



## SAFETY INVESTIGATION REPORT

201108/011

REPORT NO.: 07/2012

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The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

### NOTE

This report is not written with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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### *MV KADMOS* Contact with submerged wreck In the Malacca Strait 05 August 2011

### SUMMARY

*MV Kadmos*, a Maltese registered bulk carrier, was navigating the Malacca Strait. On 05 August 2011, a sudden impact was felt throughout the ship.

A quick look outside of the wheelhouse did not reveal any immediate cause and the first impression of the navigational officer of the watch (OOW) was that the ship had run aground.

Eventually, it was determined that *Kadmos* had made contact with the wreck of another vessel, which had sunk in the area during the previous week.

The investigation found that the master and the officers of the navigational watch were unaware of the wreck. Moreover the isolated danger buoy, which had been marking the site of the wreck was neither seen by the duty navigational OOW nor by the duty look-out posted on the bridge.

As a result of the actions taken by the ship's managers, no safety recommendations have been issued.



Kadmos

## FACTUAL INFORMATION

### Vessel description, crew, and environment

*Kadmos*, a 23,519 GT bulk carrier, was built by Industries Reunidas Caneco SA, Brazil in 1983 and was registered in Malta<sup>1</sup>. She was owned by Kadmos Maritime Ltd., managed by Nikator Navigation S.A., and classed with Germanischer Lloyd. The vessel had an overall length of 200.9 m and a beam of 27.2 m.

*Kadmos* operated on international trade. At the time of the accident, she had a crew of 24, with English being the working language on board.

The navigational OOW was 55 years old. He had been working in the present rank since 1990 and on several ships including reefers, container ships, tankers and multi-purpose cargo ships. He joined the vessel on 17 July 2011 at Eilat, Israel.

The duty look-out was 32 years old and had been an AB for eight years, sailing on bulk carriers and general cargo ships.

On 18 July 2011, the vessel completed the cargo loading operations and sailed for China with her cargo of Potash. Her forward and aft drafts were 11.02 m and 11.24 m respectively.

At the time of the accident, it was still dark. Weather conditions were clear with slight seas and a southerly moderate breeze. Outside air temperature was 25°C and visibility estimated to be eight nautical miles. Until then, the passage through the Malacca Strait was uneventful. The nearest vessel was about eight nautical miles ahead of *Kadmos*.

### Narrative

On 04 August 2011, shortly before 1600, the vessel passed through the One Fathom Bank area of the Malacca Strait. Except for the

speed log, all navigation aids were working well.

At about 1916, *Kadmos* passed the reporting point between VTS sectors 2 and 3. VTS confirmed vessel's intentions on channel 84. The OOW recalled that the VHF radios were set on channels 16, 88 and eventually 84. He was certain that he did not hear any navigational warning broadcasts on these channels. Following his watch, the OOW went straight to his cabin to sleep.

On 05 August 2011, he was woken up at 0330 and made it to the bridge by 0345. The vessel's course was 123° and her speed over the ground was 12.5 knots. The weather was fine and visibility was good.

Before taking over the watch, the navigational officer clearly observed the stern of a ship at a distance of about eight nautical miles. He could also clearly see the flashing light of a beacon, ahead of *Kadmos*' starboard bow. The two navigational officers agreed that the beacon was marking shallow waters. No other lights were observed.

At about 0415, the navigational officer took over the watch. The AB, who had arrived on the bridge at about 0330, was instructed to take the helm since the vessel was on manual steering due to the confined waters of the area. The look-out / helmsman recalled that the visibility was good and that he could also see the lights of other ships far off. No other lights or ships were observed in close proximity of *Kadmos*.

At about 0426, whilst the OOW was looking out of the front window, a sudden impact was felt throughout the vessel. It seemed that *Kadmos* had almost stopped. The vessel's position was 01° 24.8'N 103° 8.1'E (Figures 1 and 2).

