

FINAL REPORT

**MAN-OVERBOARD (LOSS OF LIFE)
FROM MALAYSIA REGISTERED
OIL TANKER AQUABELLE
IN SINKI FAIRWAY, SINGAPORE
ON 6 JANUARY 2019**

MIB/MAI/CAS.058

**Transport Safety Investigation Bureau
Ministry of Transport
Singapore**

9 January 2020

The Transport Safety Investigation Bureau

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

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SYNOPSIS

On 6 January 2019 at about 2115H, when the Malaysia registered tanker Aquabelle was transiting westwards along the Sinki Fairway under pilotage, an able seafarer (deck) fell overboard while in the process of rigging razor wire as a part of the vessel's anti-piracy measures. Search-And-Rescue (SAR) launched soon after continued for almost 10 days but the seafarer could not be found. SAR was called off on 15 January 2019 when a body was found (later identified to be that of the missing seafarer) on an Indonesian island (Pulau Pedang) about 70nm west of Singapore.

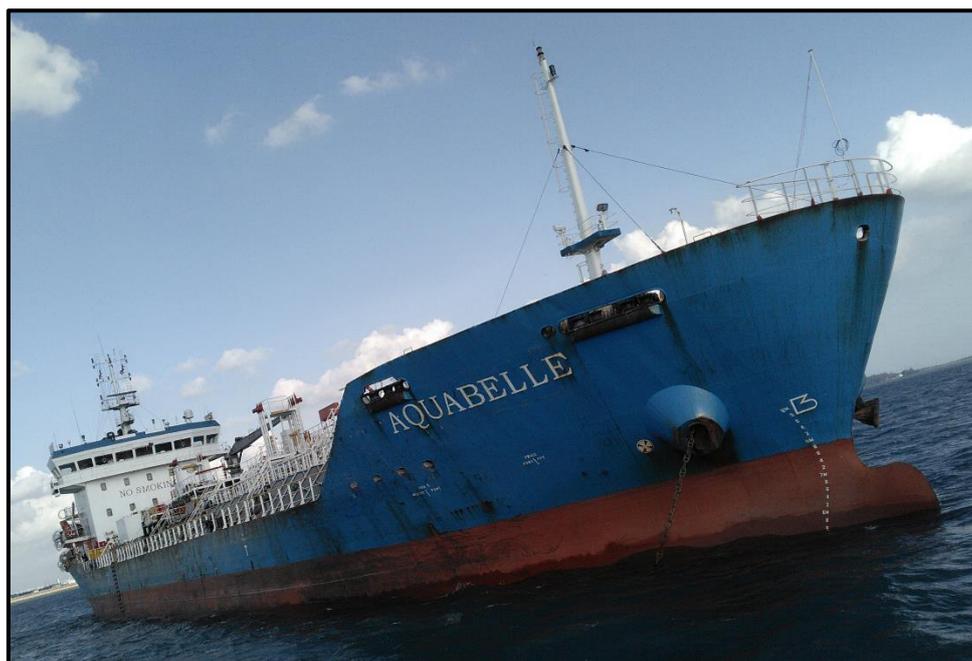
The TSIB classified the occurrence as a very serious marine casualty and launched an investigation.

The investigation revealed that the seafarer had likely fell through the opening in the railing at the pilot access area when rigging the razor wire. There was no tool-box meeting or risk assessment for this unplanned task and it was being conducted unsupervised in the hours of reduced lighting condition while the vessel was underway. The investigation also showed that 36-hour prior to the incident, multiple activities took place on the vessel which affected rest hour of the crew involved.

Though the Company's rest hour management system was designed to prompt alerts to the ship and ashore, the crew's records of hours of rest and work were not accurately recorded, thus defeating the purpose of rest hour management.

Prior to the occurrence, a new Company had just taken over the safety management of the ship. The investigation revealed that there was insufficient time for the crew to be properly familiarised with the Company's requirements due to a plethora of activities since taking over.

