

# **Final Report**

## **MAN OVERBOARD FROM GREEK REGISTERED BULK CARRIER ANGELIC GLORY AT EASTERN SPECIAL PURPOSE ANCHORAGE, SINGAPORE ON 23 OCTOBER 2019**

MIB/MAI/CAS.074

Transport Safety Investigation Bureau  
Ministry of Transport  
Singapore

24 February 2021

## **The Transport Safety Investigation Bureau of Singapore**

*The Transport Safety Investigation Bureau (TSIB) is the air, marine and rail accidents and incidents investigation authority in Singapore. Its mission is to promote transport safety through the conduct of independent investigations into air, marine and rail accidents and incidents.*

*TSIB conducts marine safety investigations in accordance with the Casualty Investigation Code under SOLAS Regulation XI-1/6 adopted by the International Maritime Organization (IMO) Resolution MSC 255(84).*

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## **SYNOPSIS**

The Greek registered bulk carrier Angelic Glory (AG) called the port of Singapore on 23 October 2019 for bunkering at Eastern Special Purpose Anchorage. In addition, some other activities such as maintenance work was planned on the vessel's air-conditioning system.

After performing maintenance work for the day, at about 1700H, four shore technicians (which included one Supervisor) waited for a launch boat (LES Swift, a supply boat) to disembark the vessel. Weather conditions were noted to be windy, the sea was choppy, and it had just started to rain. On seeing the approaching launch boat, the AG's deck crew lowered the port side accommodation ladder and the Supervisor led the technicians down. When the boat was near the accommodation ladder, the Supervisor was in the process of stepping on to the boat from the bottom platform of the accommodation ladder, when it tilted downwards, causing the Supervisor to fall into the sea. The AG's crew and the launch boat's skipper, each deployed a lifebuoy towards the Supervisor in the water. Despite their attempts to rescue the Supervisor, the Supervisor was swept by the current away from AG.

The Maritime and Port Authority (MPA) of Singapore coordinated the search and rescue operation which involved the Police Coast Guard (PCG) and Singapore Civil Defence Force. The MPA and PCG recovered a body around 0704H on 24 October 2019 off Eastern Bunkering Bravo Anchorage, which was later identified as that of the Supervisor.

The Transport Safety Investigation Bureau classified the occurrence as a very serious marine casualty.

The investigation revealed that the bottom platform, which was not properly secured, tilted downwards when the launch boat made a contact with the accommodation ladder. The locking pins for securing the bottom platform were likely fabricated on board, did not have any means to lock them in place and had not been inserted fully into the slots of the accommodation ladder.

The investigation also revealed that there was a lack of supervision in the rigging of the accommodation ladder. The frequency of inspection of the accommodation ladder was not as per the recommended guidelines and the inspection was also overdue as per the vessel's planned maintenance system. In addition, there was no process in place on board the launch boat as well as on the AG, to ensure that lifejackets were worn for transfers at the anchorage.

The investigation also noted with concern that the one-man operation of launch boat posed a risk for transfer of persons between vessels at anchorage.

## VIEW OF VESSELS



**Angelic Glory**



**LES Swift**

## DETAILS OF VESSEL

Name	AG	LES Swift (LS)
IMO Number	9261798	-
Call sign / License no.	SVCT	SC 4931C
Classification society	American Bureau of Shipping	-
Ship type	Bulk carrier	Supply boat (Harbour craft)
Year Built	2001	2019
Owner	Owner: Angeliki Doxa Investment Corporation	Launch Express Service (ISM Code not applicable)
Operator / ISM <sup>1</sup> Managers	Phelix Shipping Ventures Private Limited <sup>2</sup>	
Gross tonnage	40,597	24.5
Length overall	225.0m	14.5m
Breadth	32.3m	4.0m
Designed Draft	14.3m	1.5m
Summer Freeboard	5.3m	-
Main engine(s)	HD-B&W 5S60 MC-C (5 cylinders)	SDEC Power 1 x 340 kW @ 2100 rpm

<sup>1</sup> International management code for the safe operation of ships and for pollution prevention.

<sup>2</sup> The Company ceased the management of AG since 28 January 2020. The new management was thereafter taken over by the Panthalassa Maritime Group.

# 1 FACTUAL INFORMATION

All times used in this report are Singapore Local Time (LT) unless otherwise stated. Singapore Local Time is eight hours ahead of Coordinated Universal Time (UTC).

## 1.1 Narrative

- 1.1.1 The bulk carrier AG which was en-route from Santos (Brazil) to Bayuquan (China) had anchored in Singapore Eastern Special Purpose Anchorage (AESPA) on 23 October 2019 at about 0430H for bunkering and scheduled maintenance works. The Company of AG had arranged for an engineering firm<sup>3</sup>, Rex Marine & Engineering Pte Ltd (RME), to carry out some maintenance work on the air-conditioning system on the same day.
- 1.1.2 A team of four technicians (comprising the Supervisor and three others) from RME was scheduled<sup>4</sup> to board a launch boat at about 0500H from Marina South Pier<sup>5</sup> (MSP), but due to some delays by the launch operator, could not depart as scheduled. The four technicians eventually departed the pier at about 0600H in the launch boat, LS, which was operated by one boat skipper<sup>6</sup>.
- 1.1.3 The LS arrived at the location where the AG was anchored at about 0630H. Another launch boat was moored to the AG's port side and was in the process of supplying stores. On the starboard side, a bunker barge was moored. The skipper of LS arranged for the four technicians to transfer to the bunker barge and from there, they embarked<sup>7</sup> the AG to carry out the assigned work.
- 1.1.4 By about 1700H, the technicians had completed their work and waited for the launch boat to arrive. On seeing the launch boat approaching the vessel, the AG's crew lowered the port accommodation ladder which was fitted near the aft of the accommodation – facing forward (see **figure 1**). The technicians

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<sup>3</sup> RME is registered in Singapore.

