National Transportation Safety Board

Marine Accident Brief

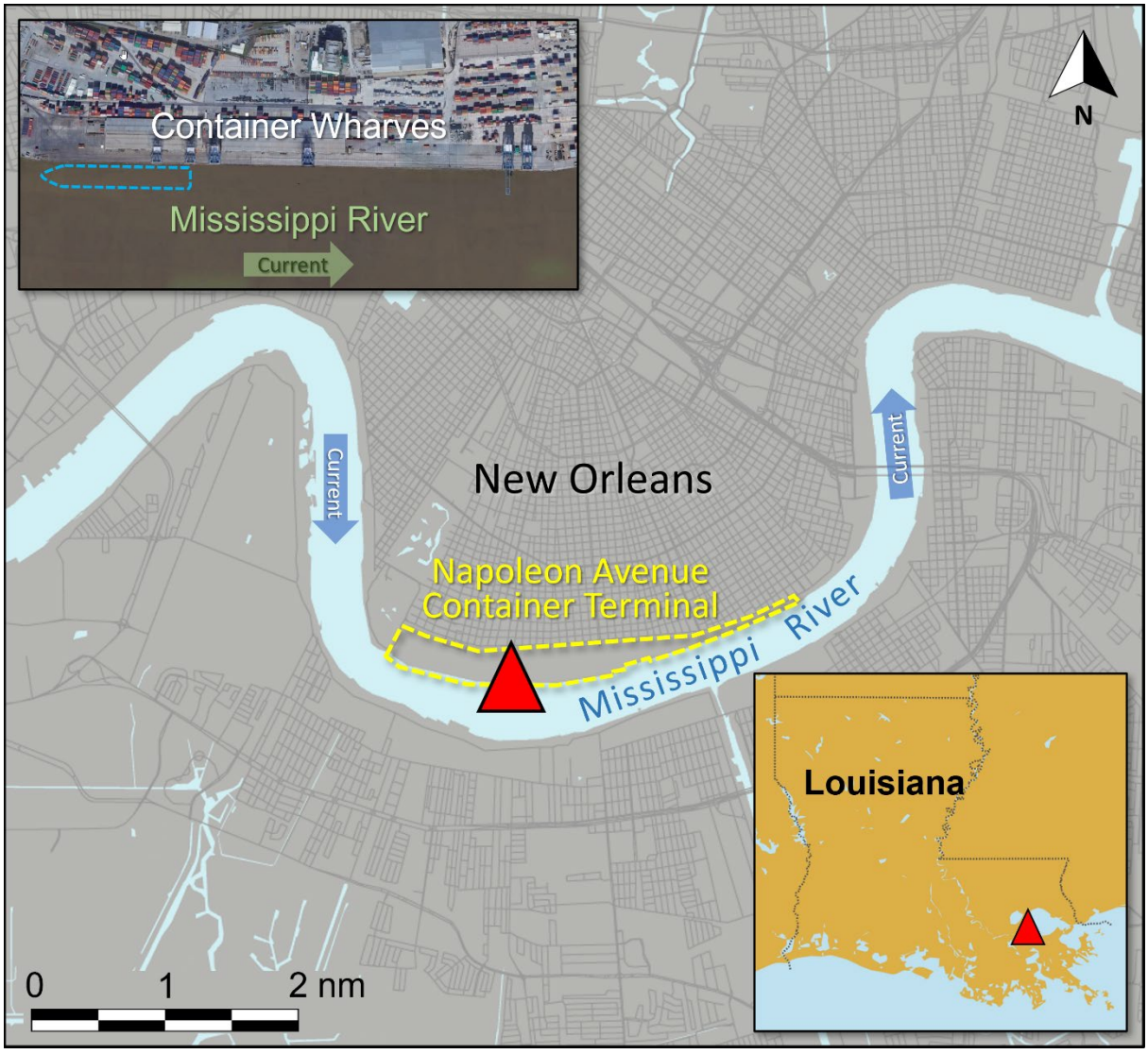
Breakaway of Containership *CMA CGM Bianca*

Accident type	Hull/Machinery/Equipment Damage	**No.** DCA20FM024
Vessel name	*CMA CGM Bianca*	
Location	Napoleon Avenue Container Terminal, Lower Mississippi River, mile 100, New Orleans, Louisiana 29°54.70' N, 90°6.94' W	
Date	August 2, 2020	
Time	1402 central daylight time (coordinated universal time – 5 hours)	
Injuries	One minor	
Property damage	$15.1 million est.	
Environmental damage	Plastic pellets from one 40-foot shipping container released into river	
Weather	Thunderstorm, visibility completely obscured, winds northwest gusting to 73 mph, air temperature 84°F dropping to 75°F during storm, water temperature 80°F	
Waterway information	The Mississippi River at Napoleon Avenue Container Terminal is about 0.5 miles wide, with water depths between 40 and 86 feet.	

