



## SAFETY INVESTIGATION REPORT

201907/006

REPORT NO.: 15/2020

July 2020

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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This safety investigation has been conducted with the assistance and cooperation of the Transport Safety Investigation Bureau, Singapore and the Deputy Commissioner of Maritime Affairs, Marshall Islands.

**MV KLIMA**  
**Allision with the Marshall Island**  
**bulk carrier *SPRING SNOW* and the**  
**Singapore registered bunker barge *LIBRA***  
**in the Eastern Special Purpose Anchorage,**  
**Singapore**  
**05 July 2019**

### SUMMARY

In the early hours of 05 July 2019, the Maltese registered bulk carrier *Klima* anchored at Eastern Special Purposes 'A', Singapore for bunkers. Bunker barge *Libra* was made fast alongside.

At about 0400, the vessel started to yaw. As the tidal stream intensified, the surge at the extremity of her yaw strained her anchor and anchor chain, and *Klima* was drawn closer to *Anatoli*, which was at anchor on her port quarter.

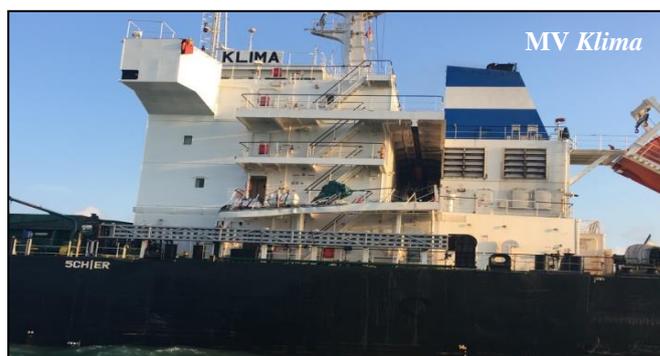
The master decided to shift *Klima* and re-anchor with the

bunker barge tied alongside.

Subsequently, *Klima* and *Libra* allided with *Spring Snow* during the shifting manoeuvres.

The safety investigation identified several contributing factors including, the monitoring of the anchor position, the vessel's yaw, and the prevailing tidal stream acting on the vessel.

In view of the safety actions taken by the Company, no safety recommendations were made by the MSIU.



## FACTUAL INFORMATION

### Vessels

#### ***MV Klima***

*Klima* (Figure 1) was a 33,044 gt Maltese registered bulk carrier, built by COSCO (Guangdong) Shipyard, China, in 2013, managed by Dearborn Shipping Co, Greece and classed with Bureau Veritas (BV).

The vessel had a length overall of 189.99 m with a moulded breadth of 32.00 m. Propulsive power was provided by one Doosan MAN B&W 6S50 MC-C internal combustion, two stroke, slow speed diesel engine, producing 9,480 kW at 127 rpm, driving a fixed right-handed propeller. The estimated speed of the vessel in loaded condition was about 14 knots. *Klima* was fitted with a semi-balanced rudder and two stockless Bower anchors, each weighing 8.7 tonnes.



**Figure 1: MV Klima**  
Source: Company internal investigation

#### ***MV Spring Snow***

*Spring Snow* (Figure 2) was a 41,074 gt bulk carrier, registered in the Marshall Islands. She was owned by Felix Bulk Carriers S.A., and managed by Kassian Maritime Navigation Agency Ltd. The vessel was built by Penglai Zhongbai Jinglu Ship Industry Co., Ltd., China in 2010 and classed with BV.

The vessel had a length overall of 225.00 m and a moulded breadth of 33.00 m. Propulsive power was provided by one MAN B&W 5S60 MC-C internal combustion, two stroke, slow speed diesel engine, producing 8,833 kW at 105 rpm, driving a fixed right-

handed propeller. The estimated speed of the vessel in loaded condition was about 14.5 knots.



**Figure 2: MV Spring Snow**  
Source: Flag State Administration

#### ***MT Libra***

*Libra* (Figure 3) was a 1,912 gt double hull oil product tanker, sailing under the flag of the Republic of Singapore, owned and operated by New Maritime Ltd., Singapore. The vessel was built by Ocean Leader Shipbuilding Co. Ltd., delivered in 2010 and classed with the China Classification Society (CCS).

The vessel had a length overall of 75.85 m and a moulded breadth of 14.00 m. Propulsive power was provided by two internal combustion diesel engines, geared drive, giving a service speed of 10.7 knots. *Libra* was licensed as a bunker barge, supplying fuel to vessels in Singapore Harbour.