<sup>4</sup> Prior to the scheduled embarkation, three of the four technicians went to RME's workshop to pick up the required tools for the planned job.

<sup>5</sup> Is primarily used for embarkation of ship / shore personnel, performing various tasks on board vessels at the anchorage.

<sup>6</sup> The skipper held qualifications (Port Limit Steersman) appropriate for operating the boat of this size and was certificated by the Maritime and Port Authority of Singapore (MPA). It was not a mandatory requirement for boats in Singapore of this size and engine capacity to be manned by another person.

<sup>7</sup> It could not be established what embarkation means were used by the technicians. It was probable that the technicians had embarked using the accommodation ladder fitted at the midship of the AG.



commenced<sup>8</sup> their descent with the Supervisor first in line. One able seafarer deck (ASD-1), who held the remote control of the accommodation ladder stood on the main deck, had a clear view of the bottom platform of the accommodation ladder.



Figure 1 – Port side accommodation ladder – *Annotations by TSIB*

- 1.1.5 By the time the LS was making its approach, the ASD-1 and the technicians (two of whom were standing on the steps of the accommodation ladder) recalled that the Supervisor was standing on the bottom platform. Recalling further that the sea condition<sup>9</sup> was a bit choppy, the ASD-1 noted that the bow of the LS briefly touched the bottom platform. Within a split second, the bottom platform tilted downwards, causing the Supervisor to fall into the sea (see **figure 2**).

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<sup>8</sup> The company had provided seven lifejackets for use when performing work at the anchorage (in accordance with Singapore's regulations, employers are to provide suitable life jackets or other equipment for keeping their employees afloat if they fall into the water). There was no procedural requirement by the company for the technicians to carry and wear the lifejackets when transferring at the anchorage. At the time of disembarkation, none of the technicians were wearing a lifejacket.

<sup>9</sup> The AG Master's incident report to MPA stated that the weather condition was good visibility, with rain (shower), and slight sea swell, wind ENE (East-North-East) Beaufort wind force scale 3 – 4. Refer to paragraph 1.8.



Figure 2 – Tilted bottom platform at the hinges and locations of locking pins (circled in red) – *Annotations by TSIB*

- 1.1.6 The ASD-1 immediately threw a lifebuoy into the sea towards the Supervisor and alerted the officer of the watch on the bridge of the Man Overboard (MOB) situation. At the time of incident occurrence, the Master<sup>10</sup> was having some discussions with the Superintendent<sup>11</sup> in his cabin. The Chief Officer was with the Bosun<sup>12</sup> in the vicinity of the accommodation ladder on deck but was not a witness to the incident.
- 1.1.7 The AG's crew in the vicinity along with the three technicians maintained visual contact of the Supervisor until the Supervisor disappeared underwater and could not be sighted further.
- 1.1.8 The MPA's Marine Safety Control Centre was notified on Ch 07 and MPA's patrol boat was dispatched for on-scene assistance.
- 1.2 **Additional information from the LS' skipper**
- 1.2.1 When the Supervisor was about to transfer from the accommodation ladder to the LS, the LS made a 'touch' contact with the bottom of the accommodation ladder in order to minimise the gap between LS and the accommodation ladder to allow the Supervisor to safely cross over to the bow of LS (see **figure 3**). Just about this time, the bottom platform (painted yellow) of the accommodation ladder tilted down causing the Supervisor to fall into the sea.

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<sup>10</sup> Signed on the AG three hours before the incident.

<sup>11</sup> Had embarked the vessel since the Company had just taken over the vessel in April 2019. The Superintendent intended to sail with the vessel to carry out inspections and audits during the voyage.

<sup>12</sup> Also signed-on with the Master

The Supervisor did not hit the LS while falling into the sea.

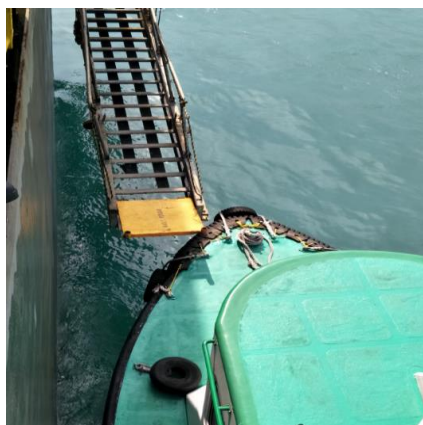


Figure 3 – Illustration of LS approaching the accommodation ladder before the occurrence – Simulated (according to the skipper’s account) during TSIB’s visit on the AG after the occurrence

1.2.2 Realising that the Supervisor had fallen into the sea, the LS’ skipper immediately reversed his boat to clear the area. The skipper noticed that the Supervisor was conscious but had started to drift towards the AG’s aft, the skipper then manoeuvred the boat towards aft. The skipper also recalled seeing the AG’s crew had thrown a lifebuoy, but the Supervisor was unable to reach it. Another lifebuoy was deployed by the skipper from the boat, but by then the Supervisor had gone underwater.

### 1.3 **Additional information by the shore technicians**

1.3.1 From the interview with the three technicians (T-1, T-2 and T-3), the investigation team noted that the team was to deploy at 0430H on 23 October 2019 for maintenance works on the AG at AESPA. The T-1 along with two other technicians prepared the tools, including lifejackets which were set aside in the office the previous night at around 2000H.