On August 2, 2020, about 1402 local time, the containership *CMA CGM Bianca* was loading cargo while moored at the Napoleon Avenue Container Terminal in New Orleans, Louisiana, when a sudden, localized thunderstorm passed through the area. The vessel's mooring lines parted in the high winds, and the ship moved away from the pier. Containers being lifted by shoreside gantry cranes struck the ship, and one damaged container dropped in the water, spilling a cargo of plastic pellets. A crane operator suffered a minor injury; no other injuries were reported among ship and shore personnel. The total cost of damages was estimated at $15 million for the shoreside gantry cranes and $60,196 for the ship.

***CMA CGM Bianca* before the accident. (Source: Henry Kadoch, harborshots.com)**

NOTE: This report was reissued on September 21, 2021, to correct a typo in the managing company's name on page 2.



Location of *CMA CGM Bianca* breakaway, as indicated by the red triangle. (Background source: Google Maps; satellite image: Google Earth)

Background

The Malta-flagged, 1,099-foot-long *CMA CGM Bianca* was built in 2010 and had a maximum container capacity of 8,533 twenty-foot equivalent units (TEU).[1] The vessel was operated by French shipping conglomerate CMA CGM and managed by Danaos Shipping Co. Ltd. It had a single, slow-speed diesel main engine manufactured by MAN B&W and rated at 96,875 horsepower. A tunnel thruster at the bow provided maneuvering assistance during berthing operations.

The Napoleon Avenue Container Terminal was owned by the Port of New Orleans, a public agency of the state of Louisiana, and operation of the facility was contracted to Ports America, a commercial marine terminal management company. Planning and oversight of the loading and unloading of containerships at the terminal, which included interfacing with the ship's crew and providing longshoremen for cargo operations, was the responsibility of the Ports America

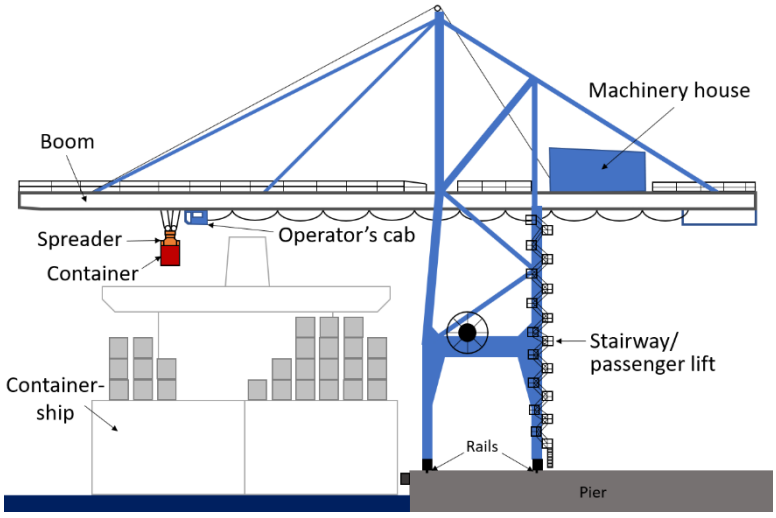
[1] *TEU* is a measure of the carrying capacity of a containership based on the number of 20-foot-long containers the vessel is capable of loading (standard shipping container lengths are 20 and 40 feet).

superintendent. By contract, Ports America sourced longshoremen, including crane operators, from the International Longshoremen's Association (ILA) union Local 3000.

Accident Events

At 0418 on August 2, the *CMA CGM Bianca* moored starboard side to at the Napoleon Avenue Container Terminal. Eight lines were rigged from the bow, with five head lines tending forward and three spring lines tending aft, and eight lines were rigged from the stern, with three spring lines tending forward and five stern lines tending aft. The ship was equipped with self-tensioning-capable mooring winches that, when engaged, heaved in or payed out line to maintain line tension between a set range. The auto-tensioning devices on the mooring line winches were not engaged because, according to the master, the river current in the Mississippi River and wash from passing vessels could trigger unwanted payout, resulting in slack lines. Instead, the mooring winches were secured by their brakes, and the lines were inspected by the crew during regular rounds to ensure adequate tension. The vessel had four additional mooring points along each side of the main deck and three spare lines. However, these were not used during normal conditions and were not rigged on the morning of the accident. At the completion of mooring, the containership's main propulsion engine was shut down.

