

**RESPONSES TO THE DRAFT REPORT 'SHIFTING CARGO CAUSES EMERGENCY - LESSONS LEARNED FROM THE OCCURENCE INVOLVING THE EEMSLIFT HENDRIKA'**

No.	Party	Page	Text to be corrected (first ... last word)	Argumentation	Corrected	Dutch Safety Board response
1	Owner/ shipping company	6	Demarcation	No attention whatsoever is paid to the loading conditions of the vessel with the deck cargo / expected weather conditions and the corresponding choices of deviating from the route to ensure safe navigation. Without the heavy deck cargo the vessel would not have been in danger of capsizing, it would only have sustained damage, the vessel would have entered port and no one would have heard anything about it.	Partly	<p>It is possible that the cargo would not have shifted in better weather conditions or during an inland route. But since the cargo did shift and since it was one of the factors that lead to the occurrence of the incident, the Board chose to look at this aspect as well. In doing so, the Board established that there were lessons to be learned in the process of shipping cargo of 100 ton or less.</p> <p>The demarcation of the report focusses on both the conditions the vessel was in and on the lashing system that failed. Both factors played a role in the occurrence of the incident. In order to do justice to the dire situation in which the crew found themselves, the structure of the report has been adjusted. Both intonation and the order of the chapters were changed. The investigation is based on the facts so as to stay clear of the appearance of apportioning blame.</p> <p>The text under the heading demarcation is altered to: 'What stands out the most about this incident is the fact that the vessel found itself in a northwestern storm off the coast of Norway. This does not necessarily mean that a vessel should get in trouble. The emergency situation occurred because the cargo of azimuth thrusters started shifting in the hold and, as a consequence, damaged a couple of tanks. To determine how it was possible for the ship to be in those conditions and to what extent the way in which the cargo was lashed contributed to the incident, the investigation focusses on the predicted and actual weather conditions and the process of shipping a cargo of azimuth thrusters.'</p>
2	Owner/ shipping company	10	During the inspection the deck cargo was inspected but the cargo in the hold was not.	The relief captain did not think this necessary, the hold was open and he thought it was visible enough from deck. That the relief captain then completely trusted the lashings is remarkable. At the handover, the relief captain signed for the handover of the vessel and thus considered it seaworthy.	Partly	<p>Correction to original text: 'An inspection of the vessel formed part of the handover, and during the inspection the deck cargo was inspected but the cargo in the hold was not. The relief captain trusted that the cargo in the hold was sufficiently lashed and secured.'</p> <p>It is not known to the Dutch Safety Board what the captain's considerations were for not going down into the hold.</p>
3	Owner/ shipping company	10 and 11	The weather forecast.	It is suggested that the weather forecast was better than it actually was. The forecast was terrible for the area the vessel would be in the night of 4 to 5 April. The relief captain already told the agent on 3 April that there would be windforce 8 beaufort and that the weather would be deteriorating so he was certainly aware. I will elaborate further on the weather conditions in the analyses.	Partly	The Board looked at the weather forecasts and actual weather conditions again and in several places in the report, altered the text.

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4	Owner/ shipping company	12	It was observed that the rudder propellers had punched a hole in the tank for ballast water on portside.	This was the anti heelingtank on portside. The anti heelingtank was completely filled with a larger volume of water than the volume of a regular water ballastank.	Yes	Correction to original text: Upon arriving in the hold, the relief first officer and the cargo superintendent found a large quantity of water and noticed that the three most forward stowed azimuth thrusters had dislodged. One of these three had come loose first and had caused a domino effect, causing the other two to also become dislodged. It was observed that the thrusters had punched a hole in the portside anti-heeling tank and that water was running into the hold. The anti-heeling tank was completely filled and contained 355.2 m3 of water, rapidly filling the hold.'
5	Owner/ shipping company	16	The captain who was relieved in Rotterdam had been working for Amasus since a number of years. He started out as second officer, became first officer.	The captain joined Amasus as an experienced first officer that previously worked on a Wagenborg multipurpose cranevessel. He did not sail as a second officer for Amasus but continued as a first officer for a couple of years and then became captain.	Yes	Correction to original text: 'The captain who was relieved in Rotterdam had been working for Amasus for a number of years. He started out first officer and eventually became captain. The voyage from the Mediterranean to Northern Europe was his first rotation as captain. He also had sailed in Norwegian waters on a number of occasions.'
6	Owner/ shipping company	22	Figure 9 is not correct.	The Centre of Gravity (CoG) in figure 9 is not correct. This is the CoG in vertical position, the position of mounting underneath a vessel. It is not the position of CoG during lifting. When the thruster is lifted at the single lifting point, the CoG is positioned more towards the centre. The CoG was determined when the load was in the crane, the nozzle becomes level when lifting at the single lifting point.	Partly	Additional text: 'The CoG as indicated on the drawing of the azimuth thrusters is a theoretical CoG. In reality the CoG can differ because of for example, shifting of oil in the gearbox. The crew usually determined the CoG when the cargo was being lifted. In the same way the CoG of the thrusters was determined by the relief first officer and the captain. When the azimuth thruster was lifted from the single lifting point, the thruster's nozzle was about horizontal. From this observation, the relief first officer derived that the thrusters' CoG was in the centre of its horizontal plane.'
