Department of Transport
An Roinn Iompair

MARINE NOTICE No. 16 of 2006

NOTICE TO

(1) ALL OWNERS/OPERATORS OF-

(a) OPEN AND PARTIALLY DECKED CLASS V PASSENGER SHIPS,

(b) UNSUBDIVIDED CLASS VI PASSENGER SHIPS CARRYING LESS THAN 101 PASSENGERS

(2) SHIP YARDS AND NAVAL ARCHITECTS

Intact Stability & Damage Survivability/Swamping in relation to open and partially decked class V passenger ships and unsubdivided class VI passenger ships carrying less than 101 passengers[1] (other than those operating on rivers or canals where the depth of water is generally less than 1.5 metres in depth)

1.0 Introduction

1.1 Under the current rules open and partially decked class V and unsubdivided class VI passenger ships are required to comply with:

- Part IIA of the Merchant Shipping (Passenger Ship Construction) Rules 1983 (S.I. No. 300 of 1983), as amended, for ships constructed prior to 1 September 1984, or
- Part IIB the Merchant Shipping (Passenger Ship Construction and Survey) Rules 1985 (S.I. No. 274 of 1985), as amended, for ships constructed on or after the 1st September 1984.

1.2 These rules require that such ships are inclined and their elements of stability determined where hydrostatic data is available. Where no hydrostatic data is available the inclining test is not required but a heel test is required to be carried out as outlined in the rules. It is important to note that compliance with a heel test is not a measure of the survivability of a ship in the event of sustaining damage or being swamped.

[1] For the purpose of this marine notice open, partially decked and unsubdivided means passenger ships that do not comply with Part IIA of the Merchant Shipping (Passenger Ship Construction and Survey) Rules 1985 or Part II of the Merchant Shipping (Passenger Ship Construction) Rules 1983

1.3 As a result of the development of personal computers, measurement techniques and stability software since 1985, hydrostatic data can now be readily obtained for any ship.

2.0 Open and Partially Decked Class V and Unsubdivided Class VI Passenger Ship Certificate Renewal (other than those operating on rivers or canals where the depth of water is generally less than 1.5 metres in depth)

2.1 Following an extensive period of public consultation in relation to passenger ship rules and in the interests of public safety, owners of open and partially decked class V and unsubdivided class VI passenger ships are required to submit the elements of stability of their ships to the Marine Survey Office for approval.

2.2 In accordance with section 8(2) of the Merchant Shipping Act 1992 (Number 2 of 1992), all Passenger Ship Certificates issued to such ships, following completion of the next renewal survey, will be conditional on approval of the elements of stability to the satisfaction of the Marine Survey Office. Accordingly, all owners are required to submit the elements of stability to the Marine Survey Office. Any necessary modifications to ensure compliance will be required to be completed prior to reissue of a Passenger Ship Certificate.

3.0 Determination of Elements of Stability

3.1 The determination of the elements of stability shall include an examination of the intact stability and survivability of a ship.

Intact Stability

3.1.1 The intact stability shall be examined in accordance with Appendix I.

Survivability in the Event of Sustaining Damage or being Swamped

3.1.2 Reserve buoyancy to be provided through passive means so the ship remains upright and afloat in the event of sustaining damage or being swamped. Ships that comply with Appendix II are considered to have adequate reserve buoyancy.

4.0 Recommended Course of Action for Owners

4.1 It is recommended that all owners of open and partially decked class V and unsubdivided class VI passenger ships should contact a competent person/company in the field of naval architecture to request the elements of stability of their ship to be determined. Owners shall submit the elements of stability to the Marine Survey Office well in advance of the renewal date of the passenger ship certificate. No modifications works should be carried out until approved by the Marine Survey Office.

Director General
Maritime Safety Directorate
Department of Transport,
Leeson Lane,
Dublin 2.

12th September 2006

For any technical assistance in relation to this Marine Notice please contact
The Marine Surveyors' Office, Leeson Lane, Dublin 2 +353 1 678 3400
For information in relation to technical specification/type approval of radio equipment contact the Radio Surveyors +353 1 678 2363/2364/2365/2367.
For general enquiries please contact the Maritime Safety Division at +353-1-678 3418
Any enquiries concerning Marine Notices should be addressed to:
Maritime Safety Directorate, Leeson Lane, Dublin 2
Email: marine.notices@transport ie
Or visit us at: www.transport.ie

APPENDIX I – Intact Stability

Classes V and VI	**Equivalent Requirements– Class V** *(See note # 1)*
Angle of Max. GZ to occur at angle greater than 25°	Angle of maximum GZ to occur at an angle of 15° to 30°, depending on ship type and area of operation
Area under the righting lever curve (GZ curve) shall not be less than 0.055 metre radian up to 30° angle of heel	Where the righting lever (GZ) occurs at an angle between 15° and 30° the corresponding area under the righting lever curve shall be $0.055 + 0.0005(30-\theta_p)$
Area under the righting lever curve (GZ curve) shall not be less than 0.090 metre radian up to 40° angle of heel or θ_f if this angle is less than 40°	Area under the righting lever curve (GZ curve) shall not be less than 0.090 metre radian up to 40° angle of heel or θ_f if this angle is less than 40°
Areas under righting lever curve (GZ Curve) between the angles of heel of 30^o and 40^o or between 30^o and θ_f, if this angle is less than 40^o, shall be not less than 0.030 metre-radian.	Areas under righting lever curve (GZ Curve) between the angles of heel of 30^o and 40^o or between 30^o and θ_f, if this angle is less than 40^o, shall be not less than 0.030 metre-radian. *(See notes # 2 a) & b))*
The righting lever GZ shall be at least 0.2 metres at an angle of heel equal to or greater than 30°	The righting lever GZ shall be at least 0.2 metres at an angle of heel equal to or greater than 30° *(See note # 2 a))*
Initial metacentric height shall not be less than 0.15 metres	Initial metacentric height shall not be less than 0.15 metres