1.3.2 On the deployment day at about 0430H, the three technicians loaded the tools into the lorry while the Supervisor was handling paper documents and waiting in the lorry. Upon arrival at the MSP, the Supervisor noticed the missing lifejackets, reprimanded the technicians for their oversight. On being asked, the technicians informed the investigation team that there was no attempt made thereafter to arrange for lifejackets, and that during the team’s journey

in the boat and transfer from the LS to the AG via the bunker barge, no one called out the team for not donning a lifejacket. The technicians embarked the AG uneventfully.

- 1.3.3 While preparing for disembarkation on completion of the job, the technicians recalled squally weather in the vicinity, but it had not started raining yet when the LS was approaching the AG. The technicians stated that all the four of them were not carrying anything and had both hands free, and that a bucket (with the work tools) was lowered down to the supply boat by the AG's crew. The technicians recalled the Supervisor warning them that wind was picking up and it had just about started to rain. The LS was riding the choppy sea due to the swell as it approached the accommodation ladder.
- 1.3.4 The technicians<sup>13</sup> saw that the Supervisor had descended the accommodation ladder and as the Supervisor had lifted one leg up from the bottom platform to put on the bow of the LS, the LS' bow contacted and lifted the bottom platform briefly, and thereafter the Supervisor fell into the sea. The LS was seen backing away and manoeuvred towards the Supervisor as the Supervisor drifted towards the stern of AG but within about five to ten minutes, the Supervisor went underwater and could not be seen.
- 1.3.5 The three technicians stayed on board the AG until about 2030H before leaving the vessel by the pilot ladder. The AG's crew subsequently provided them lifejackets for the disembarkation to the launch boat.

#### 1.4 **Engineering firm, RME**

- 1.4.1 RME essentially served the manufacturing and marine industries, with the latter focusing on marine refrigeration systems. From interviews with the technicians, it was noted that they were provided with an induction briefing upon joining the firm and familiarised with generic risk assessments. For every deployment, they would start and end at the office where risk assessment(s) and job analysis briefing (safety briefing) by the Operations Manager (OM) would be carried out. Sometimes the briefing would be done by the Supervisor at the office or on-site, relating to the job being performed.
- 1.4.2 On being asked whether any risk assessment was shared by the Supervisor

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<sup>13</sup> According to T-1 and T-2 who were near the top platform of the accommodation ladder. T-3 was on the main deck and did not witness the incident.

during the safety briefing, the technicians informed that they were aware of the materials in the office which were maintained by the OM but could not recall specific risks being briefed. The technicians added that they were briefed by the Supervisor at around 1930H on the previous day and that the OM had briefed the Supervisor separately. The technicians shared that generally, in such a briefing, they were asked to take care of themselves when they go on board. There were no specific safety instructions about wearing the lifejacket, but a mention to maintain three-point contact when climbing up or down the ladder.

1.4.3 Each employee was provided a set<sup>14</sup> of Personal Protective Equipment (PPE) which was kept in lockers at the office.

1.4.4 Reviewing additional information obtained from RME, the investigation team noted that the company did not have any specific procedures at the time of occurrence relating to work at the anchorage. After the occurrence, RME introduced a new standard operating procedure (SOP) for 'Safe Work Procedure at Anchorage', which provided clear safety instructions to all employees working on board vessels at anchorage. The investigation team noted that a briefing for this SOP was attended by all the employees at RME on 8 November 2019.

1.4.5 The Supervisor had about 20 years of experience as a technician with the company. He worked five and a half days per week. As part of the Ministry of Manpower's requirements, the Supervisor had undergone several types of training as required for Shipyard Safety Instruction Course (SIC) since 2008, with the most recent SIC for hot work conducted on 23 September 2019.

1.4.6 Work experience for the team members are as per **Table 1**.

Team member	Experience as Technician	Experience with RME	No. of working days <sup>15</sup> in a week	Nationality
Supervisor (deceased)	20 years	20 years	5.5 days	Malaysian

<sup>14</sup> PPE included safety helmet, safety gloves, safety shoes, safety goggles, ear plugs and a safety belt. At the time of the occurrence, the technicians were wearing safety shoes and using safety gloves.

<sup>15</sup> Typical working hours were those of a normal day but may commence early if deployment on the ship was to start early.

T-1	4 years	4 years	5.5 days	Indian
T-2	8 years	8 years	5.5 days	Indian
T-3	6 years	6 years	5.5 days	Bangladeshi

Table 1 – Working experience and matrix of the technicians

## 1.5 Launch Express Service (LES)

1.5.1 Launch Express Service was a launch service<sup>16</sup> provider established since 1989 and owned six harbour crafts that were licensed by the MPA.

1.5.2 There were no specific safety related instructions for the skippers of their fleet relating to ferrying passengers, crew, stores, etc. to and from ships at anchor. There were no instructions in place for passengers embarking/disembarking from ship at anchor on donning of floatation device (lifejacket).

1.5.3 According to LS' Harbour Craft Licence, the minimum manning<sup>17</sup> requirement for the craft was a Port Limit Steersman. The LS was operated by a single person (the skipper) who had around 10 – 11 years of experience operating harbour craft in that capacity in Singapore waters. The skipper had been with this company for about 11 months, of which five were spent operating the LS. He had a two-day work routine (six to eight hours per day) and the incident occurred on his second workday.