7	Owner/ shipping company	24	Experts stated that because the longitudinal accelerations of a vessel are smaller than the lateral accelerations.	<p>Because of the relatively high speed for a vessel this size, slamming would be a bigger danger than transverse accelerations. Considering the nearly negligible tippingmoment when the correct CoG is used, it does not nearly matter as much how the thrusters are positioned as is currently stated. The IMO CSS Code uses theoretical formulas and algorithms that do not cover every situation at sea. See below comments on these calculations.</p> <p>As per IMO CSS Code, the following cautions should be observed:</p> <ul style="list-style-type: none"> <li>• In the case of marked roll resonance with amplitudes above <math>\pm 30^\circ</math>, the given figures of transverse accelerations may be exceeded. Effective measures should be taken to avoid this condition.</li> <li>• In the case of heading into the seas at high speed with marked slamming shocks, the given figures of longitudinal and vertical accelerations may be exceeded. An appropriate reduction of speed should be considered.</li> <li>• In the case of running before large stern or quartering seas with a stability which does not amply exceed the accepted minimum requirements, large roll amplitudes must be expected with transverse accelerations greater than the figures given. An appropriate change of heading should be considered.</li> </ul>	No	Slamming of a vessel can be influenced by reducing the speed of the vessel whereas rolling motions are reduced by a change of heading or the vessel's stability. A heading change or changing a vessel's stability is not always possible but reducing the speed of a vessel can be done relatively easy. Thus the danger of slamming becomes less if speed is reduced whereas the danger of transverse accelerations does not necessarily decreases by maintaining heading and speed.
8	Owner/ shipping company	24	... it will also be easier to fix the lashings symmetrically.	So this is irrelevant with enough lashing points and the possibility to use extra D-rings because there is always a possibility to lash symmetrically.	No	Welding additional D-rings was not possible since the port of Palermo did not grant a hotwork permit. If the schedule and operations in the following ports of call would have allowed it, then there would have indeed been a possibility to weld additional D-rings on the tanktop. Any differences on the cargo cannot be as easily accommodated when D-rings are placed prior to loading. The results of this investigation show that the cargo had not been symmetrically lashed but that no additional D-rings were installed to ensure that this could have been done.

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9	Owner/ shipping company	25 en 26	The report by the third party shows that the data ... the calculation was fundamentally wrong.	The CoG as is used by the relief first officer is the correct one, the CoG used by EVH is for mounting of the thruster underneath a vessel. The CoG as indicated on drawings are often not correct and are in reality determined when the load is in the crane. See correction CoG on figure 9. This means that the tipping moment is smaller than the one EVH uses in their calculations. According to the lashing calculation ten lashings would be sufficient, 14-15 lashings were used. These additional lashings are used because it is not always possible to set up each lashing 100% correctly. The calculation of EVH also shows that one or more lashings could break before there would not be enough capacity left. In case a lashing chain needs to be laid around something, there is a reasonable risk of a link not properly positioned causing it to ricochet off the cargo (shock load) resulting in a loose chain lashing. To prevent this from happening, a short polyester sling of 1,5 metre with a higher breaking load than that of the chain lashing, was used. A polyester sling which will maximally stretch 1% of its length, does not really have any stretch. Yes, it is a different material than the material of the chain lashings but because of its short length negligible. Nylon slings are a different story, these do stretch too much to use them as part of a lashing.	No	See reaction 6.  In theory ten lashings on the azimuth thrusters would have been sufficient to counteract any longitudinal, transverse and vertical accelerations. The report of EVH Surveys confirmed that of the 14 lashings that were used, one or more were allowed to break. However, if the setup of the lashing system differs from reality, the results of the lashing calculations do not provide any guarantee for the load capacity in reality. In addition, the fact that a sling's stretch characteristics are limited does not mean that there are no differences in elasticity between the various materials used.
10	Owner/ shipping company	28	The rudder propellers were not supported by cargo stoppers as the captain and first officer agreed that the use of lashings alone would offer sufficient holding force to prevent the cargo from shifting. The fact that welding in the port of Palermo was not permitted was an additional reason for not installing stoppers.	Regular cargo stoppers could be not used for these thrusters, they would have had to be constructed by the manufacturer in the right shape. This was known to the captain and relief first officer.	Partly	The contract states that lashing of the cargo is the responsibility of the carrier. During the tender process, no inquiries were made about the availability of suitable cargo stoppers. The responsibility for the effective lashing of the thrusters, not to mention the fact that there was no hot work allowed in Palermo, is completely put with the crew while the office could have done more to support the crew.  Correction to original text: 'The thrusters were not supported by cargo stoppers because no special stoppers were provided by the manufacturer. According to the operator, stoppers that were tailor made to fit the thruster were required for this type of cargo. The chartering department did not check with the broker if these special stoppers were available for the cargo of azimuth thrusters whereupon the captain and relief first officer agreed that the use of lashings alone would offer sufficient load capacity to prevent the cargo from shifting. The fact that welding in the port of Palermo was not permitted was an additional reason for not installing stoppers.'