The OOW could not see any nearby lights except for the beacon's flashing light, approximately one nautical mile on

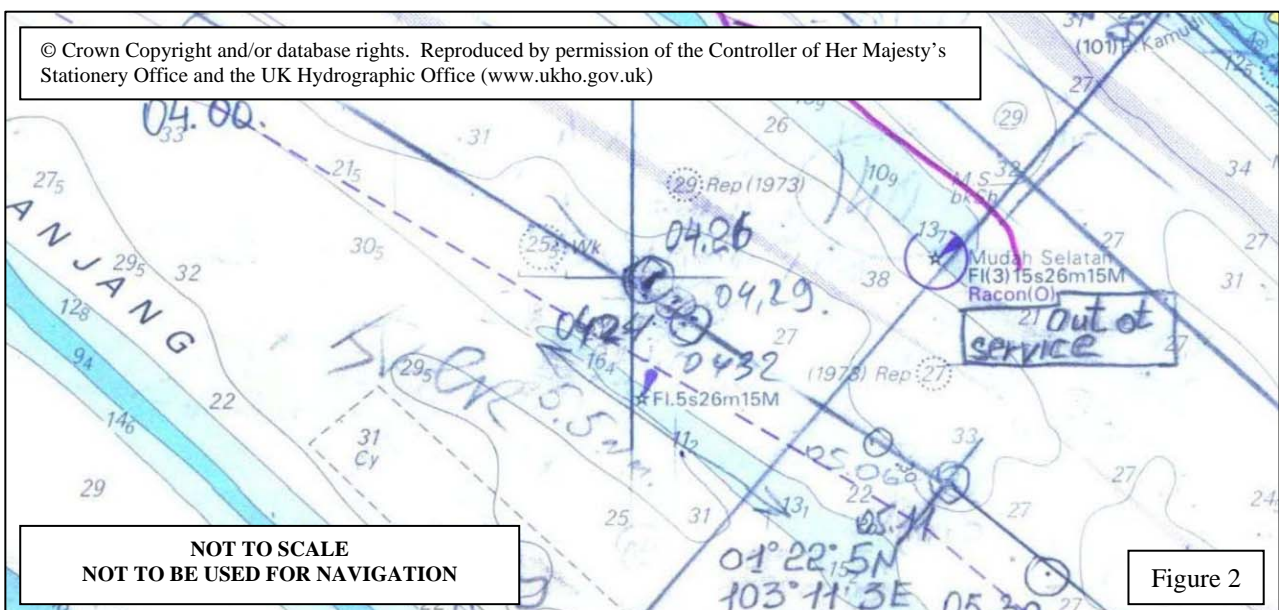
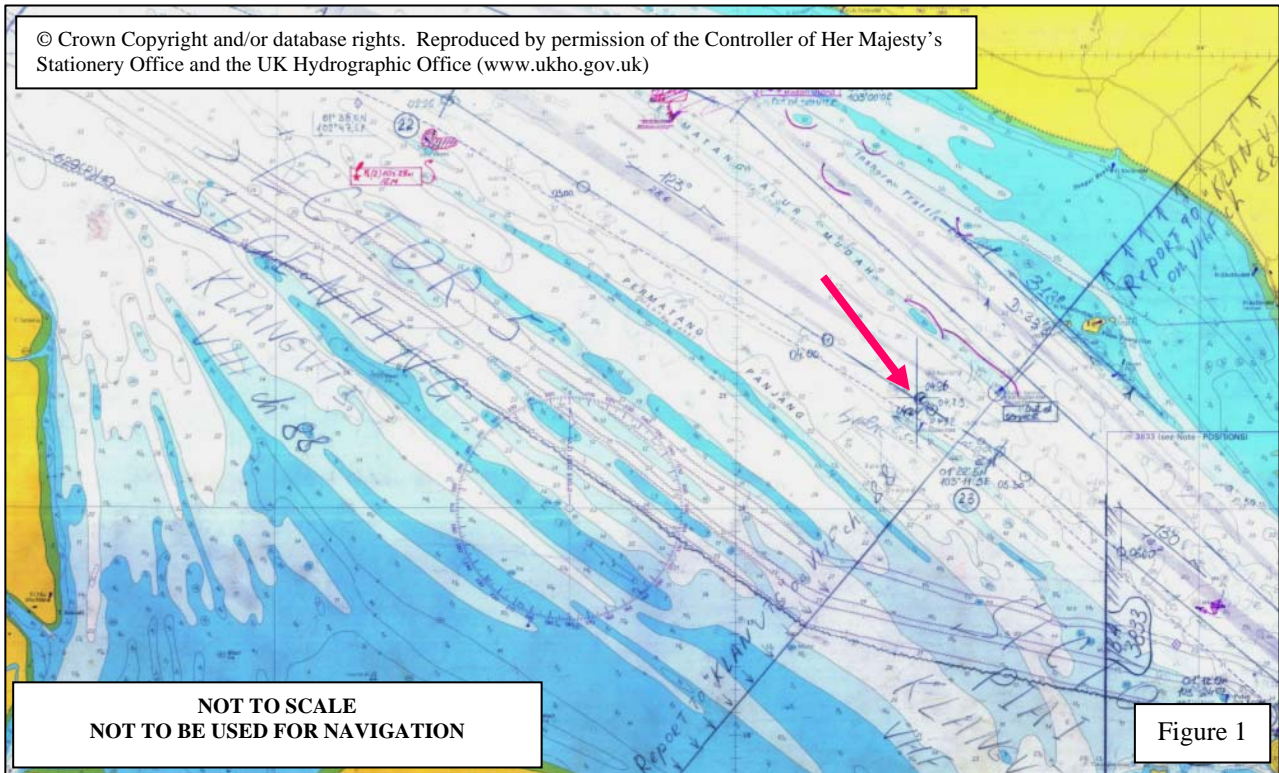
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<sup>1</sup> On owners' request, the vessel was cancelled from the Registry of Maltese ships on 20 October 2011.