## 1.6 Accommodation ladder

1.6.1 The investigation team documented the condition of the accommodation ladder on board the AG after the occurrence. The bottom platform of both the port and starboard ladders were painted with anti-skid material and appeared to be in clean condition. The bottom platform of the port ladder did not have stanchion

<sup>16</sup> Provision of transportation services to anchorages, terminals and various islands within Singapore port limits, up to 12 passengers.

<sup>17</sup> According to the MPA (Harbour Craft) Regulations, Fourth Schedule (Regulation 24) Minimum licensed manning requirements – for a mechanically propelled harbour craft (SC) carrying not more than 12 passengers, less than 100 gross tonnage, and engine shaft power less than 400 kilowatt: -

- Deck manning licence – a Port Limit Steersman
- Engine manning licence – **none**, if full engine and rudder control is provided at steering position. Otherwise, a Port Limit Engine Driver (Third Class)

poles<sup>18</sup> and safety ropes had not been extended all the way to the bottom platform at the time of the occurrence.

1.6.2 The bottom platform was attached to the accommodation ladder on a hinged bar and moved about it. To secure the bottom platform to the accommodation ladder, a locking pin on each side of the bottom platform was to be inserted into holes (slots) on the frame of the accommodation ladder so that it could be held in position at different levels depending on the freeboard of the vessel. There was no damage to or deformation of the locking pins as a result of the occurrence.

1.6.3 Both the locking pins of the port<sup>19</sup> accommodation ladder appeared to be in a reasonably good condition but were noted to be of a different size and type. The locking pins had a long tip each (circled in red in **figure 4**) that was essentially to prevent the locking pin from coming out of its housing position. A closer inspection of the locking pins by the investigation team indicated that the pins did not look original and may have been fabricated/modified. The fabricated locking pins did not seem to fit fully into the slots.

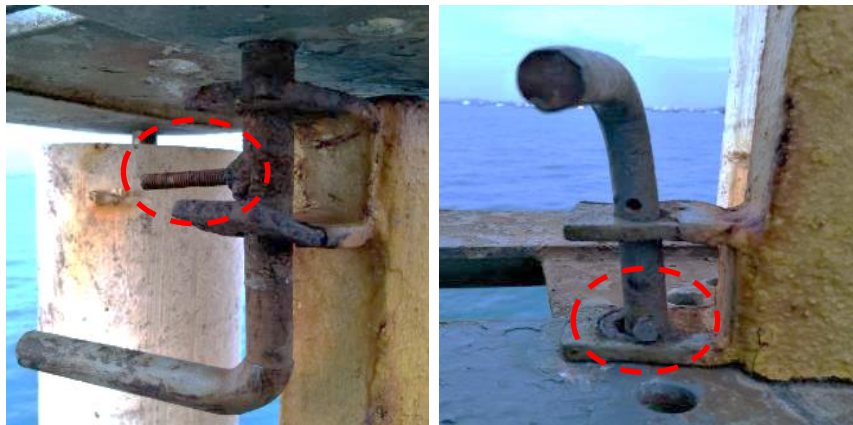


Figure 4 – Image on the left shows the outboard locking pin of the port accommodation ladder. Image on the right shows the inboard locking pin of the same ladder – *Annotations by TSIB.*

1.6.4 Once inserted into a slot, there was no locking mechanism to prevent the

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<sup>18</sup> Provides a means for a person standing on the bottom platform to hold on should the person lose balance due to unforeseen circumstances.

<sup>19</sup> The locking pins on the starboard accommodation ladder appeared to be older and corroded. In contrast, the ones on the port side were relatively new and of a different type.



locking pins from dislodging from the slot<sup>20</sup> (see **figure 5**). It could not be established whether this design was a part of the original design that came with the accommodation ladder<sup>21</sup>.

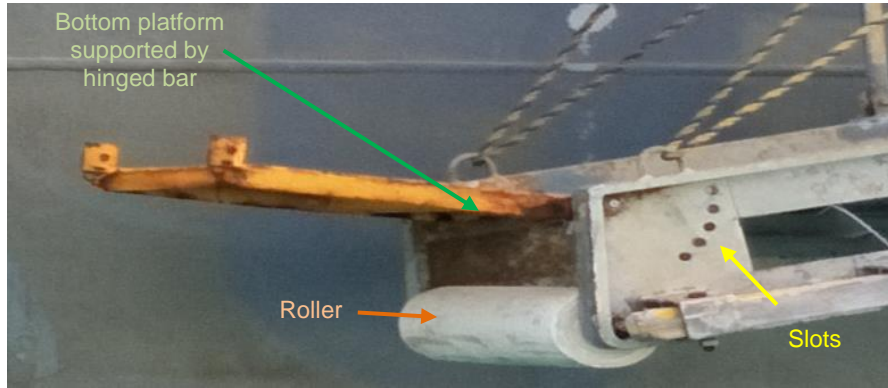


Figure 5 – Clockwise from top – Side view of port accommodation ladder, slots for inserting the locking pin (port side and starboard side) – *Annotations by TSIB*

- 1.6.5 A check on the locking pins of the starboard accommodation ladder indicated that the locking pins appeared to be of a similar size, but in a poorer condition. The locking pins on this side too had a long tip each (circled in red in **figure 6**) that was essentially to prevent the locking pin from coming out of its housing. The long tips of these locking pins were shorter than those of the locking pins

<sup>20</sup> There were five slots (holes) for each pin for varying positions, depending on the freeboard of the vessel. The adjustment of the bottom platform to these slots was part of the rigging process of the accommodation ladder.

