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DOM

Afsagt den 18. januar 2016

S-9-14

Tryg Forsikring A/S
(advokat Jesper Windahl)
mod
DHL Global Forwarding (Denmark) A/S
(advokat Michael Villadsen)

Indledning og parternes påstande

Denne sag, der er anlagt den 17. juni 2014, drejer sig om, hvorvidt DHL Global Forwarding (Denmark) A/S som kontraherende transportør er erstatningsansvarlig for det tab, som Tryg Forsikring A/S's forsikringstager, Linak A/S led som følge af, at skibet Mol Comfort forliste den 17. juni 2013, kl. 07:45, hvorved Linak A/S' containerforsendelser på skibet gik tabt. Skibet, der var på vej fra Singapore til Jeddah, forliste efter at have fået en revne i bunden og var brækket i to dele.

Tryg Forsikring A/S har udbetalt erstatning til Linak A/S og er ved subrogationserklæring af 23. august 2013 indtrådt i Linak A/S' erstatningskrav mod DHL Global Forwarding (Denmark) A/S.

Det er oplyst, at DHL viderekontraherede transporten til det schweiziske linjerederi, Danmar Lines, som viderekontraherede transporten til Hyundai Merchant Marine, men det er uoplyst, om der herefter var yderligere mellemliggende transportled før Mitsui O.K.S., der opererede skibet.

Tryg Forsikring A/S har nedlagt endelig påstand om, at DHL Global Forwarding (Denmark) A/S til Tryg Forsikring A/S tilpligtes at betale 1.049.502,35 kr. med tillæg af procesrente fra sagens anlæg den 17. juni 2014.

DHL Global Forwarding (Denmark) A/S har nedlagt påstand om frifindelse, subsidiært frifindelse mod betaling af et mindre beløb end det påstævnte.

Kravet i henhold til den nedlagte påstand er opgjort som summen af en række beløbsfakturaer, 1.034.692,72 kr. med tillæg af fragtomkostninger, 39.746,02 kr., forsikringspræmie 63,61 kr. og med fradrag for selvrisiko på 25.000 kr.

Oplysningerne i sagen

I Japan blev der nedsat en officiel komité "Committee on Large Container Ship Safety" for at få kortlagt årsagen til forliset. Komiteen udarbejdede i december 2013 1) en foreløbig rapport ("Interim Report") og i marts 2015 2) en endelig rapport ("Final Report"). Der er endvidere udarbejdet 3) en "Investigation Report on Structural Safety of Large Container Ships" (september 2014) af Class NK (Nippon Kaiji Kyokai).

Sagen er med hensyn til forliset forelagt på grundlag af uddrag af de udarbejdede rapporter, som i det dokumenterede omfang gengives nedenfor:

1) Foreløbig rapport fra december 2013 (”Interim Report af Committee on Large Container Ship Safety”) (bilag 1 og bilag 23)

Af rapporten fremgår om skibet Mol Comfort bl.a., at ”Ship Owner” var URAL CONTAINER CARRIERS S.A., at ”Operator” var Mitsui O.S.K. Lines, Ltd., at ”Ship Mangement Co.” var MOL SHIP MANAGEMENT (SINGAPORE) PTE. LTD., at ”Nationality” var Bahamas, at ”Classification” var Nippon Kaiji Kyokai, og at dets længe var 302 m, dets bredde 45,60 m og dets dybgang 25 m. Det blev søsat den 8 marts 2008. Det er oplyst, at skibets DWT (deadweight tonnage) var 90613.

Af rapporten fremgår videre bl.a.:

> **“Outline of the ship**
>
> The Container ship “MOL COMFORT” … was the sixth in a series of large container ships that were delivered starting 2006.
>
> The ship was built using YP47 steel … in the hatch coaming to mitigate against toughness degradation that could occur when using exyta thickness plates. All fuel oil tanks were designed double hull and placed protective in side structural areas to prevent environmental pollution.
>
> The main engine was an electronically controlled diesel engine of Mitsubishi-Sulzer 11RT-flex 96C with a service speed of 25.25 knots.
>
> The ship had seven cargo holds in front of the engine room ant two cargo holds aft of the engine room, and a maximum capacity of 8,110 TEU could be loaded in the holds and on the deck.
>
> **2.2 Conformity with Rules/Survey Conditions**
> **Conformity with Rules**
>
> Application for classification and statutory services during construction was made to Nippon Kaiji Kuokai (hereafter “ClassNK”), as the representative authority of the Government of the Bahamas, and it was confirmed that The Ship’s plans and hull structure conformed with the relevant requirements pf the Rules for the Survey and Construction of Steel Ships, Guidance for the Survey and Construction of Steel Ships, during plan approval, as well as during classification surveys during her construction.
>
> As part of the approval based on the rules mentioned above, direct strength calculations for the evaluation of vertical bending strength, torsional strength and fatigue strength were implemented. All these were confirmed to be satisfied with the requirements.
>
> In addition to the above, conformity with following IACS Unified Requirements related to strength of ships was also verified.
>
> …
>
> **Overview**
> Results of Investigation

The Ship experienced hogging (convex deformations in the longitudinal direction), causing the ship's midship to fracture. According to observation of the progression following the outbreak of the accident, the upper deck area was the last part to fracture. From this, it can be assumed that the crack which trigged the fracture began below the waterline in the bottom part of the ship's hull and then progressed upwards along the side of the ship. The fracture is believed to have originated in the bottom shell plates of No. 6 Cargo Hold.

Safety inspections of The Ship's sister ships (large container ships of the same design as "The Ship") have found buckling deformations (for example, measuring approximately 20mm in height) on the bottom shell plates.

An investigation of The Ship's maintenance and inspections records also found buckling deformations on the bottom shell plates of the No. 5 Cargo Hold forward of the presumed fracture point.

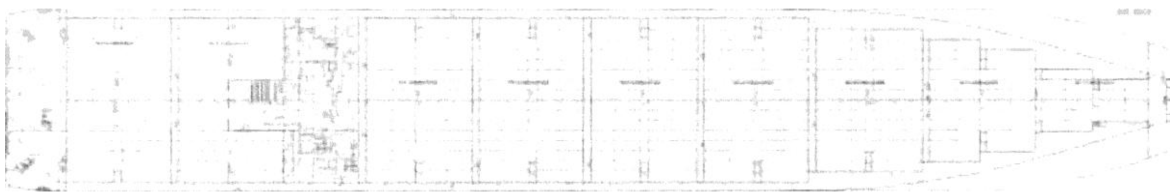
Structural analyses (simulations) were carried out using 3 hold FE model representing the midship part in order to simulate the fracture of The Ship. Meanwhile wave-load analyses under the sea state condition at the time of the accident were also carried out.

As a result, the hull strength of The Ship was calculated to be 14.0 x 10^6 kN-m. On the other hand, the estimated load acting on the hull was found to be 9.4 x 10^6 kN-m. This indicates that the estimated load equated to only approximately 67% of the hull strength.

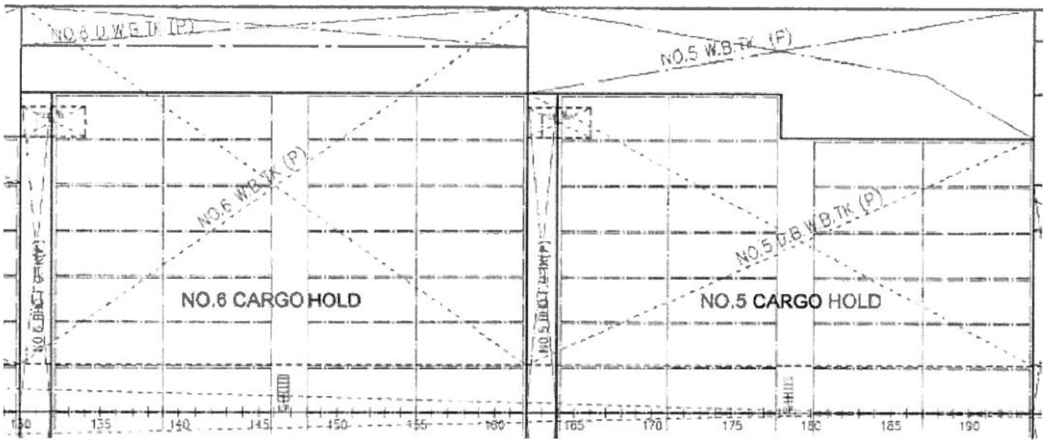
Structural simulations were also conducted to simulate the buckling deformations (approx. 20mm) found on the bottom shell plates during the safety inspections of the sister ships, but such buckling deformations did not occur even when applying loads near the ultimate hull girder strength.

Uncertain factors, in the estimation of structural strength such as the possible presence of residual deformations approximately 20mm in height on the bottom shell plates along the butt joint of the ship bottom (the welded areas between the blocks in which the hull was built) were quantitatively assessed. Furthermore, the cargo loading effect on the simulations of acting loads were quantitatively assessed. However, the conditions for fracture were not able to be simulated.

2nd Deck Arrangement



↑ No.6 Cargo Hold ↑ No.5 Cargo Hold



Tank Top Arrangement of No.5 & No.6 Cargo Holds (Port Side)

Assessment of Investigation Results

The load acting on the ship under the sea state at the time of the accident is estimated to be 9.4 x 10^6 kN-m by the Committee. However, according to the navigation records, the ship had encountered sea states in which it withstood a load of approximately 10.0 x 10^6 kN-m around three and a half years prior to the accident, and no such fracturing accident had occurred in that instance. Since fracturing accident occurred after this event, three possibilities are hypothesized that:

(1) the real loads acting on the hull at the time of the accident exceeded the estimation;

(2) The Ships hull strength had been reduced due to possible presence of residual buckling deformations on the bottom shell plates or any other reasons; or

(3) both of the above elements were combined.

For this reason, it is necessary to conduct further verification of both load and strength related simulations, including consideration of the effect of the uncertain factors in the simulations.

