U.S. Department of Transportation
United States Coast Guard

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NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 6-99

Subj: PLAN REVIEW, INSPECTION, AND CERTIFICATION GUIDANCE FOR VESSELS BUILT TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT AND ADDITIONAL INFORMATION REGARDING NON-CODE HIGH-SPEED VESSELS

Ref: (a) Title 46 CFR parts 114.540 and 175.540
(b) International Code of Safety for High-Speed Craft

1. PURPOSE. This Circular provides plan review, inspection, and certification guidance for owners and operators of passenger vessels built to the International Code of Safety for High-Speed Craft. This Circular also provides a summary of additional measures and operational practices that are being applied to domestic vessels on a local or regional level. These domestic vessels are those that operate at higher speeds, but are not necessarily built to the High-Speed Craft Code.

2. ACTION. Officers in Charge, Marine Inspection (OCMIs) may use this Circular as guidance in dealing with high-speed craft within their zone. OCMIs are also encouraged to bring this Circular to the attention of the appropriate individuals in the maritime industry within their zones.

3. DIRECTIVES AFFECTED. None.

4. BACKGROUND.

a. In 1977, the International Maritime Organization (IMO) adopted the Code of Safety for Dynamically Supported Craft (DSC). The DSC Code was developed to address the worldwide growth in size and types of high-speed craft and to facilitate future research and development of fast sea transportation.

b. The philosophy of the DSC code was different than other international conventions for ships in that it was based on the management of risk through accommodation

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NON-STANDARD DISTRIBUTION: (see page 3)

arrangement, active safety systems, and restricted operation. The DSC Code, for example, permitted the use of non-traditional materials in craft construction provided that additional safety measures were taken to ensure an equivalent level of safety was achieved. By permitting the use of lighter materials in the construction of such craft, builders were able to design craft with a lighter displacement than that of traditional ships and obtain the high speeds necessary to make such craft viable.

c. In 1994, the DSC Code was substantially revised and renamed the International Code of Safety for High-Speed Craft (HSC Code). Although the philosophy of the two codes remains the same, the HSC Code provides far more detailed guidance than its predecessor. Much of the new guidance is based upon the 17 years of experience with the DSC Code and the latest technologies that are rapidly expanding the opportunities for the high-speed craft industry.

5. DISCUSSION.

a. After the adoption of the HSC Code by IMO in 1994, the U.S. Coast Guard incorporated it as part of the rulemaking for small passenger vessels (46 CFR Subchapters T & K); (Federal Register IFR Vol. 61, No. 7, January 10, 1996 and FR Vol. 62, No. 189, September 30, 1997). Since that time, the Coast Guard has accepted the HSC Code as an equivalent to 46 CFR Subchapter H in specific cases as well. Various other domestic regulations such as the pollution prevention and navigation safety regulations may still apply to vessels constructed to this equivalency.

b. Owners and operators interested in building a craft to the HSC Code should note that the HSC Code must be applied in its entirety given its holistic philosophy toward safety. Non-compliance with any part of the HSC Code could result in an imbalance which would adversely affect the safety of the craft, passengers and crew. This point is clearly made in the preamble of the HSC Code and will be expected of owners or operators choosing to build to the international requirements.

c. The HSC Code provides more options for U.S. ship owners and builders of high-speed craft while achieving the goal of harmonization with international requirements. As ferry services increase to meet the demands being placed upon the transportation infrastructure, high-speed ferries will be in a unique position to provide a fast, safe and internationally competitive alternative for meeting the current and future needs of the intermodal transportation system.

d. This Circular contains three enclosures as described below:

(1) The first enclosure provides U.S. interpretations of specific sections in the HSC Code. These interpretations clarify those sections of the Code that have been left "to the satisfaction of the Administration." It is designed to be used in conjunction with the HSC Code.
(2) The second enclosure is an inspection checklist. It may be used in part or in whole depending on the scope of the examination.

(3) The final enclosure provides a collection of additional measures and observed practices for addressing high-speed craft issues. They are provided purely as guidance in developing and ensuring safe operations. They may be used to augment risk assessment efforts. Additional information about risk assessment and analysis methodologies may be obtained by contacting the Human Element and Ship Design Division (G-MSE-1) at Coast Guard Headquarters.

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Assistant Commandant for Marine
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Encl: (1) Plan Review, Inspection, and Certification Guidance for U.S. Flag Vessels Constructed to the International Code of Safety for High-Speed Craft: Interpretations of Sections Left to the Satisfaction of the Administration
(2) Inspection Checklist for Vessels Constructed to the International Code of Safety for High-Speed Craft
(3) Additional Measures and Operating Practices for Addressing High-Speed Craft Issues

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# Plan Review, Inspection, and Certification Guidance for U.S. Flag Vessels Constructed to the International Code of Safety for High-Speed Craft: Interpretations of Sections Left to the Satisfaction of the Administration

Enclosure (1) may be used as an aid in interpreting specific provisions of the International Code of Safety for High-Speed Craft. These interpretations clarify those sections of the Code left to the satisfaction of the Administration. These interpretations shall remain in effect until the Maritime Safety Committee of the International Maritime Organization approves a set of unified interpretations. A set of unified interpretations may not supercede all of the interpretations presented in this enclosure. The following interpretations are provided to the builders and operators of high-speed craft as well as local authorities in order to ensure the uniform application of the relevant regulations:

| HSC Code Section | Interpretation / Remarks |
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| 1.2.12 | Requests for crew sleeping berths will be considered on a case-by-case basis. Adequacy of the fire safety measures and evacuation procedures for the crew accommodation will be based on a comprehensive review by the Marine Safety Center. |
| 1.4.29 | The *maximum operational weight* is vessel and mode specific. Determination of this weight will be performed on a case-by-case basis. |
| 1.4.48 | *Worst intended conditions* may also consider minimum water temperature, icing conditions, or other factors or conditions affecting operating or exposure and hypothermia. |
| 1.5.1.2 | Surveys shall be conducted at least annually. Renewal surveys shall be conducted on five-year intervals with annual periodic surveys as described in 1.5.1.3. Quarterly exams will be required for passenger vessels measuring over 100 G.T. (regulatory tonnage). |
| 1.5.4<br>1.5.5<br>1.5.6<br>1.5.7 | Surveys may be conducted by other organizations under the Alternate Compliance Program (ACP) as prescribed by 46 CFR Part 8. Before pursuing this alternative, the owner should first contact Commandant to determine whether the other organization (i.e. classification society) has been recognized and authorized for this type of craft under the ACP. The ACP may not apply to vessels on domestic routes only. NVIC 10-82 also provides guidance on the plan review and inspection tasks that may be accomplished by classification societies. |
| 1.6 | The Officer in Charge, Marine Inspection (OCMI) shall have the discretion to determine what additional or alternative requirements are necessary to achieve the required level of safety. These determinations shall be made on a case-by-case basis in consultation with the Marine Safety Center. |
| 1.7.2 | No changes may be made to the vessel's structure, equipment, fittings, |

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| | arrangements, or materials without advance approval of the cognizant OCMI. |
| 1.8.1 | As mandated by 33 USC 3309, all vessels that are subject to inspection, including high-speed craft, will be issued a Certificate of Inspection (COI) upon completion of the initial inspection.<br><br>In keeping with policy on issuance of IMO certificates, the *High-Speed Craft Safety Certificate* and *Permit to Operate High-Speed Craft* will **only** be issued to vessels inspected under the HSC Code and engaged in international voyages (See 46 CFR 114.400 for definition of international voyages). In such cases, a COI will also be issued.<br><br>For vessels operating on domestic voyages only, the COI will indicate this restriction (domestic voyages only) and will include the information required for the *Permit to Operate* as specified by Section 18.1.3. Additionally, it will include a statement acknowledging that the vessel is in conformance with the HSC Code; i.e., *"This vessel has been designed, constructed, and outfitted in accordance with the International Code of Safety for High-speed Craft (HSC Code). The condition of this vessel and its equipment shall be maintained to conform with the provisions of the HSC Code and this Certificate of Inspection at all times."*<br><br>**NOTE:** Vessels built to the HSC Code do not have to operate under the HSC Code if they otherwise meet all applicable U.S. regulations. For example, an owner may want to use a proven HSC Code design but not operate the vessel under the HSC Code. In such case, the Coast Guard would review the vessel plans and conduct an on-sight inspection for compliance with the applicable regulations of 46 CFR. However, if the vessel will be operated on international voyages, either SOLAS or the HSC Code must be applied as well.<br><br>With the exception of vessels entered under the Alternate Compliance Program, the *HSC Safety Certificate* will be issued by the cognizant OCMI and endorsed by Coast Guard marine inspectors. NOTE: The *Permit to Operate High-Speed Craft* (and COI) will always be issued by the Coast Guard (even for ACP vessels). |
| 1.8.11 | The *HSC Safety Certificate* may be reissued up to one year beyond the date of expiration of the existing certificate to a vessel that has been laid-up or otherwise placed out of service during the expired period. Reissue of the *HSC Safety Certificate* will be conditional upon successful completion of the renewal survey. At the time of the renewal survey, it shall be apparent that no changes have been made to the vessel's structure, equipment, fittings, arrangements, or materials. |

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| | The *HSC Safety Certificate* will be issued to expire five years from the date of the renewal survey. |
| 1.11.1 | The Coast Guard will consider equivalents on a case-by-case basis. Requests accompanied with applicable testing and documentation shall be submitted to Commandant (G-MOC). |
| 1.11.2 | Alternative requirements of the Code may be allowed if strict compliance with the Code proves impractical for particular designs. Commandant will consider the substitution of alternative requirements on a case-by-case basis bearing in mind the Code's holistic philosophy toward safety. |
| 1.12.1 | During initial and subsequent inspections, the Coast Guard will ensure that the management of the company operating a particular craft has provided adequate manuals for information and guidance. The Coast Guard will also occasionally verify that the information is up-to-date. |
| 1.13.2 | Non-compliance with the provisions of the Code will be considered on a case-by-case basis by the Marine Safety Center in consultation with Commandant. |
| 2.3.4 | Alternative criteria will be considered on a case by case basis. If the characteristics of a craft are unsuitable for applying 2.3.3 (weather and loading criteria), this must be demonstrated. |
| 2.6.4 | The use of foam is limited to high-speed craft 19.8 m (65 feet) or less in length. Foam used shall meet the requirements of 46 CFR 179.240. |
| 2.7.2 | Additional guidance on the content and format of stability information is contained in 46 CFR 170.110 and NVIC 3-89. |
| 2.8 | Onboard stability computers may be used as an adjunct to the required stability booklet. The required booklet must contain all necessary information to allow for the evaluation on any intact condition manually. |
| 2.16 | The stability test may be dispensed with or deadweight survey conducted if the Coast Guard is provided with the approved results of a sister vessel. NVIC 14-81 provides criteria for deciding if the vessel is a "sister." |
| 3.5 | The owner or operator shall demonstrate acceptable design conditions, design loads, and safety factors for the intended operating conditions. This is typically done through the rules of a reputable classification society. The Marine Safety Center will also perform a review. |
| 3.6 | The Coast Guard will deem full-scale trials necessary when there are indications that the loading assumptions or structural calculations are inadequate. |
| 4.8.2 | The evacuation plan and critical path analysis shall be part of the structural fire protection submission to the Marine Safety Center. |
| 4.8.3 | The cognizant OCMI shall witness a demonstration of the evacuation such that it complies with the time calculated in 4.8.1. |
| 4.8.6 | A half trial shall be performed on all craft because this practical |