About 0700, longshoremen arrived at the pier to begin cargo operations. The longshoremen team included a foreman, two crane operators, and deckmen and groundmen who helped direct the movement of the containers on the ship and the wharf, as well as lashers, truck drivers, and other crewmembers. Before operations began, a safety meeting was conducted with the Ports America superintendent that included a discussion of proper personal protective equipment and potential hazards on the job. According to the foreman, the briefing did not include the possibility of hazardous weather. The superintendent stated that weather was discussed during safety meetings "only when we know that the forecast is doomed for the day." At 0712, container unloading commenced, followed shortly thereafter by concurrent loading operations, using gantry cranes nos. 5 and 6.



Simplified diagram of Port of New Orleans marine terminal gantry crane no. 6.

Containers were loaded and unloaded at the terminal by gantry cranes that were owned by the Port of New Orleans and maintained by port personnel. Each crane had a large, square-framed boom which, when lowered, extended out over a containership, perpendicular to the pier. Containers were lifted using cables attached to a spreader—an adjustable framework that latched into a container's corner castings—suspended from the boom. Once lifted clear of any obstructions, the container was traversed to or from the ship or pier along the length of the boom. The crane operator's station was in a cab that hung below the boom and moved with the spreader from the pier to the ship and back, thus allowing the operator to have full visibility at all times of the load being carried.

The cranes were mounted on rails running parallel to the pier, allowing them to move up and down the pier via electric motors. When working a cargo bay on a vessel, brakes on the motors, wheels, and rails engaged to hold the crane in position. Anemometers mounted on each crane measured wind speeds. According to the operations and maintenance manual for crane no. 5, a "pre alarm" sounded when sustained wind speeds exceeded 35 mph (30.4 knots), and an "alarm horn" sounded and the crane shut down automatically when sustained wind speeds exceeded 45 mph (39.1 knots) or wind gusts exceeded 55 mph (47.8 knots). The operations and maintenance manual for crane no. 6, which was built by a different manufacturer, noted alarms and shut-down functionality for high wind but did not provide specific set points.

At 1300, a second shift of longshoremen arrived to take over cargo operations. A new safety briefing was not conducted during shift changes, but, according to the oncoming operator for crane no. 6, if there was safety information to pass, "the foreman tells me" (the foreman did not turn over between morning and afternoon shifts). If any problems occurred or were anticipated, the off-going crane operator would also brief the oncoming operator. The crane no. 6 operator said that the off-going crane operator did not have any issues to report and "everything was going smoothly."

The oncoming crane operator for crane no. 5 described the weather at the time of the shift change as "bright and sunny," and the crane no. 6 operator stated similarly. However, the crane no. 6 operator told investigators that, about an hour into his shift, "I could see some rain coming because it got pretty cloudy." At the time, his crane was moving containers to and from the *CMA CGM Bianca*'s cargo bay 38, forward of the vessel's deckhouse, and crane no. 5 was moving cargo to and from bay 10, near the bow. The two crane operators stated that work normally continued during rain, only stopping during reduced visibility or high winds. So, although the crane no. 6 operator saw the approaching weather, he said, "I proceeded still with operations."

At 1350, security cameras at the terminal recorded rain beginning to fall. The rain increased steadily while visibility decreased, completely obscuring the camera view. Ten minutes later, "gale force winds, and strong rain" hit the *CMA CGM Bianca*, according to the vessel's deck log. The master described the conditions as "in the form of a tornado," and both crane operators stated that the winds developed "in seconds." At 1402, seven forward mooring lines and three aft mooring lines on the *CMA CGM Bianca* parted, and the ship moved away from the pier.