VIEW OF VESSEL



Oil Tanker Aquabelle

DETAILS OF VESSEL INVOLVED

Name	Aquabelle (AQB)
IMO Number	9410193
International Call Sign	9MVD9
Flag	Malaysia
Classification Society & ISM RO	Bureau Veritas
Ship type	Chemical/ Product Oil Tanker
Year Built	2007
Owners/ Operators	Adamas Marine Sdn Bhd.
Company¹	M.T.M Ship Management Pte Ltd ² (MTM)
Gross tonnage	5256
Length overall (LOA) / Breadth	110.00m / 18.60m

¹ In accordance with ISM Code – SOLAS Chapter IX, IMO Res.A.741(18) as amended thereof

² M.T.M Ship Management Pte Ltd took over the safety management of Aquabelle on 7 November 2018, was issued ISM Company approval by the Malaysia Marine Department on 7 January 2019. The Interim Document of Compliance (DOC) was issued on 12 November 2018.

1 FACTUAL INFORMATION

All times used in this report are Singapore Local Time. (UTC +8.0H)

1.1 Sequence of events

- 1.1.1 On 7 November 2018, MTM took over the operations of AQB from the previous ISM Managers Hong Lam Marine Pte. Ltd. (HLM). The new crew of AQB (see 1.3) were either from HLM (transferred to MTM) or had been with MTM.
- 1.1.2 Since taking over, AQB's crew was involved in a host of operations that included loading and discharging at an oil terminal from 3 January 2019, a SIRE³ inspection at Singapore western petroleum anchorage on the same day, followed by navigational passage to Eastern Outside Port Limit (EOPL) anchorage, for the conduct of tank cleaning operations and back to Singapore for back-loading on 5 January 2019. During AQB's stay at the anchorage, ship's spares and stores were supplied until about midnight on 5 January 2019, including routine visits from Company's personnel.
- 1.1.3 AQB's Master declared his vessel's notice of readiness⁴ in accordance with the Charter Party at 0001H on 6 January 2019.
- 1.1.4 At about 0515H, a harbour Pilot embarked the vessel and AQB was subsequently moored starboard alongside at another oil terminal by about 0630H and the harbour Pilot disembarked thereafter. Loading operations continued from about 0800H until about 1815H. Means of access from the terminal to the vessel was via a fixed platform on the jetty which was nearly in-line with the AQB's pilot access area (located near the manifolds). The pilot access area was typically provided with a "chain" which would be removed when using the access (see **Figure 1**)

³ Ship Inspection Report programme – a uniform inspection protocol focusing primarily on the quality and safety standard of individual tanker

⁴ Document used to notify ship readiness to load/ or unload the goods during the period of the vessel's charter