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| | demonstration is dependent upon vessel and route specifics such as arrangements and communication with base ports. A partial evacuation will only be considered when a half trial has been proven to be impractical. |
| 5.2.3 | A manually driven secondary means of actuating the directional control device must be approved by the Marine Safety Center and its installation and operation must be demonstrated to the satisfaction of the cognizant OCMI. |
| 5.2.4 | Interruption in transferring from primary to secondary control devices will be considered on a case-by-case basis. Further operational controls may be required for such directional control systems. |
| 7.2.1 | Commandant (G-MSE) has established a new approval category for Fire-resisting Divisions for High Speed Craft, under approval series 164.207. Fire-resisting divisions are tested and approved in accordance with IMO Resolution MSC.45 (65) and the IMO Fire Test Procedures Code. The terminology for divisions used in SOLAS, referring to "A", "B", and "C" class divisions, is not relevant to high-speed craft and should not be confused. For further guidance, refer to Resolution MSC.45 (65). |
| 7.2.2 | Commandant (G-MSE-4) has established a new approval category for Fire-Restricting Materials for High Speed Craft, under approval series 164.201. Fire-restricting materials are tested and approved in accordance with IMO Resolution MSC.40 (64) and the IMO Fire Test Procedures Code. |
| 7.2.4 | Non-combustible materials shall be determined using the International Code for Application of Fire Test Procedures, Part I, Non-Combustibility Test. This has been adopted by the IMO as resolution MSC.61(67). |
| 7.4.1.1 | Presently, there are no approved fire-resisting divisions for other than 30 or 60 minute under approval category 164.207. If a particular vessel design is such that a lesser structural fire protection time is determined (refer to 4.8.1), the design should be supported by actual fire testing (in no case should the SFP time be less than 30 minutes). Fire tests for approving particular designs should be in accordance with IMO Resolution MSC.45 (65). If a vessel designer wishes to use a structural fire protection design method (e.g. "Alternative Design Approach" for aluminum structures specified in SNAME Technical and Research Bulletin 2-21, "Aluminum Fire Protection Guidelines", July 1974) or heat transfer calculations in lieu of fire testing, it should be treated as an equivalency and submitted to the Marine Safety Center as such. (also see interpretation to HSC Code section 7.4.2.2) |
| 7.4.2.2 | In the absence of adequate design options (i.e. quantities of selection) for approved fire resisting divisions under Coast Guard Approval Series 164.207, traditional steel and aluminum structural fire protection |

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| | designs may be accepted if they are tested and approved in accordance with the IMO Fire Test Procedures Code. For example, a steel HSC Code vessel may use an approved "A-60" structural insulation under approval series 164.107 (approved to IMO standards) in lieu of a "Fire-resisting division 60." Likewise, an "A-30" design may be used in lieu of a "fire-resisting division 30." Note that an "A-30" design presents a higher standard than a 30-minute fire-resisting division. For application to aluminum structures, the approval must be specifically for aluminum (i.e. an approved "A-60" structural insulation under approval series 164.107 must be tested on aluminum in order to be used on aluminum in an actual design). Approved "B" class divisions may not be used where fire-resisting divisions are required. |
| 7.5.6.2<br>7.5.6.3 | This should be addressed during plan review by the Marine Safety Center and verified by the cognizant OCMI. |
| 7.7.2.1.8 | The Marine Safety Center will address this on a case-by-case basis during plan review. |
| 7.7.2.1.9 | The Marine Safety Center will address this on a case-by-case basis during plan review. |
| 7.7.2.1.11 | Commandant will consider other factors on a case-by-case basis. |
| 7.7.2.2.5 | This will be determined by the Marine Safety Center in consultation with Commandant during plan review. |
| 7.7.2.3.2 | The Marine Safety Center will address this on a case-by-case basis during plan review. |
| 7.7.2.3.4 | Commandant will address this on a case-by-case basis. |
| 7.7.6.1.1 | Commandant will address this on a case-by-case basis. |
| 7.7.6.1.5 | The Marine Safety Center will address this on a case-by-case basis during plan review. |
| 7.7.6.1.12 | The Marine Safety Center will address this on a case-by-case basis during plan review. |
| 7.7.8.5 | Fire hoses should have a length of at least 10 m, but not more than 15 m in machinery spaces and not more than 20 m in all other spaces or open decks. |
| 8.1.1<br>8.1.2<br>8.1.3<br>8.1.4<br>8.1.5<br>8.1.6<br>8.1.7<br>8.1.8<br>8.1.9 | These paragraphs reflect the current equipment approval system. All life-saving appliances and arrangements must be either Coast Guard approved, or approved to the SOLAS requirements by another Administration for which the Coast Guard accepts approvals for the particular item(s) of equipment in question. |
| 8.3.8 | Immersion suits and anti-exposure suits need not be carried on ships operating only on routes between 32 degrees north and 32 degrees south latitude. |

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| 8.6.1 | Appropriately adjustable securing and/or bowsing lines may be used at exits where more than one survival craft is used. |
| 8.7.5 | A launching appliance or marine evacuation system is not necessary if the vertical distance from the embarkation deck to the waterline or to the entry of the survival craft is 1.5 m or less. |
| 8.9.2.2 | A shipboard planned (preventive) maintenance program including the requirements of regulation III/52 of SOLAS 74 may substitute for provision of on-board maintenance instructions. |
| 8.10.1.6.2 | If a rescue boat is intended to be used to tow two liferafts simultaneously, the capability to do so must be demonstrated. |
| 8.10.2 | Vessels not on oceans or international routes may use open reversible liferafts or (for domestic routes) inflatable buoyant apparatus in lieu of liferafts. |
| 9.1.9 | An equivalent level of safety must be demonstrated for machinery without detailed compliance, subject to satisfactory performance in similar applications. |
| 9.1.12 | Deviations from these angles of inclination may be permitted by the Marine Safety Center, considering type, size, and service of vessel. |
| 10.2.4.7.2.2 | Other means of determining oil-level shall be submitted to the Commandant (G-MSE) via the cognizant OCMI for approval and will be considered on a case-by-case basis. |
| 10.2.4.9 | Flexible fuel piping shall only be used on a limited basis and the installation must first be accepted by Commandant (G-MSE). |
| 10.3.7 | For vessels of 150 gross tons or more, branch piping shall not be less than ~50 mm (2 inch) in diameter except for drainage of small pockets or spaces in which ~75 mm (1-1/2-inch) diameter may be used. |
| 12.2.9 | The Marine Safety Center may approve any arrangement that provides a level of safety equivalent to that established by the Code. Requests must be submitted to the Marine Safety Center. If necessary, the Marine Safety Center may require engineering evaluations and tests to demonstrate the equivalence of the substitute. |
| 12.6.1.2 | The OCMI may require additional precautions for portable electrical equipment for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist. |
| 12.6.3 | Manual checking is not acceptable. |
| 12.6.4.1 | When installed, the metallic armor or sheath must meet the installation requirements of IEC 92-3 or section 20 of IEEE Standard 45. |
| 12.6.4.2 | All metallic sheaths and braided armor should be electrically continuous and should be earthed (grounded). However, the braided cable armor or cable metallic sheath must not be used as the grounding conductor for the cable. |
| 12.6.4.4 | Cables which are installed in hazardous areas should be installed as detailed in 46 CFR 111.105-17. |
| 12.6.5.1 | The Coast Guard may consider exception to short circuit and overload |

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| | protections for certain critical systems. Commandant will consider these exceptions on a case-by-case basis. |
| 12.6.9 | Necessity of this sort of arrangement will be considered on a case-by-case basis during the plan review process. |
| 12.6.10 | There is no specific limit regarding voltages for propulsion purposes. |
| 12.7.4.4.1 | The Marine Safety Center in consultation with the local OCMI will consider these waivers on a case-by-case basis. |
| 12.8.2.2.4.1 | The Marine Safety Center in consultation with the local OCMI will consider these waivers on a case-by-case basis. |
| 13.1.1 | The Coast Guard will consider other means of safe navigation on a case-by-case basis. An equivalent level of safety must be demonstrated by the owner or operator. |
| 13.1.2 | Equipment approvals and installation shall be verified during initial survey (certification). |
| 14.3.1<br>14.6.4<br>14.8.4<br>14.9.4<br>14.10.2 | In general, radiocommunication exemptions will be considered on a case-by-case basis and only after advance approval by the FCC. |
| 14.15 | Requirements for licensing, crew qualification, and training will be addressed in a separate policy by the National Maritime Center. |
| 15.3.1 | Due to the unusual nature of this sort of compartment layout, these alternative operating compartment layouts will be considered on a case-by-case basis. |
| 15.3.4 | The need for leading marks astern will be considered on a case-by-case basis. |
| 15.4.10 | This determination will be made on a case-by-case basis and when safety belts are required, the owner or operator shall demonstrate compliance with 15.4.4. |
| 15.5.8 | Vessels shall carry charts of their navigating area and either:<br>(1) Provide a chart table for use by the navigator while the vessel is underway, or<br>(2) Provide an ECDIS with two sources of power, one being the emergency source of power. |
| 15.7.2 | Effective means of keeping the operating compartment windows clear include, but are not limited to one or any combination of:<br>(1) wipers;<br>(2) freshwater wash;<br>(3) heated windows;<br>(4) de-misting systems;<br>(5) de-icing systems; and<br>(6) forced air.<br>Commandant will evaluate other means on a case-by-case basis. Operational controls of the above shall be positioned within reach of |

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| | the master or first officer while seated at their respective workstations. |
| 17.8 | The Coast Guard will accept information, drawn from the FMEA studies and collision/grounding scenarios, that demonstrates the acceleration levels on passengers are within the limits of Chapter 4. |
| 18.1.1 | All elements of the maintenance manuals required by the Code shall be carried on board. |
| 18.1.3 | The *Permit to Operate High-Speed Craft* will be issued for international voyages by the cognizant OCMI (OCMI) when satisfied that the provisions specified by this section are met. The following guidelines apply: |
| 18.1.3.1 | .1 The suitability of the craft for the service intended will be determined prior to issuance of the *Permit to Operate High-Speed Craft*. The operational constraints identified during plan review and sea trials will be included in the Craft Operating Manual and the Route Operational Manual as specified in 18.2.1 and 18.2.2, respectively. The manuals will be reviewed and approved by the OCMI. NOTE: The vessel's COI should reference these manuals as part of the "Conditions of Operation". The following entry should be included on the COI: "This vessel shall be operated within the conditions and constraints specified in the Craft Operating Manual dated _____ and the Route Operational Manual dated _____". |
| 18.1.3.2 | .2 The suitability of the operating conditions in the Route Operational Manual is certified by OCMI's approval of the manual. |
| 18.1.3.3 | .3 The arrangements for obtaining weather information will be approved by the OCMI upon acceptance of the Route Operational Manual. |
| 18.1.3.4 | .4 The base port(s) as required by 18.1.4 shall be capable of communication with the vessel during its entire route of operation. Appropriate personnel assigned to the base port should be familiar with the vessel contingency and/or SAR plans required by 18.1.3.19. |
| 18.1.3.5 | .5 The vessel's Master shall be designated as the person responsible for decisions to cancel or delay a particular voyage. This designation shall be indicated on the COI. |
| 18.1.3.6 | .6 The crew required for safe operation of the vessel shall be designated on the COI. Licensing, crew qualification, and training will be addressed in a separate policy by the National Maritime Center. |
| 18.1.3.7 | .7 Licensing, crew qualification, and training will be addressed in a separate policy by the National Maritime Center. |
| 18.1.3.8 | .8 These restrictions will be addressed on a case-by-case basis by the OCMI in concert with the Commandant (G-MOC). |

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| 18.1.3.9 | .9 Licensing, crew qualification, and training will be addressed in a separate policy by the National Maritime Center. |
| 18.1.3.10 | .10 Licensing, crew qualification, and training will be addressed in a separate policy by the National Maritime Center. |
| 18.1.3.11 | .11 The vessel owner or operator shall provide arrangements for terminal safety. Such arrangements should address the safe embarkation and debarkation of passengers and vehicles. |
| 18.1.3.12 | .12 The vessel owner or operator shall provide arrangements for traffic control. As above, this should also address the safe embarkation and debarkation of passengers and vehicles. |
| 18.1.3.13 | .13 As a minimum, the navigational equipment required in Chapter 13 of the HSC Code shall be provided. Further, all crewmembers assigned to navigational duties shall be familiar with the operation of this equipment. |
| 18.1.3.14 | .14 The OCMI is given discretion to require additional navigation safety equipment if the OCMI deems it necessary for the safe operation of the vessel. |
| 18.1.3.15 | .15 A communications plan specifying the means of communication between the vessel, coast radio stations, base port radio stations, emergency services, and other ships, including the radio frequencies to be used, shall be provided. All equipment must test satisfactory prior to issuance of the *Permit to Operate*. |
| 18.1.3.16 | .16 The methods for maintaining the required records shall be provided by the vessel owner or operator prior to issuance of the *Permit to Operate*. |
| 18.1.3.17 | .17 The maintenance and servicing manual required by 18.2.4 should serve to meet this requirement. |
| 18.1.3.19 | .19 The guidance available in NVIC 1-97 may be used for this requirement. |
| 18.1.4 | For Category A craft, the maximum allowable distance from a base port or place of refuge shall be based on the definition given by 1.4.10. In making this determination, the OCMI must consider the time it would take the operator to notify and mobilize SAR resources in addition to the time it would take for SAR resources to arrive on scene and safely rescue all passengers and crew.<br><br>For Category B craft or high-speed craft engaged exclusively in cargo operations, some leniency may be given in making this determination. |
| 18.3.2<br>18.3.4<br>18.3.5<br>18.3.7<br>18.3.8<br>18.4.3 | Requirements for licensing, crew qualification, and training will be addressed in a separate policy by the National Maritime Center. |