<sup>21</sup> A check on the drawings of the ladder indicated that the ladder was fitted at the shipyard when the ship was built. The drawings of the ladder were obtained from the shipyard with the assistance of ABS. The details of the locking pins were not clear from the drawings.



on the port side.



Figure 6 – Image on the left shows the outboard locking pin of the starboard accommodation ladder. Image on the right shows the inboard locking pin of the same ladder – *Annotations by TSIB.*

1.6.6 The accommodation ladder was fitted with a wooden fender, referred to as a boat spar / chafing pad which was typical on most designs of accommodation ladders in the marine industry (see **figure 7**). The primary purpose of the boat spar, when extended, was to allow launch boats to chafe along without directly contacting the accommodation ladder when coming alongside.

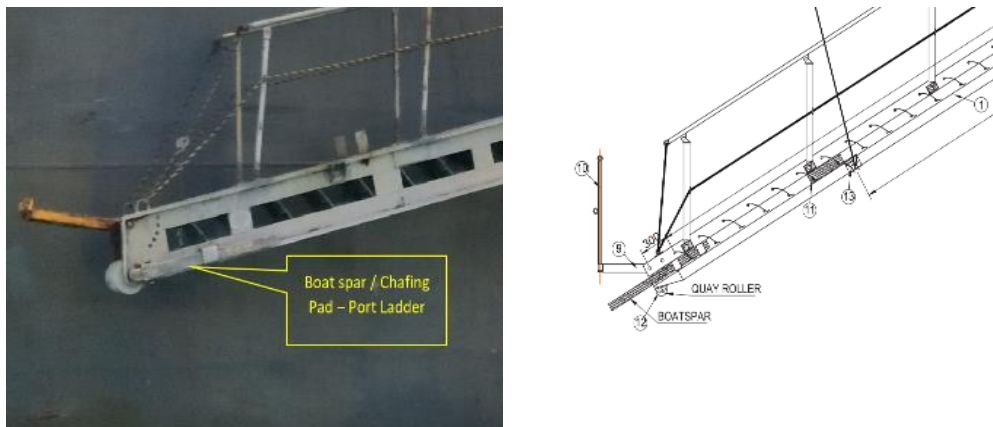


Figure 7 – Image on the left shows the boat spar of the port accommodation ladder. Image on the right shows the boat spar drawing of a typical accommodation ladder – *Annotation by TSIB*

1.6.7 The boat spar was provided with two or three holes for inserting a pin to secure the boat spar to the accommodation ladder. Rigging the boat spar required the

pin to be removed and the spar to be extended towards the sea. The investigation team noted that the boat spar on the AG had not been used during this occurrence. It could not be established whether this had been the practice in the past<sup>22</sup> (see **figure 8**).



Figure 8 – Boat spar of the port side accommodation ladder bolted in place –  
*Annotation by TSIB.*

1.6.8 The AG had undergone two Port State Control (PSC) Inspections, one in March 2019 and one in November 2019. One of the deficiencies in the inspection done in March related to inadequate safety chains near gangway (accommodation ladder). The vessel was detained during the PSC inspection done in November 2019, due to annual surveys not being carried out in a timely manner.

## 1.7 The Company's SMS Procedures

1.7.1 The Company<sup>23</sup> of AG managed three bulk carriers under its Document of Compliance (DOC). The Company had taken over the safe management and operation of the AG in April 2019, that is, about six months before the occurrence. The Planned Maintenance System (PMS) was operational, and the maintenance and inspection records<sup>24</sup> were being maintained in Word/Excel files and hard copies since take-over of the vessel. The existing crew of AG had no information about the condition of the bottom platform or the fabrication of the locking pins.

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<sup>22</sup> The boat spar was bolted using a bolt instead of a typical slot pin.

<sup>23</sup> Responsible for the safe operation under the ISM Code.

<sup>24</sup> The last inspection of the port accommodation ladder was done on 6 April 2019 and the next 6 monthly check was due on 3 October 2019. There was no evidence to confirm whether this check had been completed prior to the occurrence. Details of the scope of this check were not available for the investigation team.

- 1.7.2 While the safety management system (SMS) of the Company stated that the rigging of the accommodation ladder was to be done under the supervision of a deck officer, there was no evidence available to the investigation team that on the day of the occurrence, a deck officer had supervised the rigging of the accommodation ladder. In addition, there was no specific risk assessment or permit to work for embarkation or disembarkation for persons using the accommodation ladder.
- 1.7.3 According to the SMS, if prevailing swell is prominent, then the use of combination ladder or pilot ladder must be considered instead of the accommodation ladder or gangway.
- 1.7.4 The SMS also included a *Working Aloft and Over-side Permit* which was to be completed prior to starting any work aloft, outboard or over-side. The use of a lifejacket was required under the conditions of this permit. The Company shared that the permit was not required for rigging of the pilot ladder or when the accommodation ladder, combination ladder or pilot ladder was used for transfers, as these activities did not involve working outboard or over-side and were routine tasks on board.
- 1.7.5 SOLAS II-1/3-9 required the provision of 'Means of embarkation on and disembarkation from ships', which entered into force on 1 January 2010. This regulation further referred to 'Guidelines for Construction, Installation, Maintenance and Inspection/Survey of means of embarkation and disembarkation' (MSC.1/Circ.1331) which references to monthly inspections to ensure that the means were in a suitable condition for their intended purpose.
- 1.7.6 According to MSC.1/Circ.1331, each time the accommodation ladder or gangway was rigged, signs for distortion, cracks and corrosion should be spotted. Moving parts should be free to turn and should be greased as appropriate, and all inspections, maintenance work and repairs of accommodation ladders and gangways should be recorded in order to provide an accurate history for each appliance. The information to be recorded appropriately on board should include the date of the most recent inspection, the name of the person or body who carried out that inspection, the due date for the next inspection and the dates of renewal of wires used to support the embarkation and disembarkation arrangement.
- 1.7.7 The AG's PMS included a six-monthly check on the accommodation ladders. The last inspection of the port accommodation ladder was done on 6 April 2019

and the next 6 monthly check was due on 3 October 2019. There was no evidence to confirm whether the check in October 2019 had been completed prior to the occurrence. Details of the scope of this check were not available for the investigation team.

