

# Heavy weather





## 8.1

## Containers were lost in heavy weather because of stiff vessel

A large container vessel was sailing on a SE course in the North Atlantic, bound for a European port. During the voyage, heavy weather was encountered from ENE at Beaufort scale 9, with 7 metre waves. This meant that the wind was on the vessel's port side, causing heavy rolling. The maximum recorded roll angle was 30°.

### Collapsed containers

During the morning watch, the OOW and the Master were on the bridge. Hearing a loud noise astern of the bridge they looked out of the window and could see that a number of containers had collapsed and some had fallen into empty bays. The collapsed containers were all 20' TEU and were stowed in four bays. The side containers on the starboard side had toppled inboard into an empty space and others had fallen overboard.

After the incident the Master broadcast a safety alert over the VHF. In response to the heavy weather, he then ordered a more easterly course of ESE and reduced speed from 16 knots to 7 knots.

### Cause

The CSM required that the bottom containers on deck were secured by manual twistlocks. However, the twistlocks in the container shoes were unlocked. In accordance with the vessel's procedures, the lashings were to be checked prior to every departure, which the Chief Officer stated he had done. At the loading port the Chief Officer had signed the lashing report without noting any deficiencies.

The vessel had a GM of 11 metres which made it very 'stiff'. This means that the vessel would quickly return to the upright position after being inclined by an external force such as wind or waves.

## What can we learn?

- The base twistlocks had not been locked as they were found undamaged and still located in the shoe fittings. The combination of unlocked twistlocks and a very stiff vessel sailing through heavy weather led to the collapse of the container stacks.
- The Chief Officer should have ensured that the manual twistlocks were checked before departure.
- The officers should have reduced speed and altered course to ensure the effect of heavy weather was minimised. This was only carried out after the accident had happened.
- A GM of 11 metres was excessive for this vessel. A stiff vessel will affect the top and side containers the most. The top containers collapsed and fell onto other containers which then fell overboard. Principally, the main forces affecting the containers in the lower tiers consisted of:
  - (i) The static weight of the upper containers in the stack.
  - (ii) Transverse/longitudinal/vertical acceleration forces on the top side containers when the vessel was rolling.
  - (iii) Transverse/ longitudinal forces of wind pressure or seas impacting the vessel.
- When the vessel was rolling in heavy weather, the frames and corner posts for the lowest containers were affected by excessive racking forces. The larger the roll, the greater the racking force will be.
- Heavy rolling can impart enormous forces on the container structures and lashings.
- All of the above-mentioned loads will increase the compression and tension forces on the corner posts and to the intermediate twistlocks between them.

# Glossary of common industry abbreviations

<b>Term</b>	<b>Meaning</b>
AB .....	Able seaman
AIS.....	Automatic identification system
ARPA .....	Automatic radar plotting aid
COLREGS .....	International Regulations for Preventing Collisions at Sea
COSWP .....	Code of Safe Working Practices for Merchant Seafarers
CPA .....	Closest point of approach
CSM.....	Cargo securing manual
ECDIS .....	Electronic chart display information system
ETA .....	Estimated time of arrival
GM.....	Metacentric height
GPS .....	Global positioning system
IHO .....	International Hydrographic Organization
IMDG Code .....	International Maritime Dangerous Goods Code
IMO .....	International Maritime Organization
IMSBC Code .....	International Maritime Solid Bulk Cargoes Code
ISM .....	International Safety Management Code
JRCC .....	Joint rescue coordination centre
MOU .....	Memorandum of understanding
NM.....	Nautical miles
OOW .....	Officer on watch
PA .....	Public address system
PMS.....	Planned maintenance system
SMS.....	Safety management system
SSAS .....	Ship security alert system
SSP .....	Ship security plan
STS .....	Ship-to-ship (transfer)
TML.....	Transportable moisture limit
UHF .....	Ultra high frequency (radio)
VDR .....	Voyage data recorder
VHF .....	Very high frequency (radio)
VTS .....	Vessel traffic service



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