11	Owner/ shipping company	30	Welding was carried out during the voyage to Palermo. This meant that the D-rings had already been installed before the rudder propellers were placed in the hold and that therefore it was not possible to adapt the lashing system to deviations in the properties or the arrangement of the rudder propellers.	The number of D-rings that were placed beforehand were sufficient and additional D-rings could still be placed after stowing. Apparently this was not necessary. So it most certainly possible to adapt.	Nee	See reaction 8.
12	Owner/ shipping company	30	The difference in elasticity causes play which in turn causes lashings to become loose, generating jolts in the loads exerted on the lashings.	All lashings in the hold and on deck are checked 2 x a day and when deemed necessary tightened. In the 3 weeks preceding the incident there were no indications that lashings needed to be moved or replaced because they were too weak.	No	See reaction 9.

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13	Owner/ shipping company	31	One of those D-rings is a twistlock D-ring. By attaching two lashings to a single twistlock D-ring, the D-ring may be twisted out of its socket when one lashing chain is attached to a rudder propeller on starboard side and the other lashing chain is attached to a rudder propeller on the port side.	If 2 chain lashings are attached to 1 twistlock D-ring and pull towards the same direction in that semi-circle, even if they are each in a different quadrant, it is technically impossible to unlatch the D-ring even when a lashing breaks.	Yes	Original text removed.
14	Owner/ shipping company	32	A cargo superintendent was on board during the northbound voyage, when loading the green workboat ... This meant that the leadership positions on board were held by inexperienced crewmembers.	<p>I think is a very belittling assumption!! The captain had ample experience as a first officer before he became captain and was certainly up for the job, otherwise he would not have become a captain for Amasus. I am confident in saying that this report should not have had to be written if he had been on board during that voyage because the cause is NOT whether or not the cargo was lashed effectively.</p> <p>The cargo superintendent was on board during loading and he would also be on board during unloading because it was a heavy tandemlift exceeding 100 tons and approaching the maximum SWL of the cranes including lifting gear. The officer who had just started at Amasus had ample experience with lifting and lashing gear as a second officer. He joined the vessel as an extra to get familiar with the vessel and the gear before he started work as an actual first officer. If he would not have been ready he would have had to stay a second officer for a while. Noteworthy is the fact that the first officer and relief captain already had an argument within a couple of hours of the moment the relief captain boarded in Rotterdam. This would not have contributed to constructive communication between the two.</p>	Yes	<p>Correction to original text: 'A cargo superintendent was on board during the northbound voyage, when loading the green workboat and on the voyage from Bremerhaven to Kolvareid, port of discharge of the green workboat. He was on board because loading and unloading of the green workboat happened with a tandemlift of more than 100 tons. The lift approached the maximum Safe Working Load (SWL) of the crane and lifting materials. His job was also to provide guidance to the relief first officer during loading and unloading of the workboat, since the first officer was on his first trip in this role. It was also the first trip for the captain in his new role.'</p> <p>One of the tasks of the cargo superintendent was to support and assist the relief first officer as became known to the Board during interviews and from these responses. See also reaction 47.</p>
15	Owner/ shipping company	32	One southbound voyage carrying a similar cargo of rudder propellers was mentioned specifically, and in that case cargo stoppers had been used to absorb sliding forces.	If cargo stoppers with the correct shape was delivered by the manufacturer, they would certainly have been used. However, they were not available. Not every manufacturer constructs tailored cargo stoppers.	Partly	See reaction 10.

