

Swamp calculations or swamp tests for open or partially-decked boats

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Maritime New Zealand Position Statement

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Purpose of this position statement

This position statement sets out Maritime New Zealand's (Maritime NZ's) position on the requirement for swamp calculations or swamp tests for open or partially-decked boats to which either Maritime Rules Part 40A or 40C applies. It has been developed to inform operators and surveyors of these boats.

Vessels it applies to

This position statement applies to all open or partially-decked boats to which either Maritime Rules Part 40A or 40C applies.

The following definitions of open and partially-decked boats are given in Rules 40A.2 and 40C.2.

<p>Open boat</p>	<p>A boat not protected from entry of water by means of a complete deck or by a combination of a partial weather deck and a weathertight superstructure or deckhouse</p> <p>Note that, as stated in Maritime Rules Part 40A.2 and 40C.2, if the freeboard to a well deck, measured from the designed load waterline, is less than 250 mm the vessel shall be considered as an open boat for the purposes of subdivision, stability, and drainage requirements.</p>
<p>Partially decked boat</p>	<p>A boat in which at least two-thirds of the horizontal projection of the sheerline area is equipped with decking, cabins, shelters or rigid covers which are weathertight and designed to shed water overboard. The decked area must include all that area within one-third of the length from the bow plus the area 100 mm inboard from the periphery of the boat (excluding the transom)</p>

Background

Maritime Rules 40A.13 and 40C.13 make clear which vessels must have a swamp calculation or swamp test. These rules are shown here.

Swamp test rule requirements

Maritime Rule 40A.13 Stability

(3) A monohull boat of less than 6 metres in length overall which is—

- (a) an open boat; or
- (b) a partially decked boat that proceeds beyond enclosed waters;

must meet the flotation and stability requirements of a swamp test or calculation approved by the Director in accordance with rule 40A.13(4).

Maritime Rule 40C.13 Stability

(2) For a post-27 May 2004 ship of less than 6 metres in length overall that is a monohulled open boat, it must be demonstrated by test or calculation that, when fully swamped, the ship has sufficient buoyancy distributed so that the boat will stay afloat and in good trim, without listing if flooded. The test or the calculation must include the full outfit of equipment, the total number of persons that is permitted to carry and a mass equivalent to its engine and full tank or tanks of fuel.¹

Swamp test rule requirements

The coverage of the Rules can be summarised as follows.

Rule	Ship Type	Length (m) and Swamp Test Coverage	
Maritime Rules Part 40A (Passenger Ship)	Open boat	$L < 6$	Required
		$L \geq 6$	Silent
	Partially decked boat	$L < 6$	Required
		$L \geq 6$	Silent
Maritime Rules Part 40C (Non-passenger Ship)	Open boat	$L < 6$	Required
		$L \geq 6$	Silent
	Partially decked boat	$L < 6$	Silent
		$L \geq 6$	Silent

As shown, the rules are silent about whether partially-decked non-passenger ships (defined in Maritime Rules Part 40C) under 6 metres, and open or partially-decked passenger ships (defined in Maritime Rules Part 40A) and non-passenger ships (defined in Maritime Rules Part 40C) equal to or greater than 6 metres must have a swamp calculation or swamp test. These boats are susceptible to being swamped, putting safety at risk.

¹ For details of a recommended swamping calculation and test for open boats see the Advisory Circular to Part 40C of the Maritime Rules.

Maritime NZ's position

Maritime Rules Parts 40A.13 and 40C.13 must be complied with for the vessels to which they apply.

For open or partially-decked boats about which the rules are silent (ie partially-decked non-passenger ships (defined in Maritime Rules Part 40C) under 6 metres, and open or partially-decked passenger ships (defined in Maritime Rules Part 40A) and non-passenger ships (defined in Maritime Rules Part 40C) equal to or greater than 6 metres), Maritime NZ strongly recommends that they undergo a swamp calculation or swamp test to the specifications on page 3 of this document.

The Maritime Rules may be considered as the minimum standard for maritime operators to achieve. Section 30 of the Health and Safety at Work Act 2015 (HSWA) requires duty holders to eliminate or minimise risks to health and safety, so far as is reasonably practicable. It may be 'reasonably practicable' for an operator to achieve a higher standard under HSWA than the standard specified in the Maritime Rules. Simple compliance with the Maritime Rules may not absolve an operator of responsibility under HSWA if that higher standard is found to have been 'reasonably practicable'.