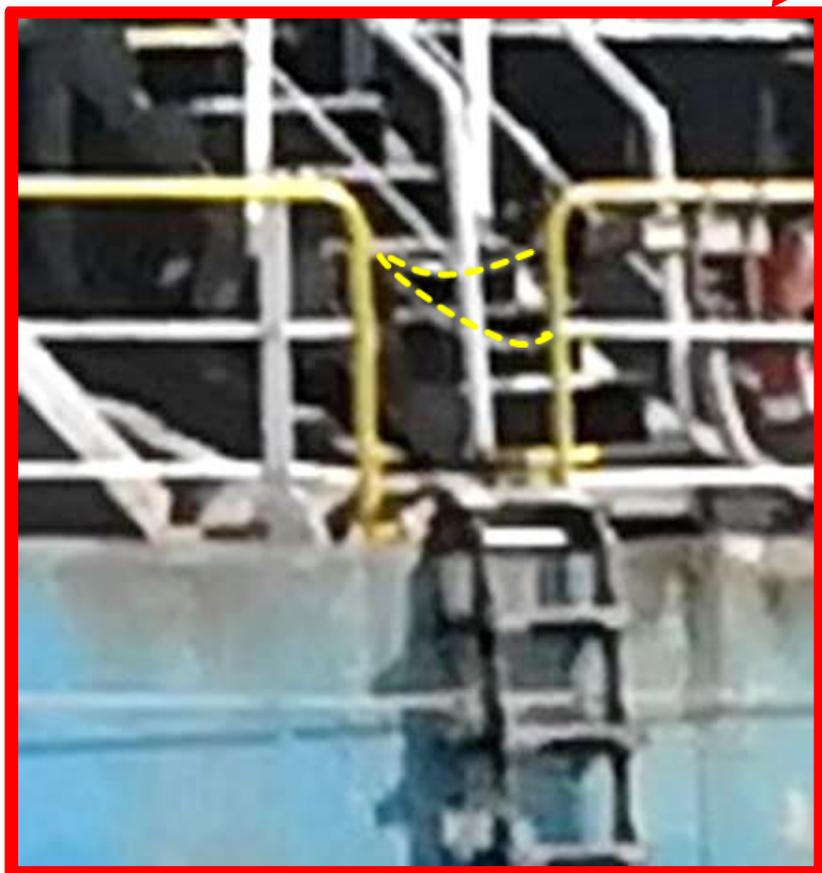


Figure 1: A single yellow-coloured chain in this figure (annotated by TSIB) was understood to have been fixed on the starboard-side pilot access area. This was different from the arrangement on the Port side which contained two separate chains

1.1.5 After the requisite paperwork for loading, all the terminal personnel disembarked from AQB using this means of access at about 2100H. The crew at the gangway then went to the forward mooring station using the catwalk (see **Figure 2**) to assist for unmooring. The harbour Pilot boarded AQB using the port side pilot ladder (via pilot launch boat) at about the same time and AQB departed the terminal at about 2120H, bound for the pilot disembarkation ground in the west for AQB's subsequent voyage to Phuket, Thailand.



Figure 2: The upper-deck view from the bridge. Red-coloured arrows indicating the direction the gangway crew took via the catwalk to the forecandle on board AQB (annotated by TSIB)

1.1.6 The bridge was manned by the Master, Third Officer (3O), an able seafarer deck (ASD-1) as the helmsman and the Pilot. The 3O was assisting the Master and the Pilot for navigation. The forward station consisted of the Chief Officer (CO), the Bosun (BSN) and another ASD-2, while the aft station was supervised by the Second Officer, who was assisted by Fourth Officer (4O) and ASD-3⁵.

1.1.7 At the request of the Pilot to standby the anchor (for emergency use), CO continued to stay at the forecandle and sent his crew, i.e. BSN and ASD-2 to prepare and rig razor wire around the ship's side with other deck hands

⁵ The crew member who fell overboard

available at the aft station, as part of the vessel's established anti-piracy measures⁶.

- 1.1.8 The BSN and ASD-2 walked back to the accommodation via the catwalk, met the 4O and ASD-3 at the port side entrance of the accommodation and informed them of CO's instructions to rig the razor wire. After preparing the necessary tools and PPE (special gloves), the group of four commenced the rigging of the razor wire at about 2145H. At this stage, AQB was transiting westwards along Sinki Fairway at about 11.4kts. The Pilot requested the Master to get the crew to prepare for the same pilot ladder on the port side for his disembarkation.
- 1.1.9 After receiving confirmation from the Master through the Pilot, the CO stood down from the forecastle. He returned to the accommodation at about 2200H via the catwalk, where he saw the group of four taking a break at the poop deck (located aft). ASD-3 updated CO that the razor wire had been rigged from the port quarter to the starboard quarter of the accommodation. The group's plan was to continue from the accommodation front on the starboard side (see **Figure 3**). Noting the group's plan for the razor wire the CO passed ASD-3 his torchlight and went into the accommodation to answer nature's call and freshen up.

⁶ There were no imminent piracy warnings promulgated for this area / period, but it was a common practice for vessels of low freeboard to prepare the vessel considering the trading area.



Figure 3: The starboard side of AQB showing the unfinished rigging of the razor wire.

- 1.1.10 The BSN requested the bridge (3O) to switch on the starboard-side (forward facing) deck lights to continue to rig the razor wire. 3O, who was standing at the starboard side of the bridge switched on the deck light from the bridge after getting concurrence from the Pilot through the Master.
- 1.1.11 Rigging of the razor wire was a three-step process. The first step was to free up the coiled wire (stowed on ship's railings), followed by opening (pulling action) up the coil to its length and finally securing (fasten) the opened-up coil on the ship's railing at fixed distances with short flexible wires. The entire process was to continue from the front of the accommodation, go past the manifold area until the ship's bow. At times, the process involved deck personnel to lean over the ship's railing.
- 1.1.12 The BSN organised the deck crew and began freeing up the coiled razor wire nearest to the accommodation. The 4O and ASD-3 were tasked to secure (fasten) them to the ship's railings after ASD-2 had done with the opening of the coil. ASD-3 was the first person towards the bow (See **Figure 4**).