Furthermore, with regards to the fact that deformations of approximately 20mm were found on the bottom shell plates during the safety inspections of the sister ships, given that the deformations could not be simulated even when loads very close to the ultimate hull girder strength were applied, and that some buckling deformations of the bottom shell plates of The Ship had been found even though she is presumed not have encountered loads close to her hull strength, it is necessary to clarify the mechanism of these buckling deformations by both full-scale stress measurements of actual ships and numerical simulations.

…

8. Results of the Investigation and Future Tasks

Based on the consideration of the estimation of the acting load based on conditions at the time of the accident, the evaluation of the hull strength based on safety inspections of The Ship’s sister ships, and the consideration of accident occurrence scenarios, the results and future tasks are presented in the following sections.

8.1 Weight Distribution and Still Water Bending Moment

Investigation Results

Since it was difficult to make an estimation of the weight distribution based on certain assumptions with respect to the presence of cargo in excess of its manifested weight and uneven weight distribution, simulations for acting loads were conducted by using the declared weights for the cargo loading. In this case, the still water bending moment would be equal to $M_s=6.0 \times 10^6$ kN-m.

Future Tasks

With regards to the proper management of cargo weight on the hull for large container ships in the 8,000 TEU class and over in particular, cargo loading planning for actual voyages could be frequently reached to the maximum permissible still water vertical bending moment (hogging condition). In accordance with the deliberations at the IMO related to the enforcement of container weight verification prior to loading, verification of the actual weight of container cargoes provided by the shipper is recommended as a safety measure for large container ships.

(see Sections 6.2 and 6.3)

8.2 Sea State Conditions at the time of the Accident and Wave Bending Moment

Investigation Results

Based on the estimation in the long crested irregular waves under the sea conditions at the time of the accident (significant wave height: 5.5m, mean wave period: 10.3 seconds), the maximum load at the time of the accident was $M_w=2.0 \times 10^6$ kN-m (wave), and $M_{whip}=1.4 \times 10^6$ kN-m (whipping), $M_w+M_{whip}=3.4 \times 10^6$ kN-m in total. Therefore the estimated bending moment is $M_s+M_w+M_{whip}=9.4 \times 10^6$ kN-m in total, by combining the still water bending moment with the wave induced vertical bending moment.

Future Tasks

Even though The Ship encountered sea states that generated loads of approximately 10.0×10^6 kN-m three and a half years prior to this accident, no such fracturing occurred in that instance. This means that (1) the possibility of loads acting on the hull exceeding the estimated values at the time of the accident, (2) the possibility of the weakening of the hull strength due to the extent of buckling deformation on the bottom shell plates and/or any other reasons, and (3) both, (1) and (2) may be taken into consideration, so that further investigations are necessary to verify the effects of uncertainties involved in the strength and acting load simulations.

Moreover, the following uncertain factors and technical challenges may exist in the simulations and it is important to upgrade the technology of evaluation and to calibrate it by full-scale stress measurements of ships;

• Accuracy of estimation of whipping effect on wave loads in the simulation
• The variation of estimated wave loads due to the difference of the phase angle of each component waves in the time domain analysis
• The difference of wave directional spectrum between short crested irregular waves (real sea state) and long crested irregular waves (in simulation and model tests)
• Development of the method for estimating load under multi-directional waves and for simulating structural strength in that wave condition.

…

8.5 Uncertainty Factors involved in the Evaluation of Ultimate Hull Girder Strength and Required Rule Values

Investigation Results

In the present investigation, acting loads based on the non-linear strip method were estimated at $M_s+M_w+M_{whip}=9.4 \times 10^6$ kN-m, while the ultimate hull girder strength based on the three hold model analysis (simulation) was calculated as $M_{ult}=14.0\sim15.0 \times 10^6$ kN-m, so that the fracturing conditions were not met. The estimated ultimate strength of

The Ship was found to be around 126% of the strength required by the classification rules (a surplus margin of 26%).

Future Tasks

With regards to the following uncertain factors and the not fully established quantitative measures involved, the appropriateness of the safety margins, which current classification rule requirements ensure, should be reviewed as to whether the margin is satisfactory, and also comparisons of large container ships with designs other than The Ship should be carried out.

• The whipping effect on wave bending moment
• Surplus margin of wave bending moment required by classification rules for whipping component
• The uncertainty in still water bending moment due to the uncertainty of container weight distribution
• Ultimate strength taking into account of transverse load (bottom and side water pressure, container load, in particular, the asymmetrical water pressure distribution due to oblique waves and two-directional waves), etc.
• Variability of the material properties and effect of welding residual stress.

…

6.3.1 Effects of Loading

While there have been debates at the International Maritime Organization (IMO) related to enforcement of container weight verification prior to loading, the container cargoes on The Ship were lost when it sank. Therefore, the actual weight of cargo in each container and its loading position cannot be verified. Data was collected in order to understand the trend of the relationship between the estimated hull deflection from measured draught values and the still water vertical bending moment, including data of The Sister Ships so as to study the effects of loading of container cargoes.

Study for The Ship

The deflection of the hull obtained by reading the measured draught values was 0.63 m at the time of departure of The Ship before the accident. The still water vertical bending moment estimated using the loading calculator when the container cargoes were loaded in accordance with the declared container weights and loading plan was 103% of the allowable design value. On the other hand, the still water bending moment estimated by direct calculation using full-ship FEM model for hull deflection (0.63 m) was 126% of the allowable value. (If the effect of buoyant force due to deflection was considered, the result obtained was 118% of the allowable value.) The considerations below were made with regard to the relationship among cargo weight, hull deflection, and still water vertical bending moment.

Firstly, the difference in magnitude of the loaded weight of container cargoes from the declared value was calculated so as to reach the still water bending moment to 126% of the allowable value. The results of the calculation showed that when the total cargo weight was the same as the declared total weight, if the weight near amidships was reduced by 14%, the weight near the stern and near the bow was each increased by 13%, then the still water vertical bending moment became equal to 126% of the allowable value (see Fig.6.3.1). On the other hand, there was also the viewpoint that it was difficult to imagine that the actual loading on The Ship was considerably different from the declared cargo weight and the loading plan. The actual loading in The Ship could not be verified due to the sinking. Moreover, there could be errors in draught measurements, and effects

of heeling of the ship, therefore, investigations and validation studies using The Sister Ships are necessary henceforth.
…"

2. Endelig rapport af marts 2015 ("Final Report of Committee on Large Container Ship Safety") (bilag F)

Af rapporten fremgår blandt andet:

"…
Results of investigation

It was inferred that the hull fracture originated from the bottom shell plates in the midship part of The Ship. About 20mm buckling deformation was detected in the bottom shell plates during safety inspections of The Sister Ships (large container ships of the same design as "The Ship"). For reproduction of the hull fracture, the Committee conducted simulation of acting loads on The Ship from the data of weather and sea condition at the time of accident. And the ship structural strength (hull girder ultimate strength) simulated by modeling midship part of The Ship was compared with the acting loads.

In the simulation for ship structural strength, lateral loads were also included in addition to vertical bending moment, taking into account actual phenomenon. This value of ship structural strength was lower than that calculated by the case without considering lateral loads. Simulation of acting loads was conducted, taking into account whipping loads (loads of vibration of ships induced by slamming), which had not been explicitly considered in the current structural requirements. The acting loads increased with growing wave height and/or ship speed. Also, the analysis was conducted in consideration of deviation of container weight (gap between declared weight and actual weight), uncertainly in actual sea and deviation of yield stress of steel.

Consequently it was found, by simulation, that The Ship had the possibility of fracture at the time of the accident. Also, it was found, by simulation, that buckling deformation detected in bottom shell plates of The Sister Ships could occur by provision of slightly lower loads than ship structural strength and that the amount of deformation could increase by repeated loads.

With regard to the safety of large container ships, the Committee considered the requirements based on the result of simulations. Consequently, it was found that the requirements should consider the effect of lateral loads in evaluation of ship structural strength (hull girder ultimate strength). It was also found that the requirements for longitudinal strength should consider the effect of whipping response against ship structural strength, based on the knowledge accumulated for the development of the requirements. Furthermore the technical backgrounds of the requirements for the vertical bending strength, including sea condition, should be considered so that they could be available as reference taking into account that acting loads for hull girder could be changed depending on wave height, ship's speed and so on.

With regard to the large container ships of ClassNK with different design from The Ship, no similar deformations of bottom shell plates were found through the safety inspections and sufficient structural margins were found comparing with The Ship as the results of the simulations. It can be considered that the similar confirmations, such as inspection of bottom shell plates, are effective for other large container ships.

Recommendations of requirements for large container ship (8,000 TEU class or over)

It is recommended that the classification requirements for large container ship structural strength, including Class NK requirements and IACS Unified Requirements, should be amended or considered in the following way at the early stage in order to implement the safety measures internationally.

.1 The effect of the lateral loads which induce bi-axial stresses of bottom shell plates should be considered in the requirements of the hull girder ultimate strength taking into account the close relationship of the lateral loads and the hull girder ultimate strength.

.2 Effects of whipping responses should be explicitly considered in the requirements of the vertical bending strength.

.3 Representation of technical backgrounds of the requirements for vertical bending strength such as sea states etc. should be considered.

1 Information regarding the accident and buckling deformations in the bottom shell plates of The Sister Ships

1.1 Outline of container ship MOL COMFORT

The Bahamian flagged container ship "MOL COMFORT", operated by Mitsui O.S.K. Lines, was designed and built by the Mitsubishi Heavy Industries, Ltd., Nagasaki Shipyard & Machinery Works. The Ship was the sixth in a series of large container ships that were delivered starting in 2007. The Ship was built using YP47 steel (yield stress: 460 N/mm^2) in the hatch coaming to mitigate toughness degradation that could occur when using extremely thick plates. All fuel oil tanks were protectively designed in side structural areas such as double hull construction to prevent environmental pollution.

The main engine was an electronically controlled diesel engine of Mitsubishi-Sulzer 11RT-flex 96C with a service speed of 25.25 knots. The Ship had seven cargo holds in front of the engine room and two cargo holds aft of the engine room with a maximum capacity of 8,110 TEU.