Kadmos' starboard side. His first thought was that the vessel had run aground.

Soon after, the master, who was in his cabin doing some paper work, arrived on the bridge. The OOW was unable to tell the master what had happened but informed him that the vessel was no longer responding to the helm.

The master requested a hard to port rudder but the vessel continued to swing slowly to starboard. He also instructed the navigational officer to proceed forward with the bosun to prepare the anchors. The forward spaces were checked for damages and it was immediately evident that nos. 1 port and starboard double bottom ballast tanks were open to sea.



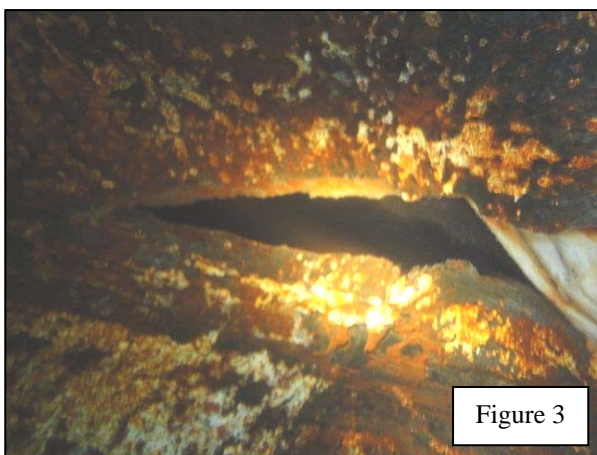
In the meantime, the main engine had been stopped. The master called the engine-room and considering the hazards in the area due to shallow waters and overtaking vessels, he instructed the engineers to re-start the engine. The main engine was started without any problems and the vessel could be steered again. By this time, *Kadmos* had drifted off course and her new heading was 170°.

VTS was eventually informed of the accident and authorisation was granted to let go anchors in position 001° 2.9'N 103° 35.7'E to assess the damages sustained as a result of the contact damage.

### Reported damages

Although the flooding in the double bottoms was an immediate indication that the tanks were open to sea, the underwater survey carried out whilst the ship was on anchor, later revealed the actual extent of the damage. Two holes were found on starboard side measuring about 2.4 m in length by 0.8 m in height and 0.4 m in length by 0.3 m in height.

Three other holes were found on port side measuring approximately 2.5 m by 0.6 m, 3.2 m by 1.2 m, and 0.2 m by 0.2 m. Moreover, both port and starboard bilge keels were damaged. Figure 3 shows some of the sustained damages to one of the double bottom tanks.



