

The following Safety Recommendations were issued as a result of NTSB Marine Accident Report “Sinking of US Cargo Vessel SS *El Faro* Atlantic Ocean, Northeast of Acklins and Crooked Island, Bahamas October 1, 2015.” Report number MAR-18-01. Adopted on December 12, 2017 and published on February 7, 2018.

Safety Recommendation Number	Safety Recommendation Recipient	Safety Recommendation Text
M-17-021	United States Coast Guard	Revise regulations to increase the minimum required propulsion and critical athwartships machinery angles of inclination. Concurrently, requirements for lifeboat launching angles should be increased above new machinery angles to provide a margin of safety for abandoning ship after machinery failure.
M-17-022	United States Coast Guard	Propose to the International Maritime Organization that design maximum operating angles of inclination for main propulsion and other critical machinery be included in damage control documents, stability instruments and booklets, and in the safety management systems for all applicable vessels.
M-17-023	United States Coast Guard	Propose to the International Maritime Organization that all watertight access doors and access hatch covers normally closed at sea be provided with open/close indicators both on the bridge and locally.
M-17-024	United States Coast Guard	Propose to the International Maritime Organization that on new and existing vessels, seawater supply piping below the waterline in all cargo holds be protected from impact.

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M-17-025	United States Coast Guard	Propose to the International Maritime Organization to require that new cargo vessels be equipped with bilge high-level alarms in all cargo holds that send audible and visible indication to a manned location.
M-17-026	United States Coast Guard	Propose to the International Maritime Organization to require that existing cargo vessels be retrofitted with bilge high-level alarms in all cargo holds that send audible and visible indication to a manned location.
M-17-027	United States Coast Guard	Propose to the International Maritime Organization that any opening that must normally be kept open for the effective operation of the ship must also be considered a downflooding point, both in intact and damage stability regulations and in load line regulations under the International Convention on Load Lines.
M-17-028	United States Coast Guard	Require that information regarding openings that could lead to downflooding be included in damage control documents, stability instruments and booklets, and safety management systems for vessels subject to the intact stability criteria of Title 46 <i>Code of Federal Regulations</i> 170.170, regardless of the designation or treatment of such openings in intact stability calculations.
M-17-029	United States Coast Guard	Propose to the International Maritime Organization that

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		existing cargo vessels operating under the International Convention for the Safety of Life at Sea be required to have damage control plans and booklets on board that meet current standards.
M-17-030	United States Coast Guard	Propose to the International Maritime Organization that damage control plans and booklets required by the International Convention for the Safety of Life at Sea be class-approved.
M-17-031	United States Coast Guard	Publish policy guidance to approved maritime training schools offering bridge resource management courses to promote a cohesive team environment and improve the decision-making process, and specifically include navigational and storm-avoidance scenarios.
M-17-032	United States Coast Guard	Require recurring bridge resource management training for all deck officers when renewing their credentials.
M-17-033	United States Coast Guard	Require that all deck officers, at both operational and management levels, take a Coast Guard-approved advanced meteorology course to close the gap for mariners initially credentialed before 1998.
M-17-034	United States Coast Guard	Publish policy guidance to approved maritime training schools offering management-level training in advanced meteorology, or in an appropriate course, to

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		ensure that the curriculum includes the following topics: characteristics of weather systems including tropical revolving storms; advanced meteorological concepts; importance of sending weather observations; ship maneuvering using advanced simulators in heavy weather; heavy-weather preparations; use of technology to transmit and receive weather forecasts (such as navigational telex or weather-routing providers); ship-routing services (capabilities and limitations); and launching of lifeboats and liferafts in heavy weather.
M-17-035	United States Coast Guard	Provide policy guidance to approved maritime training schools offering operational-level training in meteorology to ensure that the curriculum includes the following topics: characteristics of weather systems, weather charting and reporting, importance of sending weather observations, sources of weather information, and interpreting weather forecast products.
M-17-036	United States Coast Guard	Require that vessels in ocean service (500 gross tons or over) be equipped with properly operating meteorological instruments, including functioning barometers, barographs, and anemometers.
M-17-037	United States Coast Guard	Revise Title 46 <i>Code of Federal Regulations</i> 170.110 (stability booklet) to require