1.2 Conformity with Rules/Survey Conditions

Application for classification and statutory services during construction was made to Nippon Kaiji Kyokai*, as the representative authority of the Government of the Bahamas, and it was confirmed that The Ship's plans and hull structure conformed with the relevant requirements of the Rules for the Survey and Construction of Steel Ships, Guidance for the Survey and Construction of Steel Ships, during plan approval, as well as during classification surveys during her construction.

As part of the approval based on the rules mentioned above, direct strength calculations for the evaluation of transverse strength, torsional strength and fatigue strength were implemented. All these were confirmed to be satisfied with the requirements. In addition to the above, conformity with IACS Unified Requirements related to ship structural strength was also verified.

1.3 State and Conditions at the Time of the Accident

According to the operator of The Ship, a crack occurred midship part at about 07h45 (GMT + 5 hours) on 17 June 2013, while crossing the Indian Ocean on a voyage from Singapore to Jeddah in Saudi Arabia. The Ship was sailing at a speed of approximately 17 knots with the engine running at 79 rpm. The significant wave height at the time of the accident was 5.5 m with a south-westerly wind of Beaufort force 7. As a result of water ingress into the cargo hold, The Ship was unable to operate under its own power. The 26 crew members escaped by lifeboat and were rescued. Subsequently, The Ship's hull split into two which then drifted apart, and subsequently sank in the open sea (3,000 to 4,000m in depth). Records on board, such as Voyage Data Recorder, Ship Log Book, and Ballast Log Book Record among others, were lost when The Ship sank.

Water ingress was first detected by the water ingress alarm in the Duct Keel located near the center line of the double bottom of The Ship. Approximately two minutes later, further water ingress was detected in No.6 Cargo Hold located on the double bottom midship part. From the enlarged view in Fig. 1.3.1, the crack progression ran upwards from the bottom of The Ship, at No.6 Cargo Hold. From this, it was assumed that the crack which triggered the fracture had originated in the bottom shell plates below No.6 Cargo Hold midship part.

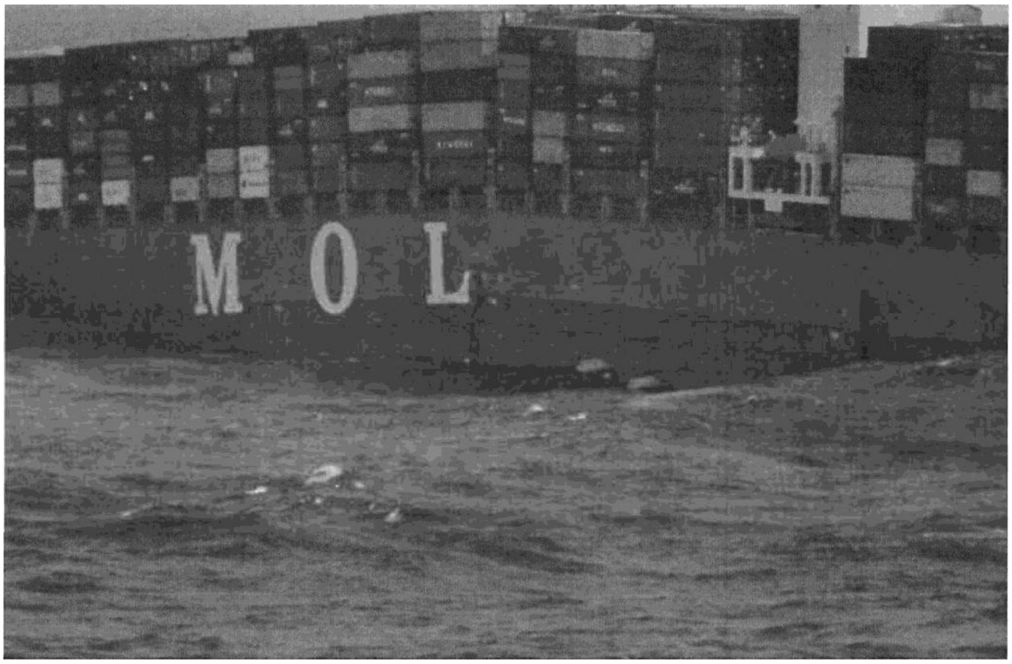
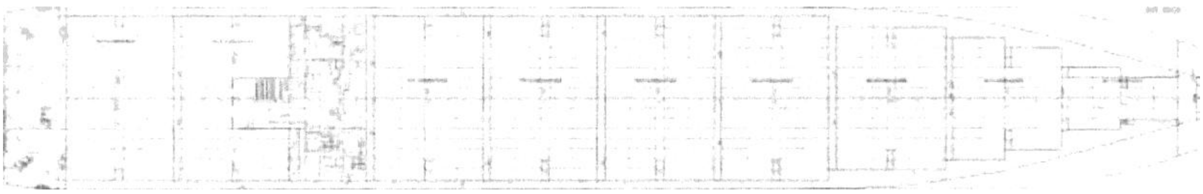


Fig 1.3.1 Condition of The Ship at the time of the accident
(Direction of the crack progression (photo by Mitsui O.S.K. Lines, Ltd)



↑ No.6 Cargo Hold ↑ No.5 Cargo Hold

Fig 1.3.2 2nd Deck Arrangement

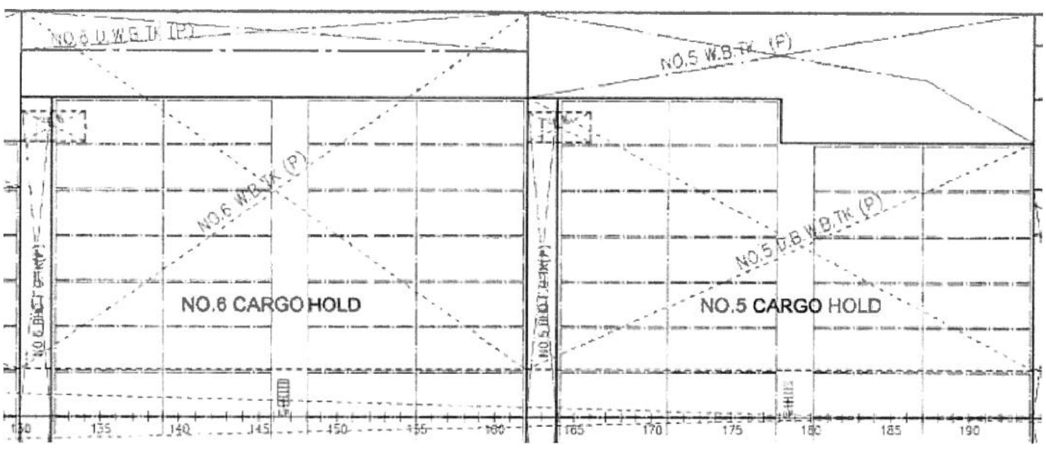


Fig 1.3.3 Tank Top Arrangement of No.5 & No.6 Cargo Holds (Port Side)

1.4 Safety Inspections of The Sister Ships

As the conditions of the hull damage and the cargo loading could not be verified due to the sinking of The Ship with on-board records, safety inspections of their bottom shell plates were conducted on The Sister Ships to collect any information relevant to the accident. Upon results of the safety inspections carried out on The Sister Ships, buckling deformations (concave and convex deformation of the bottom shell pates) of up to a maximum of 20mm in height were observed near the center line of the transverse section of the bottom shell plates in midship part. As a preventative safety measure for these Sister Ships, significant reinforcements of the double bottom structure to increase hull girder strength had been carried out successively for each ship. Inspections of 6 The Sister Ships and four other ships similar in design to The Ship were carried out with the cooperation of each operator in line with the Committee's objectives. As these ships were not Japanese flagged ships, no information about these ships will be disclosed excluding information mentioned in this report. Although differences were observed in their shape and frequency, deformations of the bottom shell plates, including minor deformations, were found in five of The Sister Ships operated by the same operator of The Ship, and found in one of the other four similar ships. No deformations were found on the remaining one operated by the same operator of The Ship just delivered in 2013.

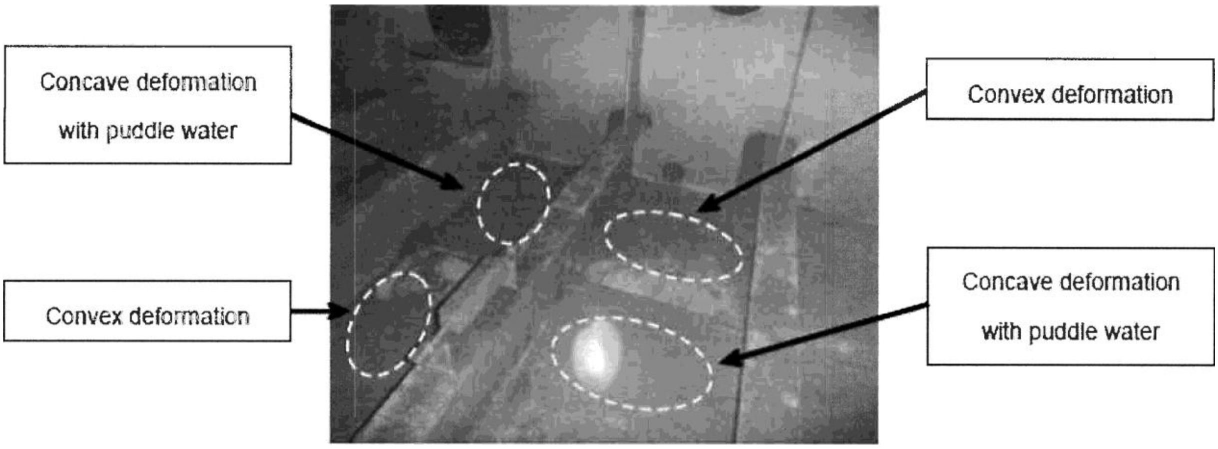


Fig 1.4.1 Example of buckling deformations observed in the bottom shell plates in double bottom midship part found on The Sister Ship operated by the same operator of The Ship (photo by Mitsui O.S.K. Lines, Ltd.)