**Figure 3: MT Libra**  
Source: Flag State Administration

### Manning

The manning on board *Klima* was in excess of the Minimum Safe Manning Certificate issued by the flag State Administration. At the time of the allision, *Klima*'s bridge team

was made up of the master, the additional chief officer, and an able seaman.

The master was a 56-year-old Indian national, with about 16 years of service at sea, seven years of which as a master. He had obtained his Certificate of Competency in the UK in 2001. This was his sixth contract with the Company and had joined *Klima* on 19 March 2019.

The additional chief officer (as listed in the crew list) was 43 years old. He was an Indian national and had about 8.5 years of sea service. He had obtained his chief officer's Certificate of Competency in the UK. This was his fourth contract with the Company and had joined *Klima* on 13 April 2019, carrying out navigational duties on board. Both the master and the additional chief officer had completed a training course in ECDIS and Bridge Team and Resource Management in March 2019.

The helmsman was a Filipino able seafarer (AB). He was 32 years old and had 9 years sea going service. He had been on board the vessel for about six months. At the time of the allision, he was at the helm.

The manning levels on board *Spring Snow* and *Libra* were also in excess of the minimum levels stipulated in the respective Minimum Safe Manning certificates.

### **Environment**

Records on board *Klima* showed that prior to the allision, the weather was clear with a Northwesterly light air. Visibility was good, with an air temperature of about 29 °C. The barometer read 1010 mb.

Tidal stream predictions for 05 July 2019, as published in the Singapore Tide Tables for the Main Strait - Eastern Petroleum 'A' (01° 14.4' N 103° 55.0' E)<sup>1</sup>, showed

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<sup>1</sup> *Klima*'s anchor position lay about four nautical miles Northeast of Eastern Petroleum 'A'.

directional change to 057° at 0100, reaching 2.5 knots by 0600.

### **Marine VHF radio**

Vessels moving, arriving or anchoring in Singapore's port area, East of longitude 103° 51.2' E, including ESPA, are required to maintain a listening watch on VHF radio channel 12 - call sign East Control. Vessels requesting pilotage service, call Singapore Pilots on its working VHF channel 20. VHF channel 14 is used by VTIS Central to provide traffic information to vessels transiting Sector 8 of the Singapore Strait.

### **Narrative<sup>2</sup>**

Having loaded iron ore fines / pellets in bulk, *Klima* sailed from Dhumra, India to China on 28 June 2019. Her departure drafts were 11.86 m forward and 12.26 m aft. The passage plan was drawn up to Singapore where she was scheduled to take bunkers. ECDIS was provided on board, however, paper charts were used as the primary means of navigation.

In the early hours of 05 July 2019, *Klima* embarked a pilot<sup>3</sup> at Eastern Boarding Ground 'B'. Heading North, she started lowering her port anchor in water depths of 30.70 m and at about 0100, she dropped her anchor. Six minutes later, the anchor was reportedly brought up to six shackles<sup>4</sup> in the Eastern Special Purposes 'A'. Shortly after anchoring, *Klima* settled on a heading of around 250°. Just over 2.7 cables away, there was a vessel ahead at anchor and another one on her starboard quarter.

At 0112, the main engine was shut down on short notice. A GPS position (01° 16.70' N 103° 58.14' E) was logged in

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<sup>2</sup> Unless otherwise stated all times in this safety investigation report are ship's time (UTC + 8).

<sup>3</sup> Pilotage is compulsory for vessels of 5,000 gt and over.

<sup>4</sup> One shackle of anchor chain measures 27.50 m.

the deck logbook and the pilot disembarked at 0133. Before leaving the bridge at 0200, the master wrote down his night orders and set the anchor watch range marker on the radar set at about 1.7 cables.

The additional chief officer (the OOW) was on anchor watch whilst one AB was on duty on deck. At 0230, bunker barge *Libra* arrived and commenced bunkering low sulphur gas oil (LSGO). At 0228, *Anatoli* (a Maltese flagged bulk carrier) anchored close on *Klima*'s port quarter, at an estimated distance of about 2.7 cables. According to the records from the bunker barge, the bunkering of LSGO was completed at 0420 and the bunker hose was disconnected at 0535.

After the master left the bridge, the OOW started preparing the passage plan for the on-coming voyage to Caofeidian, China. He also logged the hourly GPS positions on SMS Form F.NAV.8 (Monitoring of Anchoring Position). He reported that at about 0400, the vessel started yawing<sup>5</sup>. At 0500, the OOW logged *Anatoli* at 2.7 cables from *Klima*. Shortly afterwards, the OOW reportedly observed the distance between the two vessels diminishing to less than two cables.