## ANALYSIS<sup>2</sup>

### Admiralty Notices to Mariners

*Kadmos* regularly received Admiralty Notices to Mariners as required by the SOLAS 1974 Convention, as amended. At the time of the accident, *Kadmos* had received Weekly Edition 31<sup>3</sup>. However, the UK Hydrographic Office confirmed that the Admiralty Notices to Mariners for weeks 31 and 32 made no reference to the *B Oceania* wreck. The first official notification about the wreck was received on 09 August 2011 by the UK Hydrographic Office as Peninsular Malaysia Notice 48(T)/11.

### Navigational warnings

It transpired that situation awareness was a main factor, which had a direct influence on the dynamics of the accident. The crew members were unaware of the submerged wreck. The OOW was concerned whether or not the ship had run aground and was unable to brief the master on what had happened.

The Malaysian authorities were approached in this respect and requested to advise on how the navigational hazard warnings had been issued. It was confirmed that on the day of the sinking of *B Oceania*, the Malaysian authorities issued coastal warnings, which were promulgated from the coastal VTIS by VHF at regular intervals. The radio transmissions were maintained until an isolated danger mark had been positioned above the wreck by a buoy tender vessel. Navarea warnings were then transmitted by NAVTEX every four hours.

NAVTEX message UA 56 was first transmitted on 29 July 2011 at 1754 LT,

<sup>2</sup> The analysis of this safety investigation was partially based on the information provided by the crew members since it was declared that the S-VDR data had not been saved by the master.

<sup>3</sup> Edition 31 dates 04 August 2011 and was published on the UKHO website on 25 July 2011, which was five days before *B Oceania* sank.

warning ships passing Malacca Strait to keep a short look-out due to a sinking ship<sup>4</sup>. On 01 August 2011 at 0150LT, NAVTEX message UA 61 was promulgated. It advised mariners that the wreck of MV *B Oceania* (least depth unknown) was reported within one nautical mile radius of isolated danger buoy (FL(2) W 10s) in position latitude 01° 24' 895" N, longitude 103° 07' 736" E. Mariners were also advised to navigate with caution in the area<sup>5</sup> (figure 4).



The NAVTEX range for Peninsular Malaysia was 350 nautical miles.

In conjunction with the above, the Marine Department of Malaysia had also issued a Notice to Mariners (NTM 48 (T)/2011 on 01 August 2011. However, Notices to Mariners were not sent to ships but only published on the Marine Department's website. Thus, unless specifically looking for the Notices online, the crew members of *Kadmos* were never in a position to become aware of the relevant Notices to Mariners published by the Marine Department of Malaysia.

It was understood that when the initial navigational coastal warnings were promulgated (initially by VHF and then by

NAVTEX), *Kadmos* was out of range. However, since the NAVTEX messages were transmitted every four hours, the vessel should have eventually received the navigational warnings after entering within the transmission range of the coastal station in Penang<sup>6</sup>.

On the basis of the official information provided by the Malaysian authorities, it is a fact that the *B Oceania* wreck was marked with an isolated danger mark and relevant navigational warnings promulgated.

### The voyage plan

The purpose of passage planning is to ensure positive control over the safe navigation of the ship at all times. To achieve this purpose, the ship's track to be made good, once it has been finally put on the chart, would have to become the focus of attention.

Given that the voyage plan was (naturally) prepared before the voyage commenced, it had to be monitored and revised during the voyage on the basis of particular circumstances, which could not have been envisaged at the planning stage. This was a very important aspect considering that one of the objectives of a voyage plan is to have a reliable plan that warns the vessel beforehand of any hazards which it may encounter.

On the basis of the information which the deck officers were aware of, they had no possibility to make the necessary amendments to the voyage plan in order to take into consideration the hazards, which the wreck posed to shipping.

<sup>4</sup> MV *B Oceania* was involved in a collision and started to sink following the damage sustained i.w.o. her cargo holds. *B Oceania* eventually lost all her reserve buoyancy and sunk.

<sup>5</sup> Another message was eventually transmitted by NAVTEX on 15 August 2011 (*i.e.* after the *Kadmos* accident), notifying that the *B Oceania* isolated danger mark was replaced by North and East Cardinal Marks.

<sup>6</sup> During the course of the safety investigation, the managers declared that between 01 and 05 August, only one NAVTEX warning was received by the ship. It was also stated that the NAVTEX message did not provide a specific position of the wreck, which could have enabled the officers to amend the passage plan.