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		(1) stability instructions, guidance, or data on wind velocity used to calculate weather criteria; (2) list of closures that must be made to prevent unintentional flooding; (3) list of closures that must be made for an opening not to be considered a downflooding point; and (4) righting arm curve (metacentric height) table to note the angle at which initial downflooding occurs; also, add a windheel table for vessel full load displacement or the condition of greatest vulnerability to windheel.
M-17-038	United States Coast Guard	Update the guidance in Navigation and Inspection Circular 4-77 (<i>Shifting Weights or Counter Flooding During Emergency Situations</i>), based on the circumstances of the <i>El Faro</i> accident, to include a warning that actions by ship personnel intended to correct a list can produce dangerous results if roll-on/roll-off cargo is already adrift and water has reduced the coefficients of friction for lashed cargo.
M-17-039	United States Coast Guard	Conduct a complete review of the Alternate Compliance Program to assess the adequacy and effectiveness of the program.
M-17-040	United States Coast Guard	Review and implement training of Coast Guard inspectors and accredited classification society surveyors to ensure that they are properly qualified and

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		supported to perform effective, accurate, and transparent vessel inspections, meeting all statutory and regulatory requirements.
M-17-041	United States Coast Guard	Review and revise the policy for major conversion determinations to consider load line (maximum) draft as a principal vessel dimension.
M-17-042	United States Coast Guard	At regular intervals, not to exceed 20 years, review all lifesaving appliances on inspected vessels that are required by Title 46 <i>Code of Federal Regulations</i> Part 199, and require compliance with current standards.
M-17-043	United States Coast Guard	Require that open lifeboats on all US-inspected vessels be replaced with enclosed lifeboats that meet current regulatory standards and freefall lifeboats, where practicable.
M-17-044	United States Coast Guard	To prevent future errors in converting position data such as occurred in the <i>El Faro</i> accident, work with manufacturers of Global Maritime Distress and Safety System equipment, communication providers, and land earth stations to remove ambiguity from the Inmarsat-C distress alert position reports.
M-17-045	United States Coast Guard	Require that all personnel employed on vessels in coastal, Great Lakes, and ocean service be provided with a personal locator

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		beacon to enhance their chances of survival.
M-17-046	United States Coast Guard	Modify guidance and training for marine inspectors to ensure that voyage data recorder annual performance tests include the replacement of locator beacons prior to expiration and that audio used to evaluate quality is recorded while a ship is under way using its main propulsion unit.
M-17-047	United States Coast Guard	Propose to the International Maritime Organization to amend resolution MSC.333(90) to specify that “normal operations” are defined as when a ship is under way using its main propulsion unit and to assess voyage data recorder problems, including not capturing both sides of internal phone calls on the bridge electric telephone and unrecorded very-high-frequency communications, and identify steps to remedy them.
M-17-048	United States Coast Guard	If the actions recommended to the National Oceanic and Atmospheric Administration in Safety Recommendation M-17-52 establish that the automatic identification system (AIS) is a viable means by which to relay (with acceptable time delay) meteorological and oceanographic data and metadata from vessels at sea for use by global meteorological authorities,