The OOW stated that he called *Anatoli* on the VHF radio and receiving no reply, he called East Control for pilotage assistance. He then called the master and the duty engineer to start the main engine and sent the duty AB to the forecastle deck. Within a short period of time, the master was on the bridge and was briefed by the OOW. The master clearly recalled observing the vessel's position on the radar set and ECDIS, and *Libra* secured alongside, and hose disconnected. The master stated that he called East Control / pilot station on VHF radio, channels 12, 14, and 20, but was informed that no pilots were available.

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<sup>5</sup> Vessel's movement sideways around the vertical axis.

At 0533, the OOW called East Control on the VHF radio. He reported that *Anatoli* had anchored close and was about 1.2 cables from *Klima*. *Anatoli* intercepted the call and the two vessels changed over to VHF channel 06 to communicate with each other. At 0539, *Anatoli* was back on VHF channel 12, asking East Control to inform *Klima* that the latter was dragging her anchor. Over the next five minutes, East Control called *Klima* on its working channel but there was no response from *Klima*.

Meanwhile, the main engine was ready, and the chief officer and two ordinary seafarers had arrived on the forecastle deck. The OOW stated that before weighing the anchor, he noted ECDIS displaying a speed of 3.1 knots through the water (STW) and to this effect, he advised the master.

At 0540, the master ordered ahead propulsion and instructed the chief officer to heave up the anchor. The master reported that the heaving up was stopped and the anchor was walked back in gear to six shackles. However, the vessel kept falling astern. At 0615, the anchor was recovered. *Klima* was underway on a heading of 254° and *Spring Snow* was right astern at anchor, about five to six cables away. The master instructed the chief officer to prepare port and starboard anchors. He then set the engine telegraph to dead slow and slow ahead and turned the vessel to port before ordering the helm to starboard.

Noticing *Klima* making way, *Libra*'s master stated that he used her whistle, the bell and Aldis lamp at 0601, 0605, 0617, 0633 and then the VHF radio at 0637, 0638 and between 0640 and 0643 on channel 12 to attract the attention of *Klima*'s crew to let go her lines. *Libra*'s master stated that no crew member answered his calls and *Libra* remained attached to *Klima* and moving along with her.

In the meantime, the OOW was following the master's engine and helm orders. Soon after the anchor was up, the duty AB arrived on the bridge to take over the steering wheel. With the main engine ahead and a starboard helm, the vessel traversed well over an arc of 180°. *Spring Snow* was now close on her port side. At 0641, the speed through the water was 2.7 knots. Over the ground, however, the ECDIS was recording a course of 080° and speed 5.1 knots, and the OOW immediately alerted the master of the vessel's drift to port.

The master engaged the engine telegraph to full ahead<sup>6</sup> but was unable to manoeuvre clear of *Spring Snow*. An allision became inevitable. The OOW sounded the ship's whistle and the master called East Control, reporting that *Klima* was dragging her anchor and requested immediate pilotage service. The MSIU was informed that soon after the master's call, the East Control informed the Pilotage Service provider to request an urgent pilot for *Klima* to shift. In the meantime, on hearing the ship's whistle, the chief officer looked up and saw *Spring Snow* very close on *Klima*'s beam. At 0644, bunker barge *Libra* and *Klima*'s hull (in way of cargo hold no. 4), made contact with *Spring Snow*'s stem and anchor cable.

No oil pollution was reported and no crew members on board *Klima*, *Spring Snow* and *Libra* suffered any injuries.

### Post allision events

As a result of the impact, *Libra*'s moorings parted, and she was adrift. *Spring Snow* retained her anchor position but sustained structural damages to her bow and bulbous bow. *Klima* also reported hull breach in way of cargo hold no. 4, with ensuing water ingress. *Klima*'s master reported the allision to the port authorities and reiterated his request for a pilot. The third officer, who

was asleep at the time, arrived on the bridge and was instructed to save the VDR data. At 0700, a pilot boarded the vessel and *Klima* was re-anchored at Eastern Bunkering C Anchorage in position 01° 16.3' N 103° 58.2' E.

### Structural damages

The following damage was identified during damage surveys carried out by the respective vessels' classification societies.

#### *Klima*:

- Shell plating port side (Frame 100 to 105) in way of cargo hold no. 4 and rupturing of double bottom ballast tank no. 4;
- Liferafts and embarkation ladder port side damaged;
- Railing, fish plate and deck in way of A-deck buckled and dented;
- Railing, fish plate and deck in way of B-deck buckled and dented;
- Double bottom tank no. 5 port side air vent broken.

