



## How high and heavy can you go?

Do the planners and crew appreciate the impact of an increased GM on the vessel's acceleration forces?

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While there can be a number of reasons for a container stack collapsing, one of the most reoccurring causes have been a lack of attention to the metacentric height (GM) criteria. A large GM results in significant increase in various forces including racking (a horizontal force distorting the ends and sides of the container) as the rolling, which can be considered to be the dominant force, will be quite violent. Lashing can also be overloaded as a result.

Cargo securing manual (CSM) normally contains guidance on increase of forces or accelerations with increase in GM, which the crew and shore planners must be aware of. The approved computer programme used for stability and lashing calculations, should be able to cover the complete operational GM range. A higher GM may require reduced stack weight and height and the programme should be able to advise the user of that.

### **More information**

[Gard Guidance on Freight Containers](#)

[Container stack collapse - Overweight and unfit containers](#)