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NSMV Phase 3 Design

Applicable Rules and Regulations

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Summary

Coast Guard Requirements:

The basic regulatory requirement for the NSMV is contained in Subchapter R of Chapter I (Coast Guard, Department of Homeland Security) of Title 46 (Shipping) of the Federal Code of Regulations (CFR). Part 167 of Subchapter R is applicable to Public Nautical School Ships.

Subchapter R invokes several other portions of the CFR as applicable to Public Nautical School Ships. Principal among these are:
- Stability requirements (Subchapter S): For damage stability purposes a Public Nautical School Ships are treated as a passenger vessel with fewer than 400 passengers (regardless of the number of persons aboard the school ship). This is a one compartment deterministic standard.
- Lifesaving requirements (Subchapter W): A Public Nautical School Ship is treated as a passenger vessel with regards to number of life boats, etc.
- Machinery and electrical engineering requirements (Subchapters F and J)

Subchapter R is silent regarding structural fire protection (deck and bulkhead insulation and stair tower requirements). In the past it has been the policy of the Coast Guard to apply passenger ship requirements (Subchapter H) in this area to Public Nautical School Ships.

During the NSMV concept design phase, HEC held discussions with the Coast Guard's Office of Commercial Compliance (CG-CVC) concerning the acceptability of using the SOLAS Code of Safety for Special Purpose Ships in place of Subchapter H requirements. The Coast Guard indicated that this, in general, would appear to be acceptable. They noted that the SOLAS requirement is more modern than the Subchapter H requirements which are several decades old. It is understood that this was an informal opinion and that an actual determination would not be possible until the design is submitted for approval.

Subchapter R also invokes the ABS Rules for Building and Classing Steel Vessels for construction standards.

SOLAS Requirements:

As a publically owned vessel it has been the policy of MARAD to not obtain a SOLAS certificate, but to instead obtain a statement of voluntary compliance with SOLAS requirements. It is intended to do the same for the NSMV. In the past MARAD owned school ships have been in compliance with SOLAS cargo ship requirements. The NSMV is being designed to be in compliance with the SOLAS Code of Safety for Special Purpose Ships. This code defines "special personnel" to include "personnel engaging in training and practical marine experience to develop seafaring skills suitable for a professional career at sea", and is therefore directly applicable to school ships.

The Special Purpose Ship Code invokes several sections of SOLAS. Most notable among these are:
- Subdivision and Stability: as if a passenger ship with special personnel treated as passengers. Damage stability is a probabilistic method, with the requirement generally consistent with a two compartment standard.
- Fire Protection: as if a passenger ship

- Redundancy: redundancy of critical functions required in event of flooding or fire in any one compartment
- Lifesaving: as if a passenger ship

ABS “Rules for Building and Classing Steel Vessels”	construction of hulls, boilers, and machinery

Summary of USCG Regulations Applicable to NSMV

CFR Section	Subject
Pollution	
33 CFR 155.360-155.380	oily water separator
Load Lines	
46 CFR 42	load lines
Marine Engineering	
46 CFR 50 thru 46 CFR 64	(applicable sections)
Electrical Engineering	
46 CFR 110 thru 46 CFR 113	(applicable sections)
Public Nautical School Ships	
46 CFR 167.20	hull requirements
46 CFR 167.25	marine engineering
46 CFR 167.35	life saving equipment
46 CFR 167.40	electrical installations
46 CFR 167.45	special firefighting and fire prevention requirements
46 CFR 167.50	accommodations
Stability	
46 CFR 170.165	International Code on Intact Stability
46 CFR 170.248 thru 46 CFR 170.275	watertight doors
46 CFR 170.285 thru 46 CFR 170.295	free surface
46 CFR 171.070(a)	subdivision requirements Type II
46 CFR 171.072	permeability
46 CFR 171.073	stepped and recessed bulkheads
46 CFR 171.080	damage stability standards
46 CFR 171.085	collision bulkhead
46 CFR 171.090	aft peak bulkhead
46 CFR 171.095	machinery space bulkheads
46 CFR 171.100	shaft tunnels and stern tubes
46 CFR 171.105 – 171.109	double bottoms
46 CFR 173.050 thru 46 CFR 173.051	public nautical school ships
Lifesaving:	
46 CFR 199.60 thru 46 CFR 199.190	requirements for all vessels
46 CFR 199.200 thru 46 CFR 199.245	additional requirements for passenger vessels
Structural Fire Protection (applied by USCG, not by regulation)	
46 CFR 72.05-10	fire control bulkheads and decks
46 CFR 72.05-15	combustible materials
46 CFR 72.05-20	stairways, ladders and elevators
46 CFR 72.10	means of escape