#### *Spring Snow*:

- Bulbous bow starboard side in way of fore peak tank hull structure and associated web frames and stiffeners dented;
- Starboard side hull in way of bosun store at upper deck buckled;
- Starboard side in way of forward void space holed measuring and associated web frames and stiffeners deformed.

#### *Libra*:

Port side forecastle:

- Guardrails with stanchions and bulwark deformed and partly torn;
- Shell plating and internal structures in way of mooring line distorted;

<sup>6</sup> The records in the Bell Book indicate that the telegraph was put on full ahead at 0641:30s.

- Port anchor fractured from anchor shank and lost;
- Deck plating in way of paint store corrugated and cracked; fairleads, rollers and bollards collapsed;
- Part of bulkhead at frame 100 deformed;
- Handrails of ladder to forecastle deck fractured.

Starboard side forecastle:

- Guardrails and stanchions deformed and torn;
- Shell and deck plating in way of forward hydraulic control room indented, corrugated and cracked. Frames thereon along with forecastle deck distorted and fractured;
- Handrails of ladder to forecastle deck fractured;
- Part of bulkhead at frame 100 pressed and deformed.

Water ballast tank no. 1:

- Port side sheer strake from frame 85 to frame 92 bent;
- Starboard side shell plating from frame 85 to frame 100 indented;
- Starboard side web 88, 92 and 96 and regular frames in way of ballast tank distorted at upper end;
- Starboard side part of platform deformed.

Water ballast tank no. 2:

- Starboard side air pipe from lower part fractured.

### Voyage data recorder

Analysis of information captured by the VDR is vital in understanding the dynamics of events leading to the accident. It gives insight into the navigational manoeuvres, conversations with ships, port authorities and amongst the bridge team members. The process for saving VDR data is simple and straight forward although it may vary from one ship to another.

Following the allision, a VDR technician boarded the vessel and VDR data between 04 July 2019/1400 (UTC) and 05 July 2019/1720 (UTC) was extracted. However, conversation between the bridge team members was not recorded and the navigational information including radar image between 0520 and 0658, covering the events leading to the allision were missing. The MSIU was informed that the VDR technician was unable to identify the technical reasons for the missing critical data<sup>7</sup>, considering that the VDR recorded normally before and after the identified gap.

Thus, to analyse the events and determine the underlying factors to this allision, the safety investigation focused on *Klima*'s video recording of the ECDIS playback, crew statements and interviews, AIS track and VHF communication recorded by the Maritime and Port Authority of Singapore (MPA), and documentary evidence submitted by *Libra* and *Spring Snow*.

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<sup>7</sup> It must be clarified that the last Annual Performance Test on the VDR was carried out on 24 December 2018 at Santos, Brazil in accordance with SOLAS regulation V/18.8 and MSC.1/Circ.1222. The identified technical issues were resolved. The Service report was valid until 23 December 2019 and until the next annual re-validation of the certificate.

## ANALYSIS

### Aim

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, and to prevent further marine casualties or incidents from occurring in the future.

### Cooperation

During the course of this safety investigation, the MSIU received all the necessary assistance and cooperation from the Transport Safety Investigation Bureau of Singapore and the Deputy Commissioner of Maritime Affairs, Marshall Islands.

### Conflicting Information

Information given by the master and the OOW, though largely compatible, carried several details which the safety investigation could not collaborate with other sources of information. These included:

- The OOW stated that before the master arrived on the bridge, he called *Anatoli* and East Control to discuss the developing situation and that he was told to call the pilots. However, records of radio communication were neither in the ship's VDR nor in the audio recordings submitted by Singapore MPA;
- The master's statement of walking back the anchor in gear to six shackles, was not substantiated by the chief officer who was manning the anchor station;
- Arriving on the bridge at around 0520, the master stated that he called East Control on VHF channels 12, 14 and 20 for pilotage service and was informed that no pilots were available. The safety investigation found no record of the master's communication in the MPA's VHF radio log. The pilots confirmed that they received no request for pilotage service from *Klima*;

- Radar images at 0525 showed a distance of around two cables between *Klima* and *Anatoli* and not 1.2 cables as reported by the OOW;
- In the statement of facts, the master stated that the Westerly currents were very strong (about three knots). However, several months later, during the safety investigation, he informed the MSIU that he had not been notified by the OOW on the direction and rate of tidal stream. Then, information available to the Company, and provided to the safety investigation, suggested that tidal streams were discussed between the pilot and the bridge team;
- The Company stated that the master had not been properly informed of the bunkering operations and about the presence of the bunker barge alongside.