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16	Owner/ shipping company	33	This forecast is dated 1 April and offers a 96 hour window. During the voyage the subsequent forecasts did not change significantly.	<p>The predictions of a later date were worse than those on 1 April and there was a difference between the GFS and ECMWF model of which the latter showed conditions that were considerably worse. It is unwise and unnecessary to use a weather forecast that is 4 days old, there are updates everyday. Are the decisions based on an outdated weather forecast? A depression can increase or decrease in speed or change course which is crucial information when sailing across open sea with wind fields of 60-70 knts at a distance of less than 100 mile. Crossing in front of a storm when the swell and the wind will be against you will almost never work because it will become difficult to maintain course and speed. At no point whatsoever have the heavy deklod and approaching storm been taken into account when choosing the route across open sea. The presence of other vessels in the area is irrelevant, the type of vessel and cargo determine whether or not you want to be at sea. MPP vessels, not only of Amasus, with all types of cargo in the whole area were waiting or taking shelter underneath Norway or in a fjord. The fishing vessel that was in the area received orders from the coastguard to stay close to the coast and received a huge bill for damage repair in the quarters afterwards. The opportunity to check the cargo and lashings in the hold in Rotterdam during the handover was not considered necessary and the hold was assessed from deck. An effectively set up lashing system can indeed withstand these conditions on paper, but it is most certainly not wise to rely on this, especially without having actually seen it.</p> <p>The CSS does take accelerations but does not take slamming into account. In these weather conditions, even with minimal speed, it is very difficult to prevent slamming. Partly because the vessel was not fully loaded. The advice given by multiple persons to take the inland route was ignored. The excuse the captain gives of there being too much paperwork involved is not true. He and all others who sail in that area know it's one phone call to the agent and/or pilot and that the paperwork is only a formality. The wind speeds were already 18-20 m/s on Sunday evening, the swell increased drastically and the vessel speed was decreasing, according to the VDR. There was still a possibility to go inland. At midnight wind speeds were 30-31 m/s (10-11 bft) according to the VDR, the captain had only changed course just prior to the handover of his watch. He could still go inland because the sea state was still relatively calm. At the handover no clear instructions were given to the second officer regarding the weather conditions that night. A sea transport heavy lift expert writes the following:</p>	Partly	<p>Paragraph 4.2 Weather conditions, sea conditions and the movements of the vessel, is partly revised based on these responses. The Board has looked at the weather forecasts and actual weather conditions again, and updated these in the report. It is emphasized that it concerned the captain's perception of the amount of paperwork in Norway.</p> <p>It was also concluded in the chapter that the relief captain came close to the margins of safe navigation and that safer alternatives were not considered.</p>

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				<p>As per IMO CSS Code:</p> <ul style="list-style-type: none"> <li>• The application of the methods described in this annex is supplementary to the principles of good seamanship and shall not replace experience in stowage and securing practice.</li> <li>• The methods should: <ol style="list-style-type: none"> <li>1. provide guidance for the preparation of the Cargo Securing Manual and the examples therein; .</li> <li>2. assist ship's staff in assessing the securing of cargo units not covered by the Cargo Securing Manual;</li> <li>3. assist qualified shore personnel in assessing the securing of cargo units not covered by the Cargo Securing Manual.</li> <li>4. serve as a reference for maritime and port-related education and training. Based on the Code, will even 100% correct seafastening calculations not guarantee a safe ocean transport for project cargo in severe Wx. And for this reason, are experienced masters NOT steaming into severe Wx with such cargo. Again, NO calculation can replace good seamanship.</li> </ol> </li> </ul> <p>"Trusting" an effectively lashed cargo which he had not even checked cannot be condoned. But that in itself is not the cause, the voyage had been going well for 3 weeks in various circumstances and the cargo would not have shifted when good seamanship would have been used. This would never have happened to the relieved captain, which you call inexperienced. He would have gone inland with or without advice from shore! He also knew the storm would take a while but still chose to stay at open sea to ride the storm and get the full load, irresponsible with a high piece of cargo of 280ton on deck. Look at the app conversation between the agent and the captain.</p>		
17	Owner/ shipping company	37	The Board wanted to know what caused the cargo of rudder propellers to become dislodged. ... that the lashing system was not sufficient under the prevailing conditions.	The answer to how this could have happened is short and clear to me. A 100% lashing for all weather conditions does not exist, compromises will always have to be made. The vessel had no business being out at sea with those weather forecasts, worsening weather conditions, with this cargo and the possibility to find shelter. An error in judgement and nonchalant attitude of the captain.	Partly	<p>The direct cause of the list of the Eemslift Hendrika was the shifting of the cargo of azimuth thrusters in the hold. A combination of factors eventually caused the thrusters to break loose. The underlying factors can be related to the weather conditions the vessel was in at the moment the incident occurred, and the way in which the thrusters were lashed and secured.</p> <p>When the relief captain decided to take the route across open water, contradicting the advice of the owner, he came close to the margins of safe navigation. Due to the deteriorating weather conditions it became impossible to maintain course and speed and the vessel had to ride the storm.</p> <p>The lashing system could not withstand these circumstances and failed. The set up of the lashing system in reality did not match the plan. This meant that the calculated forces were different than the actual forces exerted on the lashings. The lashings were made up of different materials and showed variations in length. This caused the lashing system to have differences in elasticity. Also, the angles at which the lashings were installed exceeded the angles as prescribed by the industry standards.</p>