Fig. 1.4.1 shows an example of deformation observed in The Sister Ship operated by the same operator of The Ship. The concave and convex buckling deformation of the bottom shell plates were observed between the bottom longitudinal stiffeners which were not deformed.

The maintenance records, as a part of Safety Management System, of The Ship were investigated. No deformation was recorded in the bottom shell plates under No.6 Cargo Hold midship part, assumed to be the part where the fracture originated, but showed buckling deformations in bottom shell plates on both the port and starboard sides near the butt joint in the vicinity of Fr.182 under No.5 Cargo Hold locating one-hold forward. Some similar deformations were recorded after 4 January 2010. Since no repairs were recorded, such deformations may exist in The Ship. In addition, there are no records regarding buckling deformations in the bottom shell plates during the periodic dry-docking surveys by the classification society. …

2 Reproduction of The Ship fracture and buckling deformations in the bottom shell plates by Simulation Calculations

2.1 Method of simulation calculations

In order to reproduce The Ship fracture by simulation calculation, acting loads were calculated by estimating the sea condition from the data of weather and sea at the accident. At the same time, the elasto-plastic assessment of the midship part of The Ship was conducted and ship structural strength was estimated. The Committee verified the possibility of the accident by comparing acting loads with ship structural strength.

In simulation of acting loads by calculation, whipping loads, which have not been explicitly considered in current structural requirements, were taken into account. The deviation of the sea condition in the accident was also considered, taking into account the weather and sea conditions data. Besides, the effect of deviation of container weight (gap between declared weight and actual weight) on the still water vertical bending moment was considered. The calculated acting loads were increased or decreased depending on sea condition and/or ship speed[1].

On the other hand, ship structural strength was estimated by the elasto-plastic assessment of the midship part of The Ship. In this assessment, the effect of lateral loads such as pressure on bottom hull and container weight, which induce bi-axial stress on the bottom plating, was considered as well as vertical bending moment.(refer to Annex 2). The Committee also considered the following; the effects of deviation of yielding point of steel plate constituting ship structure, the effect of welding residual stress of bottom longitudinal and the effect of buckling deformations of the bottom shell plates, as observed in The Sister Ships. The ship structural strength by the simulation calculation is increased or decreased by those effects[2].

2.2 Verification of possibility of The Ship fracture

The Interim report has indicated the necessity of consideration of the effect of uncertainty factors in the simulations for acting loads and ship structure strength, as the cause of the accident has not yet fully been clarified quantitatively. Responding to the Interim report, ClassNK, one of the Committee members, considered the possibility of the accident, taking into account the uncertainty factors, and informed of the following report to this Committee;

.1 With regard to the possibility of the fracture accident, it considered comparison between acting loads and ship structural strength, taking into account the deviation of uncertainty factors such as yield stress of steel data, sea condition at the accident and the gap of declared container weight and actual weight.

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[1]The method of simulation for calculation of acting loads (NMRIW) includes consideration of non-linearity of wave height by estimation of various hydrodynamic forces by time steps. The detail of this method can be found in paragraph 6.2.2 in the Interim report

[2]The method of simulation for calculation of the hull girder ultimate strength (LS-Dyna) and the considered uncertainty factors can be found in Section 3 in NK report.

.2 The result indicated that there was actually possibility, although quite low, that ship fracture occurred where the load of the vertical bending moment exceeded the hull girder ultimate strength at the time of the accident.

In order to verify the possibility of the accident, the simulation of acting loads was conducted by changing the condition of ship speed, significant wave height and mean wave period, taking into account deviation of the weather and sea conditions. And the result of this simulation was compared with ship structural strength simulated by calculation. In this simulation, ship speed and sea conditions (significant wave height, mean wave period and wave direction) were changed except for the wave direction in order to confirm that the condition, set in NK report which indicated the possibility of the accident, does not lead to peculiar results. Consequently, it was verified that it is actually possible that ship fracture happened where the load of the vertical bending moment exceeded the ship structural strength at the time of the accident as shown in Table 2.2.1 and Figure 2.2.1.

Table 2.2.1 Consideration for possibility of the accident

	Interim report	NK report	Present simulation
Ship speed	17 knot	17 knot	15 knot
Significant wave	5.5 m	7.5 m	8 m
Mean wave period	10.3 sec	15 sec	12.5 sec
Wave direction	Oblique sea from bow and port side	Head sea	Head sea
Deviation of hull girder ultimate strength	-	Included (refer to paragraph 3.3 in NK report)	Included (refer to paragraph 3.3 in NK report)
Loading condition calculation of strength	At the accident	At the accident (Section 3 in NK report)	1 Bay Empty
Result	No fracture	Ship fracture is possible	Ship fracture is possible

<u>3. "Investigation Report on Structural Safety of Large Container Ships", September 2014 (bilag G) udarbejdet af ClassNK (Nippon Kaiji Kyokai)</u>

"… JG Committee [japansk havarikommission] carried out the following investigations in order to reproduce the accident as stated from Chapter 5 to 7 of JG Interim Report.

Firstly, JG Committee estimated the sea state at the time of the accident to be the significant wave height of 5.5 meters, the mean wave period of 10.3 seconds and the encountered wave direction of 114 degrees (oblique sea from bow and Port side) based on the weather and sea states data at that time. Secondly, the wave loads acting on the Ship such as vertical bending moment, external sea pressure on side and bottom shell, cargo and ballast weight at the time of the accident were evaluated in the estimated sea state and then numerical simulations of the hull structural strength of the Ship under the evaluated acting loads, i.e. lateral loads and vertical bending moment, were conducted.

The result of the simulation showed that the hull girder ultimate strength was around 150% of the estimated vertical bending moment and the simulation could not reproduce the fracture.

Chapter 8 of JG Interim Report suggested future tasks related to the simulation of acting loads and the strength considering uncertainty factors, margins of the structural strength, on-board full scale measurement and so on.

Chapter 2 The Investigative Panel on Large Container Ship Safety

In light of the findings from the investigation at JG Committee, Nippon Kaiji Kyokai (ClassNK) set up a new Investigative Panel on Large Container Ship Safety (hereinafter "NK Panel") in February 2014. It comprised Japanese shipyards building large container ships, shipping companies operating such ships and academic experts. It also invited the Japanese Ministry of Land, Infrastructure, Transport and Tourism and the Japanese National Maritime Research Institute as observers. …

NK Panel investigated the two issues described below and delivered the Investigation Report on Structural Safety of Large Container Ships (hereinafter "this Report") containing the findings, the conclusions and the action plan to be implemented by ClassNK.

(i) Investigation on possibility of occurrence of the fracture

JG Committee obtained a result that the hull girder ultimate strength of the Ship was around 150% of the vertical bending moment estimated to act on the Ship at the time of the accident, and could not reproduce the fracture. Taking such result into account, NK Panel investigated the possibility of occurrence of the fracture considering uncertainty factors on the strength and the loads with reasonable ranges of the deviations.

(ii) Investigation on structural safety

NK Panel conducted 3-hold model elasto-plastic analyses for a number of large container ships including the Ship and investigated the margin of hull girder ultimate strength. NK Panel also investigated the relationship between the collapse strength of the bottom shell plates and the hull girder ultimate strength in order to figure out the mechanism of occurrence of the fracture.

Chapter 3 Investigation on Possibility of Occurrence of the Fracture

3.1 Introduction

JG Interim Report published in December 2013 estimated that the hull girder ultimate strength of the Ship had been around 150% of the estimated vertical bending moment at the time of the accident and could not show the possibility of the occurrence of the fracture.

JG Interim Report suggested the need to consider the effects of uncertainty factors involved in the strength and loads.

With consideration of the suggestion of JG Interim Report, the possibility of the occurrence of the fracture accident was investigated by probabilistic approach in this Chapter taking into account uncertainty factors affecting the hull girder ultimate strength and the vertical bending moments.

3.2 Uncertainty Factors in Strength and Loads

A key point in the investigation on the possibility of the occurrence of the fracture is the margin of the hull girder ultimate strength against the loads.

The factors related to the margin of the hull girder ultimate strength are listed below in the case of the fracture accident.

The followings are definite factors on the strength which are clearly specified in the hull structural drawings.

- Scantling of the structural members of the double bottom structure and structural arrangement of the double bottom structure such as spacing of bottom longitudinals, arrangement of girders and floors. (It was concluded that the fracture had originated from the bottom shell plates in the double bottom structure of the midship part.)
- Scantlings and structural arrangement of surrounding structural members which affect the strength of the double bottom structure such as the partial bulkheads.
- Structural details around the starting point of the fracture such as butt joint, scallop, opening and discontinuity in scantling of structural members.

Meanwhile the followings are considered as uncertainty factors on hull girder ultimate strength in general referring to JG Interim Report.

- Yield stress of steel (hereinafter "yield stress")
- Effect of welding residual stress
- Lateral loads, such as sea pressure and container loads
- Sea states
- Effect on still water bending moment due to deviations of container weight

Among these factors affecting the structural strength, definite factors such as scantling, arrangements and structural details were taken into consideration on the 3-hold model elasto-plastic analyses carried out in JG Interim Report to estimate the hull girder ultimate strength of the Ship.

On the other hand, uncertainty factors such as the yield stress and the effects of local deformations of the bottom shell plates found in the sister ships of the Ship were not taken into consideration in JG Interim Report.

With respect to the loads, JG Interim Report estimated the sea state at the time of the accident as the significant wave height of 5.5 meters, the mean wave period of 10.3 seconds and the encountered wave direction of 114 degrees (oblique sea from bow and Port side) from the weather and sea states data at that time and information on her heading and ahead speed. Based on the above estimated sea state, the wave-induced vertical bending moment including whipping response was estimated through the simulations by a non-linear strip method. However as commented in JG Interim Report, the estimation of the sea state at the time of the accident may have some deviations due to the measurement errors of the weather and sea states data used in the estimation.

In addition, the uncertainty of the still water vertical bending moment caused by deviations in container weights, i.e. the differences between declared weights and actual weights, was also not taken into account in JG Interim Report.

In view of the above, the possibility of the occurrence of the fracture was investigated by NK Panel with consideration of uncertainty factors in strength and loads which had not been considered in JG Interim Report.