### Alcohol and drugs

The Company policy prohibited the possession and use of illegal drugs. The Company's requirements on the consumption and distribution of alcohol met the International Chamber of Shipping guidelines and had been implemented on board *Klima*. In this respect, alcohol breathalyser tests on crew members were done either on a monthly basis, or when directed by the Company.

On 05 July 2019, shortly after the allision, the master carried out alcohol test on the crew members that were on duty in the engine-room and on deck. The test results were negative (0%). Alcohol was therefore not considered to be a contributing factor to this allision.

### Fatigue

The records of 'Hours of Work and Rest' of the bridge team were in compliance with the international requirements of the MLC and the STCW Convention. However, the safety investigation noted that on 04 July, a day

before the allision, the master was on duty between 0800 and 1200, and again from 1600 until her arrival at Singapore. He left the bridge to take a rest at 0200. However, shortly after 0500, he was called on the bridge to manage the challenging situation. Therefore, although fatigue had not been considered as a definite cause of the allision, the safety investigation did bear in mind that the master had several demanding hours, which may have affected his cognitive decision-making process.

### **Bridge manning**

The Company's safety management system (SMS) procedures were collated in the vessel's Bridge Manual. Manning and composition of the bridge and the engine-room were detailed in Chapter 8 of the Manual. Accordingly, minimum manning at anchor watch consisted of the OOW and lookout. The recommended manning under pilotage and when the vessel was in restricted waters, was described in level 3. In addition to the pilot, level 3 manning included the master, the OOW, the helmsman and a lookout.

Documents made available to the safety investigation indicated that the manning on the bridge during the manoeuvre to re-anchor was less than the minimum recommended in the SMS Manual, potentially affecting the cognitive workload on the bridge<sup>8</sup>.

### **VHF logbook**

A section in the vessel's Bridge Manual entitled 'VHF Logbook' required that officers maintain a logbook and log the time the VHF was switched on, radio channel(s) used, the time the message was received or transmitted, and details of the subject discussed or communicated. During the collection of evidence on board, it was discovered that the recommended VHF

logbook was not maintained and key elements of VHF communications relevant to the allision were not recorded in the deck logbook.

### **Guidance on anchoring**

*Klima's* SMS provided instructions and guidance on anchoring and anchor watch. Chapter 5 of the Bridge Manual advised masters to take into account weather and tidal conditions, and approach anchorage from the direction the ships of similar type, size and draft are heading so that manoeuvring in restricted area is minimized.

While available information suggested that the tidal stream was discussed between the pilot and the bridge team, and its effect on manoeuvring had been validated and documented in 'Preparation for Anchoring Form F.NAV.8', tidal details, however, were not entered in the Form. Information on tides and tidal stream was also neither shown in the passage plan, nor disclosed in the pilot card. It therefore seemed likely that during manoeuvring to re-anchor the vessel, the direction and strength of the current was not considered.

The fact that *Klima* was brought up within a few minutes of dropping anchor, at a time when tidal stream was changing direction (slack water), suggested that either the anchor chain may have not been leading ahead, or not taut when she was reportedly brought up.

### **Conduct of anchor watch**

Navigating officers on anchor watch are responsible for drawing drag and swing circles on the primary chart. In addition, they must frequently check position by visual and electronic means, and watch movement of ships in close proximity. Details of how drag and swing circles are constructed and plotted on the chart were provided in the Bridge Manual.

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<sup>8</sup> The situation at the time was dynamic and evolving. Hence, new data would have been constantly received by the bridge team members.

When *Klima* dropped her anchor at ESPA, the tidal stream had turned and began to set to the Northeast and was predicted to reach a maximum rate of 2.5 knots at 0600. Thus, given the predicted tidal stream and in proximity of vessels, constant monitoring of the anchor position was required. Evidence submitted to the MSIU suggested that only hourly GPS positions had been logged.

As the tidal stream intensified, the vessel started to yaw. In these circumstances, the anchor's holding power can be adversely affected and surge or snatching of the cable at the extremity of her yaw may ease the anchor out of its holding position. Following the accident, the MSIU was informed that an alert<sup>9</sup> was displayed at 0422 on the second ECDIS, indicating 'dragging of anchor'. This alert was not detected when it first

appeared and consequently, the master had not been informed. During the safety investigation, the MSIU could not determine why the alert had been missed by the OOW. Given that the recommended drag and swing circles had not been plotted on the paper chart, the OOW had no way of discerning whether *Klima* lay inside or outside her anchor watch circle.

Available information suggested that shortly after 0500, severe yaw exacerbated the vessel's rotational motion towards *Anatoli* (Figure 4), which alarmed and induced the OOW to call the master on the bridge. Nonetheless, analysis of the prevailing conditions suggested that although the situation seemed alarming, *Klima* was in no immediate danger and *Anatoli* was nowhere near the 1.2 cables as reported by the OOW.