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18	Owner/ shipping company		Comments	<p>The effect of leaking oil on the dunnage is only mentioned slightly in the report of EVH and is not fully investigated. The samples showed that a large quantity of oil had leaked from the thrusters. There was nearly no friction left because of the oil, either on the plywood or on the tanktop having soaked through the plywood. The lashing calculations with 0-friction, oil lubrication is effectively negative friction, were not sufficient. It is also typical that the thruster where some oil had been found in the previous 3 weeks was one of the first to come loose, perhaps the first, namely port forward.</p> <p>Despite the fact that experts had findings about the lashing system, the lashing system was adequate. The cause can be found in risking the vessel, cargo and lives of the crew by sailing into this storm. The advice was to take an inland route and this was blatantly ignored. That your findings were supported by other shipping companies is not objective given their competitive market position. The captain is ultimately responsible. The excuse that an effectively lashed cargo would be able to withstand every weather situation and that unrestricted sailing is therefore possible, does not exist within good seamanship. Advice from the cargo superintendent who took over command and was the last one to abandon the vessel: Have another look at the 2 videos that were made from the helicopter during evacuation. Listen to the interview with helicopter rescue crew about the conditions and reconsider the real the cause of this incident. These were the worst weather conditions he had seen in 25 years of worldwide sailing. These were the worst conditions this rescue team has ever worked in. And all that in weather conditions that were predicted!!</p>	No	<p>The Board finds it not plausible that a loss of oil from the thrusters is the cause of (one of) the azimuth thrusters becoming dislodged. Oil does have a negative effect on the friction between a thruster and dunnage, and when the thrusters broke loose, it probably did play a part when the cargo was shifting.</p> <p>At no point in drawing up the reference for the process of shipping cargo, has information from the investigation been shared with other shipping companies. Generic conversations regarding the process of shipping cargo were held. The company that reran the calculations for the Board signed a non-disclosure agreement and cannot share anything concerning this investigation.</p> <p>According to the ISM, the captain is indeed ultimately responsible for his ship. A shipping company or owner can however, act when this is considered necessary. That a captain is ultimately responsible does not mean that he cannot be given instructions or orders.</p> <p>See reaction 1.</p>
19	First officer	4	The wind was northwesterly with a force of 9 Beaufort and the waves were ten to fifteen metres high.	<p>From memory this is jumping to conclusions. I am fairly certain the windspeed was already increasing on Saturday in Bremerhaven. On Sunday and Monday (4 and 5 April '21) the prevailing windforce was 9 to 10 beaufort, with gusts of 12 beaufort. It is difficult to indicate the wave height. A better estimate would be a wave height of 12 to 18 metres high. The weather was extremely bad.</p>	Partly	See reaction 16.

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20	First officer	6	The investigation focusses ... the role of the parties involved.	Why does the demarcation of the investigation focus on the incident when there are various factors influencing the incident? And you are, in my opinion, focussing on the incorrect subject.	Partly	<p>It is possible that the cargo would not have shifted in better weather conditions or during an inland route. But since the cargo did shift and since it was one of the factors that lead to the occurrence of the incident, the Board chose to look at this aspect as well. In doing so, the Board established that there were lessons to be learned in the process of shipping cargo of 100 ton or less.</p> <p>The demarcation of the report focusses on both the conditions the vessel was in and on the lashing system that failed. Both factors played a role in the occurrence of the incident. In order to do justice to the dire situation in which the crew found themselves, the structure of the report has been adjusted, both in tone and in the order of the chapters. The investigation is based on the facts so as to stay clear of the appearance of apportioning blame.</p> <p>The text under the heading demarcation is altered to: 'What stands out the most about this incident is the fact that the vessel found itself in a northwestern storm off the coast of Norway. This does not necessarily mean that a vessel should get in trouble. The emergency situation occurred because the cargo of azimuth thrusters started shifting in the hold and, as a consequence, damaged a couple of tanks. To determine how it was possible for the ship to be in those conditions and to what extent the way in which the cargo was lashed contributed to the incident, the investigation focusses on the predicted and actual weather conditions and the process of shipping a cargo of azimuth thrusters.'</p>
21	First officer	7	Timeline.	Exact dates are mentioned everywhere in the table but not in the upper right part. You mention the 'first officer' in a timeline ranging from 17 February to 7-8 April. Are you aware that a crew change had taken place in this timeline? Text 5 April 2021 is grammatically incorrect.	Yes	The crew change of the first officer is included in the timeline based on this response. The grammar suggestion has not been incorporated.
22	First officer	8	The first officer made his first trip on board of this ship ... sent to the chartering department to be checked.	The first officer did not create the stowage plan with the thrusters, which is what you are suggesting here.	Yes	<p>Correction to the original text: 'On March 1 a crew change took place in Rotterdam. The first officer was relieved by a first officer who was doing his first rotation as first officer and on board the vessel. The relieved first officer stayed on board for a few days more to ensure an extensive handover and assist the relief first officer where necessary.</p> <p>Prior to loading the thrusters, the relief first officer made lashing calculations based on the voyage instructions and stowage plan.'</p>
23	First officer	.10	Prior to the voyage from Bremerhaven to Kolvereid ... wind came from the same direction, these two phenomena amplified each other.	How did you come by this information? Windforce 6 to 7 beaufort? The weather forecast was way worse than what you are suggesting/noting down here.	Yes	See reaction 16.
24	First officer	12	Upon arriving in the hold, ... three most forward stowed rudder propellers had dislodged.	Initially it was almost completely dry. You can also see that on the picture that u use on page 13, figure 6. Later that day (morning) the hold containment was compromised and flooded rapidly.	Yes	See reaction 15.