### **The navigational watch**

The International Regulations for the Prevention of Collisions at Sea 1972, as amended (COLREGs) state that there is an obligation for all seafarers to maintain a proper look-out during their navigational watch. In addition, the regulations require a full appraisal of the situation, assessment of the risk of collision, and appropriate action to avoid collision.

In the time leading to the contact with the wreck, the OOW was accompanied by an AB who was at the helm since the ship was on hand steering.

Considering that the AB was also tasked with the duties of a helmsman, then he cannot be considered to be a look-out. The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW Convention) permits officers in charge of a navigational watch to be the sole look-out in daylight<sup>7</sup>.

Effectively, the STCW requirement prohibits OOWs from acting as sole look-outs during hours of darkness. The main safety concern is that by acting as a helmsman, the crew member's attention would be diverted from the duties of looking out of the bridge windows. In this respect, he would not be keeping a proper visual look-out.

The navigational officer stated that after his eyes adjusted to darkness, he went to the bridge to take over the watch. He was able to observe the stern light of a vessel about eight nautical miles away.

Since the S-VDR data was not available after the accident, the investigation was unable to analyse this piece of evidence. However, from the chart available, the eight mile distance roughly corresponded to the site where the wreck was.

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<sup>7</sup> This is only possible under certain circumstances. *Vide* paragraph 15 of section A-VIII/2 of the STCW 1978 Convention, as amended in 1995.

The navigational officer confirmed that he was able to see the flashing light of the beacon on the starboard side of the vessel, which marked shallow waters. That beacon was also about eight nautical miles ahead of *Kadmos*.

There was no indication that the navigational officer used the radar in such a way to get a better appraisal of the situation ahead of his ship. The isolated danger mark would have been detected on the radar as well<sup>8</sup>.

Two main factors, which therefore emerged from this analysis, were the issue of the look-out and the awareness of the navigational OOW – given that the AB had his attention focused on steering a steady course.

### **Additional look-out**

The information available suggested that *Kadmos* was on manual steering because the area was considered to be confined waters. During the previous watch, the vessel was already navigating in what were considered to be confined waters. As yet, there was no consideration on having an extra person on duty, given that the additional look-out would have been acting as a helmsman.

It is understood, however, that this would not have been an issue that could have been resolved there and then. This is so because even the voyage plan did not identify the 'confined waters' as an area where an additional deck officer / deck rating may have been necessary - even if sensitive enough to warrant the vessel to change to manual steering.

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<sup>8</sup> The fact that the isolated danger mark was not detected on the radar raised doubts on how the OOW could have determined that the other ship was eight nautical miles away. It was not excluded, therefore, that he actually observed the other ship by sight, but was only informed of the distance; indicating that the other OOW would have also missed the isolated danger mark.

### Situation awareness

The fixes on the chart indicated that the vessel did not alter course at any time leading to the accident. However, this had to be seen in the context in which the navigational watch was being kept; not least the look-out.

For some reason, which the safety investigation had not managed to establish in an objective manner, the NAVTEX warnings, if received by the ship, had not been acted upon by the navigational officers. Moreover, NAVTEX warnings turned out to be the (only) 'external' warnings which, the ship had, prior to approaching the navigational hazard.

The available evidence did not indicate whether the NAVTEX print-outs were on board. However, this is not to say that if available, then the crew members were negligent for omitting navigational warnings. In fact, this was not the case. What is being claimed is that cognitively, mistakes can only be corrected through the intervention of some external agent. This did not seem to have happened.

A negative reporting loop meant that either there was no double check on the receipt of NAVTEX warnings (if received), or the NAVTEX warning which was claimed to have been received on board was not followed up any further. This had resulted in a situation where the need to amend the voyage plan was not considered.

Therefore, the safety investigation can only hypothesise that the oversight from the navigational officer responsible to act upon NAVTEX warnings was not identified by any other crew member (*i.e.* the external agents). This was one of the reasons that facilitated the development of a situation where the crew members on board *Kadmos* remained oblivious of the wreck.

Thus, the context that had to be considered was that the external warnings to the ship were not reaching crew members who, as far

as they were concerned, were going about their normal watchkeeping tasks. As such none of the crew members expected an isolated danger mark – otherwise, the ship's course would have been altered.