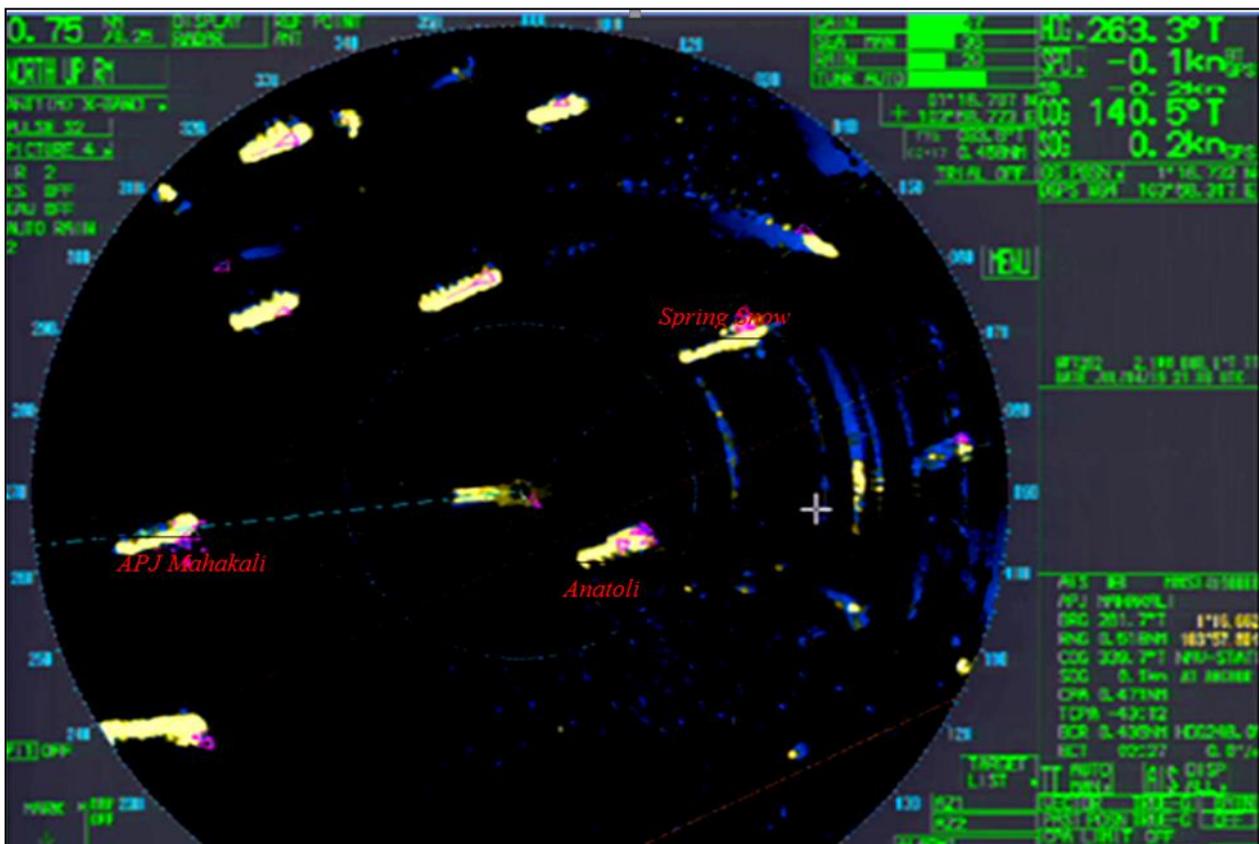


Figure 4: Image from X-band radar (Scale 0.75 nm) showing *Klima*'s anchor position at 0508

<sup>9</sup> Limits of the anchor dragging circle on the second ECDIS were not submitted to the MSIU.

### Assessment of events leading to the allision

Navigation in any restricted waters requires careful planning, and enhanced situational awareness, considering potential close quarter situations which could result in collisions. Whilst vessel size and engine power impose restrictions on manoeuvrability, the operation itself would require extreme caution, advance planning and evaluation of inherent risks of moving about in unfamiliar waters. In this accident, the situation was even more complex as a result of the influence of tidal stream on vessel's manoeuvrability.

Evidence showed that the master observed the vessel's position on the radar and ECDIS upon being called to the bridge. At that moment, *Klima* was about two cables from *Anatoli* (Figure 5). As noted above, there was no immediate danger although yaw and sporadic rotational motion may have brought her unacceptably close to *Anatoli*.