3.3 Estimation of Strength and Load in Consideration of Deviation of Uncertainty Factors

The five factors listed below were considered as the uncertainty factors in this investigation. Strength and loads were estimated in the consideration of their deviations within reasonable ranges instead of giving uniquely defined values.

[Uncertainty factors related to the strength]

- Yield stress
- Effect of local deformations of the bottom shell plates
- Effect of residual stress of the fillet welding part of bottom longitudinals

[Uncertainty factors related to the loads]

- Sea state in connection with wave-induced vertical bending moment
- Actual container weight in connection with still water vertical bending moment

The strength, i.e. hull girder ultimate strength of the Ship was estimated by 3-hold model elasto-plastic analyses in this Chapter, and they were carried out with the full draught (14.5m), the same as in JG Interim Report, instead of the actual draught at the time of the accident. It was expected that the effect of the deviations of the lateral loads acting on the double bottom structure, which was mainly caused due to the deviation of wave-induced pressure, could be taken into account by the difference between the full draught used in the analyses and the actual draught. Therefore, the uncertainty of the lateral loads was not taken into account in the investigation of this Report, although this had been pointed as an uncertainty factor in JG Interim Report.

3.3.1 Estimation of strength in consideration of deviation of uncertainty factors

Yield stress, effect of local deformation and effect of welding residual stress were considered as the uncertainty factors in the strength.

In consideration of the deviation of the yield stress, the average value of the yield stresswas calculated based on the values on the mill sheets of the bottom shell plates in the area where the fracture of the Ship was concluded to have originated. Using the average value of the yield stress based on the mill sheet values, the hull girder ultimate strength was calculated and defined as *the mean value of the hull girder ultimate strength.*

For the minimum value of the hull girder ultimate strength corresponding to the minimum value of the yield stress, the following two cases were considered. The investigation of Case 1 estimated smaller deviation of the yield stress than that of Case 2.

Case 1	• The standard deviation (a) of the yield stress was calculated based on the mill sheet values of the bottom shell plates. The minimum yield stress was defined to be the value lower by three times the standard deviation (3a) than the average value of the yield stress obtained through the mill • The hull girder ultimate strength was calculated in consideration where the yield stress of all bottom shell plates in the caiculation was equal to the above minimum yield stress, and the calculated value was defined to be *the minimum hull girder ultimate strength.*
Case 2	• The hull girder ultimate strength was calculated in consideration where the yield stress of all bottom shell plates in the calculation was equal to the specified minimum yield stress, and the calculated value was defined to be *the minimum hull girder ultimate strength.*

The hull girder ultimate strength was calculated by 3-hold model elasto-plastic analyses. Details of the analysis conditions are shown in **Appendix 2.**

The effects on the hull girder ultimate strength caused by the local deformations of bottom shell plates and the residual stress at the fillet welding part of bottom longitudinals were treated as follows. …

- The possibility was considered that deformations might have existed in the bottom shell plates of the Ship which had the similar mode to the local deformations found in the sister ships through the inspections after the accident. The effect of the local deformations in the bottom shell plates was considered to reduce the hull girder ultimate strength and estimated at maximum 4%.
- It was estimated that the reduction of the hull girder ultimate strength due to the effect of the welding residual stress in the longitudinal direction caused by the fillet welding of bottom longitudinals was maximum 5%.

The minimum hull girder ultimate strength corresponding to the minimum yield stress shown in the above table was multiplied by the two effects values of the strength reduction, that is to say one is due to the effect of the local deformations in the bottom shell plates and the other is due to the effect of the welding residual stress. The resulting value of the hull girder ultimate strength was defined as *the lower limit of the hull girder ultimate strength.*

Table 3-1 shows the values of the hull girder ultimate strength of the Ship thus calculated.

Table 3-1 Hull girder ultimate strength of the Ship
considering the deviation of uncertainty factors

(Unit : kN-m)

Mean value of the hull girder ultimate strength (Value corresponding to average yield stress of bottom shell plates of the Ship based on the mill sheet values)	14.8×10^6	
Minimum hull girder ultimate strength corresponding to the minimum yield stress	Case 1 Minimum yield stress was estimated based on the deviation of the mill sheets values of the Ship	Case 2 Minimum yield stress was defined as the specified minimum yield stress
	14.2×10^6	13.2×10^6

Lower limit of the hull girder ultimate strength (Value calculated by multiplying *Minimum hull girder ultimate strength* by 0.96 and 0.95 considering the effects of local deformation and welding residual stress, respectively)	13.0 x 10^6	12.0 x 10^6

3.3.2 Estimation of wave-induced vertical bending moment in consideration of deviation of uncertainty factors

JG Interim Report estimated that the sea state at the time of the accident had a significant wave height of 5.5 meters, the mean wave period of 10.3 seconds and the encountered wave direction of 114 degrees (oblique sea from bow and Port side). It also pointed out that the significant wave height might have variation from 0.5 meters to 2 meters due to the measurement errors in the weather and sea states data used for the estimation.

In the investigation of this Chapter, wave-induced load simulations in a total of 27 different cases of sea states at the time of the accident were carried out combining significant wave heights of 5.5 m, 6.5 m and 7.5 m, mean wave periods of 10.3 seconds, 12.5 seconds and 15 seconds and encountered wave directions of 120 degrees, 150 degrees and 180 degrees (head sea) to estimate the deviation of the wave-induced vertical bending moment at the time of the accident under different conditions. **Appendix 4** describes the details. The simulations showed the result that the upper limit of the wave-induced vertical bending moment at the time of the accident was 7.23 x 10^6 kN-m including whipping response component of 3.05 x 10^6 kN-m corresponding to the significant wave height of 7.5 meters, mean wave period of 15 seconds and encountered wave direction of 180 degrees (head sea).

3.3.3 Estimation of still water vertical bending moment in consideration of deviation of uncertainty factors

JG Interim Report concluded the still water vertical bending moment at the time of the accident to be 6.0 x 10^6 kN-m. This value was calculated from the container weights declared by the shippers. In reality, there could have been gaps between the declared weight and the actual weight of the containers. This means that the actual still water vertical bending moment might have deviated from that which was calculated based on the declared weight. The investigation in this Chapter took into consideration 10% deviation at maximum from the calculated still water vertical bending moment in accordance with the investigation result of draught measurement data of the sister ships of the Ship at the time of their departure as shown in **Appendix 5.**

3.3.4 Lower limit of strength and upper limit of load

As stated in 3.3.1 of this Report, it is estimated that the lower limit of strength was 13.0x10^6 kN-m in Case 1 and 12.0x10^6 kN-m in Case 2 respectively as shown in **Table 3-1.**

As stated in 3.3.2 and 3.3.3, the total vertical bending moment at the time of the accident, the sum of the wave-induced vertical bending moment and the still water vertical bending moment, was estimated to be 13.8x10^6 kN-m (=7.23 x 10^6 kN-m +6.0x 10^6 kN-m x 1.1) as the upper limit.

The results of the investigation on strength and loads considering the deviations of the five uncertainty factors listed in the beginning of this section indicate a possibility that the upper limit of the load (the vertical bending moment) may have exceeded the lower limit of the strength (the hull girder ultimate strength).

3.4 Possibility of Occurrence of Fracture

As concluded in 3.3 of this Report, there was a possibility that the upper limit of the load exceeded the lower limit of strength at the time of the fracture. The possibility of the occurrence of the fracture was estimated in the probabilistic way by estimating the probability distributions of the strength and the load in the investigation of this section.

Given the limitation of data on both the strength and the loads used for the estimation of the probability distribution, at first the types of the probability distribution of the strength and the loads were assumed and then the parameters which figured the deviations of the probability distributions were estimated based on the values of the strength and the loads as evaluated in 3.3 of this Report considering the deviations. While there are many different methods of estimating the probability distributions for the strength and for the loads with the various assumptions, the probability distributions were estimated by the following methods in the investigation of this Report.

The probability distribution of the hull girder ultimate strength was presumed to follow the normal distribution. The degree of the deviation of the strength was calculated using the two methods, one is according to Case 1 in 3.3.1, where the minimum yield stress was estimated from the deviation of the mill sheet values of the bottom shell plates of the Ship and the other method is according to Case 2 in 3.3.1, where the minimum yield stress was defined as the specified minimum yield stress.

The probability distribution of the wave-induced vertical bending moment resulting from the simulations of the 27 cases was presumed to follow the Gumbel distribution, which is one of extreme value distributions. On the other hand, the probability distribution of the still water vertical bending moment was presumed to follow the normal distribution according to the investigation results shown in **Appendix 5.**

The details of the estimation of probability distributions for the strength and the loads are shown in **Appendix 6. Appendix 6** also shows the result in case where the probability distribution of the wave-induced vertical bending moment was presumed to be the normal distribution for reference.

Fig. 3-1 shows relationship between the strength and the load at the time of the accident based on the probability distribution, which was estimated by the above method. In **Fig. 3-1,** the deviation of the strength was used as calculated by the method of Case 1 in 3.3.1 where the minimum yield stress was estimated from the deviation of the mill sheet values of the bottom shell plate of the Ship, which was considered more realistic than the other cases. Results of the other cases are shown in **Appendix 6.**

Fig. 3-1 shows that it is actually possible where the load of the vertical bending moment exceeded the hull girder ultimate strength at the time of the accident when the effects of the deviations of the uncertainty factors were considered although the overlap between the strength and the load is very narrow.

In **Fig. 3-1,** the size of the overlapping part between the blue curve which shows the probability of the strength and the red curve which shows the probability of the load indicates the qualitative level of occurrence probability of the fracture. Therefore it can be said that the following two factors are important to investigate the possibility of occurrence of the fracture:

- the margin of strength against the load represented by the gap between the respective peaks; and
- the degree of the deviation, i.e. the ranges of the probability distribution curves of the strength and the load.