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| 19.1 | At the time of initial certification, the operator shall demonstrate the adequacy of their maintenance organization. This should include discussion of the guidance required by 18.2.4. The operator shall also demonstrate this adequacy any time there are significant changes to their maintenance organization, e.g. a substantial reorganization or a change from self-maintenance to third party maintenance. |
| 19.2 | During the course of periodic surveys (inspections), the Coast Guard will verify maintenance in accordance with 18.2.4.10. The Coast Guard will verify that mechanisms are in place for ensuring adequate inspection, maintenance, and recording of all life-saving appliances and distress signals by examining the maintenance and servicing manual required by 18.2.4.10 as well as the appropriate parts of the safety management system. |
| 19.3 | In addition to the routine preventative inspection and maintenance procedures described above, the operator shall ensure that adequate measures are in place to address section 8.9. |

# INTERNATIONAL CODE OF SAFETY FOR HIGH SPEED CRAFT (HSC CODE)

# INSPECTION CHECKLIST

**Instructions.** This checklist may be used as an inspection guide for either foreign or domestic high-speed craft that are certified (or to be certified) as meeting the IMO HSC Code. For the initial certification of domestic vessels, this checklist should be completed in its entirety in order to confirm compliance with all applicable parts of the HSC Code. This checklist may also be used as a guide for the annual and quarterly (if applicable) inspection of domestic vessels. In general, annual examinations should focus primarily on crew training, operational safety, and the testing and inspection of shipboard safety systems and equipment. Quarterly inspections should focus primarily on crew training and operational safety matters. Finally, for foreign vessels, this checklist may be used as a guide to verify substantial compliance with the HSC Code; although the scope of examination is reduced, the same focus as for domestic vessels should be applied.

## I. Vessel Information

| | | |
|---|---|---|
| Name of Vessel: | | |
| Former Name(s): | | |
| Lloyd's or Coast Guard Number / Call Sign: | | |
| Registry: | | |
| Classification Society: | | |
| Owner (Name and Mailing Address): | | |
| Operator (Name and Mailing Address): | | |
| Agent (Name and Mailing Address): | | |
| Length: | Gross Tons: | Net Tons: |
| Date Keel Laid: | Place Built: | Passenger Capacity: |
| Category (A or B): | Craft Model/Type: | Propulsion: |
| Date of Last Survey (Initial or Renewal): | | |
| Date of Last Survey (Periodic): | | |
| Other Surveys: | | |
| Conversions (Date and Nature of Conversion): | | |
| Outstanding Classification Society or Flag State Requirements: | | |

Vessel Documents:

| | I.D. Number | Issuing Agency | Location | Issue Date | Expiration Date | Endorsement. Date |
|---|---|---|---|---|---|---|
| Certificate of Registry | | | | | | |
| Classification Doc. | | | | | | |
| HSC Safety Cert. | | | | | | |
| Record of Equipment | | | | | | |
| Permit to Operate | | | | | | |
| Safe Manning Cert. | | | | | | |
| IOPP Certificate | | | | | | |
| Intl. Tonnage Cert. | | | | | | |
| COFR | | USCG | | | | |
| Safety Mgmt Cert. | | | | | | |
| Doc. of Compliance | | | | | | |

## II. Buoyancy, Stability, & Subdivision

_____ Inclining and Stability Information (HSC Code 2.7)

- Date of last inclining or lightweight survey _____ (2.7.4)
  - Lightweight survey every 5 years (2.14.1) **
- Stability information available on board (2.7.6)
- Draft marks / draft indicating system (2.7.7)

_____ Ensure watertight integrity of compartments (HSC Code 2.2) including means of closing openings (HSC Code 2.2.4)

_____ Monitoring program for buoyancy medium (e.g. foam) (HSC Code 2.6.4)

_____ No alterations affecting stability (e.g. lightship characteristics (HSC Code 2.7.3)

_____ Loading and stability assessment completed at last departure (HSC Code 2.8)

_____ Marking and recording of the design waterline (HSC Code 2.9)

_____ Effects of icing, particularly when operating north of 42 degrees latitude (HSC Code 2.1.2, Annex 5)

## III. Structures

_____ Confirm vessel conforms to approved plans

- Domestic vessels (Initial COI): Conduct periodic visits during the construction process to confirm the vessel meets the approved vessel structural plans
- Foreign vessels: No enforcement action necessary at unit level

_____ Critical area inspections, as required

## IV. Accommodations and Escape Measures

_____ Verification of approved plans

- Domestic vessels: Confirm that the vessel, as constructed, conforms to approved general arrangement, fire control, and/or evacuation plans.
- Foreign vessels: Conduct spot check to verify the vessel conforms to flag-approved plans (fire control plan).

_____ Public address and information system (HSC Code 4.2)

- General alarm audible through all accommodation and work areas (4.2.1)
  - **Test general alarm system**
- Public address system installed in all passenger & crew areas, escape routes and embarkation stations (4.2.2)
  - **Test public address system**
- Safety information for passengers (4.2.3) **

** Applies to passenger craft only

- Adequate for making visual safety announcement to passengers (4.2.4)
- **Test means of visual safety announcement**

➢ Emergency instructions available at each passenger seat (4.2.5)

_____ Design level based on collision load, $g_{coll}$ _____ (HSC Code 4.3, Table 4.4.2)

_____ Accommodation design (HSC Code 4.4)

➢ Accommodations designed IAW guidelines given in Table 4.4.2 (4.4.2)

➢ Adequate handholds on both sides of any passage for passengers (4.4.6)

_____ Seating construction (HSC Code 4.5)

➢ Seats not meeting 4.5 or 4.6 marked "not for use in hazardous situations" (4.5.2)

➢ Seating does not obstruct essential emergency equipment or means of escape (4.5.3)

➢ No dangerous projections or hard edges (4.5.4)

➢ Seats meet testing and evaluation requirements (Annex 9)

_____ Safety belts (HSC Code 4.6)

➢ Where required (see Table 4.2.2), safety belts shall be of one-hand-release design, either 3-point or shoulder harness (4.6.1)

_____ Exits and means of escape (HSC Code 4.7)

➢ Crew has easy access to passenger accommodation areas (4.7.1)

➢ Public spaces, evacuation routes, exits, lifejacket stowage, survival craft stowage, and embarkation stations are clearly and permanently marked and illuminated as required in Chapter 12. (4.7.3)

➢ Enclosed passenger and crew spaces are provided at least two means of escape from opposite ends of the space. (4.7.4)

➢ Exit doors are capable of being readily operated from inside and outside the craft, in daylight and in darkness. (4.7.6)

➢ Closing, latching and locking of exit doors is readily apparent to crew. External doors are designed to prevent jamming by ice or debris (4.7.7)

➢ Each exit allows sufficient room for positioning a crewmember. (4.7.9)

➢ All exits are adequately marked for passenger guidance and for the guidance of rescue personnel from outside the vessel (4.7.10)

➢ Footholds, ladders, etc. at exits are of rigid construction and permanently fixed; handholds are provided where necessary. (4.7.11)

➢ At least two unobstructed evacuation paths are available to each person. (4.7.12)

➢ Evacuation paths are of adequate size for persons wearing lifejackets. (4.7.13)

➢ Adequate notices are provided to direct passengers to exits. (4.7.14)

➢ Provisions for safe evacuation of passengers to lifesaving appliances are provided. (4.7.15)

_____ Evacuation time (HSC Code 4.8)

➢ Evacuation procedure included in craft operating manual. (4.8.2 & 4.8.11)

** Applies to passenger craft only

- Critical path analysis reviewed by Marine Safety Center (4.8.2)
- Documented achievement of the required evacuation time is available. (4.8.3)
- **Initial COI: Witness demonstration of evacuation time (full trial, half trial, etc.)**

_____ Baggage, stores, shops, and cargo compartments (HSC Code 4.9)

- Provision is made to prevent shifting of baggage, stores, and cargo. Safe storage for carry-on baggage is available in passenger accommodations. (4.9.1)
- Controls, electrical equipment, high-temperature parts, pipelines, etc. located in baggage, stores, and cargo compartments is adequately protected (4.9.2)
- Loading limits (if necessary) are posted in storage compartments. (4.9.3)
- Closure of exterior openings of cargo, luggage, and special category (vehicle) spaces are weathertight. (4.9.4)

_____ Noise levels (HSC Code 4.10)

- Noise levels are low enough to enable the public address system to be heard. (<75 dB-A) (4.10.1)
- Noise levels will not cause communication problems in the operating compartment. (<65 dB-A) (4.10.2)

## V. Directional Control Systems

_____ General (HSC Code 5.1)

- Directional control can be accomplished without undue physical effort (5.1.1)

_____ Reliability (HSC Code 5.2)

- Powered system employs secondary means of actuation or an alternate system is installed (5.2.2)

_____ Demonstrations (HSC Code 5.3)

- **Initial COIs and Initial CVEs:** An operational demonstration should be witnessed in accordance with Annex 8 to determine the affect of failure of any one directional control device (5.3.2)
- **Witness operational testing of directional control systems in all modes and at all control stations**

_____ Control Position (HSC Code 5.4)

- Normally operated from the craft's operating position (5.4.1)
- Two-way communication between all operating positions (5.4.2)
- Adequate indications of directional control system response (e.g. rudder angle indicators) provided at all operating stations. (5.4.3)
  - Indicators are independent of directional control system.
  - **Test alarm that indicates abnormal response or malfunction.**

** Applies to passenger craft only

## VI. Anchoring, Towing, and Berthing

_____ Anchoring (HSC Code 6.2)

- At least one anchor with associated cable and means of recovery is provided. (6.2.1)
- Designed using good engineering practice to ensure personnel safety (6.2.2)
- Two-way communication between the operating compartment and anchoring station is provided (6.2.3) Specify type _____ .
- Adequate arrangements to secure the anchor under all operational conditions (6.2.4)
- Craft protected to prevent anchor damage (6.2.5)
- **Initial and Annual COIs: Witness operational test of anchoring equipment**

_____ Towing (HSC Code 6.3)

- Craft is capable of being safely towed in worst intended conditions (6.3.1)
- Maximum towing speed included in the operating manual (6.3.3)

_____ Berthing (HSC Code 6.4)

- Adequate mooring gear available. (6.4.1)

## VII. Fire Safety

_____ Verification of approved plans

- Domestic vessels: Confirm that the vessel, as constructed, conforms to approved general arrangement, fire control, ventilation, and other fire safety related plans.
- Foreign vessels: Conduct spot check to verify the vessel conforms to flag-approved plans (fire control plan).

### Part A – General

_____ Structural fire protection (HSC Code 7.4)

- Verify structural fire protection details (7.4.1 & 7.4.2) (See also NVIC 9/97)
- Restricted use of combustibles (7.4.3)
  - Separating divisions, ceilings, or linings that are not fire-resisting divisions should be non-combustible or fire-restricting materials.
  - Insulation in areas of flammable liquids or vapors should be impermeable and should have low flame-spread surfaces.
  - Furniture and furnishings in public spaces and crew accommodation should meet the standards prescribed by 7.4.3.3.
  - Low flame-spread surfaces in all accommodation, service spaces and control stations.
  - Thermal and acoustic insulation should be non-combustible if it does not meet 7.2.1 or 7.2.2.
  - Voids having low-density combustible materials installed for buoyancy should have fire-resisting divisions and should be gas-tight but vented to atmosphere.
  - Non-combustible ashtrays should be provided in smoking areas; no smoking signs posted where appropriate.

** Applies to passenger craft only

- Materials in the vicinity of exhaust gas pipes should be non-combustible or shielded with non-combustible insulation.

➢ Arrangement (7.4.4)

- Draft stops should be fitted not more than 14m (45 feet) apart.

_____ Fuel and other flammable liquid tanks and systems (HSC Code 7.5)

➢ Tanks are separated from passenger, crew, and baggage compartments by vapor-proof enclosures (7.5.1)

➢ Fuel tanks are not located in or near areas of major fire hazard (7.5.2)

➢ Fuel tanks have shut-off valves located near the tank from outside the space (7.5.3)

- **Test local and remote operation of fuel shut-off valves**

➢ Fuel has flashpoint of 35°C or above.

