LIVESTOCK CARRIER STABILITY AND CAPSIZE AVOIDANCE

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" MV Gulf Livestock 1" – capsized in typhoon conditions off coast of Japan. Only two crew survived. Forty one missing, presumed dead.

INTRODUCTION

The recent capsize and sinking of the MV Gulf Livestock 1 in typhoon conditions resulted in the death of 41 seafarers and livestock specialists together with about 5000 breeding cattle destined for the Chinese dairy market. There were only two crew members who ultimately survived. Flag state investigations are underway but the indications are that a sudden loss of stability was a major contributing factor.

The creation of this Risk Bulletin has been motivated by the above incident. It will review the regulatory and operational issues relating to ensuring Livestock Carrier stability and capsize avoidance. The current role and sufficiency of the International Stability Code 2008 (IS Code 2008), as amended to

2020, as a tool to accomplish the safe stability goal will be assessed. The necessity to refer to supporting IMO Guidelines and consider the application of supplementary regulation will also be discussed.

BACKGROUND

The subject of ship stability has been discussed in three previous MM Risk Bulletins being, namely: No. 30 Container Ship Stability, No. 31 Tug Stability and No. 32 Deck Barge Stability. This Risk Bulletin No. 35 provides a continuation of stability knowledge by focusing on MM Members who operate Livestock Carriers, a class of vessel which presents unique and challenging stability problems in relation to their operation and safety.

Internet research shows that Livestock Carrier capsizes with heavy loss of life have occurred on a number of occasions. A tragic example is provided by the loss of the MV Danny F which occurred in Force 9 wind and sea conditions off the coast of Lebanon in 2009 with a loss of 42 lives. This incident was investigated by the flag state as to cause and ultimately reported in 2013 under IMO casualty investigation provisions.

One of the investigating flag state's recommendations to prevent recurrence was that there should be additional IS Code 2008 stability criteria developed for Livestock Carriers. Further, that this should be based on Australian Marine Order No. 43, as amended, generally accepted as being the most advanced and comprehensive carriage of livestock by sea regulation in the world. Reference to the IMO GSIS website shows that although this recommendation was discussed by the IMO Marine Safety Committee in 2014, it was not implemented.

LIVESTOCK CARRIER STABILITY REGULATION AND THE IS CODE 2008

Several amendments to the IS Code 2008 have now been incorporated into a single document published as the IS Code 2008, as amended to 2020. This publication can be purchased from chart agents and the IMO website. Alternatively, the UK's Maritime Coastguard Agency (MCA) has published an MCA IS Code 2008, as amended to 2020, updated version online which usefully shows the IMO amendments in green text. There have been no amendments to the IS Code 2008 in relation to the stability criteria requirements for Livestock Carriers.

The IS Code 2008, as amended to 2020, consists of two parts, Part A which is mandatory and Part B which is recommendatory. Their content is outlined below:

> **Part A** provides mandatory 'general stability criteria' for all cargo vessels over 24 m. in length together with additional and 'special stability criteria' for certain ships inclusive of passenger ships, oil tankers, cargo ships carrying timber deck cargo and grain and high speed craft. There are no 'special stability criteria' for livestock carriers despite the fact that, similar to high windage and high centre of gravity (C of G) passenger vessels, livestock carriers require large crews and transport live cargo.
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> **Part B** provides 'recommended design criteria and additional guidelines for certain types of ships and operations'. There are no recommendations or additional guidelines for livestock carriers despite the fact that additional criteria are provided for a number of special vessel types. This includes large windage area and high C of G containerships over 100 m.in length.

The end result appears to be that the IS Code 2008 stability criteria requirement for Livestock Carriers (as provided by Part A) is, questionably, no more than that required for a low windage and low C of G bulk carrier. The issue must then be as to whether compliance with the Part A stability criteria alone is sufficient to ensure the prevention of a Livestock Carrier capsize in all foreseeable conditions?

IS CODE 2008, PART B, OPERATIONAL PROVISIONS AGAINST CAPSIZING

The short answer to the question posed above is "No" as declared by the extract below from Part B, Chapter 5:

5.1.1 Compliance with the stability criteria [alone] does not ensure immunity against capsizing, regardless of the circumstances, or absolve the master from his responsibilities. Masters should therefore exercise prudence and good seamanship having regard to the season of the year, weather forecasts and the navigational zone and should take the appropriate action as to speed and course warranted by the prevailing circumstances.