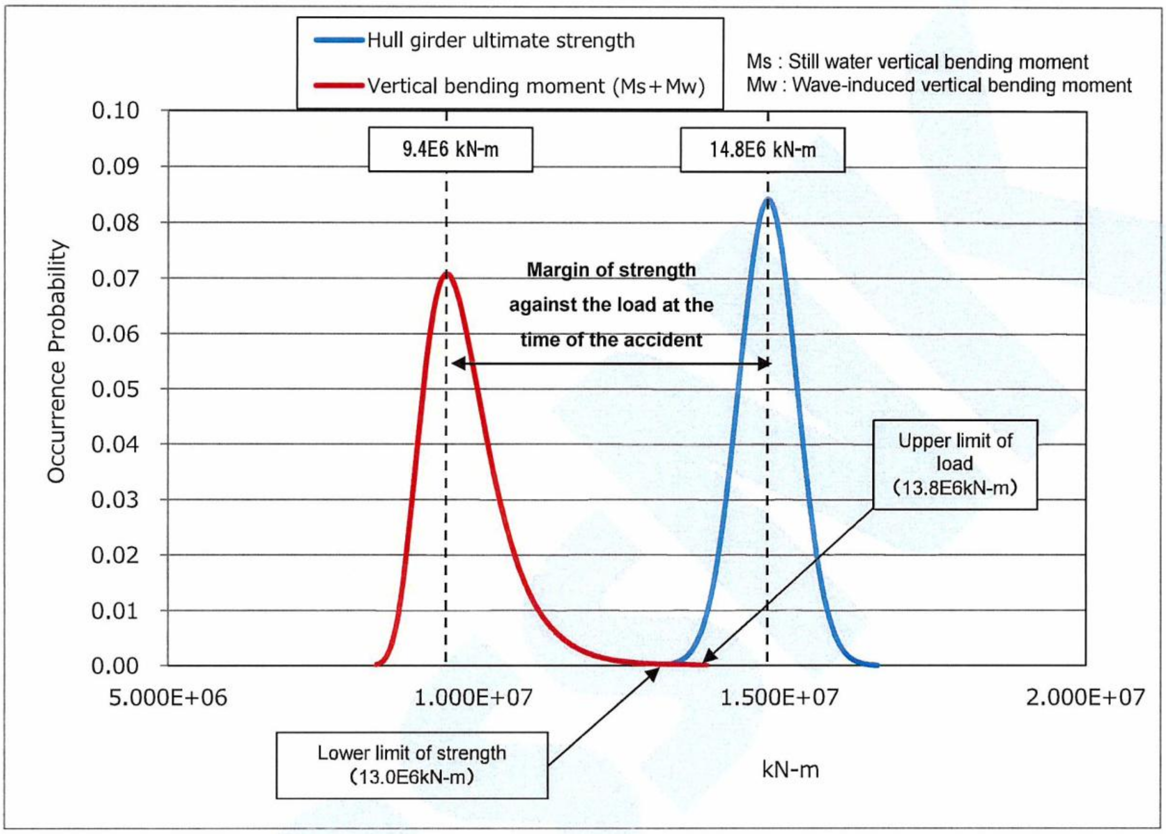

Fig. 3-1 Relationship between strength and load at the time of the accident
(Probability distribution curve of strength and load)

Probability distribution of strength : Normal distribution
(The deviation to be estimated from the deviation of the mill sheets values of the Ship)
Wave-induced vertical bending moment : Gumbel distribution
Still water vertical bending moment : Normal distribution
Note : The vertical axis shows the occurrence probability corresponding to the band of strength and load of 1.0×10^5 kN-m.

The margin of the strength becomes very important for large container ships in the same category, where the degrees of the deviations of the strength and the loads represented by the range of the blue and the red curves in **Fig. 3-1** respectively are almost the same among large container ships.

…

4.4 Characteristics of Container Ships, and Changes in Structure and Operation due to Increased Ship Size

Container ships carry container cargoes which are light in weight compared to their volumetric capacity, and thus the still water vertical bending moment is always in hogging condition. Due to this characteristic, the ship's double bottom structure under wave-induced vertical bending moment is always subjected to compressive load. As for cargo holds, the upward load due to bottom sea pressure is dominant on the double bottom structure since container cargoes are relatively light.

Unlike tankers and bulk carriers, container ships are always operated with containers loaded onboard. Further, the number, weight and layout of containers differ in each voyage even in the same navigation route. For these reasons, operators need to make the cargo loading plan for each voyage while checking compliance with the requirements of stability and longitudinal strength.

> Based on such characteristics of load and voyage, container ship design is generally carried out considering "One-bay empty condition" with the assumption that one of the bays is not loaded with containers, in addition to the standard loaded condition with homogenous container loading in each cargo hold. In this One-bay empty condition, the double bottom structure under the empty bay of a cargo hold is subjected to severe load condition from the structural viewpoint of the transverse strength, because of no container weights balanced with the upward load due to bottom sea pressure.
>
> As stated in **Appendix 12,** Post-Panamax container ships have improved their stability in comparison with Panamax container ships and have gained more cargo loading flexibility in complying with the stability requirements, because the breadth of Post-Panamax container ships is relatively increased than the depth. As a result, the need to ballast in the double bottom tanks to improve stability is reduced. On the other hand, the upward lateral load due to bottom sea pressure acting on double bottom structure has increased because of the increased breadth of the hull. The container weight cannot be balanced sufficiently with this increased upward lateral load even in the case of normal loading conditions where containers are homogeneously loaded in every bay. Consequently the occasion increases where the load acting on double bottom structure becomes almost equal to the load in One-bay empty condition without ballast in double bottom, which is the severe condition for the transverse strength. This trend is especially obvious in Post-Panamax container ships of 8,000 TEU class or larger.
>
> …"

Retssager

Der verserer flere retssager rundt om i verden som følge af forliset.

Ved *Tokyo District Court, Civil Division*, blev der af skibets ejere udtaget stævning den 10. januar 2014 mod det japanske værft på grundlag af den foreløbige rapport fra december 2013 ("Interim Report"). Det sagsøgte japanske værft havde af samme type som skibet MOL Comfort bygget 6 søsterskibe.

Det fremgår af stævningen videre:

> "… After Comfort commenced her service until she left Singapore, the last port on June 11, 2013, there was no problem in her shearing force and longitudinal bending moment at the time of departure from each port compared with the tolerance value in design…
>
> Also, after leaving Singapore, in order to maintain the calculation value of shearing force and longitudinal bending moment within the safety range of tolerance value in design, ballast water pouring operation was conducted. On the day of Breached Incident, the shearing force at the maximum position (frame No. 74) was 91.8% (against tolerance value of 100% in design), and the longitudinal bending moment at the maximum position (frame No. 130) was 96,5%. ….
>
> On June 10, 2013 Comfort arrived in Singapore and commenced loading operation. On June 11, the next day, at 18:45 completed loading operation. At around 19:05 on the same day, Comfort left for next port, Jeddah, Saudi Arabia laden with 4,382 containers (7,041 TEU, 64,521.1 ton). …

Master decided the route based on the advice from Weathernews, a metrological investigation and prediction company, and thereafter, Comfort proceeded Jeddah …

By inspection of sister ships made after this hull breach incident, it was found that 5 sister ships except MOL Commitment very recently launched had the buckling deformation with abt. 20mm height or more at or around double buttom shell plating below No. 6 hold (bat joint point near flame no. 151) on or around the center of the transverse hull phase, where the hull bridge was originated. …"

Vedrørende et uheld med et skib, APL Zeebrücke (benævnt "AZ"), som efter det oplyste var bygget med samme "structural design" som MOL Comfort, fremgår under et punkt 3, "Defects in warning" i stævningen bl.a.:

"…
In May 2010, Defendant at Nagasaki Dock Yard completed building of AZ, and AZ was sent to a trade of Asia/Europe. On December 13, 2011, with her age of about 1,5 year, she, on the voyage from Singapore to Hong Kong, had a buckling deformation with longitudinal length of about 3.6m at but joint part near flame no. 151 on the double bottom shell plating below No. 6 Hold in midway of her hull. The weather at that time was influenced by the low pressure at an area of Singapore-Hong Kong, but the max wind was 25 knots (13m/s) (wind force 6) and the significant wave height was 3-4m. Defendant, having had a report re this accident, considered it arisen out of longitudinal sharing force, evaluated the longitudinal strength, and reported its result to a Japanese company, who substantially managed AZ. In December 2012, Special survey on AZ was made, and AZ effected the permanent repair. At that time, Defendant provided the owner with necessary plans and sent a superintendent. On June 17, 2013, this Breach Incident happened, and Defendant informed MOL of information re this AZ Buckling Deformation Incident. Before that time, there was no such information from Defendant. … "

Ved en stævning af 4. april 2014 er der ved *The High Court of the Hong Kong Special Administrative Region, Court of 1st Instance*, anlagt en retssag af en lang række erstatningssøgende parter, herunder Trygs forsikringstager i nærværende sag, Linak A/S, mod en række sagsøgte parter, herunder Danmar Lines, som efter det oplyste skal være koncernforbundet med DHL. Det fremgår af et bilag til stævningen, at der er henvist til en Sea Waybill med et dokumentnummer, som svarer til det nummer, som er oplyst i nærværende sags bilag L.

Af en protokoludskrift af den 16. april 2015 i en tysk retssag ved *Hanseatisches Oberlandesgerich Hamburg, 6. civilafdeling*, vedrørende samme forlis som i nærværende sag, fremgår bl.a. følgende:

"Domstolen påpeger, at der fortsat er et ganske betydeligt behov for yderligere afklaring og bevisførelse vedrørende spørgsmålet om ansvarsfrihed. Sagsøgte skal fremkomme med yderligere oplysninger, især vedrørende de "buckling deformations", der blev konstateret i 2010. Det er også nødvendigt, at der fremskaffes yderligere oplysninger vedrørende spørgsmålet om de dybgangsforskelle, der blev konstateret lige inden afsejlingen. Domstolen beder om, at rapporterne fra den japanske kommission fremlægges på tysk. Det ville også være relevant at fremlægge de undersøgelser, der refereres til i rapporterne, med de pågældende konklusioner set i forhold til henholdsvis sikkerhedsgodkendelserne og klasseinddelingerne. Derefter skal der efter det foreliggende sandsynligvis også foretages en vurdering af en teknisk ekspert, hvilket vil blive meget tidskrævende og dyrt.