The function of an isolated danger mark/buoy is to serve as a signalling device that translates the presence of a hazard into something which is perceptible *i.e.* a flashing light, intended to be perceptible by sight. The buoy itself may be also detected by an appropriately tuned radar<sup>9</sup>.

The buoy had all the characteristics to be classified as a safety barrier, intended to signal hazards. The main potential problem was that the buoy had to be observed and acted upon.

Moreover, the physical presence of buoys or the emitting signal does not require the crew members' acknowledgement<sup>10</sup>. In fact, considering that the buoy would have been detected by radar, there were no indications on whether the alarms on navigational equipment were active at the time or deactivated at some point in time after departure<sup>11</sup>.

The point therefore remained that in the absence of objective warnings (irrespective of their origin, *i.e.* NAVTEX and/or look-out), the hazard perception of both navigational OOWs was altered. Therefore,

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<sup>9</sup> There was no evidence, which suggested that the radar was not appropriately adjusted.

<sup>10</sup> In comparison, an engine-room alarm, which is also a safety barrier, requires an acknowledgment; otherwise it will remain active.

<sup>11</sup> The navigational OOW stated that the stern light of another ship was observed about eight nautical miles southeast of *Kadmos*, which was approximately the same distance to the *B Oceania* wreck. He made no reference to the activation of navigational equipment alarms because of this ship. Notwithstanding, the managers claimed that their internal investigation revealed that all the pre-departure arrangements regarding the navigational instruments had been carried out in accordance with the relevant procedures.

if the crew members' perception of the external environment was such that all was understandable, then they had no reason to (actively) search for hazards.

Being an executive task, if hazards are not searched for actively, then the hazard perception ability would be reduced. It is only an external alert that could have triggered casual reasoning, eventually resulting in an alteration of the vessel's course.

Thus, this frame of mind led the navigational OOWs not to alter the system's balance. The ship therefore remained on its planned course.

## CONCLUSIONS

1. The latest Admiralty Notices to Mariners available on board made no reference to the *B Oceania* wreck;
2. Although *Kadmos* was not within the range of the coastal station to receive the first NAVTEX warnings, the crew remained unaware of subsequent navigational warnings promulgated every four hours;
3. Considering that the duty AB was at the helm, the navigational officer of the watch was the sole look-out during hours of darkness;
4. The negative communication loop on the bridge led to a situation where the voyage plan had not been amended;
5. The crew member's risk perception was unaltered because of the lack of active warnings - to the extent that the vessel's course remained unaltered.

## SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION<sup>12</sup>

The Company has revised the relevant procedure in its safety management system to further address watchkeeping duties, especially during hours of darkness. Moreover, the passage plan document has been revised to ensure it remains an active document throughout the voyage.

The matter has been also brought to the attention of all the company's managed vessels.

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<sup>12</sup> Safety actions and recommendations should not create a presumption of blame and/or liability.



## SHIP PARTICULARS

Vessel Name:	KADMOS
Flag:	Malta
Classification Society:	Germanischer Lloyd
IMO Number:	8018261
Type:	Bulk Carrier
Registered Owner:	Kadmos Maritime Ltd.
Managers:	Nikator Navigation S.A., Greece
Construction:	Steel
Length Overall:	200.90 metres
Registered Length:	192.48 metres
Gross Tonnage:	23519
Minimum Safe Manning:	17
Authorised Cargo:	Solid cargo

## VOYAGE PARTICULARS

Port of Departure:	Eilath, Israel
Port of Arrival:	Lianyungang, China
Type of Voyage:	International
Cargo Information:	Muriate of Potash
Manning:	24

## MARINE OCCURRENCE INFORMATION

Date and Time:	05 August 201 at 0426 (LT)
Classification of Occurrence:	Serious Marine Casualty
Location of occurrence:	Malacca Strait
Place on board	Bottom shell plating
Injuries / fatalities:	None
Damage/environmental impact:	Flooding of nos. 1 port and starboard double bottom ballast tanks. No environmental impact
Ship Operation:	Normal Service - In passage
Voyage Segment:	Transit
External & Internal Environment:	Wind: Moderate Breeze, S 11 knots Visibility: Good at eight miles One navigational OOW and an AB as helmsman
Persons on board:	24