## 1.8 Meteorological conditions

1.8.1 Weather conditions at the time of occurrence were:

- (a) Wind – Direction / Speed: ENE<sup>25</sup> / 7 to 16 knots (BF<sup>26</sup> 3 – 4) (see **figures 9a and 9b**)
- (b) Current – Direction / Speed: Westerly 270° / 1.0 knot
- (c) Visibility – Good, rain (shower)
- (d) Sea state (swell height) – Slight sea and swells

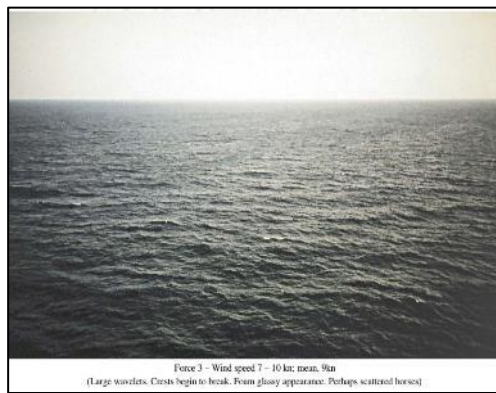


Figure 9a – BF force 3

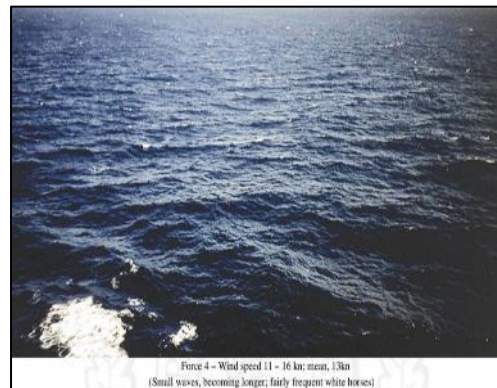


Figure 9b – BF force 4

(Source: The Mariners' Handbook)

## 1.9 Additional information

1.9.1 The investigation team visited<sup>27</sup> several launch boats at the MSP and established the following through discussions with the skippers: -

- There were no checks at the MSP on whether suitable personal flotation

<sup>25</sup> Compass direction East North East (ENE) with a range of 056.25° to 078.75°

<sup>26</sup> Beaufort wind force scale.

<sup>27</sup> Discussions with the skippers were conducted in November 2020.

devices<sup>28</sup> were worn by persons boarding launches and that the launch skippers were not able to enforce the passengers to don the lifejackets.

- Most boats were operated by a single person, and that an additional deckhand was only present if the client (the ship or its agent or the Company) requested for such a person.
- Although the skippers informed the investigation team that having an additional deckhand would be useful for the safety of the passengers, it was a common practice to manoeuvre the boat close to the accommodation ladder or to the ship's hull, which sometimes resulted in making a touch contact with the ladder, so that the passengers could safely cross over to the bow of the boat when disembarking from the vessel or on to the bottom platform when embarking the vessel.
- The skippers further informed the investigation team that they had not come across the boat spar / chafing pad of the accommodation ladder being used<sup>29</sup> on most vessels during embarkation or disembarkation.

1.9.2 The investigation team carried out a survey of the marine industry to gather whether the boat spar / chafing pad fixed to the accommodation ladder was a commonly used equipment. Nearly 30% of the respondents stated that they had not seen it being used. About 60% of those who had seen it being used indicated that there were practical challenges for its effective usage, such as reluctance of boat skippers to come close for fear of damage to the bow of the launch boat itself. Only 5% of the respondents had come across a procedure within the SMS that required the usage of the boat spar / chafing pad for embarkation or disembarkation of personnel by launch boats, by extending it at the time of rigging the accommodation ladder.

1.9.3 The MPA coordinated the search and rescue operation which involved the Police Coast Guard (PCG) and Singapore Civil Defence Force. The MPA and PCG recovered a body around 0704H on 24 October 2019 off the Eastern

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<sup>28</sup> In August 2019, the MPA had launched a new lifejacket poster which was distributed to the harbour craft operators during the International Safety@Sea Conference. The poster depicted several scenarios where donning of a lifejacket is recommended i.e. climbing the pilot ladder, transfer from boats, rigging of pilot ladder. In August 2020, MPA issued a Port Marine Circular no. 34 on 'GUIDELINES FOR SAFE TRANSFER OF PERSONS BETWEEN VESSELS AT ANCHORAGES'.

<sup>29</sup> Some of the skippers did not know the purpose of this boat spar, while some of them knew. There was no insistence on the part of these skippers for the boat spar to be used.

Bunkering Bravo Anchorage<sup>30</sup>, which was later identified to be that of the Supervisor. Information obtained from the Autopsy report<sup>31</sup> indicated that the cause of death was drowning. There were no other significant<sup>32</sup> toxicological findings.

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<sup>30</sup> About 2nm away from AESPA.