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		propose to the International Maritime Organization that vessels required to use AIS also be equipped with meteorological and oceanographic sensors—including, at a minimum, sensors for barometric pressure and sea-surface temperature—that will automatically disseminate the data at high-temporal resolution via AIS.
M-17-049	United States Coast Guard	Propose to the International Maritime Organization that vessels under regulations of the International Convention for the Safety of Life at Sea that are not already automatically disseminating meteorological and oceanographic data by other means be required to manually disseminate such data while at sea via the automatic identification system or the Voluntary Observing Ship program at the times of 0000 coordinated universal time (UTC), 0600 UTC, 1200 UTC, and 1800 UTC.
M-17-050	Federal Communications Commission	Require that all US vessels required to carry 406-megahertz emergency position-indicating radio beacons (EPIRBs) immediately discontinue the use of EPIRBs that are not global positioning system enabled.
M-17-051	Federal Communications Commission	Reserve the designated application-specific message frequencies for very-high-

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		frequency data exchange system use in US territories, as identified in International Telecommunications Union (ITU) recommendation ITU-R M.2092-0, and consistent with international efforts.
M-17-052	National Oceanic and Atmospheric Administration	Coordinate with the National Weather Service, vessel operators, automatic identification system (AIS) service providers, and required onboard technology vendors to perform a “proof-of-concept” project to establish whether AIS, or another suitable alternative, can practically deliver, in a single message, (1) meteorological and oceanographic data obtained directly from automated instrumentation and manual observation on board vessels at sea, (2) vessel position and time of observation, and (3) other important metadata, by satellite and land-based receivers, to global meteorological authorities via the Global Telecommunication System with acceptable time delay.
M-17-053	International Association of Classification Societies	Recommend to your members to increase the minimum required propulsion and critical athwartships machinery angles of inclination. Concurrently, requirements for lifeboat launching angles should be increased above new machinery angles to provide a margin of safety for

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		abandoning ship after machinery failure.
M-17-054	International Association of Classification Societies	Recommend to your members to require that design maximum operating angles of inclination for main propulsion and other critical machinery be included in damage control documents, stability instruments and booklets, and in the safety management systems for all applicable vessels.
M-17-055	International Association of Classification Societies	Recommend to your members to require that all watertight access doors and access hatch covers normally closed at sea be provided with open/close indicators both on the bridge and locally.
M-17-056	International Association of Classification Societies	Recommend to your members to require that on new and existing vessels, seawater supply piping below the waterline in all cargo holds be protected from impact.
M-17-057	International Association of Classification Societies	Recommend to your members to require that new cargo vessels be equipped with bilge high-level alarms in all cargo holds that send audible and visible indication to a manned location.
M-17-058	International Association of Classification Societies	Recommend to your members to require that existing cargo vessels be retrofitted with bilge high-level alarms in all cargo holds that send audible and visible indication to a manned location.
M-17-059	International Association of Classification Societies	Recommend to your members that any opening that must normally be kept open for the effective operation of the ship

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		must also be considered a downflooding point, both in intact and damage stability regulations and in load line regulations under the International Convention on Load Lines.
M-17-060	International Association of Classification Societies	Recommend to your members that existing cargo vessels be required to have damage control plans and booklets on board that meet current standards.
M-17-061	International Association of Classification Societies	Recommend that your members require that damage control plans and booklets required by the International Convention for the Safety of Life at Sea be class-approved.
M-17-062	American Bureau of Shipping	Enhance training of your surveyors to ensure that they are properly qualified and supported to perform effective, accurate, and transparent vessel surveys, meeting all statutory and regulatory requirements.
M-17-063	Furuno Electric Company, Limited	Update your Global Maritime Distress and Safety System software to detect and correct user errors when entering ship positions using the global positioning system.
M-17-064	TOTE Services, Inc.	Establish standard operating procedures for heavy weather that address operational limitations and oil levels in critical machinery to ensure their continued operation.
M-17-065	TOTE Services, Inc.	Establish procedures for opening, closing, and logging all closures that make up a vessel's watertight envelope while the vessel is at sea.