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25	First officer	13	The first officer informed the captain of the critical situation ... the stability of the vessel was threatened and that the situation might become uncontrollable.	The first officer informed the captain on the bridge of the critical situation in the hold, as there was no radio communication set up. In addition, the first officer woke the second officer so that he would not be sleeping in this dire situation. The second officer went to the bridge.'	Partly	Correction to the original text: 'At 09.40 hours the relief first officer informed the relief captain on the bridge of the critical situation in the hold. First he tried to inform the relief captain from the hold using VHF but received no reply. Subsequently the relief first officer went to the bridge. On his way to the bridge, the relief first officer woke the second officer. When the relief first officer arrived on the bridge, the relief captain started deballasting the leaking tanks. The second officer also arrived on the bridge and took over the deballasting operations from the relief captain. At 10.10 hours the relief captain went to the hold to view the situation for himself. At the same moment the relief captain entered the hold, the vessel started to roll violently. The three thrusters that had worked loose earlier slid from one side to the other, while the other three were still lashed securely in their original position. The movements of the vessel became so extreme that the cargosuperintendent thought it possible that the stability of the vessel was threatened and that the situation might become uncontrollable.'
26	First officer	13	'immediately began'	Who says this? The captain had absolutely no idea of what was going on.	Yes	See reaction 25.
27	First officer	14	The cargo superintendent had previous experience ... from the captain.	Which was due to lack of leadership of the captain and not because of the CSI's attitude (which is what you are suggesting here).	Yes	Correction to the original text: 'The cargo superintendent had previous experience as captain on board of the vessel and naturally took the command from the relief captain who had frozen under the circumstances.'  It cannot be predicted how individuals respond in emergency situations or extreme circumstances. The moment a person freezes during such a situation and does not keep command, does not necessarily have to be a representation of his leadership skills at other moments.
28	First officer	14	... upon which the captain, the first officer and the cargo superintendent left the hold.	And if I am not mistaken, so did the chief engineer.	Yes	Correction to the original text: 'The cargo superintendent gave the order to clear the hold, upon which the relief captain, the chief engineer, the relief first officer and the cargo superintendent left the hold.'
29	First officer	14	The chief engineer, relief captain and relief first officer jumped from the rear deck into the water.	Chronologically correct: The chief engineer, captain and first officer... A general comment so far about your timeline/emergency situation: (Also to indicate how bad the weather conditions were) it was observed rather quickly that a small crane (6 tons) on deck had broken loose. It was lashed with four webbing slings of 10 tons each. This crane was immediately secured by the crew.	Yes	Correction to the original text based on the first response: 'The chief engineer, relief captain and relief first officer jumped from the rear deck into the water and were picked up by the helicopter.'  Correction to the original text based on the second response: 'After watch handover to the captain at 08.00 hours, the relief first officer together with the cargosuperintendent went to check the hold at 08.20 hours. Before they went to the hold the relief first officer and cargosuperintendent went on deck to secure a small crane which had gotten loose. The six ton crane was secured with four lashings of which the load capacity was ten tons each.'
30	First officer	18	In order to determine the underlying factors, ... The calculation report can be found in Appendix A.	Is only the way in which the cargo of azimuth thrusters was shipped assessed? Can you base this incident solely on the azimuth thrusters in the hold?	Partly	See reaction 1.
31	First officer	21	The drawing showing the dimensions ... coupling piece than in the other direction.	Is that so? How did you come by this information? When the thruster was lifted in Palermo it came up pretty much horizontally.	Partly	Additional text: 'The CoG as indicated on the drawing of the azimuth thrusters is a theoretical CoG. In reality the CoG can differ because of for example, shifting of oil in the gearbox. The crew usually determined the CoG when the cargo was being lifted. In the same way the CoG of the thrusters was determined by the relief first officer and the captain. When the azimuth thruster was lifted from the single lifting point, the thruster's nozzle was about horizontal. From this observation, the relief first officer derived that the thrusters' CoG was in the centre of its horizontal plane.'

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32	First officer	22	The discrepancy between the available information and the required information made it difficult for the first officer to devise an effective lashing system.	This statement is therefore not completely correct.	Partly	Correction to the original text: 'The discrepancy between the available information and the required information made it difficult to devise a symmetric lashing system.'
33	First officer	23	For the purpose of checking the calculation by the third party,... rudder propellers on starboard side were oriented slightly rearward.	The positions in the stowage plan were accurately drawn onto the tanktop. The only thing that does differ, was the orientation of the gearboxes of a couple of degrees.	No	The azimuth thrusters were not stowed as per the stowage plan. The forward most thruster on portside is about a metre aft relative to its position on the stowage plan and the gearboxes are rotated a couple of degrees. The fact that the positions of the thrusters on the stowage plan are copied onto the tanktop, does not guarantee that the thrusters are actually stowed in those positions.
34	First officer	24	By placing the rudder propellers longitudinally in the hold, it will also be easier to fix the lashings symmetrically.	The pieces of cargo are round with CoG in the centre. It does not matter for the symmetry of the lashing system if you stow them transversely or longitudinally.	Partly	See reaction 6.
35	First officer	24	Because of the limited space in the hold and the presence of other cargo, the captain and first officer in this case opted for placing and lashing the rudder propellers transversely.	The first officer in this story is not the same first officer as the relief first officer. The relief first officer did not make the stowage plan.	Yes	See reaction 22.
36	First officer	24	... but the Excel tool mentioned above was found to be more user friendly by the crew.	The first officer is also part of the crew. Actually, the first officer worked with this program. I did not see it as a more user friendly program. I regarded it as 'the calculating tool on board' in addition to the common 'codes' of lashing cargo.	Partly	Correction to the original text: 'It was also possible to use another tool for making lashing calculations, but the Excel tool mentioned above was the common tool used.'