Tabulation of USCG Regulations Applicable to the NSMV

46 CFR Subchapter R – Nautical Schools

Part 167 – Public Nautical School Ships (46 CFR 167)

Subpart 167.20 Hull Requirements, Construction and Arrangement

- 46 CFR 167.20-1 Invokes ABS "Rules for Building and Classing Steel Vessels" regarding construction of hulls, boilers, and machinery (U.S. Navy and U.S. Coast Guard Standard Construction Specification also acceptable)
- 46 CFR 167-20-7 invokes Subchapter S for subdivision and stability (applicable parts)
- 46 CFR 167.20-10 Means of escape
- 46 CFR 167.20-17 invokes Subchapter F (Marine Engineering) parts 50 to 61 for bilge pumps and bilge piping
- 46 CFR 167.20-35 invokes 33 CFR 155.330 through 155.380 regarding oily water separators

Subpart 167.25 Marine Engineering
- 46 CFR 167.25-1 invokes Subchapter F (Marine Engineering) parts 50 to 63 for boilers, pressure vessels, piping and appurtenances (U.S. Navy and U.S. Coast Guard Standard Construction Specification also acceptable)

Subpart 167.35 Lifesaving Equipment
- 46 CFR 167-35-1 invokes Subchapter W (lifesaving appliances and arrangements) for special purpose vessels

Subpart 167.40 – Certain Equipment Requirements
- 46 CFR 167.40-1 invokes Subchapter J (Electrical Engineering) for electrical installations (U.S. Navy Standard Construction Specification and IEEE Standard No. 45 also acceptable)

Subpart 167.45 – Special Firefighting and Fire Prevention Requirements

Subpart 167.50 – Accommodations

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46 CFR Subchapter E – Load Lines (46 CFR 42) (applies to all U.S. vessels engaged in foreign voyages)

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46 CFR Subchapter F – Marine Engineering (46 CFR 50 thru 46 CFR 64) (required by 46 CFR 167.20 and 46 CFR 167.25)

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46 CFR Subchapter J – Electrical Engineering (46 CFR 110 thru 46 CFR 113) (required by 46 CFR 167.40)

46 CFR Subchapter S (required by 46 CFR 167.20-7)

Part 170 – Stability Requirements for all Inspected Vessels

Subpart E – International Code on Intact Stability 46 CFR 170.165 (applies to each vessel with an International Load Line Certificate)

Subpart H – Watertight Bulkhead Doors 46 CFR 170.248 -170.275 (applies to vessel with watertight doors in bulkheads required to be watertight to comply with stability regulations)

Subpart I – Free Surface 46 CFR 170.285-170.295 (provides requirements on how free surface is to be treated for intact and damage stability calculations)

Part 171 – Special Rules Pertaining to Vessels Carrying Passengers

Subpart C – School Ships 46 CFR 173.050-173.051

- 46 CFR 171.070(a) as a passenger vessel carrying 400 of less passengers – Subdivision requirements – Type II
  - 46 CFR 171.080 Damage stability standards for vessels with Type I or Type II subdivision
- 46 CFR 171.072 Calculation of permeability for Type II subdivision
- 46 CFR 171.073 Treatment of stepped and recessed bulkheads in Type II subdivision
- 46 CFR 171.085 Collision bulkhead (applies to each vessel)
- 46 CFR 171.090 Aft peak bulkhead (applies to each vessel)
- 46 CFR 171.095 Machinery space bulkheads (applies to each vessel)
- 46 CFR 171.100 Shaft tunnels and stern tubes (applies to each vessel)
- 46 CFR 171.105 – 171.109 Double bottoms (applies to each vessel)

The Coast Guard has indicated that SOLAS subdivision requirements may be applied in place of the 46 CFR 171.070(a) requirements as they are more severe.