➢ If fuel having a flashpoint below 43°C is used, the provisions of 7.5.6 are met:

- Located outside machinery spaces
- Mechanical ventilation installed
- Flame screens fitted
- No smoking signs near entrance to fuel spaces
- Intrinsically-safe electrical equipment in fuel spaces
- Means for retaining spills
- Safe and efficient means for sounding tanks (no gauge glasses)
- Refueling procedures outlined in route operational manual

_____ Ventilation (HSC Code 7.6)

➢ Dampers are installed where ventilation opens to areas of major fire hazard. (7.6.1)

➢ Automatic dampers installed where ventilation ducts pass through fire-resisting or smoke-tight divisions. (7.6.4)

➢ Dampers are capable of remote closure from a continuously manned control station. (7.6.1 & 7.6.6)

- **Test manual and remote closure of dampers**

➢ Remote ventilation shutdowns (7.6.2)

- **Test ventilation shutdowns**

_____ Fire detection and extinguishing systems (HSC Code 7.7)

➢ Areas of major and/or moderate fire hazard and other enclosed accommodation spaces not regularly occupied are fitted with a smoke detection system and a manually operated call point system. (7.6.1)

- Main engine rooms are fitted with a means of fire detection other than smoke and fitted with TV cameras monitored from the operating compartment.
- Call points are located at each exit and around areas of major fire hazard.
- **Test smoke detection and call point system**

➢ The fixed fire detection and fire alarm systems comply with the specific requirements of 7.2.2.

** Applies to passenger craft only

- Capable of immediate operation at all times
- Systems are fitted with visual and audible alarms to indicate electrical fault.
- Normal and emergency sources of power available
- Failure to acknowledge alarms within two minutes will automatically sound an alarm throughout all crew areas
- Clear information displayed to indicate areas covered by each alarm section
- Size of each fire detection system is limited as required by 7.7.2.1.8 & .9
- Detectors are operated by heat, smoke, flame, or any combination of these factors
- Suitable instructions and component spares available
- Design and installation requirements of 7.7.2.2 and 7.7.2.3 are met

➢ The fixed fire detection and alarm system for periodically unattended machinery spaces meets the requirements of 7.7.3.

➢ Areas of major fire hazard are protected by appropriate fixed extinguishing systems, capable of local release and remote release from the continuously manned control station (7.7.4)

➢ Fixed fire extinguishing systems comply with requirements of 7.7.6.1

➢ Carbon dioxide systems comply with 7.7.6.2

➢ **Sight evidence of annual servicing of all fixed fire extinguishing systems**

➢ Portable fire extinguishers provided throughout all control stations, accommodation spaces and service spaces. At least one additional extinguisher outside each machinery space (7.7.7)

- **Sight evidence of annual servicing of all portable fire extinguishers**

➢ Fire pumps and associated equipment meet requirements of 7.7.8

- At least two independently-driven fire pumps installed
- Sufficient number and adequate spacing of hydrants
- Fire hoses and tools/fittings kept ready for use
- Hoses in interior locations are connected to the hydrant
- Dual purpose nozzles with shutoff are provided
- **Witness operational test of all fire pumps**

_____ Protection of special category spaces (HSC Code 7.8)

➢ Boundaries insulated as required in tables 7.4-1 and 7.4-2 and indicators for doors accessing the special category space are provided (7.8.1)

➢ A manually-operated, fixed pressure water-spray system (or other flag-approved system) is installed (7.8.2)

- **Test water spray system for sufficient coverage**

➢ A fire patrol is maintained unless a fixed fire-detection and fire alarm system is installed and a video surveillance system is provided (7.8.3)

➢ An adequate number of manual call points are installed

- **Test a random sample of manual call points**

➢ Sufficient fire-extinguishing equipment is provided as required by 7.8.4

➢ Ventilation system meets the requirements of 7.8.5

- **Test remote ventilation shutdowns and fire dampers**

** Applies to passenger craft only

- Appropriate precautions are taken to prevent ignition of flammable vapors (7.8.7)

_____ Miscellaneous (HSC Code 7.9)

- Flag-approved fire control plans are posted for the guidance of officers (7.9.1)
- A duplicate set of fire control plans is stored outside the deckhouse for shoreside availability (7.9.2)
- Any openings in fire-resisting divisions meet the requirements of 7.9.3:
  - Closures meet fire-resistance of division
  - Doors can be opened/closed on either side by one person
  - Fire doors are self-closing
  - Remote-controlled or power-operated doors are equipped with an alarm
  - All fire doors are capable of remote and automatic release from a continuously-manned central control station and local release from either side of door (not required for normally-closed fire doors)
  - Closure of fire doors is indicated at control station
  - No hold-back hooks are installed
  - Power-operated doors are provided local power accumulators to allow local operation at least ten times
  - **Test remote and local operation of fire doors**

_____ Fireman's outfits (HSC Code 7.10)

- All craft, other than category A craft, shall carry at least two fireman's outfits (7.10.1)
- In addition, category B passenger craft shall carry two fireman's outfits and two sets of personal protective equipment (PPE) for every 80 m of passenger/service space (7.10.1.1) **
- For category B passenger craft, one water fog applicator is provided for each pair of breathing apparatus (7.10.1.2) **
- Fireman's outfits and PPE are easily accessible and ready for use; additional sets are widely separated (7.10.2)
- In passenger craft, at least two fireman's outfits and one set of PPE is available at any one control station (7.10.2) **
- Each fireman's outfit meets the requirements of 7.10.3

## Part B - Additional Fire Safety Requirements for Passenger Craft

_____ Ventilation (HSC Code 7.12)

- Ventilation fans of each zone in accommodation spaces can be independently controlled from a continuously-manned control station
- **Test independent control of ventilation fans**

_____ Fixed sprinkler system (HSC Code 7.13, IMO Resolution MSC 44(65) "Standard for Fixed Sprinkler Systems for High-Speed Craft", NFPA 13)

- Public spaces, service spaces, storerooms (other than those containing flammable liquids), and similar spaces are protected by a fixed sprinkler system (7.13.1)

** Applies to passenger craft only

- In category B craft, no sprinkler section serves more than one zone (7.13.1)
- System plans are displayed at each operating station (7.13.2)
- Manual sprinkler systems activation requirements.
- Equivalent systems should be reviewed by the Marine Safety Center.
- Pumps: means of starting, air exhaust, and gauges
- Sprinkler pump should not be located in any space to be served.
- Connection to fire main.
- Fast response sprinklers (IMO Resolution A.800(19) or appropriate sprinkler head types.
- Piping (NFPA 13).
- Additional dry pipe requirements.
- Test arrangements.

**Part C - Additional Fire Safety Requirements for Cargo Craft**

_____ Control station (HSC Code 7.14)

- Control stations, lifesaving appliances, escape routes, and lifesaving equipment embarkation areas are located adjacent to crew accommodation areas

_____ Cargo spaces (HSC Code 7.15)

- Cargo spaces are fitted with automatic smoke detection systems and fixed fire-extinguishing systems

## VIII. Lifesaving Appliances and Arrangements

_____ Verification of approved plans

- Domestic vessels (Initial COI): Verify that primary lifesaving equipment is arranged in accordance with approved plans
- Foreign vessels: No plan review necessary

_____ Communications (HSC Code 8.2)

- At least three VHF radios are provided on craft (8.2.1)
- At least two radar transponders provided (8.2.1)
- Crew is capable of two-way communications between emergency control stations, muster and embarkation stations and other strategic locations on board (8.2.2)
  - **Test two-way communications**
- General alarm system is installed and operable (8.2.2)
  - **Test general alarm system**
- Daylight signaling lamp is provided (8.2.3)
  - **Test daylight signaling lamp**
- 12 rocket parachute flares are provided; stowed in or near operating compartment (8.2.3)

** Applies to passenger craft only

_____ Personal lifesaving appliances (HSC Code 8.3)

- If passengers have access to exposed decks, at least one lifebuoy is provided on each side of the craft (8.3.1): **
  - Capable of quick release from the control compartment
  - Equipped with self-igniting light and self-activating smoke signal
- At least one lifebuoy is provided at each normal exit from the craft and on each open deck accessible to passengers and crew, subject to a minimum of two (8.3.2)
- Lifebuoys provided at each normal exit are fitted with 30 m of buoyant line (8.3.3)
- Not less than half of all lifebuoys are fitted with buoyant lights (lights should not be fitted on those with lines) (8.3.4)
- Lifejackets complying with LSA Code 2.2 (formerly SOLAS III/32.1) are provided for every person on board. In addition:
  - Lifejackets suitable for children are provided, numbering at least 10% of total passenger capacity or a greater number to provide a lifejacket for each child
  - Lifejackets for not less than 5% POB are stowed at conspicuous locations on deck or at muster stations
  - Sufficient number of lifejackets are provided for those on watch and for use at survival craft and rescue boat stations
  - All lifejackets are fitted with a light complying with LSA Code 2.2.3 (formerly SOLAS III/32.3).
- All lifejackets are readily accessible and their positions are clearly indicated (8.3.6)
- Immersion suits are provided for each member of the rescue boat crew (8.3.7)
- Immersion suits or anti-exposure suits are provided for each crewmember assigned MES duties (8.3.8)

_____ Muster list, emergency instructions and manuals (HSC Code 8.4)

- Clear emergency instructions are provided for each person on board (8.4.1)
- Muster lists complying with SOLAS III/53 (now SOLAS III/37) are provided in conspicuous locations including control compartment, engine room and crew accommodation areas (8.4.2)
- Illustrations and instructions are posted in public spaces, muster stations, other passenger locations and near each seat to inform passengers of:
  - Their muster station
  - Essential actions to take in an emergency
  - Method of donning lifejackets
- Muster stations provide ready access to embarkation stations and have ample room for marshalling and instruction of passengers (8.4.4) **
- Training manual complying with 18.2.3 is provided in each crew messroom and recreation room (8.4.5)

_____ Operating instructions (HSC Code 8.5)

- Posters or signs are provided in the vicinity of survival craft and launching controls (8.5.1):

** Applies to passenger craft only

- Illustrate complete procedures for operating the appliance, including relevant safety warnings
- Can be easily seen under emergency lighting
- Standard IMO symbols are used

_____ Survival craft stowage (HSC Code 8.6)

- Survival craft are stowed in such a manner to permit release near the stowage position and near the operating compartment (8.6.2)
- Survival craft are equally distributed on either side of craft (8.6.3)
- Adequate lighting (normal and emergency) is provided at the embarkation area and at the area of water below (8.6.7)
  - **Test lighting at embarkation stations during abandon ship drill**
- Overboard discharges do not interfere with survival craft (8.6.8)
- Liferafts are stowed with the painter permanently attached to the craft and with a float-free arrangement complying with LSA Code 4.1.6 (formerly SOLAS III/38.6) (8.6.10)
- Rescue boats can be launched within five minutes (8.6.11)
  - **Witness launching of at least one rescue boat during abandon ship drill**

_____ Survival craft and rescue craft embarkation and recovery arrangements (HSC Code 8.7)

- Muster stations are readily accessible from passenger spaces and embarkation stations are readily accessible from muster stations (8.7.1)
- Adequate lighting is provided along routes to muster and embarkation stations (8.7.3)
- If davit-launched liferafts are not provided, MES is installed to avoid persons having to enter water to board survival craft (unless freeboard in damaged or undamaged condition is less than 1.5m (8.7.4 & 8.7.5)
  - **Initial & Annual COIs; Initial CVEs: Witness use of MES with an inflatable liferaft during the abandon ship drill (see MOC Policy Ltr 4-98 for further guidance)**
- Safety knife is provided at each MES station (8.7.7)

_____ Line-throwing appliance (HSC Code 8.8)

- Line-throwing appliance meeting the requirements of LSA Code 7.1 (formerly SOLAS III/49) is provided (8.8)

_____ Operational readiness, maintenance and inspections (HSC Code 8.9)

- All lifesaving appliances are in good working order and ready for immediate use (8.9.1)
- Instructions for on-board maintenance are provided in accordance with SOLAS III/52 (now SOLAS III/36) and maintenance is carried out accordingly (8.9.2)
- Falls are "end-for-ended" at intervals of not more than 30 months and renewed at intervals of not more than five years (8.9.3)
- Spares and repair equipment are provided on board for items subject to wear or consumption (8.9.4)
- Weekly inspections are completed in accordance with 8.9.5

** Applies to passenger craft only

- Monthly inspections are completed in accordance with SOLAS III/52.1 (now SOLAS III/20.7) (8.9.6)
  - **Review documentation of monthly inspections**
- All inflatable liferafts, inflatable lifejackets and MES are serviced at 12-month intervals at approved servicing facilities (8.9.7)
- Hydrostatic release units are serviced at 12-month intervals at approved servicing facilities (8.9.9), or replaced upon expiry if disposable.