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M-17-066	TOTE Services, Inc.	Ensure that damage control plans and booklets are aboard all your load-lined vessels and that officers and crewmembers are trained in their use.
M-17-067	TOTE Services, Inc.	Require senior officers to receive formal training approved by the manufacturer in all functions found in installed stability programs, including damage stability modules.
M-17-068	TOTE Services, Inc.	Revise your safety management system and bridge resource management programs to contain detailed polices, instructions, procedures, and checklists to mitigate the risks of severe weather to your vessels.
M-17-069	TOTE Services, Inc.	Conduct an external audit, independent of your organization or class society, of your entire safety management system to ensure compliance with the International Safety Management code and correct noted deficiencies.
M-17-070	TOTE Services, Inc.	Require your vessels to be equipped with properly operating meteorological instruments, including functioning barometers, barographs, and anemometers.
M-17-071	TOTE Services, Inc.	Institute a formal company process to provide independent weather routing, passage-planning assistance, and vessel position monitoring.

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M-17-072	TOTE Services, Inc.	Provide formal and recurrent training to your deck officers on the public and commercial weather information systems provided on board each vessel to ensure that the officers are fully knowledgeable about all weather information sources at their disposal and understand the time delays in the information provided.
M-17-073	TOTE Services, Inc.	Provide shoreside management and vessel senior personnel with training in the Rapid Response Damage Assessment program and standard operating procedures, to include requirements to conduct annual drills and submit departure stability conditions for each vessel on each voyage.

February 7, 2018

Commandant of the Coast Guard
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US Coast Guard
2703 Martin Luther King Jr. Avenue SE
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On December 12, 2017, the NTSB adopted its report *Sinking of US Cargo Vessel SS El Faro, Atlantic Ocean, Northeast of Acklins and Crooked Island, Bahamas, October 1, 2015*, NTSB/MAR-17/01. The details of this accident investigation and the resulting safety recommendations may be found in the attached report, which can also be accessed at <http://www.nts.gov>.

Among the safety recommendations are 29 issued to the US Coast Guard, which can be found on pages 248–251 of the report.

The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives. We would appreciate a response within 90 days, detailing the actions you have taken or intend to take to implement these recommendations. When replying, please refer to the safety recommendations by number. We encourage you to submit your response to correspondence@nts.gov. If it exceeds 20 megabytes, including attachments, please e-mail us at the same address for instructions. Please do not submit both an electronic copy and a hard copy of the same response.



February 7, 2018

The Honorable Ajit Pai
Chairman of the Federal Communications Commission
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Washington, DC 20554

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—railroad, highway, marine, and pipeline. We determine the probable cause of the accidents and issue safety recommendations aimed at preventing future accidents. In addition, we carry out special studies concerning transportation safety and coordinate the resources of the federal government and other organizations to provide assistance to victims and their family members affected by major transportation disasters.

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Among the safety recommendations are two issued to the Federal Communications Commission, which can be found on page 251 of the report.

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February 7, 2018

RDML Timothy Gallaudet
Acting Under Secretary, NOAA
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Among the Safety Recommendations is one issued to the National Oceanic and Atmospheric Administration, which can be found on page 252 of the report.

The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives. We would appreciate a response within 90 days, detailing the actions you have taken or intend to take to implement this recommendation. When replying, please refer to the safety recommendation by number. We encourage you to submit your response to correspondence@nts.gov. If it exceeds 20 megabytes, including attachments, please e-mail us at the same address for instructions. Please do not submit both an electronic copy and a hard copy of the same response.



February 7, 2018

Robert Ashdown, Secretary General
IACS Limited, Permanent Secretariat
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Among the safety recommendations are nine issued to the International Association of Classification Societies, which can be found on pages 252–253 of the report.

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February 7, 2018

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Among the Safety Recommendations is one issued to the American Bureau of Shipping, which can be found on page 253 of the report.

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February 7, 2018

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Among the safety recommendations is one issued to Furuno Electric Company, Ltd., which can be found on page 253 of the report.

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February 7, 2018

Anthony Chiarello, President and CEO
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Among the safety recommendations are 10 issued to TOTE Services, Inc., which can be found on pages 253–254 of the report.

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