θ_p = angle of maximum righting lever (GZ)

θ_f = angle at which the lowest edge of any openings in the hull, superstructures or deckhouses, being openings which cannot be closed weathertight, are immersed.

Notes:

#1. When considering the stability of a passenger ship the primary objective is to ensure that it fully complies with the requirement of column 1 above. Equivalent criteria should only be applied, subject to agreement of the Marine Survey Office, in those cases where, because of the vessel's design, area of operation or restrictions applied, it would be unreasonable or impracticable to enforce.

#2. a) This criterion may be relaxed for vessels whose design makes application impracticable and whose area and type of operation have further restrictions applied beyond those applied by the Class definitions.

b) Provided the minimum required area of 0.090 metre-radian to the downflooding angle is satisfied, a downflooding angle of less than 30° may be accepted. For the purposes of calculating the other criteria, the GZ curve is to be considered truncated at this point.

Appendix II - Survivability in the Event of Sustaining Damage or being Swamped

Definitions

"Decked Space" is an enclosed space extending the width of the ship bounded by a watertight bulkhead at each end, spaced at a minimum of 10 percent of the length of the ship, with a weathertight deck on the top. The top of the weathertight deck shall be positioned a minimum of 380mm above the fully loaded waterline for ships of 6 metres in length and a minimum of 760 mm above the loaded waterline for ship of 18.3 metres in length. The minimum freeboard for lengths between 6 metres and 18.3 metres shall be obtained by linear interpolation.

"Length of the ship" is the length measured between perpendiculars taken at the extremities of the deepest subdivision load line.

"Un-decked Space" is any space other than a "decked space".

Swamping and Damage Stability

Stability

(1) The stability required following the assumed loss of buoyancy as set out in paragraph (4) below or the assumed sustained damage set out in paragraph (5) shall be determined as follows:

a. Range of positive GZ to be greater than 15°. This range may be reduced to a minimum of 10°, in the case where the area under the righting lever curve is that specified in b. is increased by the ratio 15/Range.

b. Area under the GZ curve to be greater than or equal to 0.015 metre radian measured from the angle of equilibrium to the lesser of

i. the angle of flooding, θ_f,or

ii. 22° (from upright) for one compartment flooding

c. Maximum GZ to be greater than or equal to Heeling Moment Lever (metre) + 0.04

where: Heeling Moment Lever = Heeling moment (tonne metre) ÷ displacement (tonne)

Heeling Moment is the heeling moment due to crowding of all passengers towards one side as defined in (2) below.

In no case is GZ to be less than 0.1 m within positive range.

(2) For the purposes of calculating the heeling moment in (1) c the following assumptions shall be made:

a. 4 persons per square metre,

b. a mass of 75 kg for each passenger,

c. Passengers shall be distributed on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way they produce the most adverse heeling moment.

(3) Margin line not to be immersed in the final stage of flooding.

a. For decked spaces the margin line shall be assumed to be 76mm below deck and for un-decked spaces the margin line shall be assumed to be 200mm below top of the un-damaged un-decked space.

Swamping

(4) The assumed loss of buoyancy shall be taken to be:

a. for open vessels;

within the gunwales, up to the lowest point of the gunwale and with the flooded waterline parallel with the load waterline.

b. for partially decked ships;

the combined volume of all un-decked and/or non-weathertight spaces.

c. no loss of buoyancy shall be assumed for ships with weathertight decks extending the length of the ship.

Damage

(5) For decked spaces the extent of damage shall be assumed to be as follows:

a. longitudinal extent: within length of decked space.

b. transverse extent: 20 per cent. of the breadth of the ship, measured inboard from the ship's side at right angles to the centre line at the level of the deepest load waterline taken parallel to the keel.

c. vertical extent: from the base line upwards without limit.

d. if any damage of lesser extent than that indicated in the foregoing clauses (a), (b) and (c) would result in a more severe condition regarding keel or loss of metacentric height, such damage shall be assumed for the purposes of the calculation.

(6) For any un-decked spaces the extent of damage shall be assumed to be as follows:

a. longitudinal extent: 10 percent of the length of the ship within the length of the undecked space.

b. transverse extent: 20 percent of the breadth of the ship, measured inboard from the ship's side at right angles to the centre line at the level of the deepest load waterline taken parallel to the keel.

c. vertical extent: from the base line upwards without limit.

d. if any damage of lesser extent than that indicated in the foregoing clauses a, b and c would result in a more severe condition regarding keel or loss of metacentric height, such damage shall be assumed for the purposes of the calculation.