Nonetheless, dropping the second anchor to

arrest dragging or engaging steering gear and / or main engine to relieve yaw motions were not considered. Instead, the master decided to move and re-anchor on his own. There was no contingency plan, taking into consideration that the risks of moving a vessel in restricted waters were not assessed, and the intended manoeuvres were neither communicated to the chief officer nor discussed with the OOW. Moreover, the port authorities had not been informed, and the timely assistance of a local pilot had not been requested before moving the vessel to re-anchor.

The master's decision and actions need to be seen within a wider context rather than in isolation. Presented with the evolving situation when he arrived on the bridge, the master made his own analysis, based on his understanding and position at the time. It was clear to the safety investigation that the master had two general options – and the decisions taken as described above, would have fallen under one of the options available.

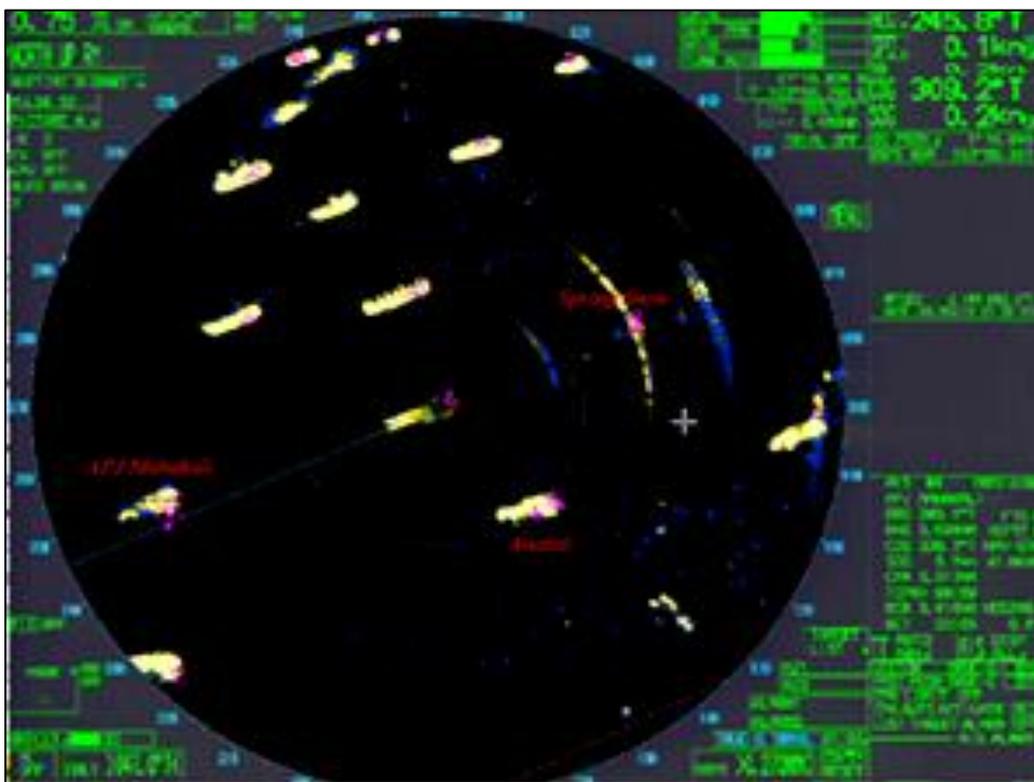


Figure 5: Image from X-band radar (Scale 0.75 nm) showing *Klima*'s position at 0520

In terms of outcomes, those decisions, as taken by the master, would have been at the time deemed as the most advantageous by shifting the vessel without a pilot.

Naturally, any of the available options, irrespective of which one was taken by the master, was not free from the risk of an adverse outcome. The absence of informative communication led to different mental models on the bridge.

The OOW did not question the master's intended actions and assumed that the master would kick the engine ahead and drop anchor. The extended manoeuvre to port and then starboard to arrive at the previously occupied position or another position were anticipated neither by the OOW nor by the chief officer.

Whilst the crew were engaged preparing the anchors and the bridge team engrossed with the vessel manoeuvring in limited space, *Libra's* incessant calls to let go her lines were missed.

Thus, the perceived and actual situations were not aligned, leading to the collision. In particular, the course of *Klima's* movement to secure a suitable anchor position, proximity of anchored vessels, impact of tidal stream on manoeuvrability and the limited options available to the master to counter the vessel's drift towards *Spring Snow* (Figure 6) had contributed to the complexity of the already evolving situation.



