

Guidance on conducting the Simplified Roll Test is at Annex A below.

Annex B should be used by a Surveyor or Competent Person when using the Roll Test – Minimum Metacentric Height Test

**Basic Data:**

|  |  |  |  |
| --- | --- | --- | --- |
| Vessel's Name: |  | Year of Build |  |
| Reg. (RSS) No.: |  | Fishing No.: |  |
| Date of test: |  | Fishing method: |  |
| Weather conditions: |  | Water conditions: |  |
| Name of person conducting test: |  | Signature of person conducting test: |  |
| If conducted at MCA inspection, name of surveyor |  | Signature of Surveyor |  |
| Breadth: |  m | Depth | m |
| Registered Length | m | Length Overall | m |

**Condition of vessel:**

|  |  |  |  |
| --- | --- | --- | --- |
| Fuel oil - Full: Y/N |  | Provisions - Full Y/N |  |
| Water - Full: Y/N |  | Fishing gear stowed? Y/N | Where stowed? |
| Ice on board? Y/N | If Yes - amount: t | Spare warps etc | Where stowed? |

Details of Fishing Gear and other loose equipment:

**Minimum Freeboards: Additional measurements only if using**

 **Minimum Metacentric Roll Test (See Annex B)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Port | Starboard |  | Ls | Lwl |
|  m |  m |  |  m |  m |

**Roll Period:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test No 1 | Test No 2 | Test No 3 |
| Oscillations | n1 = |  | n2 =  |  | n3 =  |  |
| Stopwatch No 1 | t(1)1 = |  s | t(1)2 = |  s | t(1)3 = |  s |
| Stopwatch No 2 | t(2)1 = |  s | t(2)2 = |  s | t(2)3 = |  s |
| Average Time for one roll  |  s | Beam |  m | Result | Pass/Fail |

**If the time for one average roll in seconds is less than the beam of the vessel in metres the vessel can be said to be stiff and passes the test. If the time in seconds is more than the beam of the vessel in metres then the vessel is said to be tender and fails the test.**

**If the vessel 'fails' the roll test you must speak to the MCA and discuss remedial action.**

**ANNEX A – CONDUCTING THE ROLL TEST**

The roll test should be conducted in the following manner:

* Check dimensions on the vessel and from previous roll test report, where applicable. Where previous reports are available, freeboard measurements are unlikely to be exactly the same as those previously recorded but should not be dramatically different. Freeboard measurements are best carried out from a tender with no one on board the vessel. Where this is not possible as few persons as is necessary should be on board when measurements are taken and appropriate precautions should be taken to minimise any effect on the angle of heel that may result.
* The vessel should be rolled by pulling rhythmically (in time with the vessel’s rolling), with a rope, on the mast or other substantial structure well above the water line. Any other practical method may be considered (e.g. pulling on a rope fixed ashore through a high point using a warping drum on the vessel, using a crane ashore to repeatedly lift and place a weight on the deck. The important point is that the method adopted is to be used to initiate the rolling and therefore should be stopped as soon as the amplitude has increased to an acceptable level, in order to ensure that the vessel is then able to roll naturally and free of constraint.
* The roll period should be timed over as many oscillations (minimum three but preferably five) as can be reasonably discerned. In theory, to ensure the best possible accuracy, a distant or other suitable object that will align with the vessel’s mast (or other suitable part of the vessel’s structure), at the stage in the oscillation where the vessel is upright or near upright, should be used as a reference point for timing the oscillations. In practice this is rarely possible and the normal practice is to use the point of maximum amplitude of the roll (i.e. when the vessel has roll motion has stopped just prior to commencement of another roll cycle).
* This process should be repeated at least three times or until consistent measurements are obtained. On each occasion the time for at least three (but preferably five) oscillations should be measured.
* A mean time (T) for one oscillation (i.e. the roll period) can then be calculated from the timings taken.
* If the time for one average roll in seconds is less than the beam of the vessel in metres the vessel can be said to be stiff and passes the test. If the time in seconds is more than the beam of the vessel in metres then the vessel is said to be tender and fails the test.

ANNEX B – ROLL TEST - MINIMUM METACENTRIC HEIGHT

1. **Conduct of the test**
	1. The test shall be conducted in the same manner as Annex A above
	2. An average (mean) time (RP) for one oscillation (i.e. the roll period) can then be calculated from the timings taken.
2. **Application of average roll period:**
	1. The following approximate formulae for minimum metacentric height GMmin, in metres, should be used for all operating conditions as the criterion:

$$GM\_{min}=0.53+2B\left[0.075-0.37\left(\frac{f}{B}\right)+0.82\left(\frac{f}{B}\right)^{2}-0.014\left(\frac{B}{D}\right)-0.032\left(\frac{l\_{s}}{Lwl}\right)\right]$$

Where:

Ls is the length of enclosed superstructure extending from side to side of the vessel, in metres and

Lwl is the length of the vessel on the waterline in maximum load condition in metres, and

B is the maximum beam of the vessel, in metres and

D is the moulded depth amidships, in metres and

F is the actual minimum freeboard or clear height at side or down flooding point.

2.2 Vessels should have their dimensions checked against the following criteria:

$$0.02 \leq \left(\frac{F\_{min}}{B}\right)\leq 0.2$$

Minumum Freeboard divided by Beam should be between 0.02 and 0.2.

$$\frac{l\_{s}}{Lwl}<0.60$$

Length of full width superstructure divided by waterline length should be less than 0.6

$$1.75\leq \left(\frac{B}{D}\right)\leq 2.15$$

Bean divided by depth should be between 1.75 and 2.15

2.2 Where the above limitations can no longer be complied with, the roll test should be used with caution as the result may not be valid, and the vessel should be assessed against the Heel Test.

1. **Calculation of the actual metacentric height GM**
	1. The actual metacentric height GM, in metres, should be calculated according to the following formula:

$$GM = \left(\frac{0.80.B}{RP}\right)^{2}$$

where:

RP, in seconds, is the rolling period.

1. **Test Result:**
	1. The initial stability is deemed satisfactory when the actual GM is not less than GMmin based upon the equation at 2.2 above.
2. **Suitability of test**
	1. The Roll Period Test – Minimum Metacentric Height maybe suitable for single hull vessels with larger underwater appendages, there is no lower vessel size limit. The hull may have a large keel or bilge keels, hard chines or other large underwater appendages. However, vessels of an unconventional design (such as high-speed vessels), may still exceed the limitations of the test. In those instances, a Heel Test may be necessary.
	2. Where the above limitations can no longer be complied with (as indicated above) the roll test should not be used, and the vessel should be assessed against the Heel Test.
	3. This test is not suitable for multihulls.
	4. The minimum upright freeboard should comply with the requirements of Chapter 3 of the Code of Practice.

Additional Minimum Metacentric Test Height Records

|  |
| --- |
| Vessel Dimension Checks |
| Measurement | Result | Use Minimum Metacentric Test with caution if |
| Min Freeboard ÷ Beam |  | less than or equal to 0.02 or greater than or equal to 0.2 |
| Length of enclosed superstructure ÷ waterline length |  | more than 0.6 |
| Beam ÷ Depth |  | less than or equal to 1.75 or more than or equal to 2.15 |

|  |  |
| --- | --- |
| Measurement | Result |
| Minimum metacentric height GMmin | **m** |
| Actual metacentric height GM | **m** |