_____ Survival craft and rescue boats (HSC Code 8.10)

- All survival craft and rescue boats meet the requirements specified by 8.10.1

## IX. Machinery

_____ Verification of approved plans

- Domestic vessels (Initial COI): Verify that all machinery and associated systems/equipment conform to approved plans
- Foreign vessels: No plan review necessary

### Part A – General

_____ General (9.1)

- Surfaces exceeding 220°C are insulated. The insulation is impervious to flammable liquids and vapors (9.1.2)
- Machinery can be brought into operation from a dead-ship condition without external aid (9.1.5)
- All pressure piping and associated fittings have been pressure tested prior to using for the first time (9.1.6)
- A failure mode and effect analysis has been completed for all machinery systems (9.1.10)
- Boilers, pressure vessels, and associated piping systems are fitted with adequate means to prevent over-pressure (9.1.13)
- Failure of any liquid cooling system can be rapidly detected and is alarmed (9.1.14)

_____ Engine (general) (9.2)

- Engines are fitted with adequate safety monitoring and control devices. (9.2.1)
- Machinery can be controlled from operating compartment. For category B craft and cargo craft, additional controls are provided at or near the machinery space (9.2.1)
- Machinery installation is suitable for operation as unmanned machinery space (9.2.1)
- Engines are protected against overspeed, loss of lube oil pressure, loss of cooling medium, high temperature, malfunction of moving parts, and overload (safety devices should not cause complete engine shutdown without prior warning except in critical situations) (9.2.2)
  - **Test engine safety devices for proper operation**

** Applies to passenger craft only

- At least two independent means of stopping the engines are available in the operating compartment (9.2.3)
  - **Test engine shutdowns**
- Provision is made to drain all excess fuel and oil to a safe location in case of fire (9.2.6)
- Where appropriate (e.g. where low flash-point fuels are used), an interlock is fitted to require operation of ventilation prior to starting engines (9.2.8)
  - **Test as appropriate**

_____ Gas turbines (9.3)

- Turbine cannot be continuously operated within any speed range where excessive vibration, stalling, or surging may be encountered (9.3.1)
- Turbines are designed and installed such that shedding of compressor or turbine blades will not endanger the craft, other machinery, or persons on board (9.3.2)
- Turbines are safeguarded against damage by ingestion of contaminants and provision is made to prevent accumulation of salt deposits and icing (9.3.4)
- Emergency overspeed shutdowns are provided (9.3.6)
- Acoustic enclosures, where fitted, are provided with a fixed fire detection and extinguishing system (9.3.7)

_____ Diesel engines for main propulsion and essential auxiliaries (9.4)

- All external high-pressure fuel lines are protected with a jacketed tubing system capable of containing fuel from a line failure (9.4.2)
- Crankcase explosion relief valves are fitted as required (9.4.3)
- Visible and audible alarms are installed to indicate low lube oil level and low lube oil pressure (9.4.5)

_____ Transmissions (9.5)

- Speeds at which torsional vibration or oscillation is likely to cause failure are recorded as a limitation in the craft operating manual (9.5.3)
- Provision is made such that failure of any part or component will not hazard the craft or its occupants (9.5.5)

_____ Propulsion and lift units (9.6)

- Appropriate arrangements are made to ensure that (9.5.3):
  - Injection of debris is minimized
  - The possibility of injury from rotating parts is minimized
  - Inspection and removal of debris can be carried out safety in service

**Part B – Requirements for Passenger Craft**

_____ Independent means of propulsion for category B craft (9.7)

- At least two independent means of propulsion are provided

** Applies to passenger craft only

_____ Means for return to a port of refuge for category B craft (9.8)

- Craft is capable of maintaining essential machinery and control in the event of fire or other casualty in any one compartment

**Part C – Requirements for Cargo Craft**

_____ Essential machinery and control (9.9)

- Craft is capable of maintaining essential machinery and control in the event of fire or other casualty in any one compartment

## X. Auxiliary Systems

_____ Verification of approved plans

- Domestic vessels (Initial COI): Verify that auxiliary systems conform to approved plans
- Foreign vessels: No plan review necessary

**Part A – General**

_____ Arrangement of oil fuel, lubricating oil and other flammable oil (10.2)

- Flammable oil lines are screened or otherwise protected (10.2.2)
- Flammable oils are not carried forward of public spaces and crew accommodation (10.2.3)
- High pressure fuel piping and components are not concealed and are well lighted (10.2.4.1)
- Sufficient machinery space ventilation is provided (10.2.4.2)
- Safe and efficient means for determining fuel oil tank levels is provided (10.2.4.7)
  - Sounding pipes do not terminate in public spaces, crew accommodation or machinery spaces
  - In passenger craft, oil level gauges do not penetrate below the top of the tank and their failure will not permit release of fuel **
  - No cylindrical gauge glasses are installed (in cargo craft, flat gauge glasses with valves between the gauges and the tanks may be used)
- Sufficient machinery space ventilation provided (10.2.4.2)
- Provision is made to prevent overpressure of oil tanks and piping systems; relief valves discharge to safe locations; flame arresters installed on reliefs (vents) where fuel has a flash point less than 43°C (110°F) (10.2.4.8)
- Restricted use of non-metallic flexible pipes; fire-resistant and of adequate strength (10.2.4.9)
- Lubricating oil arrangements meet the standards of 10.2.5
- Stowage, distribution and use of other flammable oils meets the provisions of 10.2.6
- Fuel oil and lube oil systems within machinery spaces meet the provisions of 10.2.7:
  - Where daily service tanks are filled automatically or remotely, means are provided to prevent overflow
  - Equipment used to treat flammable liquids such as purifiers, filters and heaters are installed in a special space and have means to prevent overflow

** Applies to passenger craft only

- Where daily service tanks or settling tanks are heated, a high temperature alarm is installed if the flashpoint of the oil can be exceeded by the heating system

_____ Bilge pumping and drainage systems (10.3)

- Arrangements are made for draining any watertight compartment (10.3.1)
- Bilge pumping system is capable of operation in the damaged conditions specified by 2.6.5 and 2.6.8 (10.3.3)
  - The system is designed to prevent water flow from one compartment to another
  - Bilge suction controls can be operated from above the "datum"
  - All system components are accessible under normal conditions
- Power-operated self-priming bilge pumps are not used for pumping oil (10.3.4)
- Bilge pump arrangements, capacities and associated piping diameters meet the requirements of 10.3.5 - 10.3.7, 10.3.13, and 10.3.14
  - **Test operation of bilge pumps and suction valves (with exception of emergency bilge suction)**
- Emergency bilge suction is provided in each propulsion machinery space from the largest available power pump (other than bilge, propulsion, or oil pumps) (10.3.8)
- Spindles for sea suction valves extend well above machinery space floor plates (10.3.9)
- All bilge suction piping is independent of other piping (10.3.10)
- Spaces above water level in damage condition may be drained directly overboard through scuppers fitted with non-return valves (10.3.11)
- Unattended spaces where bilge pumping is required are fitted with bilge alarms (10.3.12)
  - **Test bilge alarms**
- Non-return valves are fitted in the following components (10.3.15):
  - Bilge valve distribution manifolds
  - Bilge suction hose connections
  - Direct bilge suction pipes and bilge pump connections

_____ Ballast systems (10.4)

- Water ballast is not carried in oil tanks unless appropriate oily-water separating equipment is provided, meeting MARPOL requirements (10.4.1)
- If the fuel transfer system is used for ballast, it is isolated from the water ballast system and meets the requirements of MARPOL (10.4.2)

_____ Cooling systems (10.5)

- Arrangements are adequate to maintain all lubricating and hydraulic fluid temperatures to within recommended limits

_____ Engine are intake systems (10.6)

- Arrangements provide sufficient air to engines and protect against ingress of foreign matter

_____ Ventilation systems (10.7)

- Machinery space ventilation is adequate to ensure safe operation of the craft

** Applies to passenger craft only

____ Exhaust systems (10.8)

- Provides for safe operation of machinery and safe operation of the craft
- Arranged to minimize intake of exhaust gases into manned spaces, air-conditioning systems and engine intakes
- Exhaust pipes in the vicinity of the waterline are corrosion resistant and are fitted with a device to prevent back-flow of water
- Gas turbine exhausts are directed away from areas where personnel have access

**Part B – Requirements for Passenger Craft**

____ Bilge pumping and drainage systems (10.9)

- **Category B craft:** fitted with at least three power bilge pumps, one of which may be driven by propulsion machinery (10.9.1)
- **Category A craft:** fitted with at least two power bilge pumps, one of which may be driven by propulsion machinery (10.9.1)
- Both may otherwise meet 10.3.14 (10.9.1)
- At least one pump is available for use in all flooding conditions which the craft is required to withstand (10.9.2)
- **Multihull craft:** each hull fitted with at least two bilge pumps (10.9.2)
  - **Test operation of bilge pumps and suction valves (with exception of emergency bilge suction)**
- Bilge pumping system is capable of operation under emergency conditions (10.9.4):
  - At least one bilge pump can be operated in any compartment in the event of flooding
  - Damage to a pump or its piping will not put the system out of action
  - Emergency bilge pumping system is independent of the main system and is capable of operation under the flooding conditions specified in 10.3.3

**Part B – Requirements for Cargo Craft**

____ Bilge pumping systems (10.10)

- At least two power bilge pumps are provided, one of which may be driven by the propulsion machinery. Alternate arrangements are in accordance with 10.3.14
- **Multihull craft:** Each hull is fitted with two power bilge pumps unless a pump in one hull is capable of pumping bilge in another hull. At least one pump is an independent power pump (10.10.2)

## XI. Remote Control, Alarm and Safety Systems

____ General (11.2)

- Failure of any remote or automatic control system will initiate an audible and visible alarm and will not prevent normal manual control (11.2.1)
- Maneuvering and emergency controls are "user-friendly" (11.2.2)

** Applies to passenger craft only

- Transfer of maneuvering or propulsion controls can only be effected from the station taking control (11.2.3)
- Two way voice communications is provided between control stations and between each control station and the lookout position (11.2.3)
- Failure of the control system will bring the craft to low speed without hazarding passengers or the craft (11.2.3)
- **Category B craft and cargo craft:** Remote control systems for propulsion machinery and directional control are equipped with back-up systems controllable from the operating compartment. For cargo craft, the back-up system may be controllable from an engine control space.