46 CFR Subchapter W – Lifesaving Appliances and Arrangements (required by 46 CFR 167.35)

Part 199 Lifesaving Systems for Certain Inspected Vessels

Subpart B – Requirements for All Vessels (46 CFR 199.60 thru 46 CFR 199.190)

Subpart C – Additional Requirements for Passenger Vessels (46 CFR 199.200 thru 46 CFR 199.245) (required by 46 CFR 199.10 (e)(2))

33 CFR Subchapter O – Pollution (required by 46 CFR 167.20)

Part 155—Oil or Hazardous Material Pollution Prevention Regulations for Vessels

Subpart B – Vessel Equipment

- 33 CFR 155.360 Oily mixture (bilge slops) discharges on oceangoing ships of 400 gross tons and above but less than 10,000 gross tons, excluding ships that carry ballast water in their fuel oil tanks.
- 33 CFR 155.370 Oily mixture (bilge slops)/fuel oil tank ballast water discharges on oceangoing ships of 10,000 gross tons and above and oceangoing ships of 400 gross tons and above that carry ballast water in their fuel oil tanks.
- 33 CFR 155.380 Oily water separating equipment and bilge alarm approval standards

46 CFR Subchapter H (not explicitly required per Subchapter R, but in the past applied by USCG by policy - the Coast Guard indicated that SOLAS Structural Fire Protection and Means of Escape requirements would be an acceptable substitute for these Subchapter H requirements.)

Part 72 – Construction and Arrangement

Subpart 72.05 – Structural Fire Protection
- 46 CFR 72.05-10 gives requirements for fire control bulkheads and decks
- 46 CFR 72.05-15 restricts the use and location of combustible materials
- 46 CFR 72.05-20 gives requirements for stairways (including stair towers), ladders, and elevators

Subpart 72.10 – Means of Escape

Tabulation of SOLAS sections Applicable to NSMV (invoked by Special Purpose Ship Code)

2008 Intact Stability Code (required by Special Purpose Ship Code, chapter 2)

Part B

2.5 – Special purpose ships

2.5.2 – Stability criteria – should comply with Part A, 2.2

Part A

2.2 – Criteria regarding righting level curve properties

SOLAS II-1, Part B Subdivision and stability (required by Special Purpose Ship Code, chapter 2)

Must comply with following sections of SOLAS as if passenger ship and special personnel are passengers:

II-1/8 Special requirements concerning passenger ship stability
II-1/8-1 System capabilities and operational information after a flooding casualty (redundancy requirement)
II-1 Part B-2 Subdivision, watertight and weathertight integrity

II-1 Part B-3 Subdivision load line assignment for passenger ships
II-1 Part B-4 Stability management

II-1/9 Double bottoms in passenger ships and cargo ships other than tankers
II-1/13 Openings in watertight bulkheads below the bulkhead deck in passenger ships
II-1/19 Damage control information
II-1/20 Loading of passenger ships
II-1/21 Periodical operation and inspection of watertight doors, etc. in passenger ships
II-1/35 Bilge pump arrangements

The following regulations are not applicable:
II-1/14 Passenger ships carrying goods vehicles and accompanying personnel
II-1/18 Assigning, marking and recording of subdivision load lines for passenger ships

SOLAS II-1, Part C Machinery installations (required by Special Purpose Ship Code, chapter 3)
Must comply with requirements of this chapter, with following additional requirement:

II-1/29.6.1.1 Steering gear power unit redundancy requirement

SOLAS II-1, Part D Electrical installations (required by Special Purpose Ship Code, chapter 4)
Must comply with requirements of this chapter, with following additional requirements:

II-1/42 Emergency source of electrical power in passenger ships
II-1/45.1-45.10 - Precautions against shock, fire and other hazards of electrical origin
II-1/45.12 Distribution systems arrangement

SOLAS II-2 Construction - Fire protection, fire detection and fire extinction (required by Special Purpose Ship Code, chapter 6)

Portions of this section which may impact concept design are:
II-2/9.2.2 – Containment of fire – Passenger ships
II-2/13/3 – Means of escape from control stations, accommodation spaces and service spaces
II-2/13.3.2 – Escape – Means of escape in passenger ships
II-2/13.7.4 requires an evacuation analysis in accordance with MSC Circular 1238

