BRITANNIA P&I
TRUSTED SINCE 1855

REDUCING CONTAINER LOSSES - 14,000 TEU VESSEL

OPERATIONAL GUIDANCE

WAVESGROUP waves-group.co.uk

Lloyd's Register

HOW TO IDENTIFY SYNCHRONOUS AND PARAMETRIC ROLL MOTIONS

- **Synchronous rolling** occurs in beam seas, when the roll period of the vessel matches the wave period. The vessel heels over with ever larger successive roll angles.
- **Parametric rolling** occurs due to changes in vessel stability as the vessel moves in waves. It is most common in heavy head seas but can occur also in following seas. It is a sudden phenomenon with large and rapidly increasing roll angles experienced over a short period of time.

KEY TRIGGERING CONDITIONS TO WATCH FOR

- **Vessel rolling period** (time it takes for the vessel to roll from port, to starboard, then back to port) approximately equal to the wave encounter period, or twice the wave encounter period.
- **A low metacentric height (GM)** leading to long rolling period.
- Near following sea conditions or head seas.

The wave encounter period can be measured with a stopwatch as the time between two wave crests. It is close to the vessel pitching period (time it takes for the vessel to pitch bow down, stern down and back to bow down).

STEPS OF PARAMETRIC ROLLING

Vessel rolls to one side whilst on the wave crest, stability decreases and large roll motions are experienced.

As Vessel uprights on the trough of the wave, stability increases leading to a strong push, worsened by a high GM / stiff vessel.

Vessel is on top of the wave crest again, and rolls even further ...

WHAT TO DO WHEN IT HAPPENS

To reduce the risk of large roll motions, IMO guidance recommends changing the vessel heading or adjusting the speed, whilst avoiding abrupt steering. The guidance in the following pages shows, for a range of generic containership vessel sizes and typical loading conditions, the expected safe zone where dangerous situations are less likely to occur.

Masters should use this guidance with particular observation of the specific features of their vessel and its behaviour in heavy weather. All deck officers should familiarise themselves with the applicable chart for their size of vessel and the loading condition at the beginning of a voyage, so they are familiar with actions to be taken to reduce the rolling, as parametric rolling in particular, can develop quickly necessitating prompt remedial actions.

HOW TO USE THIS GUIDANCE

Find the two metacentric heights (GM) closest to the vessel operating conditions (Upper / Lower). For each containership size, three GM values are covered in the guidance (Low GM / Average GM and High GM), based on the range of GM values recommended by Classification Society Guidelines for the design of securing elements on containerships.

Depending on the Classification Society, the range can vary slightly. It is expressed as a % of the vessel Breadth in the following guidance.

HOW TO READ THE CHARTS

The charts show the vessel speed and headings at which roll motions in excess of 16 degrees are expected for a range of significant wave height conditions (Hs=6m, Hs=8m, Hs=10m).

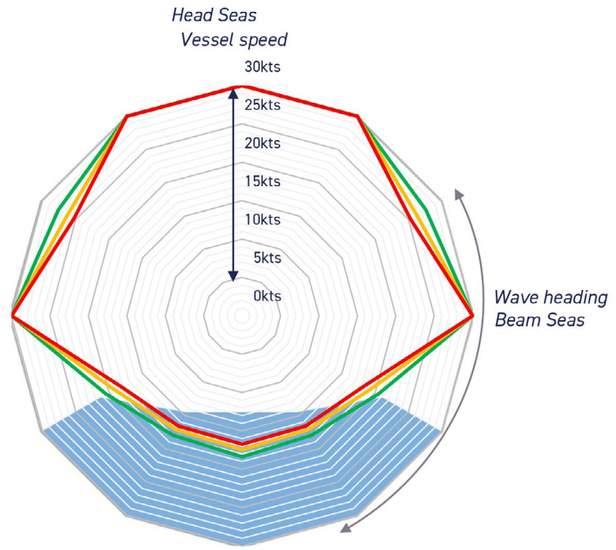
The "at risk' areas are defined as per IMO Circular MSC.1 / Circ.1228 and are highlighted for the vessel category (vessel lengths and breadths are provided).

This guidance is general only – it is not specific to any vessel or sea conditions. At all times, the prevailing sea conditions and the specific characteristics of the vessel for which you are responsible must be taken into account when assessing the correct action in any given situation.

High roll motion risks for a given Hs, wave heading and vessel speed.

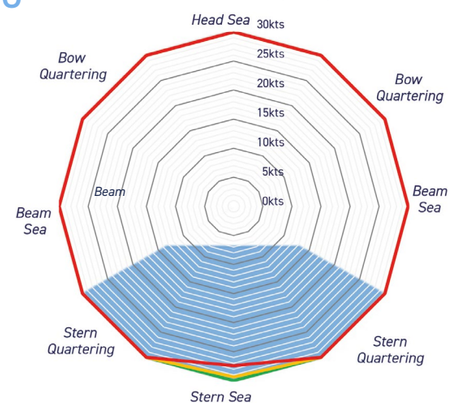
- Hs = 10m
- Hs = 8m
- Hs = 6m
- At risk situation as defined in MSC.1 / Circ. 1228

If you have any questions, or would like further advice on reducing container losses, then contact Waves Group at: mail@waves-group.co.uk

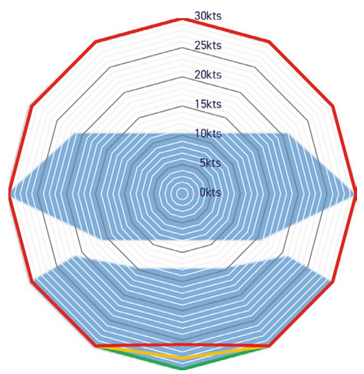


14,000 TEU

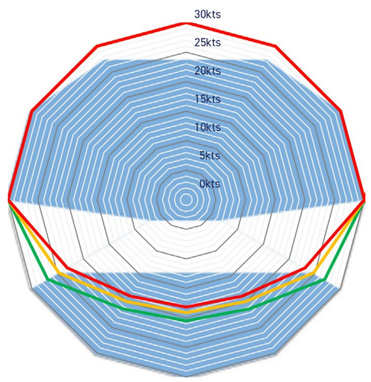
LOW GM – 2.5%B (1.3m)



AVERAGE GM - 5.0%B (2.6m)



HIGH GM – 7.5%B (3.8m)



LEGEND

Charts derived for a generic 2,000 TEU vessel (Length = 189m, Breadth = 28.5m, Draft = 11.5m) and three GM values based on Classification Society recommendations.

Within the boundaries of the high roll motion risk curves, the risk that a vessel will experience roll motions in excess of **16 degrees should be limited**.

Operation within the high roll motion risk curves (red, orange and green lines) may still be safe. However, whenever parametric or synchronous rolling is suspected, the charts can be used to provide support on what speed reduction and/ or change of vessel heading are likely to bring the vessel to a safer operating zone.

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