____ Emergency controls (11.3)

- Emergency controls are provided, within easy reach, at each control station for use in an emergency to (11.3.1)
  - Activate fixed fire-extinguishing systems
  - Close ventilation openings and stop ventilation for spaces covered by fixed fire-extinguishing
  - Shut-off fuel to main and auxiliary machinery
  - Disconnect all electrical power sources from the normal distribution system
  - Stop main engines and auxiliary machinery
- **Test emergency controls**
- Stations which provide propulsion or maneuvering controls outside the operating compartment have direct communication with the operating compartment (11.3.2)
  - **Test means of communication**

____ Alarm system (11.4)

- Alarm systems are provided to announce at the control position, by visible and audible means, any malfunctions or unsafe conditions (11.4.1)
- Alarms requiring **immediate action** are distinctive and in full view in the operating compartment. Such alarms are provided for the following (11.4.1.1):
  - Activation of a fire detection system
  - Total loss of normal electrical supply
  - Overspeed of main engines
  - Thermal run-away of any permanently installed NI-CAD battery
- Alarms requiring action to prevent degradation to an unsafe condition are provided for the following (11.4.1.2):
  - Exceeding the limits of any craft, machinery or system parameter other than engine overspeed
  - Failure of normal power supply to powered directional or trim control devices
  - Operation of any automatic bilge pump
  - Failure of compass system
  - Low fuel tank level
  - Fuel oil tank overflow

** Applies to passenger craft only

- Extinction of side, stern, or masthead navigation lights
- Low level of any fluid essential to normal craft operation
- Failure of any connected electrical power source
- Failure of any ventilation fan where inflammable vapors may accumulate
- Diesel engine fuel line failure

➢ All warnings required by 11.4.1.1 and 11.4.1.2 are provided at each station where control functions may be exercised (11.4.1.3)

- **Conduct operational test of alarm systems (where practicable)**

_____ Safety system (11.5)

➢ Emergency shutdowns for main propulsion machinery are arranged to preclude inadvertent operation

➢ An audible and visible alarm is given at the control station when any automatic shutdown system is activated

## XII. Electrical Installations

_____ Verification of approved plans

➢ Domestic vessels (Initial COI): Verify that electrical installations conform to approved plans

➢ Foreign vessels: No plan review necessary

### Part A – General

_____ Main source of electrical power (12.2)

➢ At least two generating sets are provided for main electrical power (12.2.1)

➢ Any one generating set is capable of providing sufficient power to maintain the normal operational conditions of propulsion/safety and adequate services for cooking, heating, domestic refrigeration, mechanical ventilation, and sanitary and fresh water (12.2.2)

➢ Any one generating set is capable of providing services necessary for starting the main propulsion plant from a dead-ship condition (the emergency generator may be used as long as it can continue to provide the required emergency electrical service) (12.2.4)

➢ A main electrical lighting system is provided for passenger and crew areas (12.2.6)

➢ Main switchboards are adequately separated from generators (12.2.8)

➢ **Initial and Annual COIs; Initial CVEs: Test main source of electrical power including safety relays (as appropriate)**

_____ Emergency source of electrical power (12.3)

➢ A self-contained emergency source of electrical power is provided (12.3.1)

➢ Located above the waterline in the damaged condition, fully operable and readily accessible (12.3.2)

➢ Emergency source of power is in a safe location; will not be affected by a fire or other casualty in the space containing the main source of electrical power (12.3.3)

➢ Where the emergency source of electrical power is a generator, it should be (12.3.6):

** Applies to passenger craft only

- Driven by a suitable prime mover with an independent supply of fuel
- Started automatically upon failure of main electrical power and automatically connected to the emergency switchboard
- Automatic starting occurs within 45 seconds

➢ Where the emergency source of electrical power is an accumulator battery, it should be capable of (12.3.6):

- Carrying the electrical load without recharging throughout the required discharge period within 12% of its nominal voltage
- Automatically connected to the emergency switchboard upon failure of main electrical power
- Immediately supplying emergency electrical service

➢ Accumulator batteries and the emergency switchboard are in separate spaces (12.3.9)

➢ Battery discharge is indicated on the bridge (12.3.9)

➢ Non-emergency circuits are automatically disconnected from the emergency board where necessary to ensure power to emergency circuits (12.3.11)

➢ Means to prevent overcharge or overheating of accumulator batteries is provided (12.3.13)

➢ Space containing accumulator batteries is well ventilated (12.3.13)

➢ **Test emergency source of electrical power**

_____ Starting arrangements for emergency generating sets (12.4)

➢ Emergency generator is capable of starting in cold condition at 0°C (12.3.1) or is otherwise provided heating arrangements (12.4.1)

➢ The starting device capable of at least 3 consecutive starts (12.4.2)

➢ **Initial COIs and Initial CVEs: Test capabilities of starting device**

_____ Steering and stabilization (12.5)

➢ Where steering or stabilization is dependent on one device, two independent electrical circuits are provided, one being from the emergency source of power or from an independent power supply (12.5.1)

➢ The requirements of chapters 5 and 16 for power supply of the directional control system and stabilization system of the craft are met (12.5.4)

_____ Precautions against shock, fire and other hazards of electrical origin (12.6)

➢ Requirements for electrical equipment grounding are met in accordance with 12.6.1.1

➢ All electrical components are constructed and installed in such a manner to prevent injury when normally handled or touched (12.6.1.3)

➢ Switchboards are suitably guarded; non-conducting mats are provided at the front and rear as necessary (12.6.2)

➢ A suitable ground detection system is provided (12.6.3)

➢ Metal-sheathed cables are electrically-continuous and grounded (12.6.4.1)

➢ Electrical cables and wiring are flame-retardant (12.6.4.2)

➢ Cables and wiring are routed clear of high fire-risk areas (12.6.4.3)

** Applies to passenger craft only

- In hazardous locations, appropriate measures are taken to prevent fire or explosion due to electrical fault (12.6.4.4)
- Cables and wiring are supported in a manner to prevent chafing or other damage (12.6.4.5)
- Each separate circuit is protected against overload or short circuit (12.6.5.1)
- Overload protective devices are properly rated and marked (12.6.5.2)
- Fuses are placed on the load side of the disconnect switch for the circuit (12.6.5.3)
- Lighting equipment is arranged to prevent overheat (12.6.6)
- Lighting and power circuits terminating in bunker or cargo spaces are fitted with a multiple-pole switch outside the space (12.6.7)
- Accumulator batteries are suitably housed (12.6.8.1)
- Electrical equipment installed in hazardous locations (battery compartments, paint lockers, etc.) meet the requirements of 12.6.9
- The additional electrical safety requirements outlined in 12.6.10 have been met

**Part B – Requirements for Passenger Craft**

_____ General (12.7)

- Separation and duplication of essential electrical services is provided (12.7.1)
- Where the main source of electrical power is located in two or more compartments which are not contiguous, the alternative requirements of 12.7.2 have been met (12.7.2)
- For category A craft, the emergency source of power is capable of meeting the requirements prescribed by 12.7.3
- For category B craft, the emergency source of power is capable of meeting the requirements prescribed by 12.7.4
- The transitional source of electrical power meets the requirements of 12.7.5
  - **Initial COI and Initial CVE: Test the transitional source of power**
- For passenger craft with special-category spaces, the provisions of 12.7.9 are met (12.7.9)

**Part B – Requirements for Cargo Craft**

_____ General (12.8)

- Separation and duplication of essential electrical services is provided (12.8.1)
- Where the main source of electrical power is located in two or more compartments which are not contiguous, the provisions of 12.8.2 are met (12.8.2)
- The emergency source of electrical power is capable of meeting the requirements prescribed by 12.8.2.2
- The transitional source of electrical power meets the requirements of 12.8.3
  - **Initial COI: Test the transitional source of power**

** Applies to passenger craft only

## XIII. Navigational Equipment

_____ Compasses (13.2)

- Equipped with magnetic compass and binnacle (13.2.1)
- Easily readable at the control position (13.2.2)
- Compass is properly adjusted; deviation table is available on board (13.2.3)
- For a passenger craft certified to carry 100 or less passengers, an additional instrument is available to provide speed and motion information, providing more accurate heading information than a magnetic compass (13.2.5)
- For cargo craft and passenger craft certified to carry more than 100 passengers, a gyrocompass is fitted in addition to the magnetic compass (12.2.6)

_____ Speed and distance measurement (13.3)

- Equipped with a device to reliably measure speed and distance (13.3.1)
- If fitted with an ARPA, device will measure speed and distance through the water (13.2.2)

_____ Echo-sounding device (13.4)

_____ Radar installations (13.5)

- At least one azimuth-stabilized X-band (3 cm) radar is fitted on board (13.5.1)
- If over 500 gross tons or certified to carry over 450 passengers, two radar installations are fitted (13.5.2)
- At least one radar can be used for plotting (13.5.3)
- Adequate communications between radar operator and person in charge are available (13.5.4)
- Radar installation is suitable for intended craft operations (13.5.5)
- Radar is mounted to avoid vibration (13.5.6)

_____ Electronic positioning systems (13.6)

- Depending on system reliability, electronic positioning equipment is installed (13.5.1)

_____ Rate of turn indicator and rudder angle indicator (13.7)

_____ Other navigational aids (13.8)

- Navigational information is clearly displayed for optimum accuracy (13.8.1)

_____ Searchlight (13.9)

- At least one searchlight is installed, controllable from the operating station (13.9.1)
- One portable signaling lamp is installed, powered from emergency circuit (13.9.2)

_____ Night vision equipment (13.10)

- When required, appropriate night vision equipment is installed (13.10.1)

_____ Steering arrangement and propulsion indicators (13.11)

- Steering is arranged so the craft turns in the direction of the wheel, joystick, or control lever (13.11.1)

** Applies to passenger craft only

- Propulsion system(s) mode is clearly indicated in the operating station (13.11.2)
- If fitted with an emergency steering station, visual compass readings are available on station (13.11.3)

_____ Automatic pilot equipment (13.12)

- Should be fitted with auto-pilot (13.12.1)
- If an auto-pilot is installed, it is equipped with a manual override (13.12.2)

_____ Performance standards (13.13)

- Equipment is approved by the Administration as meeting IMO performance standards (or equivalent) (13.13.2)
- **Conduct operational test of all electronic navigational equipment**

## XIV. Radiocommunications

**Note: This chapter is not applicable to craft operating on the Great Lakes and their connecting tributaries**

_____ Functional requirements (14.4)

- Craft is capable of: (14.4.1))
  - Transmitting ship-to-shore distress alerts by at least two separate and independent means;
  - Receiving shore-to-ship distress alerts;
  - Transmitting and receiving ship-to-ship distress alerts;
  - Transmitting and receiving SAR communications;
  - Transmitting and receiving on-scene communications;
  - Transmitting and receiving signals for locating;
  - Transmitting and receiving maritime safety information;
  - Transmitting and receiving general radiocommunications to and from shore-based radio systems or networks;
  - Transmitting and receiving bridge-to-bridge communications

_____ Radio installations (14.5)

- Every radio installation should be: (14.5.2)
  - Located to avoid any harmful electrical or mechanical interference;
  - Located to ensure safety and operational availability;
  - Protected against environmental damage;
  - Provided with lighting, independent of main electrical power, to illuminate controls;
  - Clearly marked with call sign, ship station identity, and other codes as applicable.
- Control of VHF channels required for navigational safety is immediately available at the conning position(s) (14.5.3)

_____ Radio equipment: general (14.6)

- Craft is provided with: (14.6.1)
  - VHF radio, capable of transmitting and receiving DSC on Ch. 70;

** Applies to passenger craft only

- VHF radio, capable of transmitting and receiving on Ch. 6, 13, and 16;
- Radio installation capable of maintaining a continuous DSC watch on VHF Ch. 70;
- Radar transponder capable of operating in the 9 GHz band;
- Receiver capable of receiving International NAVTEX service broadcasts;
- Radio facility for reception of maritime safety information by the Inmarsat enhanced calling group system if NAVTEX service is not available;
- Satellite EPIRB which meets the requirements of 14.6.1.6

➢ Until 1 February 1999, craft is capable of receiving distress calls on 2182 kHz (14.6.2)

➢ Until 1 February 1999, craft is capable of transmitting an alarm signal on 2182 kHz (14.6.3)

_____ Radio equipment: sea area A1 (14.7)

➢ For craft that operate exclusively in sea area A1, the additional radio equipment requirements prescribed by 14.7 are met

_____ Radio equipment: sea areas A1 and A2 (14.8)

➢ For craft that operate within sea area A1 but not beyond A2, the additional radio equipment requirements prescribed by 14.8 are met

_____ Radio equipment: sea areas A1, A2 and A3 (14.9)

➢ For craft that operate within sea area s A1 and A2 but not beyond A3, the additional radio equipment requirements prescribed by 14.9 are met

_____ Radio equipment: sea areas A1, A2, A3 and A4 (14.10)

➢ For craft certified to operate in any sea area, the additional radio equipment requirements prescribed by 14.9 are met

_____ Watches (14.11)

➢ A continuous watch is maintained on the radio channels and frequencies prescribed by 14.11.1

➢ Maritime safety information is continually monitored (14.11.2)

➢ Until 1 February 1999, VHF Ch. 16 is continually monitored at the navigating position (14.11.3)

➢ Until 1 February 1999, 2182 kHz is continually monitored at the navigating position (14.11.4)

_____ Sources of energy (14.12)

➢ Sufficient electrical energy is available to radio installations at all times (14.12.1)

➢ Reserve and emergency power sources are provided in addition to the craft's main and emergency sources of power (14.12.2)

➢ The reserve source of power is independent of the craft's propulsion and electrical system and can operate the required equipment for one hour (14.12.3)

➢ Where multiple radio installations are connected to the reserve power source, the requirements of 14.12.4 are met

➢ Accumulator batteries for the reserve source of power are appropriately sited and installed (14.12.7)

** Applies to passenger craft only

_____ Performance standards (14.13)

- All radio equipment conforms to appropriate performance standards, not inferior to those adopted by the IMO (14.13.1)
- **Test radiocommunications equipment (as appropriate)**

