

## FLYER TO THE SHIPPING INDUSTRY

### Catastrophic structural failure of a general cargo ship

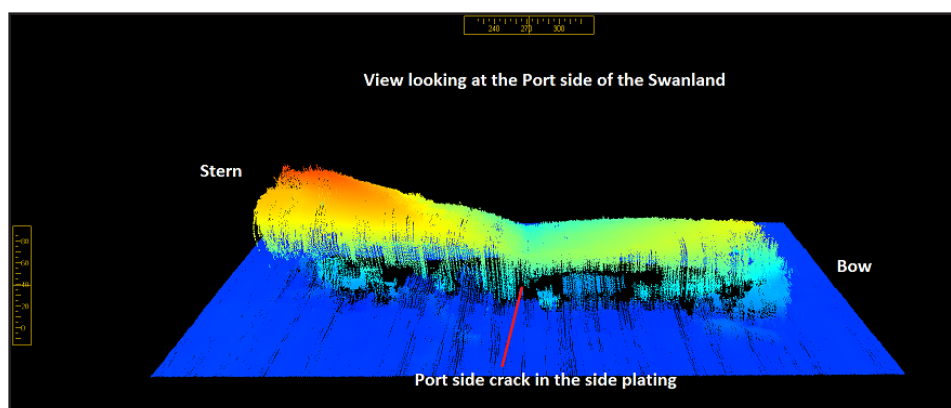


Figure 1: Sonar image of *Swanland* inverted on the seabed

#### NARRATIVE

On 27 November 2011, the master and five of the crew from the 34-year old general cargo ship *Swanland* were lost when the vessel foundered about 17 minutes after suffering a structural failure amidships. The failure occurred as the vessel was heading directly into a south westerly gale in rough to very rough seas. Only the second officer and an AB survived. Underwater surveys confirmed that the vessel had suffered a structural failure amidships (**Figure 2**).

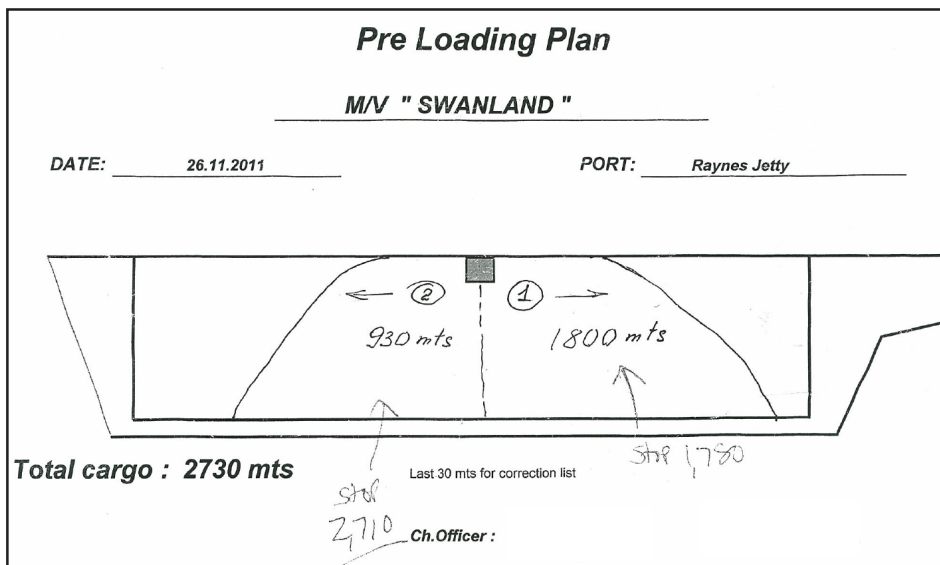


Figure 2: ROV image of the structural failure amidships

At the time of the accident, *Swanland* was carrying a cargo of 2730 tonnes of MOT Type 1 Granular Sub Base (GSB) limestone, which is a high density cargo. The limestone had been loaded in two piles biased towards the centre of the vessel's single hold in accordance with the loading plan prepared on board (**Figure 3**).

The vessel had been converted in 2003 to allow self-discharging of the cargo and had carried limestone in this manner on numerous occasions. The loading information available on board *Swanland* was probably limited to that included in the vessel's stability book, which lacked detail and provided no information on longitudinal strength or tank top loading limits. *Swanland* had not been strengthened to carry heavy cargoes.

A longitudinal strength assessment of the vessel following the accident confirmed that the large sagging bending moments induced by the cargo and the wave conditions experienced on the day of the accident would have been sufficient to cause compressive failure of the upper midships structure.



**Figure 3:** Pre-loading plan

## SAFETY LESSONS

*Swanland's* foundering is one of many cargo ship losses in recent years in which poor loading or overloading of cargo has been a significant contributing factor. In this case, the stresses on the vessel's hull would have been significantly reduced had the limestone cargo been loaded and trimmed in an even or more 'homogenous' distribution within the vessel's single hold.

On 1 January 2011, the International Maritime Solid Bulk Cargoes (IMSBC Code) entered into force, replacing the Code of Safe Practice for Solid Bulk Cargoes (BC Code). The aim of the IMSBC Code is to '*facilitate the safe stowage and shipment of solid bulk cargoes*'. Unlike the BC Code the IMSBC Code is mandatory for **all vessels carrying solid bulk cargoes, not just bulk carriers**. Nevertheless, it is evident that compliance with its requirements and recommendations is not as widespread as intended.

To try and prevent further similar accidents occurring in the future, owners, operators and crews of general cargo ships carrying solid bulk cargoes are strongly advised to:

- Adhere to the requirements and best practice contained in SOLAS and the IMSBC Code, particularly regarding:
  - The provision of sufficient information on a vessel's longitudinal and tank top strengths and the proper distribution of the cargo in order to prevent the structure from being overstressed.
  - The importance of cargo trimming; a single pile of cargo will inevitably lead to increased bending moments and might also overload the tank tops in the cargo hold.
- Ensure that appropriate authorisation to carry solid bulk and high density cargoes has been obtained from the vessel's flag state administration and/or classification society.
- Where possible, reduce the wave-induced bending moments and stresses on a vessel's structure in heavy weather by weather routing, sheltering, or adjusting course and/or speed.

Furthermore, the shippers of solid bulk cargoes, the competent authorities of the ports of loading and terminal representatives are also strongly advised to ensure they fulfil their obligations under SOLAS and the IMSBC Code, in particular:

- By providing cargo information, including density and angle of repose, to a vessel's master or his representatives.
- By agreeing with a master how a solid bulk cargo is to be loaded or unloaded to ensure that the permissible forces and moments on the ship are not exceeded.

This flyer and the MAIB's investigation report are posted on our website: [www.maib.gov.uk](http://www.maib.gov.uk)

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**June 2013**