<sup>31</sup> By the Health Sciences Authority of Singapore.

<sup>32</sup> 50mg of Ethanol detected in 100g of liver tissue. Possibly due to post-mortem production as a result of decomposition.

## 2 ANALYSIS

### 2.1 The issues with the bottom platform

2.1.1 The Supervisor was standing on the bottom platform when the launch boat was approaching and fell into the sea when the bottom platform tilted downwards after being contacted by the launch boat. Post incident verification of the locking pins revealed no damages nor deformation of the pins and hence the failure of the locking pins was ruled out. It is likely that the locking pins had dislodged from the slots causing the bottom platform to tilt downwards.

2.1.2 If the design of the locking pins had a locking mechanism or the two locking pins had been inserted in position properly, it would not have been easily possible for them to be dislodged from the slots by a contact of the launch boat. It is likely that the locking pins were fabricated on board and did not insert fully into the slots when the ladder was rigged.

2.1.3 The AG was 20 years old at the time of occurrence and local repairs may have been carried out for worn out fittings, such as the fabrication of the locking pins. However, as there is safety impact on proper locking of the bottom platform, it would have been desirable for the locking pins to either be procured from the manufacturer or if needed to be fabricated, to be as per the original specifications. This is to ensure that the replaced locking pins are fit for purpose and able to withstand the conditions under which the ladder was tested.

### 2.2 The Company's SMS requirements

2.2.1 According to the SMS a pilot ladder or combination ladder should have been used instead of the accommodation ladder, considering the prevailing swell condition at the time of occurrence. Reasons for the accommodation ladder to be used by the AG's deck crew instead could not be established.

2.2.2 The SMS further required that rigging of the accommodation ladder was to be done under the supervision of a responsible officer. The insertion of the locking pins to the bottom platform was part of the rigging process of the accommodation ladder. It was further noted that there were no stanchion poles fitted to the bottom platform to fix side ropes which would have provided additional support for the Supervisor to hold on to while waiting for and

transferring to the launch boat. It could not be established why these stanchions and ropes had not been fixed to the bottom platform.

- 2.2.3 The rigging of the accommodation ladder was likely not supervised by a deck officer as required by the Company's SMS. The incident highlights the importance of the accommodation ladder to be properly rigged under appropriate supervision for safe usage.
- 2.2.4 Recognising the risks of boarding a vessel at anchorage either via a pilot ladder or accommodation ladder, which could result in injuries and fatalities, it would be desirable for the SMS to include the conduct of a risk assessment in addition to proper inspection and preparation of the means of transfers. A proper risk assessment should include a check on fitness for purpose of the means used for embarkation/disembarkation and the risk of falling into the sea. Regardless, the use of flotation devices should be ensured to mitigate the risk drowning in the event of a fall into the sea.
- 2.2.5 The Company's SMS did not include a monthly inspection for the means of transfer, such as the accommodation ladder, as required by the IMO MSC.1/Circ.1331. Had such an inspection regime been implemented, it may have provided an additional opportunity for the AG's crew to identify the usage of a non-standard locking pins for securing the bottom platform and a timely intervention.

### 2.3 **RME's SOP on donning of lifejackets for transfer at anchorage**

- 2.3.1 While there was provision of lifejackets by RME, the lifejackets were not carried by the technicians resulting in the team not having the lifejackets while taking the launch boat and transferring to the AG. There was no attempt thereafter to make alternative arrangements such as going back or borrowing lifejackets at the MSP when the lifejackets were first noted to be missing by the Supervisor.
- 2.3.2 This is likely because RME did not mandate the donning of lifejackets for work at the anchorage. Had there been a procedural requirement mandating the donning of lifejackets for work at anchorage, the team would have to make alternative arrangements in order to comply with the company's requirement even if the lifejackets had been left behind at the office.



## 2.4 **Incidental observations**<sup>33</sup>

- 2.4.1 Transfer of persons at between vessels posed a risk of falling into the sea. The investigation team noted that the use of an additional deckhand to assist in the transfer of personnel was not mandatory and was dependent on various factors such as special requests, manning levels, as well as costs involved in employing such a person. However, having an additional deckhand would be useful to guide the skipper for a controlled approach when manoeuvring the boat close to the accommodation ladder or to the ship's hull, so that the personnel could safely cross over to the bow of the boat. There is merit for a review of the framework for a provision of an additional person for ensuring safe transfers at the anchorage to be considered.
- 2.4.2 Lifejackets are designed with features to aid in lifting the head of an unconscious person who has fallen into the sea, clear of the water. The light and whistle on the lifejacket can be used by a conscious person in the water to draw attention for recovery and rescue efforts. Thus, it is extremely important to ensure that a lifejacket / personal flotation device is donned properly when transfers are carried out.
- 2.4.3 Although a poster had been distributed by the MPA to the harbour craft operators just two months prior to the occurrence, and was also displayed prominently near the operators' ticket counters at the MSP reminding stakeholders to wear a lifejacket, it was probable that the intent behind the posters was not appreciated by the harbour craft community and there was no process in place to ensure passengers use the lifejackets prior to any transfer, as noted by the investigation team's interaction with the launch skippers.
- 2.4.4 As noted, by the results of the survey, the use of the boat spar / chafing pad was uncommon in the industry. This probably explains why the purpose of the boat spar / chafing pad had been underestimated on board the AG (see paragraph 1.9.2) resulting in its non-usage. While the boat spar / chafing pad may not have prevented the bottom platform from tilting downwards, as a result of the pins being dislodged, it could have reduced the probability of the boat coming close to the platform. The investigation team held the view that if the accommodation ladder is used, the boat spar / chafing pad should be extended when rigging the accommodation ladder to minimise any contact between the

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<sup>33</sup> Did not directly contribute to the occurrence but are included to enhance the safe transfer of personnel between ships.

boat and the bottom platform.

