10-degree-wide cone, and you have the area in which the center of the storm is likely to go. The length of the cone is the storm’s speed of approach (knots) times 24 (hours). Do this every day, obtaining the most recent information on the storm’s position and speed of approach from the National Hurricane Center. The tracks for all of 2017’s hurricanes are pictured above. Anyone with an internet connection can obtain this information directly from the NHC, which updates its predictions every six hours, refining them with data from satellites, hurricane-hunter aircraft observations and numerous computer prediction models. A word of warning: Do not fixate on the centerline of the conical depiction of the predicted track — the center of the storm could go anywhere within the cone, or even outside of it.

hurricanes have formed in the Caribbean and headed east into the Eastern Caribbean: Alice in 1954, Klaus in 1984, Lenny in 1999 and Lili in 2001. There were also two odd-ball hurricanes. One, in 1872, hit Guadeloupe and headed north via Antigua, Barbuda, St. Barts, St. Maarten and Anguilla before heading out to sea. Another hit St. Vincent, then turned north and struck every island, including Barbuda, before heading off into the Atlantic.

All other hurricanes and named tropical storms that affected the islands of the Eastern Caribbean have

Bedford Forrest. When asked how he managed to tear holes in the Union army behind the main lines, destroying or seizing supplies while dodging federal cavalry, he replied, "I hit 'em where they ain't!" So, to survive hurricanes, go where they ain't.

Boats in commission in the islands should keep a constant watch for tropical storm formation and begin plotting their escape as early as possible. Usually, this means heading south to be well below the latitude of the southern-most island in a storm's path.

In the case of Irma, Martinique would have been

INSURANCE CONSIDERATIONS

Over the five decades I have been selling yacht insurance, I have seen many scams that left yachtsmen hung out to dry after making a claim. I recommend buying insurance through a broker who will place it with either a U.S. insurance company, a U.K. company or a Lloyd's syndicate. (Lloyd's is not a company but an association of underwriters that operates out of the Lloyd's building in London.) Different insurance companies have different records on prompt and equitable payment of claims, and so do Lloyd's syndicates, so check

12 degrees north puts all of Grenada inside the box, so boats under those policies need to be in Trinidad to be covered.

Either way, if a storm is on a track far enough south to strike Grenada, the best policy is to head farther south. Insured or not, a boat on the beach in Grenada or anywhere else is no longer cruising.

Sailors who decommission their boats for hurricane season should make sure they are stored properly ashore as described above.

Those who continue cruising in the summer need to monitor every tropical disturbance for development, and have a plan



Two successful methods of securing boats ashore during hurricane season: Lloyd's-approved cradles are considered to be one of the strongest options (left). Hurricane pits reduce windage and the forces on stands and supports (right).

formed in the Atlantic and headed west, rarely altering course more than 5 degrees in 24 hours. The course alteration is almost always to the north; alterations to the south are usually for only 24 hours and never more than 72 hours. The track of one of these storms can, therefore, be predicted quite well on a daily basis (see "Predicting Hurricane Tracks," page 71).

Of course, the only reasonable way for boats in commission to avoid hurricane damage is to follow the battle plan of Confederate cavalry general

far enough south. Modern cruising catamarans, if the advertising is to be believed, have seven-league boots and can manage 240 miles per day. At that rate, 36 hours after leaving the Virgin Islands, a catamaran could be safely anchored in Grenada.

My advice, especially if the storm was on a track toward the southern islands, would be to head south to Trinidad, bypassing Chaguaramas, with its overcrowded anchorage, poor holding and reversing tide, and anchor off Pointe-à-Pierre, 120 miles south of Grenada.

the broker's reputation for settling claims, and also that of the backing insurance company or Lloyd's syndicate.

Most insurance policies provide normal coverage for boats in commission that are inside the "hurricane box" from June 1 to November 30, but exclude damage resulting from a "named storm."

Policies that place the southern limit of the hurricane box at 12 degrees 30 minutes north, putting the south coast of Grenada outside the box, cover boats in that area for named storms. A southern limit at

for sailing well away from any possible track that a tropical storm could follow.

Legendary Caribbean yachtsman and cruising guide author Don Street knows hurricanes. He remembers the hurricane of '38 and made his first marine insurance claim in 1944, when the "Great Storm" of 1944 damaged the Snipe dinghy (Hull No. 3) he owned with his sisters in Manbasset Bay, New York. In 2017, he initiated a claim for 16 feet of garden wall that collapsed after Hurricane Opbelia scored a direct hit on his home in Glandore, Ireland.