Maritime NZ considers that, under HSWA, swamp calculations or swamp tests on these boats could be interpreted as a reasonably practicable step for an operator to take to help minimise the risks associated with swamping.

Recommended swamp calculation or swamp test specifications for partially-decked non-passenger ships (defined in Part 40C) under 6 metres, and open or partially-decked passenger ships (defined in Part 40A) and non-passenger ships (defined in Part 40C) equal to or greater than 6 metres*

1. It is highly recommended that swamp calculations or swamp tests for these boats are carried out in accordance with the requirements of Part 40A.13(4) or Part 40C.13(2) according to whether they are passenger ships or non-passenger ships.
2. The determination of required volume and location of flotation material is given in the Advisory Circular Issue No. 40A-1.
3. The form in Appendix 1 of this document may be used for recording the swamp test.
4. The calculation sheet and figure in Appendix 2 of this document may be used for recording and marking the swamp calculation and distribution of flotation material.
5. Based on the Surveyor Recognition Framework, surveyors capable of undertaking swamp calculations or swamp tests are from the following categories:
 - Swamp calculations: DA and IC
 - Swamp tests: DA and IC.

*Notes

- When undertaking swamp calculations, surveyors should ensure that level flotation can be achieved when the vessel is fully swamped. Additional calculations or analysis may be necessary to achieve a finding.
- More-accurate and realistic swamp simulation (e.g. by 3D modeling) is accepted to account for hull buoyancy other than that provided by flotation material and other features that may positively (or negatively) contribute to the swamp performance of the boat.

Appendix 1 – Swamp Test Record

Swamp Test Record			
1 Ship Particulars			
Ship Name		Length Overall (m)	
MNZ Number		Beam (m)	
Building Material		Freeboard (m)	
Capacity of Persons (kg)			
2 Statement			
(Please clearly state the swamp test procedure)			
3 Conclusion / Result			
Pass / Fail (Please circle)			
Date of Test		Attending Surveyor	
Signature of Surveyor			

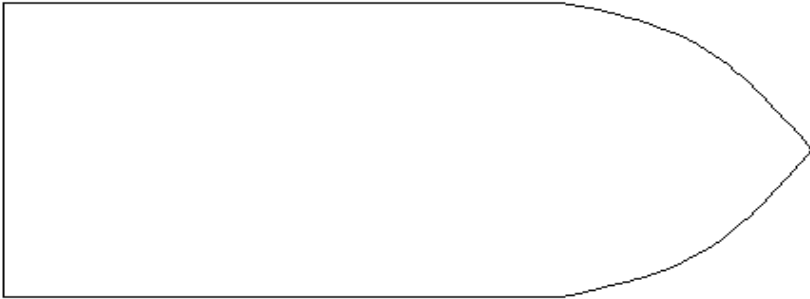
Appendix 2 – Swamp Calculation Record

Calculation

Swamp Calculation		
Vessel Particulars Input		Submerged Weight
Vessel Name		Weight (W_h) kg
MNZ Number		Factor N/A
Material		Submerged (W_b) kg
Capacity of Persons	kg	Volume of Flotation (V_b) m^3
Length Overall	m	
Beam	m	Motor and Equipment
Freeboard	m	Weight (W_m) kg
Hull Weight	kg	Volume of Flotation (V_m) m^3
Maximum Engine Power	hp	
Weight of Engine and Equipment	kg	Capacity of Persons
Flotation Density	kg/m^3	Weight (W_p) kg
Equivalent Density (D)	kg/m^3	Factor N/A
Result		Submerged (W_b) kg
Total Volume of Flotation	m^3	Volume of Flotation (V_p) m^3
Date		
Attending Surveyor		Other Item
Signature of Surveyor		Weight (W_o) kg
		Factor N/A
		Submerged (W_o) kg
		Volume of Flotation (V_o) m^3

Flotation Distribution

Please summarise the flotation distribution based on the calculation above.



Location 1		Location 6	
Location 2		Location 7	
Location 3			
Location 4			
Location 5			