- 2.4.5 It would be also desirable for the guidelines within the Port Marine Circular to be reviewed, considering the usage of the boat spar / chafing pad as a safe practice (to minimise the chances of contact between the boat and the accommodation ladder), may not be commonly known to the community.

### 3 CONCLUSIONS

*From the information gathered, the following findings are made. These findings should not be read as apportioning blame or liability to any particular organisation or individual.*

- 3.1 While standing on the bottom platform of the accommodation ladder waiting to transfer to the launch boat, the Supervisor fell into the water when the bottom platform tilted downwards after being contacted by the launch boat. The degree of impact from the contact between the boat and the bottom platform could not be established.
- 3.2 The locking pins, holding the bottom platform to the accommodation ladder, had likely not been inserted properly into the slots of the accommodation ladder and got dislodged causing the bottom platform to tilt downwards. In addition, there were no stanchion poles with additional side ropes fitted to the bottom platform, as an additional support for the Supervisor to hold on to.
- 3.3 The supervision of the rigging of the accommodation ladder was not carried out by a deck officer as required by the Company's SMS.
- 3.4 It was probable that the locking pins had been modified / fabricated on board and were not as per the manufacturer's specifications. This had resulted in the locally fabricated locking pins not able to be fully inserted into the slots of the accommodation ladder.
- 3.5 The inspection regime on the AG's accommodation ladders was not as per the recommended frequency of monthly inspections and the six-monthly check as per the PMS was overdue by about 20 days.
- 3.6 The Company's SMS did not require the conduct of risk assessment for embarkation/disembarkation of persons from any means of transfer, including the accommodation ladder.
- 3.7 There is merit for a review of the licensing framework to consider having an additional person on board the launch boat to ensure safe transfers of personnel at the anchorage.
- 3.8 To further entrench the aim and safety guidelines listed in the Port Marine Circular 34 of 2020 for safe transfer of persons between vessels at anchorages, it would be desirable for the guidelines to include the purpose of

the boat spar / chafing pad as a safe practice to minimise the chances of contact between the boat and the accommodation ladder.

## 4 SAFETY ACTIONS

*Arising from discussions with the investigation team, the organisations have taken the following safety action.*

### 4.1 Actions taken by the Company

4.1.1 The Company incorporated a computer-based PMS used by vessels across the fleet and approved by the Classification Society – Bureau Veritas.

4.1.2 The SMS was revised stating that for embarkation/disembarkation, only the pilot ladder or combination ladder depending on freeboard must be in use, instead of using the accommodation ladder. All personnel, whether ship or shore personnel, embarking/disembarking must use a life vest.

### 4.2 Actions taken by RME

4.2.1 The SOP introduced by RME after the occurrence, required all persons to wear a lifejacket at all times, i.e. when travelling in a boat, transferring from boat to the vessel and vice versa, and when using an accommodation ladder/pilot ladder. The SOP also prohibited persons from transferring in heavy rain, rough sea, or when the boat is pitching/rolling.

### 4.3 Actions taken by the port regulator

4.3.1 In August 2020, the MPA issued a Port Marine Circular No. 34 of 2020 in consultation with the National Maritime Safety at Sea Council (NMSSC) and the MPA's Harbour Craft Safety Working Group, providing guidelines for safe transfer of persons between vessels at anchorages. The guidelines stipulated, amongst other things –

- To prepare for safe transfers, persons are strongly recommended to wear appropriate Personal Protective Equipment (PPE), including a lifejacket;
- Suitable boarding arrangements, such as accommodation ladder, pilot ladder and/or combination ladder, are to be properly rigged and assessed to be safe for use, by an authorised person from the vessel providing the boarding arrangements;
- Embarkation/disembarkation areas of the service boats shall be free of slipping or tripping hazards, have sufficient handholds, be free of

obstructions, be within line-of-sight of the boat's operator, and be sufficiently illuminated during hours of darkness;

- Risk assessments are to be conducted by the owner/operator of the service boats and translated as safety guidelines displayed prominently on board as guidance to the master, crew and passengers of the service boat; and
- The master of service boats should consider the weather conditions and sea state before deciding on proceeding with the transfer of personnel at the anchorages.

## 5 SAFETY RECOMMENDATIONS

*A safety recommendation is for the purpose of preventive action and shall in no case create a presumption of blame or liability.*

### 5.1 For the Company of AG

5.1.1 To amend its PMS to include a monthly inspection regime of the accommodation ladder so that its structural and safety parts are fit for purpose. **[TSIB-RM-2021-008]**

5.1.2 To ensure that advice from the Classification Society is obtained prior carrying out any modifications to the accommodation ladder. **[TSIB-RM-2021-009]**

5.1.3 To ensure rigging of the accommodation ladder is appropriately supervised so that stanchion poles with additional side ropes are fitted to the bottom platform. **[TSIB-RM-2021-010]**

### 5.2 For the regulator of the port

5.2.1 To consider a review of the existing licensing framework of one-man operation for the launch boats to ensure safe transfers of personnel at the anchorage. **[TSIB-RM-2021-011]**

5.2.2 To remind the industry using appropriate means, for using the boat spar / chafing pad when an accommodation ladder is used for transfers of personnel at the anchorage. **[TSIB-RM-2021-012]**

**- End of Report -**