II-2/13.4.1 – Means of escape from machinery spaces – Means of escape on passenger ships
II-2/18 – Helicopter facilities
II-2/20 – Protection of vehicle, special category and ro-ro spaces
II-2/21 – Casualty threshold, safe return to port and safe areas
II-2/23 – Safety centre on passenger ships

SOLAS Chapter V – Safety of navigation (required by Special Purpose Ship Code, chapter 10)

Portions of this chapter which may impact concept design are:
V/22 – Navigation bridge visibility
V/23 – Pilot transfer arrangements

MSC Circular 1238 – Guidelines for Evacuation Analysis for New and Existing Passenger Ships (required by SOLAS II-2/13.2.7.4)

Summary of SOLAS Special Purpose Ship Code Applicable to NSMV

General

The Special Purpose Ship Code provides for a certificate called a Special Purpose Ship Safety Certificate. As this supplants the normal SOLAS certificate, special purpose ships engaged in international voyages should also carry a SOLAS exemption certificate.

"Special personnel are expected to be able bodied with a fair knowledge of the layout of the ship and to have received some training in safety procedures and the handling of the ship's safety equipment before leaving port and include the following:
....
2. Personnel engaging in training and practical marine experience to develop seafaring skills suitable for a professional career at sea. ..."

Chapter 2 – Stability and subdivision

2.1 Intact stability should comply with provisions of 2.5 of Part B of the 2007 Intact Stability Code

2.2 Subdivision and damage stability should in general be in accordance with SOLAS chapter II-1 where the ship is considered a passenger ship and special personnel are considered passengers, with a R-value is assigned as R (ship is certified to carry 240 persons or more)

2.3 Requirements of SOLAS regulations II-1/8 and II-1/8-1 of SOLAS chapter II-1, parts B-2, B-3, and B-4 should be applied as though the ship is a passenger ship and the special personnel are passengers. SOLAS regulations II-1/14 and II-1/18 are not applicable.

2.5 All special purpose ships should comply with SOLAS regulations II-1/9, II-1/13, II-1/19, II-1/20, II-1/21, and II 1/35, as though the ship is a passenger ship

Chapter 3 – Machinery installations

3.1 Requirements of part C of chapter II-1 of SOLAS should be met (subject to 3.2)

3.2 Steering gear – should be in accordance with II-1/29.6.1.1

Chapter 4 – Electrical installations

4.1 Requirements of part D of chapter II-1 of SOLAS should be met (subject to 4.2 and 4.3)

4.2 Emergency power source – should be in accordance with II-1/42

4.3 Precautions against shock, fire and other hazards of electrical origin – should be in accordance with II-1/45.1 thru 45.10 and II-1/45.12

Chapter 5 – Periodically unattended machinery spaces – not applicable to NSMV

Summary of Code (continued)

Chapter 6 – Fire Protection

6.1 Requirements of chapter II-2 for passenger ships carrying more than 36 passengers should be applied

Chapter 7 – Dangerous goods – not applicable to NSMV

Chapter 8 – Life saving appliances

8.2 Requirements of chapter III of SOLAS for passenger ships engaged in international voyages which are not short international voyages should be met

8.3 Requirements of III/21.1.5 (life rafts with evacuation system) may be used in lieu of III/21.1.1 (life rafts with launching apparatus) if at least two rescue boats are provided

8.5 The following sections of chapter III are not applicable:

III/2	Exemptions
III/19.2.3	Passenger safety drills
III/21.1.2	Requirements for short international voyages
III/21.1.3	Requirement for survival craft launching time
III/31.1.6	Requirement for chemical tanker lifeboats
III/31.1.7	Requirement for tanker lifeboats

8.6 Where chapter III of SOLAS the term “passenger” is used, it should be read to mean “special personnel”.

Chapter 9 – Radiocommunications – Should comply with SOLAS chapter IV for cargo ships

Chapter 10 – Safety of Navigation – Should comply with SOLAS chapter V

Chapter 11 – Security – Should comply with SOLAS chapter XI-2, having to do with enhanced surveys