37	First officer	25	When making both lashing calculations, the first officer used ... in this case a separate calculation would need to be made for each individual rudder propeller.	Apart from the grammatical error in the last sentence, this is jumping to conclusions. The calculation clearly showed that 12 lashing chains would be sufficient for a piece of cargo of 52 tons. For each piece of cargo, 13 to 15 chain lashings were used under different angles. It does not matter if a chain lashing has a 45° angle or 48° angle.	No	The results of a lashing calculation can provide a theoretical indication that a certain number of lashings is sufficient to counteract transverse, longitudinal and vertical accelerations. When the cargo is in reality not lashed as per plan or theory, the calculations do not offer a guarantee for the correct load capacity in reality. Small differences in angles of a few degrees would not matter much. Larger differences, as was the case here, would.  The grammatical suggestion has not been incorporated.
38	First officer	25/26	The report by the third party shows ... calculation, the calculation was fundamentally wrong.	This is not correct. My input of the CoG is correct. As indicated before, the story about the tippingmoment is also not correct.	Partly	See reaction 6.
39	First officer	26	The results of both the initial lashing calculation ... loads to be exerted on the lashings than had been anticipated.	The story is not correct. My input of the CoG is correct. I have, in addition, specified in interviews that 10 chain lashings would have sufficient. In reality I always place more chain lashings. In this case 13 to 15 chain lashings per piece of cargo. The theoretical angles cannot always be realised (because of available space) and more chain lashings are used. The polyester sling is used because there were not enough lashing points on the cargo. These slings have no stretch and a higher breaking strength than the lashing chain. Therefore it is completely safe to use these slings to lash a piece of cargo with.	No	See reaction 6.  In theory ten lashings on the azimuth thrusters would have been sufficient to counteract any longitudinal, transverse and vertical accelerations. The report of EVH Surveys confirmed that of the 14 lashings that were used, one or more were allowed to break. However, if the setup of the lashing system differs from reality, the results of the lashing calculations do not provide any guarantee for the load capacity in reality. In addition, the fact that a sling's stretch characteristics are limited does not mean that there are no differences in elasticity between the various materials used.
40	First officer	27	The way in which the crew had ... data causing it to be fundamentally incorrect.	This statement/conclusion based on incorrect information is not correct. The inputdata was realistic. Extra chain lashings were used for extra safety.	No	See reaction 6.

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41	First officer	27	The lashing plan was not recorded on paper, not even after loading was completed.	So? There was a stowage plan, lashing calculations were made and photos have been taken by the first officer after loading. Both the first officer and the captain were satisfied with the lashing system.	No	This statement is factually correct.
42	First officer	28	The rudder propellers were not supported by cargo stoppers ... for not installing stoppers.	And we did not have the special (because of the round shape of the cargo) stoppers available to us. Those should have then be delivered in Palermo.	Yes	<p>The contract states that lashing of the cargo is the responsibility of the carrier. During the tender process, no inquiries were made about the availability of suitable cargo stoppers. The responsibility for the effective lashing of the thrusters, not to mention the fact that there was no hot work allowed in Palermo, is completely put with the crew while the office could have done more to support the crew.</p> <p>Correction to original text: 'The thrusters were not supported by cargo stoppers because no special stoppers were provided by the manufacturer. According to the operator, stoppers that were tailor made to fit the thruster were required for this type of cargo. The chartering department did not check with the broker if these special stoppers were available for the cargo of azimuth thrusters whereupon the captain and relief first officer agreed that the use of lashings alone would offer sufficient load capacity to prevent the cargo from shifting. The fact that welding in the port of Palermo was not permitted was an additional reason for not installing stoppers.'</p>
43	First officer	29	This meant that the D-rings had already been installed ... properties or the arrangement of the rudder propellers.	This is not correct. If I would not have been happy with the set up/ lashing system afterwards, I would have adjusted it after we departed from Palermo.	No	Welding additional D-rings was not possible since the port of Palermo did not grant a hotwork permit. If the schedule and operations in the following ports of call would have allowed it, then there would have indeed been a possibility to weld additional D-rings on the tanktop. Any differences on the cargo cannot be as easily accommodated when D-rings are placed prior to loading. The results of this investigation show that the cargo had not been symmetrically lashed but that no additional D-rings were installed to ensure that this could have been done.
44	First officer	29	The rudder propellers were almost stowed against the walls ... vertical angles across the edges of the jet pipes.	This did not limit. The lashings only become a little shorter. For some lashing chains the angle will be slightly different. To avoid this becoming disadvantageous, extra chain lashings were used. Your (symmetrical) story is not correct.	No	See reaction 37.
45	First officer	30	The difference in elasticity of the materials ... across edges increases the risk of the strops being cut.	There is no difference in elasticity. Also, there is no play. The lashings were checked everyday and tightened where necessary (see logbook). The slings were also checked for cuts. No damage was observed. To prevent any damage to the slings, shells were removed in Palermo. Therefore this is an assumption.	No	See reaction 9.