_____ Maintenance requirements (14.14)

- Radio equipment is maintained as prescribed by 14.14

_____ Radio personnel (14.15)

- Radio operators are fully qualified and hold appropriate certificates

_____ Radio records (14.16)

- Appropriate incident records are maintained

## XV. Operating Compartment Layout

_____ Field of vision from the operating compartment (15.3)

- An all-around view of the horizon is available from the navigating workstation (15.3.1)
- Blind sectors in the operating compartment are minimized (15.3.2)
- Blind sectors are within the limits prescribed by 15.3.3
- While navigators are seated, the view of the sea surface is not obscured by more the one craft length on the bow, to 90° on either side (15.3.5)

_____ Operating compartment (15.4)

- Design and arrangement ensure the required field of vision for each function (15.4.1)
- The operating compartment is not used for purposes other than navigation, communications and other functions essential to operation of the craft (15.4.2)
- An integrated operating station for command, navigation, maneuvering and communication is provided to facilitate navigational safety (15.4.3 & 15.4.11)
- Equipment and means for navigation, maneuvering, control, communication and other essential functions are located close together to enable the officer-in-charge and any assisting officer to receive all necessary information while seated (15.4.4)
- The workstation to monitor engine performance (if fitted) does not interfere with the primary functions of the operating compartment (15.4.5)
- The location of radio equipment does not interfere with the primary navigational functions of the operating station (15.4.6)
- Design and layout of the operating compartment are appropriate for the assigned manning levels (15.4.7)
- Primary controls are "user-friendly" from the seated position (15.4.8)
- It is not necessary to make seat adjustments in order to operate controls (15.4.9)
- Controls are easily operated with safety belt secured (15.4.10)
- Arrangements are made to prevent passengers from distracting the crew (15.4.12)

** Applies to passenger craft only

_____ Instruments and chart table (15.5)

- Instruments and controls are permanently mounted in consoles (15.5.1)
- Instruments are logically grouped to avoid confusion (15.5.2)
- Instruments are plainly visible and easily read (15.5.3)
- Instruments essential to safe operation of the craft are clearly marked with any limitations; emergency controls for lifesaving and firefightings systems are separated (15.5.4)
- Instruments and controls are provided with means for screening and dimming (15.5.5)
- Console surfaces have dark, glare-free colors (15.5.6)
- Duplicate instruments are provided if not visible by all essential personnel (15.5.7)
- A suitable chart table with working light is provided (15.5.8)

_____ Lighting (15.6)

- Satisfactory lighting is available, day or night (15.6.1)
- Glare and stray-image reflection is minimized (15.6.2)
- Lighting intensities can be adjusted as necessary (15.6.3)
- Red lights are used wherever possible (15.6.4)
- During hours of darkness, displays and controls are discernable (15.6.5)

_____ Windows (15.7)

- Window divisions are kept to a minimum; no divisions in front of operating stations (15.7.1)
- A clear view can be provided regardless of weather conditions (15.7.2)
- Solar glare is minimized; polarized or tinted windows are <u>not</u> installed (15.7.3)
- Windows are angled to reduce reflection (15.7.4)
- Windows are fitted with safety glass (15.7.5)

_____ Communication facilities (15.8)

- Internal communications are available during both normal and emergency conditions (15.8.1)
- Means to communicate between the operating compartment and spaces containing essential machinery is provided (15.8.2)
- Means for making public address and safety announcements are provided in the operating compartment (15.8.3)
- Provisions are made to monitor, receive and transmit radio safety message at the operating compartment (15.8.4)

_____ Temperature and ventilation (15.9)

- Operating compartment is equipped with adequate temperature and ventilation control systems

_____ Colors (15.10)

- Surfaces in the operating compartment have suitable colors to avoid reflections

** Applies to passenger craft only

____ Safety measures (15.11)

- The operating compartment is free of physical safety hazards

## XVI. Stabilization Systems

____ General requirements (16.2)

- The stabilization system is designed such that, in case of failure, the parameters of craft motion will remain within safe operating limits (16.2.1)
- Craft motion will remain within safe limits in the case of failure of any automatic stabilization equipment (16.2.2)
- If fitted with an automatic stabilization system, the craft is fitted with an automatic safety control unless redundancy in the system provides an equivalent level of safety; the main operating station can override the automatic safety control if necessary (16.2.3)
- The stabilization system has been included in the failure mode and effect analysis (16.2.6)

____ Lateral height and control systems (16.3)

- Automatic control system is fitted with an automatic safety control that can be counteracted by the operating crew (16.3.1)
- The automatic control system is designed to ensure that the parameters of craft motion will remain within safe limits (16.3.2)

____ Demonstrations (16.4)

- A demonstration and verification process has been completed in accordance with Annex 8 (16.4.1)
- **Initial COI and Initial CVE:** The demonstration and verification process should be witnessed to determine any adverse effects upon safe operation of the craft in the event of an uncontrollable total deflection of any one control device. (16.4.2)

## XVII. Handling, Controllability and Performance

____ General (17.1)

- Full scale tests of the prototype craft have been completed to determine:
  - Handling and performance limitations;
  - Actions to be taken in the event of prescribed failure; and
  - Limitations to be observed for safe operation subsequent to prescribed failures
- **Initial COI and Initial CVE:** The full scale tests required by Chapter 17 should be witnessed and the results verified

____ Proof of compliance (17.2)

- Information on controllability and maneuverability is contained in the craft operating manual

____ Weight and center of gravity (17.3)

- The effects on handling, controllability and performance have been considered for all combinations of weight and center of gravity

** Applies to passenger craft only

_____ Effects of failures (17.4)

- Effects of failures considered as critical according to annex 4 have been verified in accordance with annex 8

_____ Controllability and maneuverability (17.5)

- Instructions regarding craft limitations and required actions subsequent to prescribed failures are included in the craft operating manual (17.5.1)
- Controls are easily operated (17.5.2)
- Craft is capable of performing those maneuvers essential to its safe operation up to the critical design conditions (17.5.3)
- In determining safety parameters with respect to handling, controllability and performance, the following aspects were considered:
  - Yawing;
  - Turning;
  - Stopping in normal and emergency conditions;
  - Stability in the non-displacement mode;
  - Trim;
  - Plough-in; and
  - Lift power limitations

_____ Change of operating surface and mode (17.6)

- Information on change in craft behavior during transition from one type of operating surface or mode to another is available to the vessel master

_____ Surface irregularities (17.7)

- Craft operating limitations due to surface irregularities have been identified and made available to the vessel master

_____ Acceleration and deceleration (17.8)

- The worst likely acceleration or deceleration will not hazard persons on the craft

_____ Speeds (17.9)

- Maximum safe speeds have been determined for various modes of operation and environmental conditions

_____ Minimum depth of water (17.10)

- The minimum depth of water has been determined for all modes of operation

_____ Hard structure clearance (17.11)

- For amphibious craft, clearance of the hard structure when cushion-borne has been determined

_____ Night operation (17.12)

- Full-scale tests included evaluation of condition during night operation

** Applies to passenger craft only

## XVIII. Operational Requirements

### Part A – General

_____ Craft operational control (18.1)

- Prior to issuance of the Permit to Operate (and/or COI), the provisions of 18.1.3 are met (18.1.3)
- The maximum allowable distance from a base port or place of refuge was determined after assessing the provisions made under 18.1.3 (18.1.4)

_____ Craft documentation (18.2)

- Adequate information and guidance in the form of technical manual(s) is available on board to enable the craft to be operated and maintained safely.
- The Craft Operating Manual meets the requirements of 18.2.1
- The Route Operational Manual meets the requirements of 18.2.2
- The Training Manual meets the requirements of 18.2.3
- The Maintenance and Servicing Manual meets the requirements of 18.2.4

_____ Training and qualifications (18.3)

- Type rating certificates have been issued to the master and all officers having an operational role. The type rating training covers the minimum requirements prescribed by 18.3.3
- The type rating certificate specifies a particular type and model of craft operated on a specific route (18.3.4)
- The type rating certificate is revalidated every two years (18.3.5)
- All crew members have received instructions and training, as specified in 18.3.3.6 to .12 (18.3.6)
- The standards of physical fitness and frequency of medical examinations have been specified by the Administration (18.3.7)
- For foreign vessels, the OCMI/COTP is satisfied with the level of training, experience and qualification of the master and each crew member (18.3.8)

_____ Manning of survival craft and supervision (18.4)

- A sufficient number of trained persons are on board for muster and assisting untrained persons (18.4.1)
- A sufficient number of crew members are on board for operating survival craft, rescue boats and launching arrangements
- A deck officer, certificated person, or other qualified crewmember is placed in charge of each survival craft (18.4.3)
- The person in charge of a survival craft has a list of persons assigned to the survival craft (18.4.4)
- Rescue boats and motorized survival craft have a person assigned to operate the engine and carryout minor adjustments (18.4.5)

** Applies to passenger craft only

_____ Emergency instructions and drills (18.5)

- Emergency fire and evacuation drills for the crew are held weekly for passenger vessels and monthly for cargo vessels (18.5.2)
- Each crewmember has participated in at least one evacuation, fire and damage control drill per month (18.5.4)
- Crewmembers have been trained in the use of the craft's evacuation, fire and damage control appliances and systems (18.5.5)
- Complete emergency instructions are available near each passenger and crew seat (18.5.6)
- Complete records of emergency and other safety drills have been recorded in a log book (18.5.7)
- Evacuation drills are conducted in accordance with (18.5.8)
  - **Witness evacuation drill**
- Rescue boat drills should be conducted monthly (as practicable) in conjunction with evacuation drills, but must be conducted at least quarterly (18.5.3)
  - **Witness rescue boat drill**
- Each crewmember has been given individual instruction on the use of the craft's lifesaving systems and equipment; within one month for passenger vessels or two months for cargo vessels (18.5.8.4)
  - **Evaluate the level of crew training by questioning crewmembers**
- On-board training in the use of davit-launched liferafts has taken place at intervals not exceeding four months (18.5.8.5)
  - **Evaluate the crew's ability to safely and effectively launch a davit-launched liferaft using MSOC Policy Ltr 4-98 as a guide**
- Fire drills are conducted weekly in accordance with 18.5.9
  - **Witness fire drill**
- Damage control drills are conducted weekly in accordance with 18.5.10
  - **Witness damage control drill**

**Part B – Requirements for Passenger Craft**

_____ Type rating training (18.6)

- Type rating training covers the control and evacuation of passengers (18.6.1)
- If cargo is carried, craft also complies with Part C of Ch. 18 (18.6.2)

_____ Emergency instructions and drills (18.7)

- Emergency instructions are available to passengers and placed near each passenger seat (18.7.1)
- Passengers are advised of emergency instruction upon boarding (18.7.2)

** Applies to passenger craft only

**Part C – Requirements for Cargo Craft**

_____ Type rating training (18.8)

- All crewmembers have received type rating training to cover cargo and vehicle storage area security systems

_____ Emergency instructions and drills (18.9)

- Emergency instructions are available to crew

## XIX. Inspection and Maintenance Requirements

_____ Craft maintenance organization is satisfactory (19.1)

_____ Craft and equipment are adequately maintained (19.2)

- Routine preventative inspection and maintenance is completed (as approved by the Administration)
- Maintenance tasks are completed in accordance with maintenance manuals, service bulletins, and other appropriate instructions
- All modifications are recorded and their safety aspects investigated
- Arrangements are in place to inform the master of the serviceability of the craft and equipment
- Maintenance duties and procedures for obtaining assistance away from port are clearly defined
- Defects and repairs are reported to the maintenance organization by the master
- Records of defects and their correction are maintained; recurring defects or safety defects are reported to the Administration

_____ Arrangements are provided to ensure adequate inspection, maintenance and recording of lifesaving appliances and distress signals (19.3)

** Applies to passenger craft only

# Additional Measures and Operating Practices for Addressing High-Speed Craft Issues

This enclosure has been compiled to provide those involved with high-speed craft the benefit of the Coast Guard's experience in observing industry practices and in dealing with operational issues. This portion of the Circular is particularly relevant to domestic vessels that operate at higher speeds, but are not necessarily built to the High Speed Craft Code.

The HSC Code dictates certain operational requirements and controls. However, there are areas in the Code that do not adequately address all concerns that may arise regarding a local waterway. The same situation applies to domestic high-speed vessels not built to the Code. The domestic standards cannot adequately address all concerns regarding high-speed craft operations.