About the same time, crane nos. 5 and 6, both with containers suspended from their spreaders, began moving along their rails (forward to aft, in relation to the *CMA CGM Bianca*) as they were buffeted by the wind. The container suspended from crane no. 5 hit other containers stowed on the ship and then fell from the ship, still connected to the spreader, hitting the pier and breaking open before falling in the water. Part of the container's cargo of very small (less than 5 millimeters) plastic pellets, known as "nurdles" and used for producing plastic products, was discharged into the river. Millions of the pellets floated downriver, washing up on the river banks or out into the Gulf of Mexico. According to port officials, the nurdles were "irretrievable."[2]

[2] Baurick, Tristan. "Millions of plastic pellets are flowing into Gulf," *houmatoday*, August 19, 2020, https://www.houmatoday.com/story/news/2020/08/19/no-cleanup-planned-millions-plastic-pellets-and-flow-gulf-mexico/5608318002/, accessed July 16, 2021.

Security camera footage of Napoleon Avenue Container Terminal pier during accident. (Source: Ports America)

The container suspended from crane no. 6 struck a hatch cover guide in the *CMA CGM Bianca*'s cargo bay 38, puncturing the container. The forward spreader bars then detached from the spreader, dropping the container and the forward spreader bars into the ship's hold. The remainder of the spreader, still attached to the crane, then impaled and lodged in another container.

The crane no. 6 operator stated that the high-wind alarm in his cab sounded on and off when the storm hit, but because it did not sound continuously, he did not initially stop working. The crane no. 5 operator could not recall hearing the high-wind alarm sounding during the storm. The operators stated that when the high winds hit, they attempted to move to safety the containers slung from the cranes, but conditions quickly became dangerous, and the power to their cranes automatically cut off due to the high wind, so they decided to evacuate their control stations. Because the power had shut off, the operators could not move their cabs to the position from which they normally exited. Consequently, they evacuated by climbing up to a catwalk on the boom and walking toward the back of the crane. Although each crane was equipped with a personnel lift, the operators used stairs to get to the ground. While evacuating, one of the operators sustained a minor injury.

On the *CMA CGM Bianca*, the crew was ordered to stand by, and the master proceeded to the bridge. Shortly thereafter, the crew dropped both of the ship's anchors and started the bow thruster to help maintain the ship's position in the river, which was now about 80 feet off the pier. The main engine was brought online, and control was transferred to the bridge at 1408. From then on, the engine was operated sporadically to maintain position.

About 1410, the winds subsided, and the rain lessened, although rain continued to fall for another 10 minutes. Two tugboats were made fast on the port side of the containership to steady it while crews worked to free the fouled spreader from crane no. 6. The vessel re-moored to the pier at 1915 that evening.

Additional Information

Weather. The National Weather Service (NWS) forecast for the accident date, issued at 0357 that morning, predicted, "Partly cloudy with a 40 percent chance of showers and thunderstorms. Highs in the lower 90s. Northwest winds to 5 mph [4.3 knots]." In an Area Forecast Discussion issued at the same time, the NWS stated, "scattered showers may develop . . . but not expecting numerous showers and storms. . . . While a random gusty wind will be possible with storms today, stable warm layer below 750 [millibar] will make it hard for anything to reach the surface."

At 1319 (about 30 minutes before rain started falling at the terminal), the NWS issued a special weather statement with the following information:

> At 117 PM CDT, a strong thunderstorm was located over St. Rose [located 13.5 miles due east of the Napoleon Avenue Terminal], or near Hahnville, moving east at 15 mph.
>
> The main threats from this thunderstorm will be frequent lightning and brief periods of heavy rainfall that could lead to ponding of water in low lying and poor drainage areas.
>
> Locations impacted include . . . New Orleans.

The NWS did not issue a severe thunderstorm warning or special marine warning for the thunderstorm that affected the accident site.

The closest official surface weather station to the accident site was Naval Air Station Joint Reserve Base New Orleans (KNBG), located 7 miles southeast of the accident site. In a routine weather report issued at 1355, the station recorded winds at 4 knots (4.6 mph) from the north, 10 miles visibility, an air temperature of 84°F, and light rain in the area related to thunderstorms. At 1419, the weather station issued a special weather report with recorded winds at 10 knots (11.5 mph) gusting to 27 knots (31.1 mph) and varying from west to northwest, 1.5 miles visibility, an air temperature of 75°F, and heavy rains due to thunderstorms. According to the report, the wind gust peaked at 27 knots (31.1 mph) at 1314. Fourteen minutes later, a KNBG special report recorded winds at 8 knots (9.2 mph) from the northwest, visibility 5 miles, air temperature 75°F, and light rain related to thunderstorms.