**Figure 6: AIS showing *Klima's* track and collision with *Spring Snow***

Source: Company internal investigation / Singapore MPA

## CONCLUSIONS

1. *Klima* dragged her anchor because of severe yaw and surge on her cable which eased her anchor from its holding position;
2. Although ECDIS was fitted on board, paper charts were the primary means of navigation. The recommended anchor watch markers (drag and swing circles) were not plotted on the paper chart. There was no indication of whether anchor positions logged by the OOW lay inside or outside the anchor watch circle;
3. Considering the tidal stream, yaw, and close proximity of other vessels, monitoring / logging of anchor position at an interval of one hour was not appropriate;
4. The anchor dragging alarm displayed on the second ECDIS was ineffective and did not immediately draw the watchkeeper's attention;
5. Neither the master nor the watchkeeper broadcasted a warning to other vessels that *Klima* was dragging anchor, call pilots for assistance or alert East Control to the developing situation;
6. Weighing of anchor and re-anchoring were unplanned and no particular attention was given to the tidal stream's direction, rate, or its influence on vessel's manoeuvrability;
7. *Klima* was unable to move swiftly because there was insufficient time to develop speed and arrest the vessel's drift towards *Spring Snow*;
8. VHF logbook recommended by the Ship's SMS procedures was not kept on board and key communications relevant to the incident were not logged in the deck logbook;
9. *Libra*'s calls went unnoticed because *Klima*'s crew members were engaged in preparing the anchors and the bridge

team was focussed on manoeuvring *Klima*;

10. It was not excluded that fatigue may have affected the master's assessment of the situation and subsequent actions on the bridge.

## SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION<sup>10</sup>

The following corrective actions were taken by *Klima*'s managers:

- A safety bulletin was communicated to all vessels managed by the Company;
- Lessons learnt will be taken into account in forthcoming risk assessments and incorporated in the office's and vessel's risk assessment libraries;
- Prior to re-employment, the master and additional chief officer were required to undergo a training programme in Managing Stress and Bridge Resource Management and Ship Handling Simulator course;
- Additional internal / external navigational audits were agreed to be carried out on completion of repairs;
- Additional training material / DVD has been prepared and a safety campaign on managing collision avoidance at sea was introduced on board Company ships;
- All masters are required to be briefed on this accident prior to their employment;
- This allision will be discussed during the Company's annual safety seminars;

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<sup>10</sup> Safety actions shall not create a presumption of blame and / or liability.

- An extra Management Review Meeting will be convened in order to discuss the results of the investigation and agree on the further actions to be taken to prevent reoccurrence. The Management Review Meeting will mainly focus on the recruitment process for masters and navigating officers.

**SHIP PARTICULARS**

Name:	<i>Klima</i>	<i>Spring Snow</i>	<i>Libra</i>
Flag:	Malta	Marshal Islands	Singapore
Classification Society:	Bureau Veritas	Bureau Veritas	CCS
IMO Number:	9594561	9473274	9568744
Type:	Bulk Carrier	Bulk Carrier	Product Tanker
Registered Owner:	Dearborn Shipping Co.	Felix Bulk Carrier SA	New Maritime Pte Ltd
Managers:	Dearborn Shipping Co.	Kassian Maritime Navigation Agency Ltd	New Maritime Pte Ltd
Construction:	Steel	Steel	Steel
Length overall:	189.99 m	225.00 m	76.85 m
Registered Length:	185.64 m	Unknown	Unknown
Gross Tonnage:	33,044	41,074	1,912
Minimum Safe Manning:	14	16	6
Authorised Cargo:	Dry bulk	Dry bulk	Bunker fuel
Port of Departure:	Dhamra, India	Unknown	Singapore
Port of Arrival:	Singapore	Singapore	Singapore
Type of Voyage:	International	Unknown	Coastal
Cargo Information:	50,000 tonnes of Iron ore fines/pellets	Unknown	Gasoil
Manning:	24	23	9
Date and Time:	05 July 2019 at 0644 (LT)		
Type of Marine Casualty or Incident:	Serious Marine Casualty		
Location of Incident:	Eastern Special Purposes Anchorage 'A'		
Place on Board:	Overside	Bow/bulbous bow	Overside
Injuries/Fatalities:	None	None	None
Damage/Environmental Impact:	None	None	None
Ship Operation:	Anchoring/manoeuvring	On anchor	Moored alongside <i>Klima</i>
Voyage Segment:	Arrival	Arrival	Internal
External & Internal Environment:	Wind North-westerly Beaufort Force 2. Sea state slight and visibility up to eight nautical miles. The air temperature was 29 °C.		
Persons on Board:	24	23	9