To address these concerns, various additional measures have been implemented. However, some of these issues cannot be adequately addressed by single national guidance, and are rightly left to the local discretion of the Captains of the Port (COTP) or Officers in Charge, Marine Inspection (OCMI).

The OCMI/COTP should base decisions on their risk assessment of vessel specifics, local waterway characteristics, waterway traffic, and operating routes. Some have used the systems approach to human element risk analysis discussed in Section 3.2 and described in Annex I of the *Prevention Through People Quality Action Team Report* published July 15, 1995.

Local Coast Guard authorities are guided by the Coast Guard Office of Marine Safety and Environmental Protection Business Plan to employ risk-based methods in waterway management. Additional measures for high-speed craft may arise as a result of these risk assessments.

Vessels meeting the Code definition of high-speed craft and not on an international voyage, which choose to comply with applicable U.S. regulations in lieu of the HSC Code, may be subject to additional requirements determined by the cognizant Officer in Charge, Marine Inspection (OCMI):

- Determination of area of operation for each vessel including necessary operational limits (46 CFR 115.110, 176.110)
- Requirement for additional navigation, control, or communications equipment on a vessel that operates at high speeds in restricted or high traffic areas (46 CFR 121.100, 184.100). Guidance for performance standards of such equipment can be found in the applicable IMO Resolutions (e.g. IMO Res. A820(19) for navigating radar equipment for high-speed craft). Standards for other equipment are listed in the applicable sections of the HSC Code.
- Determination of vessel manning requirements for a specific vessel based on considerations such as vessel size, type, and service (46 CFR 15.501)
- Assurance that crew accommodations and work spaces are suitably equipped for safe operation of the vessel (46 CFR 116.700, 177.700)

OCMI/COTP's are encouraged to refer to the HSC Code as one source of guidance when developing local policies for their high-speed vessels.

Trends within the industry have also been compiled. In conjunction with other official travel around the country, the Quality Assurance and Traveling Inspection staff has attempted to capture the operating histories and practices of existing domestic high-speed vessels not built to the Code (specifically those operating at speeds in excess of 25 knots). The following is a compilation of issues and practices directly observed or reported during underway interviews with licensed Masters operating these craft and their company counterparts ashore. Some local OCMI requirements have also been included. It is intended to provide examples of existing operational practices as well as highlight some areas for future dialog between owners or operators and the Coast Guard.

Restricted Visibility: The nature of restricted visibility varies from location to location. For example, some ports are more prone to fog than others, and even the type of fog cover varies from port to port. Therefore, each operation or local authority has addressed the issue of restricted visibility in a slightly different manner.

One OCMI has required Masters aboard high-speed vessels to obtain radar endorsements.

Rule 6 of the *Rules of the Road* (i.e. International Regulations for Prevention of Collisions at Sea (COLREGS 72) and the Inland Rules) provides some guidance as to "safe speed." The state of the visibility is one of the factors to be taken into account for determining a safe speed. Generally, operators are aware of their responsibilities under the *Rules of the Road* and slow down as necessary to operate at what they subjectively determine to be "safe speed." The companies observed typically rely on their Master's judgement, understanding the importance of a safe transit in periods of reduced visibility as opposed to imposing a "schedule at all costs" corporate culture.

Many operators have created bridge teams or have required additional lookouts to partially compensate for the effects of restricted visibility. Despite these precautionary practices, most companies do not have explicit policies regarding operations in restricted visibility. One company did, however, have a policy which required vessels to proceed at speeds which allow stopping in half the distance of the visibility. This "half the visibility rule" has long been used as a maritime rule of thumb and has been supported in the admiralty courts.

Other companies required their senior deckhand to be stationed on the bridge at night and during restricted visibility. Some companies require an additional lookout forward equipped with a radio for communication to the bridge. The safety measures observed were highly dependent upon the specific operation, passenger count, vessel configuration, and internal company policy. Other measures include enforcement of speed zones, flashing yellow light requirements, and/or adjustment of intervals for sound signaling devices.

Traffic Density: In all cases, traffic density was directly related to local conditions such as the geographic layout of the port and the degree to which existing buoy systems were used, as well as the nature and priority of the existing waterway users. Many of these high-speed vessels operate as commuter ferries where peak commuting hours do not normally coincide with peak recreational waterway usage, notwithstanding seasonal considerations. When this is not the case, operators have developed communications systems whereby their operating schedules are shared widely in an effort to minimize density in a specific area or during a specific time. Some ports were faced with unique challenges such as crossing traffic from kayaks and other small craft. However, the presence of these small craft is usually only during fair weather when visibility is good.

Efforts have been made to increase awareness through education and communication. Some operators have prepared informative bulletins about their operations while others have provided outreach services to help the community adjust to a "new" high-speed operation. For example, efforts have been made to document fast ferry routes on nautical charts. There have also been campaigns for informing small craft operators of the advantages of using radar reflectors.

Watchkeeping: There appears to be a technological (or possibly operational) break point where vessels that operate below a certain speed align with conventional training and watchkeeping standards. Those that operate above that speed voluntarily adopt additional measures to maintain an equivalent level of safety while operating at those higher speeds.

Many high-speed vessel operators have implemented a two-person bridge system to keep up with the navigational demands. In fact, some operators have voluntarily provided an additional licensed operator with a radar endorsement aboard their vessels for added safety due to the increased stress and demands from operating at higher speeds. Two people (whether licensed or not) on the bridge fully engaged in the operation and navigation of the vessel appears to be appropriate due to the increased relative motion, and is currently being voluntarily provided by the operators on certain routes. This additional watchstander was observed to be in place, more often than not, as a function of the speed at which the vessel travels and not solely passenger count as has traditionally been the case. Occasionally, the operators have requested that their COI reflect these self-imposed additional manning levels.

Based on discussions with the operator, one OCMI has required that the Master and Mate (on a specific HSC Code vessel) shall hold valid licenses with 500 gross ton endorsements even though the vessel is documented as less than 100 gross tons. This provides an additional level of experience and competence.

Engineering Support: Many of these vessels observed were catamarans with redundant machinery systems in each hull. Coupled with the lack of a requirement for onboard engineers, there is no expectation for making repairs while underway on these characteristically short routes. Therefore, mechanical reliability has been based upon adequate shoreside maintenance support. This support is critical to continuous safe operations.

Each operator has adopted a slightly different approach to providing support. Many operators use overnight crews to perform preventative maintenance, and then remain on-call during ferry operating periods. One operator has such an on-call shoreside support, but in one case a gap in the maintenance crew schedule resulted in some apprehension on the part of the vessel's operating crew due to unfamiliarity with specific light-off procedures. Such a maintenance and engineering support system needs complete coverage and may require initial and or periodic review at the discretion of the OCMI.

Other operators have adopted a cross-training philosophy where crewmembers are trained in basic, vessel-specific engineering. Beyond this, some operators have employed personnel with both engineering and deck licenses. This level of depth and the obvious cross-training implications makes for a non-traditional, but arguably safer, company culture. Yet other operators voluntarily employ unlicensed engineers aboard their vessels due to the technical complexity.

One OCMI has required a third assistant engineer with an unlimited horsepower endorsement on a specific HSC Code vessel. In addition, due to the complex nature of power plant and discussions with the operator, the OCMI required completion of a training course on main gas turbines.

Training: Like watchkeeping, many operators have adopted a form of type-rating for their crews. Each crewmember is trained in vessel-specific systems and operations of their high-speed vessel. Some companies have developed a complete training program that includes safety and operations checklists and requires specific skills to be demonstrated from machinery start-up to emergency drill procedures.

Other operators use the senior deckhand regime. Some expressed concern over the content and quality of the senior deckhand training program. This was particularly evident on those vessels where the senior deckhand was the second member of the bridge team and a higher degree of competency was called upon. In certain cases, however, seniority was the basis for selecting senior deck hands that may or may not yield the best-qualified person for augmenting the bridge team. Some operators felt that the senior deckhand should have a radar endorsement similar to other licensed operators. In any case, a thorough review of each vessel's senior deckhand program may be encouraged or required at the discretion of the local OCMI.

In fact, one OCMI required navigation and watchkeeping training for the senior deckhand equivalent to that required of Masters or Mates, Great Lakes/inland, 200 gross tons (including Master, Great Lakes/inland, 100 gross tons).

The High-Speed Commercial Craft Safety Board, a group comprised of high-speed ferry operators in and around the New York area, has developed a generic training manual template that allows operators to develop their own in-house training process similar to that of type rating. The training manual requires a period of instruction followed by

satisfactory demonstration of various tasks. The template provides a flexible framework, which can be tailored for specific vessels and operations.

Operations Manuals: To address concerns surrounding potential imbalances regarding safety, one OCMI has worked with the owners/operators to create an operations manual which includes vessel particulars, construction and systems, operating instructions, limitations and approved systems, loading, location of marine and emergency equipment, as well as contingency and emergency procedures. The operations manual was incorporated into sea-trial procedures and tested section-by-section much like an automation test procedure. Although beyond the scope of the domestic regulations, this industry-Coast Guard consensus up-front was seen as a way to develop and address port and operational risks early in the operation.

Fatigue: Fatigue and the resulting lack of alertness and/or attention is even more critical at high-speeds than is normally the case. Many operators have realized that fatigue plays an important role in setting schedules. In addition to placing a second person on the bridge to reduce the overall workload, one operator split their 12-hour operating day into equal shifts. Now, their Masters work either the morning or afternoon shift rather than the entire day, and have no more than 8-hours on task.

Many studies are being conducted to determine the effects of fatigue on marine operation and the results may be useful in determining optimal schedules. The Coast Guard is presently looking at fatigue and physical standards and may develop future policy based on the results.

Bridge Layout and Human Factors Engineering: Significant improvements can be made by incorporating basic human factors engineering principles. Most companies observed realized the critical importance of bridge layout regarding ease of operations at increased speeds. Although subject to personal preference, the layout (e.g. location of navigation equipment, style of console, seat spacing, open versus closed bridge wings) was discussed in detail. As expected, Masters with input to the bridge layout design were most comfortable with the situation.

Considering the importance of the human factor to the success of a high-speed operation, owners and designers are strongly encouraged to include bridge layout and human factors engineering in their initial discussions. Chapter 15 of the HSC Code provides information pertinent to this issue.

Quality of Navigation and Communication Gear: Many operators, including some of the Masters interviewed, agreed that performance standards should be prescribed for navigation and communication equipment so that ineffective gear would not be placed aboard the vessel.

Performance specifications for this equipment is presently beyond the scope of the domestic standards, but pertinent information may be found in the Resolutions referenced in the HSC Code.

Sea State: Some ship builders provide a table of recommended speeds based on sea state to avoid excessive slamming loads to the structure. Other vessels have no such table, but many operators state that this is self-regulating because they adjust their speed based on passenger comfort (e.g. speeds are slowed to avoid passenger seasickness).

One OCMI adopted class society recommendations for speed limitations based on significant wave height. A table indicating this has been included in that HSC Code vessel's COI.

Marine Mammals: In addition to all other safety issues, operators should consider the presence of marine mammals along their routes. A whale strike can result in significant vessel damage and even personal injury. Federal regulations prohibit approach within 500 yards of northern right whales and require specific precautionary measures should a right whale surface within 500 yards of a vessel. To address this, a number of northeast operators (including those of high-speed vessels) have adopted additional voluntary safety measures such as the posting of specially trained lookouts and seasonal route adjustments while transiting known habitat areas. The same precautionary measures may be relevant to other species as well. Information on these issues can be obtained from federal agencies, such as the National Marine Fisheries Service or the U.S. Coast Guard, as well as state wildlife agencies.

As can be seen, there is not one "right" answer to addressing the operational issues surrounding high-speed craft. Each safety measure is dependent upon the specific operation. There are other options available through existing regulation as well; e.g. operational controls such as regulated navigation areas, speed zones, or COTP orders.

At present, many of the operational practices cited above are beyond the scope of the current domestic standards/existing regulations. The HSC Code, Chapter 18 in particular, provides some valuable information for consideration when attempting to address these high-speed craft issues. The practices detailed throughout this enclosure have been implemented largely based on the operator's need to provide additional safety measures for vessels operating at higher speeds. Often these practices are the result of discussion with and encouragement from OCMIs. An active dialog between the builder, owner, operator, and the local OCMI, as well as other local authorities is strongly encouraged and is invaluable for advancing overall safety and risk management principles.