The *CMA CGM Bianca* was equipped with an anemometer for measuring wind speeds. To meet air draft requirements for passing under bridges when arriving in New Orleans, the mast upon which the device was mounted was folded down. Thus, information recorded on the vessel's voyage data recorder was unreliable. However, a tow boat that was moored directly across the river (about 2,500 feet from the containership) recorded a wind speed gust of 73 mph (63.4 knots) and heavy rains during the storm.

Crane Operators' Training and Experience. Both ILA crane operators had completed the required training program and credentialling process for their positions. The crane no. 5 operator had about 17 years' experience as a qualified operator; the crane no. 6 operator had nearly 2 years' experience.

High-Wind Procedures. Ports America's operations manual contained procedures in the event of high wind during container vessel loading and unloading. Per the procedures, the

superintendent was responsible for monitoring weather conditions throughout the duration of cargo operations. The superintendent on site during the accident stated that he monitored the weather by watching the news and observing conditions at the terminal. The company's health, safety, and environmental manager stated that he also received alerts from a commercial weather application and communicated severe weather threats to personnel at the terminal when necessary.

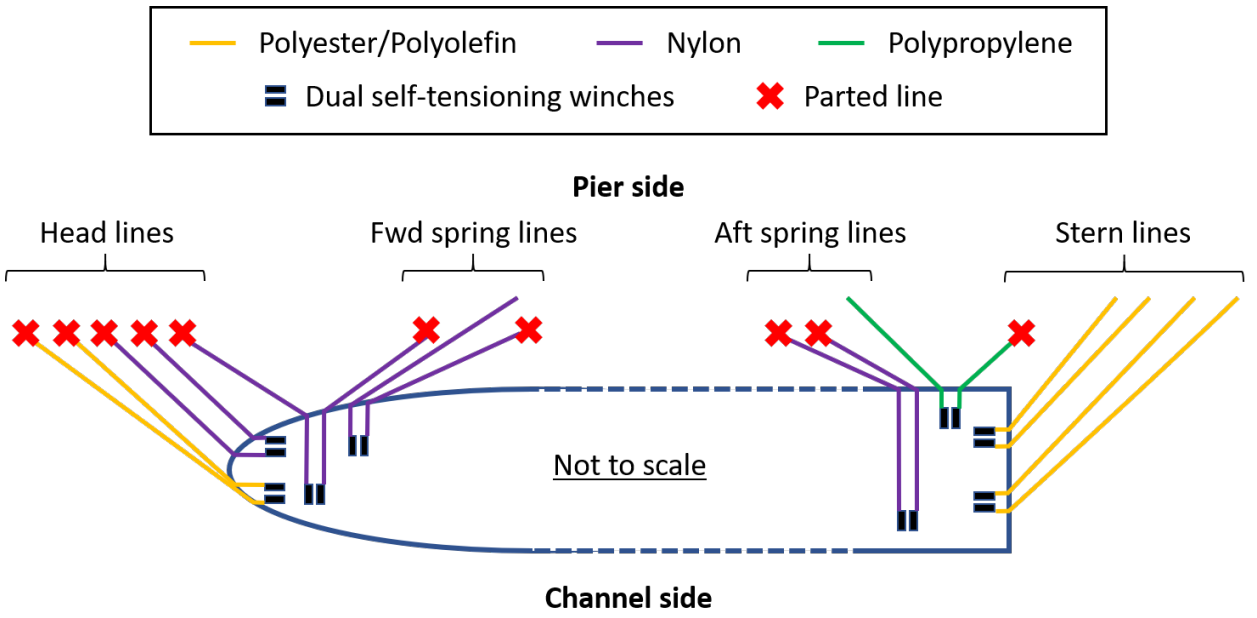
The Ports America high-wind procedures directed that, when wind speeds reached the "Warning" setting, the operator was to place the crane in the park position and notify the foreman and superintendent, and operations for all longshoremen on the vessel were to cease. When winds reached the "Trip Alarm" setting, the crane operator was required to contact the port's crane department and exit the crane. The crane department was then required to "boom up" and pin the crane arms.

The crane no. 6 manual included "Precautions During Storms," which stated, "Make clear to the crane operator the working limitations of the crane, with particular reference to wind velocity and its effect upon the suspended load." The manual further stated that, when a storm warning was issued, several measures were to be taken "without fail." These measures included installing tie-downs to the pier, raising and latching the boom, turning off all power, and closing and locking the cab.