Chapter 5 then goes on to provide detailed operational stability advice to all Masters under the headings:

> 5.1 General precautions against capsizing

5.2 Operational precautions in heavy weather

5.3 Ship handling in heavy weather

In addition to the above advice, it is essential that all Masters are aware of and fully understand the application of the additional operational advice provided by the IMO's Revised Guidance to Masters for Avoiding Dangerous Situations in Adverse Weather and Sea Conditions MSC.1/Circ.1228.

SHOULD THE IS CODE 2008 BE SUPPLEMENTED BY MO 43 OR SIMILAR CRITERIA?

There are no IMO conventions which provide internationally agreed regulation or specific guidance on the carriage of livestock by sea. Any such regulation is therefore left to flag and/or coastal states to create and enforce. Few countries have done so. However, MO 43, as now amended to 2018,, provides detailed Australian regulation on the carriage of livestock within Australian waters and to all vessels used to export livestock from Australia. New Zealand, based on its close geographic and cultural relationship with Australia, has adopted virtually identical legislation.

The application of MO 43 is accomplished by requiring all livestock carriers wishing to load livestock in Australia to make formal application for inspection and approval by issue of an Australian Carriage of Livestock Certificate (ACLC) prior to loading. Its enforcement is accomplished by a preloading inspection and the power to cancel the ACLC due to non-compliance.

With reference to stability, Section 11 of MO 43 first states that the Master of a Livestock carrier must demonstrate that his vessel is in full compliance with the requirements of the IS Code 2008 as amended. In addition to this, his vessel's stability must also comply with the supplementary requirements of MO 43, Schedule 1, Stability Criteria for Livestock Carrier, which includes:

1.1 Shift of Livestock Criteria – based on average livestock mass, floor area and a 'livestock constant' derived from pen length and breadth.

1.2 Shift of Fodder Criteria – by reference to the heeling lever due to the shift of fodder in pellet form.

1.3 Effect of Wind Criteria – based on lateral area above the waterline, the height of the lateral area centroid above the immersed hull centroid and the wind pressure.

In summary, MO 43 appears to provide the 'special stability criteria' and capsize prevention for Livestock carriers which the flag state investigators of the Danny F capsize considered as 'missing' from the IS Code 2008 stability data on board that vessel. It is therefore concerning that MO 43's potentially lifesaving and additional stability standards are currently only obligatory and enforceable on board Livestock Carriers transporting livestock from Australia and, under identical regulation, from New Zealand.

CONCLUSION AND TAKEAWAY

In terms of their design, construction and stability, Livestock Carriers have similar characteristics to both Passenger Vessels and Containerships in that they all present the inherent problems of high windage areas and a high C of G when loaded. The IS Code 2008 recognises these stability hazards in relation to Passenger Vessels and Containerships but does not appear to do so in relation to Livestock Carriers. Logic and tragic experience advocate that this arguably dangerous gap should be a high profile issue of safe stability concern and awareness for all concerned.

The other critical issue is that reliance on stability criteria and calculations alone, whether as required by the IS Code 2008, as amended to 2020, or as supplemented by MO 43 or similar regulation, will not guarantee immunity from the dangers of capsizing. It is therefore essential that Masters be informed and mindful of the operational and navigational aspects of ship stability as detailed by Chapter 5 of the IS Code 2008 and reinforced by the IMO's Guidance to Masters to Avoid Dangerous Situations MSC.1/Circ.1228.

By way of summary, MM's recommendations to Members who operate Livestock Carriers include ensuring that:

1. Your ship managers, DPA and ship masters are provided with PDF copies of this Risk Bulletin No. 35 and the information links it contains.

2. A copy of the latest edition of the IS Code 2008, as amended to 2020, is provided on board all of your ships together with a copy of IMO MSC.1/Circ.1228.

3. The content of the approved stability book on board all your ships is endorsed as being up to date with the stability criteria requirements of the IS Code 2008, as amended to 2020.

4. The ISM Code SMS procedures for stability maintenance on board all of your ships are:

    - Checked to ensure that they provide a direct reference to both the ISM Code 2008, as amended to 2020, as well as MSC.1/Circ.1228.

    - Internally audited to ensure Master and crew awareness and full implementation.

5. If your ships are not transporting livestock from either Australia or New Zealand (such that MO 43 or similar regulation does not apply by force of law), consideration is given to recognising the potential upgrade in stability safety that could be achieved by voluntarily adopting the supplementary stability requirements of MO 43, Section 11, Schedule 3.