46	First officer	31	The photograph on the right in figure 16 shows that ... other lashing chain is attached to a rudder propeller on the port side.	Really? Where does it say that? In the annex it is said this is the case but the portable D-ring is not twisted by lashing in two different directions. Also, the locking pin is always checked to determine if the D-ring twists.	Yes	Original passage deleted.

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47	First officer	32	His job was to provide guidance ... leadership positions on board were held by inexperienced crewmembers.	Coaching? Assisting when required. The first officer (me) loaded the cargo by himself. Leadership positions held by inexperienced crewmembers? Said captain and I are capable and experienced enough to judge how to lift and how to lash. What a statement...	Yes	Correction to original text: 'A cargo superintendent was on board during the northbound voyage, when loading the green workboat and on the voyage from Bremerhaven to Kolvereid, port of discharge of the green workboat. He was on board because loading and unloading of the green workboat happened with a tandemlift of more than 100 tons. The lift approached the maximum Safe Working Load (SWL) of the crane and lifting materials. His job was also to provide guidance to the relief first officer during loading and unloading of the workboat, since the first officer was on his first trip in this role. It was also the first trip for the captain in his new role.'  One of the tasks of the cargo superintendent was to support and assist the relief first officer as became known to the Board during interviews and from these responses.
48	First officer	33	These predictions were not considered to be extreme. The actual weather conditions also did not deviate significantly from the predicted conditions.	Who says that? The weather forecast was extremely bad. The actual weather conditions were terrible on Sunday evening 4 april 2021 until Monday afternoon 5 april 2021. The vessel was rolling and pitching like crazy. How can you formulate it in this way?	Partly	Paragraph 4.2 Weather conditions, sea conditions and the movements of the vessel, is partly revised based on these responses. The Board has looked at the weather forecasts and actual weather conditions again, and updated these in the report. It is emphasized that it concerned the captain's perception of the amount of paperwork in Norway.  It was also concluded in the chapter that the relief captain came close to the margins of safe navigation and that safer alternatives were not considered.
49	First officer	34	According to the crew, ...A Marine Traffic printout confirms this.	So? The observation being? It was safe to commence the voyage? It depends on the type of vessel and cargo if departure is safe. Moreover, that fishing vessel was not in that location to fish.	Yes	Original passage deleted.
50	First officer	34	Nevertheless, waves as high as this off the Norwegian coast are quite rare in the month of April. In April the average wave height is 2.5 metres.	So? The observation being? It was a fine day to sail across open sea? I dare to state that the waves were higher than 12 metres.	Partly	See reaction 16.
51	First officer	34	The high waves of some 12 metres at the time ... by steering the bow into wind and reducing speed.	It was more than uncomfortable. It was extremely dangerous. Riding the storm with a ship full of cargo was a bad/unwise move.	Partly	See reaction 16.
52	First officer	34	The captain considered the risk of sailing across open sea ... additional risk posed by the shifting of cargo.	You can delete this paragraph. This is a lie. Nothing was assessed. He did not count on anything. Recommendations were made by several parties to deviate from the route (inland) because of the bad weather in relation to a fully loaded vessel. There is a reason for that. Said captain chose to sail across open sea just to see how it would go. Just to ride the waves. He admitted this himself after the incident.	No	See reaction 16.
53	First officer	34	A properly devised lashing system would be able to withstand the described conditions.	Also with oil that has leaked into the hold? Also with deteriorating weather conditions that are way worse than you indicate. Not a single lashing system (with residual oil from the cargo) in good condition can withstand these conditions.	Partly	See reaction 16.
54	First officer	36	The amount of paperwork involved in taking an inland route using pilotage also played a part in the captain's reasoning.	Ordering a pilot does not require any paperwork. Nothing was assessed by the captain.	Partly	See reaction 16.

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55	First officer	37/38		<p>General remark on the report:  The report emphasizes that the fault lies in lashing of the thrusters. The way I see it 20 lashing chains and four (special) stoppers would not have been sufficient to prevent the thrusters with oil from breaking loose in the extremely dangerous and bad weather. Sailing across open sea with a fully loaded vessel in these weather conditions was, in my opinion, a dangerous affair. The captain did not take into account the amount of cargo in relation to the bad weather. He is also not mentioned in the section about leadership. This man did not communicate to his crew whatsoever during his short stay on board. My learnings from the incident are:</p> <ul style="list-style-type: none"> <li>- Do not sail across open sea with this weather forecast.</li> <li>- Establish better communication with the manager (captain) about weather forecasts.</li> </ul> <p>My learnings are not that a lashing calculation has to be made for each individual thruster when these have different lashing points or when the orientation of the gearbox differs 10° from the rotation in the stowage plan. Extremely disappointing results in a report of the Dutch Safety Board.</p>		<p>See reaction 1.</p> <p>Fault and liability are emphatically not a part of the investigations conducted by the Dutch Safety Board.</p> <p>When the Board assessed and incorporated the responses, the intonation of the report was reviewed and altered to take away the appearance of apportioning blame.</p> <p>See reaction 17.</p>