Domstolen påpeger, at begge parter skal fremkomme med oplysninger vedrørende telefonsamtalen og prisaftalen. I givet fald skal det også anføres, om parterne tidligere har haft forretningsforbindelse med hinanden, og hvordan aftalerne i den forbindelse blev indgået. Det kan være af betydning, hvis noget ikke har været drøftet i den konkrete telefonsamtale.

Domstolen påpeger endvidere, at oprettelsen af garantifonden efter Domstolens opfattelse ikke spiller nogen rolle her.

Domstolen tilråder, at man indgår forlig for at undgå en meget langvarig og dyr bevisførelse. Dette forlig kunne under afvejning af alle gensidige risici og også under hensyntagen til ansvarsbegrænsninger være udformet således, at sagsøgte forpligter sig til at betale 4.000 EUR til sagsøger ved ophævelse af sagsomkostninger."

I en mail til Trygs advokat har advokat Sabine Rittmeister redegjort for omstændighederne omkring retsmødet i Hamburg den 16. april 2015 og suppleret oplysningerne i protokollen.

Forklaringer

Der har ikke været afgivet forklaringer under sagen.

Parternes synspunkter

For Tryg, er der i det væsentlige procederet i overensstemmelse med påstandsdokumentet af 25. oktober 2015, hvoraf bl.a. fremgår:

"1. Skibet Mol Comfort var usødygtigt ved rejsens begyndelse

Det gøres gældende, at skibet Mol Comfort ikke var sødygtigt ved rejsens begyndelse, idet havariet, som indtrådte ved, at skibet brækkede i to dele, medens skibet befandt sig på åbent hav, selvsagt ellers ikke kunne være indtrådt. Det er ubestrideligt, at et havari, der opstår på denne måde er udtryk for, at skibet ikke var sødygtigt.

Sagsøgte er præsumptivt ansvarlig som kontraherende transportør for tab af lasten ombord i skibet, jf. sølovens § 275, der gælder præceptivt for transporten, jf. § 252.

Det påhviler sagsøgte at godtgøre, at der af sagsøgte og sagsøgtes undertransportører og disses kontrakthjælpere ikke er begået nogen fejl eller forsømmelse med henblik på at sørge for, at skibet var sødygtigt ved rejsens begyndelse. Kredsen af personer, som sagsøgte hæfter for i denne forbindelse omfatter i hvert fald de personer, der er omfattet af sølovens § 151.

For at ansvarsfrihed efter sølovens § 276 kan komme på tale, må sagsøgte således godtgøre,

• hvad der var årsagen - eller årsagerne - til havariet, og

• at de således påviste årsager ikke beroede på nogen fejl eller forsømmelse begået af nogen, som sagsøgte svarer for.

Det er ikke – og bør ikke være – muligt at opnå ansvarsfrihed ved benyttelse af et usødygtigt skib, hvis årsagen til usødygtigheden og det deraf følgende havari ikke påvises af sagsøgte.

2. Skibet var overlastet

Vedrørende tillastningen af skibet og vægtfordelingen af lasten anføres det i den officielle japanske undersøgelsesrapport, at havariet kan skyldes en overskridelse af skibets lasteevne, jf. s. 5 i rapporten [bilag 1, under "Assessment of Investigation Results"]. Denne mulighed angives som en af tre mulige årsager til havariet:

Since fracturing accident occurred after this event, three possibilities are hypothesized that:

• *The real loads acting on the hull at the time of the accident exceeded the estimation*

• *The ship's hull strength had been reduced due to possible presence of residual buckling deformations on the bottom shell plates or any other reasons; or*

• *Both of the above elements were combined.*

Sagsøgte er [opfordring 6 i replik af 14. oktober 2014] opfordret til at dokumentere, hvilke forholdsregler og undersøgelser der blev foretaget af rederiet for at sikre, at skibets last, herunder vægten af lastede containere, ballastvand, m.v. ikke faktisk overskred skibets bærevne. Sagsøgte har ikke besvaret den nævnte provokation.

Det gøres gældende, at det ikke er godtgjort af sagsøgte, at havariet ikke er forårsaget som en faktisk overlastning og dermed overskridelse af skibets bæreevne, som ikke burde være forekommet, som påpeges som en mulig årsag til havariet i rapporten.

3. Skibets stabilitet var kompromitteret ved rejsens begyndelse

Sagsøgte er [opfordring 8 i processkrift 1 af 18. maj 2015] opfordret til at redegøre for og dokumentere skibets stabilitetsberegninger på tidspunktet for rejsens begyndelse i Singapore, herunder dokumentere skibets dybgang og bøjningsmoment og redegøre for og dokumentere, at skibets stabilitetsberegninger var forsvarlige og hensigtsmæssige

Der er ikke af de sagsøgte tilvejebragt nogen dokumentation for, at der af rederiet blev foretaget nødvendige, relevante og adækvate undersøgelser og vurderinger vedrørende skibets stabilitet.

Som bilag 23 er fremlagt en kopi af afsnit 6.3.1 i bilag 1. Af side 44 [under ["Study for The Ship"] fremgår følgende

> "The deflection of the hull obtained by reading the measured draught values was 0.63 m at the time of departure of The Ship before the accident. The still water vertical bending moment estimated using the loading calculator when the container cargoes were loaded in accordance with the declared container weights and loading plan was 103% of the allowable design value. On the other hand, the still water bending moment estimated by direct calculation using full-ship FEM model for hull deflection (0.63 m) was 126% of the allowable value. (If the effect of buoyant force due to deflection was considered, the result obtained was 118% of the allowable value.) The considerations below were made with regard to the relationship among cargo weight, hull deflection, and still water vertical bending moment."

Som det fremgår heraf, at skibets stabilitet var kompromitteret ved rejsens begyndelse.

Sagsøgte har ikke godtgjort, at den kompromitterede stabilitet ikke kunne være undgået, og at den ikke havde betydning for det indtrådte havari.

4. Buckling deformations

Efter det foreliggende, herunder den officielle japanske undersøgelsesrapport, må det lægges til grund, at sagsøgte, eller nogen for hvilke sagsøgte svarer, jf. sølovens § 151, var vidende om, at der inden rejsens begyndelse var konstateret deformationer i bunden af skibets skrog.

Uanset dette lod sagsøgte rejsen påbegynde med det pågældende skib.

De sagsøgte har fremsat et synspunkt om, at det ikke skulle have nogen betydning for de sagsøgtes ansvar, at der ikke blev foretaget nærmere undersøgelser af de "buckling deformations", der i 2010 blev konstateret af rederiet i bunden af "Mol Comfort" ved lastrum nr. 5, idet "det ikke var disse deformationer, som forårsagede ulykken". Synspunktet forekommer ikke velbegrundet, idet det netop fremgår af sagens bilag 1, at havariet opstod som følge af "buckling deformations" i bunden af "Mol Comfort":

> "It was inferred that the hull fracture originated from the bottom shell plates in the midship part of The Ship. About 20mm buckling deformations was detected in the bottom shell plates during safety inspections of the Sister Ships."

Det gøres gældende, at de sagsøgte som kontraherende transportører hæfter for, at der ikke af rederiet blev foretaget nærmere undersøgelser i 2010 af årsagen til disse deformationer og ikke mindst af deres betydning for skibets sødygtighed.

Det er ikke godtgjort, at en adækvat professionel vurdering af årsagen til, at de pågældende deformationer var opstået og foretagelse af en forstærkning af skibet på dette punkt, som efterfølgende også blev foretaget af søsterskibene til Mol Comfort, ikke ville have forhindret, at Mol Comfort brækkede i to dele.

Den omstændighed, at Mol Comfort ikke har fået pålæg som følge af de nævnte deformationer i forbindelse med port state control disculperer ikke sagsøgte allerede fordi det ikke vides, om den inspektør, der foretog port state control den 5. marts 2013 blev gjort bekendt med revnedannelserne af rederiet. En port state control har ikke til formål at udgøre en gennemgang af alle tekniske forhold vedrørende skibet, og den omstændighed, at der ikke gives anmærkning betyder ikke, at rederiet fritages for selv at foretage forholdsregler for at sørge for, at skibet er sødygtigt, særligt i relation til deformationer, endsige at rederiet som følge heraf kan gå ud fra, at skibet er sødygtigt.

I forhold til sagsøgtes bemærkning om, at skibet ikke har fået "*pålæg af klassifikationsselskabet*" bemærkes, at det ikke er godtgjort,

• hvilke deformationer i skibet, der var til stede på det pågældende tidspunkt, hvor et klasse-survey blev foretaget,

• at klassen af rederiet blev gjort opmærksom på deformationerne,

• at klassens undersøgelse omfattede de pågældende deformationer.

Det fremhæves endelig, at ansvaret for skibets sødygtighed påhviler skibets rederi, og at ansvaret for at sikre denne sødygtighed ikke kan delegeres til et klassifikationsselskab.

5. Afgørelse truffet af Hanseatic Oberlandsgericht, Hamburg

Hanseatic Oberlandsgericht, Hamburg har i sag 413 HKO 170/13 vedrørende det under denne sag omhandlede spørgsmål, om en kontraherende transportørs (hæftelses)ansvar for rederiets fejl tilkendegivet, på baggrund af en bevisbedømmelse af det materiale, som også indgår i denne sag, at det ikke er godtgjort, at der af rederiet er udvist "due diligence" i forhold til at foretage alle nødvendige forholdsregler for at sikre "Mol Comforts" sødygtighed ved rejsens begyndelse.

Det gøres gældende, at der ikke er grundlag for, at Sø- og Handelsretten skulle foretage en anden bedømmelse af dette spørgsmål end den, som er foretaget ved den tyske appelret, idet nærværende sag vedrører de samme faktiske og retlige omstændigheder som den ved Hanseatic Oberlandsgericht pådømte sag. Hensynet til at undgå uforenelige retsafgørelser taler med vægt for, at den tyske appelrets afgørelse følges af Sø- og Handelsretten i denne sag."