The crane operators working on the accident date stated that they were unfamiliar with Ports America's procedures and that training for emergencies and heavy weather was conducted at the crane operator training school, by the union, and on the job. The crane no. 5 operator noted that high winds that were "anything past 40 miles per hour" would require cargo operations to shut down. The crane no. 6 operator stated that the sounding of a high-wind alarm was "more of a warning" that did not require cargo operations to shut down.

Mooring lines. The *CMA CGM Bianca* was equipped with a mix of mooring lines constructed of either nylon (polyamide), dual fiber polyester/polyolefin, or polypropylene. Each line was certificated by its manufacturer to be in conformance with designed specifications and breaking strength. The breaking strength of the nylon and polyester/polyolefin lines was 108 tons; the breaking strength of the polypropylene lines was 106 tons. During the accident, seven of eight nylon lines parted, two of six polyester/polyolefin lines parted, and one of two polypropylene lines parted. Each of the lines parted close to the eye on the end closest to the bollard on the pier.

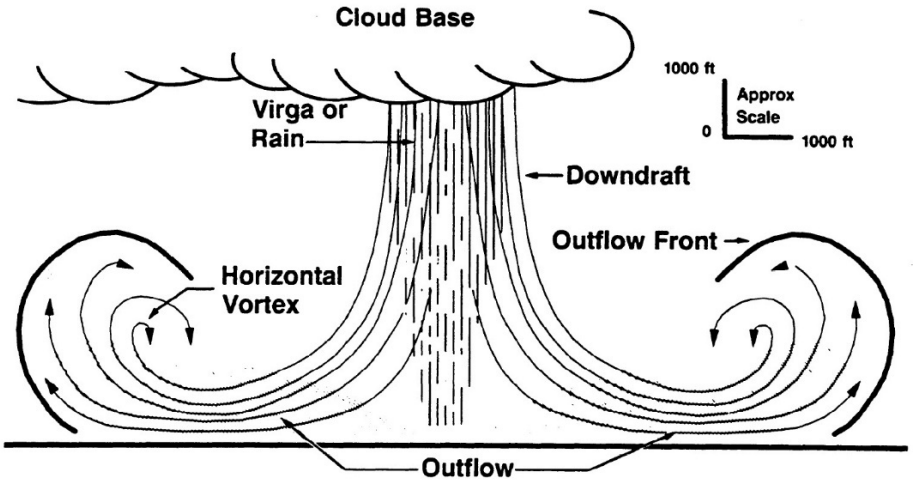
All 16 lines used on the accident date had been put in service between 2018 and 2020, except the two polypropylene lines, which had been in service since 2011. According to records kept on board the vessel, the mooring lines were last inspected on June 6, 2020. The lines were reported to be in "good" condition, with the exception of the two older polypropylene lines, which were rated as "acceptable."



***CMA CGM Bianca* mooring line arrangement.**

Analysis

According to the NWS, "downbursts are powerful winds that descend from a thunderstorm and spread out quickly once they hit the ground. These winds can easily cause damage similar to that of a EF0 (65–85-mph winds) or even EF1 (86–110-mph winds) tornado and are sometimes misinterpreted as tornadoes."[3] The outflow or gust front from a downburst can create an environment favorable for unexpected changes in wind direction and speed. If a storm is likely to produce a damaging downburst, the NWS will issue a severe thunderstorm warning.



Exemplar diagram of a downburst.[4]

[3] (a) NWS, "How Do Downbursts Form?" https://www.weather.gov/lmk/downburst, accessed August 9, 2021. (b) *The Enhanced Fujita Scale*, or *EF Scale*, is used to assign a tornado a rating based on estimated wind speeds and related damage. NWS, https://www.weather.gov/oun/efscale, accessed August 9, 2021.

[4] Federal Aviation Administration, *Pilot Windshear Guide*, Advisory Circular 00-55, Washington DC: Department of Transportation, 1988, page 8.

The crane operators and crewmembers of the *CMA CGM Bianca* reported extreme high winds that came on "in seconds" during heavy rains. Rains were heavy enough to completely obscure the visibility of security cameras at the terminal. Although the closest official weather station recorded winds peaking at 31 mph (27 knots), a vessel located very close to the accident reported a wind gust at 73 mph (63.4 knots), and both the no. 5 and no. 6 cranes shut down automatically, indicating sustained winds of at least 45 mph (39.1 knots) or gusts of at least 55 mph (47.8 knots). The master said that the storm was "in the form of a tornado." Taken together, the evidence suggests that the *CMA CGM Bianca* was struck by outflow winds from a downburst, causing the vessel to break away from the pier and the gantry cranes to move along their rails.

The NWS issued a special weather statement about 40 minutes before the accident, reporting a thunderstorm in the area moving east toward the accident site. However, the statement made no mention of the threat of high winds, and a severe thunderstorm warning was not issued. Earlier on the accident day, the NWS had forecasted a 40% chance of thundershowers, with the possibility of a "random gusty wind," but noted that it was unlikely that these winds would reach the surface. The Ports America superintendent stated that he typically watched the news and observed conditions at the facility to determine the threat of dangerous weather. However, it is unlikely that more robust weather-monitoring measures would have changed the outcome of this accident given the sudden onset of the high wind and the lack of warning in the available weather information.

The crane operators who conducted cargo operations on the *CMA CGM Bianca* were not familiar with Ports America's procedures for high wind. While it is important that operators fully understand and comply with safety procedures, their lack of knowledge was not a factor in the accident. The crane operators were aware of the danger of high winds and had a general understanding that operations should cease under these conditions. The crane operator in each crane started to move the crane and attached container into a safe position when the wind hit the container terminal; however, due to the wind's sudden onset and extreme velocity, they had little time to act before the suspended containers struck the vessel and containers on board.

Containerships such as the *CMA CGM Bianca* have large sail areas (the area of the above-water silhouette of a vessel and cargo, as viewed from abeam), particularly when loaded, and thus are prone to the effects of wind. They also have limited deck space for mooring equipment, and therefore lines tend to be concentrated at the most forward and aft areas of the ship where forces acting on the lines may be greater, particularly if a vessel moves so that it is no longer parallel with the pier. The mooring lines on the *CMA CGM Bianca* were certificated and in good or acceptable condition. The vessel was using all lines that were in service and rigged for a starboard-side-to mooring under normal conditions, but the force of wind against the ship's sail area during the downburst overcame the breaking strength of several lines, leading to the ship's moving away from the pier. Although the vessel was fitted with additional mooring points along the main deck and equipped with spare lines, these were not rigged under normal conditions, and the sudden and unexpected onset of the high winds precluded their use.

The mooring lines on the *CMA CGM Bianca* were made of three different materials: nylon (polyamide), dual fiber polyester/polyolefin, or polypropylene. Lines constructed of different materials may have similar or equal breaking strengths, as was the case with the lines on the accident vessel, but they may have other differing properties that effect performance. For example, if lines with less elasticity are combined with lines with more elasticity, the less elastic lines may

take greater load than the more elastic lines when under heavy tension. In extreme conditions, this may result in unexpected failure of the less elastic lines and successive failure of all lines. Self-tensioning winches can assist in evening the load between lines, but they were not engaged on the *CMA CGM Bianca* due to the captain's concern over unintended payout. The impact of the differences in mooring line materials was beyond the scope of this investigation, but it is possible that these differences contributed to the containership's lines parting.

Within minutes of the *CMA CGM Bianca*'s lines parting, the crew had dropped both anchors in the water, energized the bow thruster, and started and transferred control of the main engine to the bridge. The crew then used the thruster and engines, along with the anchors, to hold the vessel's position in the river. The quick actions of the crew prevented the vessel from drifting down river, where it could have caused damage to other vessels or shore infrastructure.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the breakaway of the containership *CMA CGM Bianca* from the Napoleon Avenue Container Terminal wharf and the ensuing equipment damage was the sudden onset of unforecasted severe winds likely originating from the outflow of a thunderstorm-generated downburst.

Vessel Particulars

Vessel	*CMA CGM Bianca*
Owner/operator	Teucarrier (No. 3) Corp./CMA CGM
Port of registry	Valletta, Malta
Flag	Malta
Type	Containership
Year built	2011
Official number (US)	None
IMO number	N9436367
Classification society	DNV GL
Construction	Steel
Length	1,099 ft (335 m)
Draft	42.7 ft (13 m)
Beam/width	140.4 ft (42.8 m)
Tonnage	91,498 ITC
Engine power; manufacturer	1 x 96,875 hp (72,240 kW); MAN B&W diesel engine
Persons on board	27

NTSB investigators worked closely with our counterparts from Coast Guard Sector New Orleans throughout this investigation.

For more details about this accident, visit www.ntsb.gov and search for NTSB accident ID DCA20FM024.

Issued: September 2, 2021