For DHL Global Forwarding (Denmark) A/S, er der i det væsentlige procederet i overensstemmelse med påstandsdokument af 26. oktober 2015, hvoraf bl.a. fremgår:

"1) DHL gør **gældende**, at DHL ikke er ansvarlig for bortkomsten af Tryg's forsikringstagers gods, idet hverken DHL selv eller nogen, som DHL måtte svare for, har udvist fejl eller forsømmelser, der har medvirket til tabet, se søloven § 275, stk. 1.

Ud fra de foreliggende oplysninger kan retten lægge til grund, at MOL COMFORT's forlis skyldes pludselig opståen af en revne i skibets bund midt i lastrum 6. Der henvises i denne forbindelse til rapporterne fra den japanske undersøgelseskomité, især **bilag F** Final Report, side 6 og 7 [under "1. Information regarding the accident and buckling deformations in the bottom shell plates of The Sister Ships"].

Det fremgår endvidere af bilag F, bl.a. på side 8, [under "1.4 Safety Inspections of The Sister Ships"] at der blev fundet "buckling deformations" på nogle af MOL COMFORT's søsterskibe, men derimod ikke på andre sammenlignelige skibe af samme størrelse. Dette tyder på, at der er tale om fejlkonstruering af MOL COMFORT og søsterskibene. Ejeren af MOL COMFORT har da også udtaget stævning ved retten i Tokyo mod det japanske værft, der byggede MOL COMFORT og søsterskibene, se stævning fremlagt som **bilag H**.
…

3) Såfremt Sø-og Handelsretten når frem til, at MOL COMFORT var usødygtigt enten ved rejsens begyndelse, eller at det blev usødygtigt under rejsen, gør DHL **gældende**, at DHL eller nogen, som DHL måtte svare for, udviste tilbørlig omhu med henblik på at sørge for, at skibet var sødygtigt ved rejsens begyndelse, se søloven § 276, stk. 2.

a) Det **bestrides**, at skibet var overlastet ved rejsens begyndelse. Der henvises i denne forbindelse til den foreløbige rapport fra den japanske undersøgelseskomité, **bilag E**, side 4 midt [bilag 1, under "Results of Investigation"]. Det fremgår heraf, at de belastninger, der påvirkede skroget på uheldstidspunktet, kun udgjorde 67% af den samlede kraft, som skroget kunne tåle.

Det fremgår endvidere af den foreløbige rapport side 5, 1. afsnit, [bilag 1, "Assessment of Investigation Results"] at skibet ved tidligere lejligheder havde været udsat for belastningsforhold tæt på brudstyrken uden problemer, ligesom det fremgår af rapporten side 10 under punkt 8.5, [bilag 1, "8.5 Uncertainty Factors involved in the Evaluation of Ultimate Hull Girder Strength and Required Rule Values"] at den faktiske styrke af skroget var 126% i forhold til klassifikationsselskabets krav (et plus på 26%).

Tryg har med henvisning til side 44 i den foreløbige rapport, fremlagt som bilag 23, ["6.3.1 Effects of Loading"] fremført, at skibet var overlastet. Dette er en forkert udlægning af, hvad der skrives i rapporten. Det fremhævede afsnit drejer sig om skibets "still water vertical bending moment", der er udtryk for fordeling af de samlede vægte af og på skibet, bl.a. gods, bunkers, ballastvand, stores m.v. Undersøgelseskomitéen anfører på baggrund af en beregning, hvori indgår alle kendte vægte, at skibets "still water vertical bending moment" var på 103%, hvilket må siges at være acceptabelt, idet skibet vil forbruge bl.a. bunkers og proviant under rejsen.

Det gøres på denne baggrund **gældende**, at der intet var at udsætte på skibets stabilitet ved rejsens begyndelse.

b) Det gøres **gældende** af DHL, at skibet opfyldte alle krav stillet af klassen.

Skibet var konstrueret og bygget i henhold til klassens krav.

Skibet havde overholdt de periodiske (årlige) klasseeftersyn, og skibet havde endda afsluttet det omfattende 5-årige hovedeftersyn 19 dage forud for uheldet. Klassen var bekendt med eventuelle konstateringer af "buckling deformations" i bunden af lastrum 5, uden at dette gav klassen anledning til pålæg til skibet. Det kan derfor lægges til grund, at de "buckling deformations" i lastrum 5, som den japanske undersøgelseskomité omtaler, men som ikke er nærmere dokumenterede af Tryg, ikke har haft indflydelse på eller betydning for forliset. Det skal endvidere fremhæves, at revnen, der førte til, at skibet knækkede, opstod i midten af bunden af lastrum 6, hvorfor der ikke er sammenhæng mellem eventuelle "buckling deformations" i lastrum 5 og forliset.

c) Det gøres endvidere **gældende**, at DHL som kontraherende transportør/speditør ikke kan pålægges et nærmest objektivt ansvar for den udførende transportørs undersøgelser forud for rejsens begyndelse, sådan som Tryg lægger op til i processkrifterne.

Det **bestrides**, at søloven § 151, der vedrører en reders arbejdsgiveransvar, er relevant i denne sag.

DHL viderekontraherede transporten til det anerkendte linjerederi Hyundai, og DHL havde ikke på forhånd kendskab til, hvilket skib, der skulle udføre transporten.

4) Såfremt Sø- og Handelsretten når frem til, at DHL er ansvarlig for bortkomsten af Tryg's forsikringstagers gods, gøres det **gældende**, at det påstævnte krav skal reduceres.
…

Endvidere har Tryg's forsikringstager udtaget stævning for en del af kravet ved retten i Hong Kong, se **bilag D**.
…

Stævning i Hong Kong ses at være indgivet før, der blev udtaget stævning ved Sø- og Handelsretten, hvorfor denne del af kravet skal udgå. Det ses at dreje sig om fakturaerne fremlagt som **bilag 18C og 18D**. Beløbet ses omregnet at udgøre DKK 177.223,80.

Efter DHL's opfattelse kan Tryg's krav maksimalt være som følger:

Købsfaktura og fragt i alt	DKK	1.074.438,74
Fradrag selvrisiko	DKK	25.000,00
	DKK	1.049.438,74
Fradrag krav fremsat i Hong Kong	DKK	177.223,80
	DKK	872.214,94
	…	
	DKK	872.214,94

Det gøres **gældende**, at det skal have processuel skadevirkning for Tryg, at hverken Tryg eller dennes forsikringstager har anmeldt kravet i den af rederiet i Japan oprettede begrænsningsfond.

5) Det **bestrides**, at referatet af et telefonretsmøde afholdt i Hanseatisches Oberlandesgericht, Hamburg, (bilag 21) kan tages som udtryk for, at appelretten har taget

stilling til ansvarsspørgsmålet. Retten udtaler sig om spørgsmålet om omfanget af omkostninger ved fremskaffelse af beviser i forhold til det omtvistede beløb.

Appelretten har efter det oplyste aldrig truffet afgørelse i sagen."

Sø- og Handelsrettens begrundelse og resultat

Årsagen til "Mol Comforts" forlis den 17. juni 2013 undervejs fra Singapore til Jeddah foreligger ikke afklaret med de fremlagte undersøgelsesrapporter. Der er i rapporterne peget på nogle forhold, som kan have haft betydning for forlisets indtræden, herunder navnlig forekomst af "buckling deformations" i bunden af skibets lastrum 5 samt skibets "still water vertical bending moment" (bøjningsmoment) på afsejlingstidspunktet. Om det sidstnævnte forhold bemærker rettens sagkyndige retsmedlemmer, at skibet ikke burde være afsejlet fra Singapore med et "still water vertical bending moment" på 103 %. Rettens juridiske dommer tilslutter sig denne vurdering.

Under hensyn til det anførte og idet der ikke i øvrigt foreligger omstændigheder, der kan føre til en anden vurdering, findes DHL ikke at have løftet den bevisbyrde for ansvarsfrihed, der efter sølovens § 275, stk. 1, påhviler DHL som kontraherende transportør af det bortkomne containergods. DHL må herefter anses for erstatningsansvarlig over for Tryg, der ved at have udbetalt erstatning til sin forsikringstager Linak A/S ved subrogation er indtrådt i Linak A/S' erstatningskrav.

For så vidt angår Trygs erstatningspåstand bemærkes med hensyn til posten på 177.223,80 kr., som DHL har rejst indsigelse imod med henvisning til en i Hong Kong verserende retssag mellem Trygs forsikringstager Linak A/S og Danmar Lines, at stævningen i sagen er dateret den 4. april 2014, på hvilket tidspunkt Tryg havde udbetalt erstatning til Linak A/S og - den 23. august 2013 - var subrogeret i Linak A/S's krav. Der er derfor ikke grundlag for at fratrække dette beløb i Trygs erstatningsopgørelse. Herefter og idet der ikke i øvrigt på nogen begrundet måde er rejst indsigelser imod Trygs påstand, der udgøres af summen af en række købsfakturaer og fragtomkostninger samt med fradrag af en selvrisiko på 25.000 kr., tages Trygs påstand til følge.

Efter sagens værdi og udfald skal DHL betale 85.500 kr. i sagsomkostninger til Tryg, hvoraf 25.500 kr. udgør dækning af Trygs udlæg til retsafgift i forhold til det vundne beløb, mens resten dækker rimelige udgifter til advokatbistand.

Thi kendes for ret:

DHL Global Forwarding (Denmark) A/S skal betale 1.049.502,35 kr. til Tryg Forsikring A/S med tillæg af procesrente fra den 17. juni 2014.

Inden 14 dage betaler DHL Global Forwarding (Denmark) A/S sagsomkostninger med 85.500 kr. til Tryg Forsikring A/S.

Sagsomkostningsbeløbet forrentes efter rentelovens § 8 a.

Karsten Riis Andersen Claus Forum Petersen Ole Sehested

Claus Nikolajsen Flemming Ipsen

(Sign.)

Udskriftens rigtighed bekræftes

Sø- og Handelsretten, den 18. januar 2016