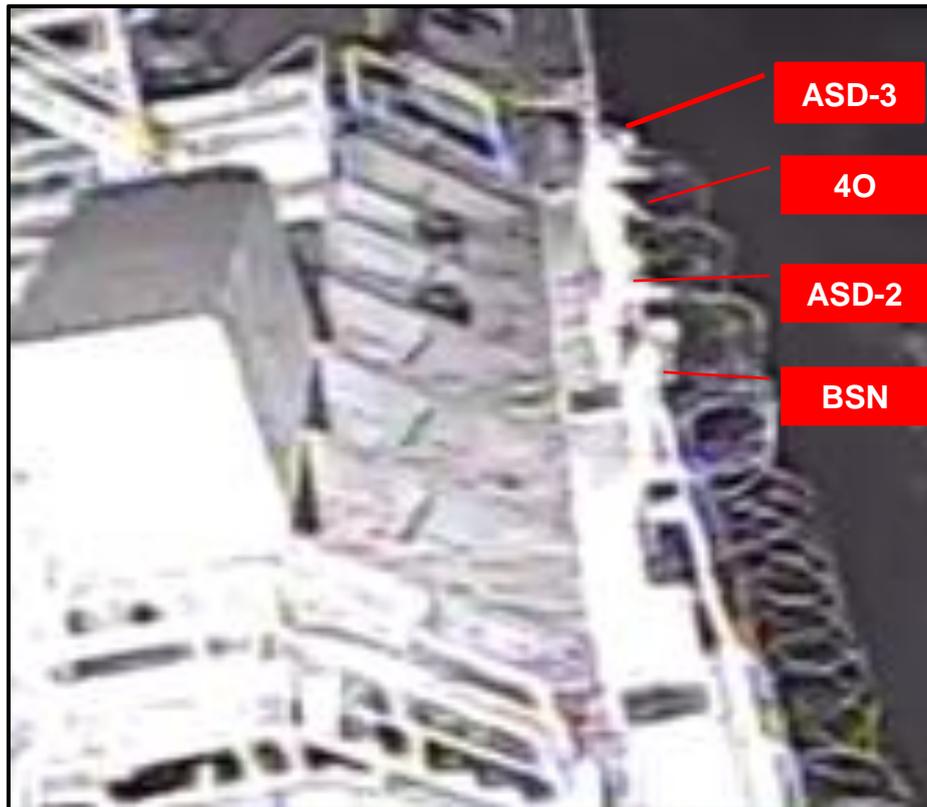


Figure 4: The sequence of the group rigging the razor wire over the railing on the starboard side. (Source: AQB's CCTV footage)

- 1.1.13 While the crew were involved in the task, the BSN saw a helmet in the water drifting past. He enquired loudly if anyone dropped it overboard. At the same time, 4O shouted back that ASD-3 had fallen overboard. 3O (on the bridge) noticed the ASD-3 falling at the same time too, and shouted man-overboard (MOB) to the Master and Pilot. 3O marked the MOB position on the electronic chart and ran out of the bridge to the starboard bridge wing to release the MOB lifebuoy (i.e. with light and smoke signal).
- 1.1.14 Meanwhile, the deck crew left the razor wire and ran to the poop deck in the attempt to locate ASD-3, while the Pilot ordered the engines to be stopped and subsequently for the helm to go to starboard⁷ and broadcast the emergency to Singapore port operations control and port marine safety⁸ via VHF. The Master rang the ship's emergency signal for MOB and also ran out to the starboard bridge wing to assist the 3O for releasing the lifebuoy.
- 1.1.15 The Pilot meanwhile coordinated with the pilot launch which was waiting near the disembarkation ground, for assistance to search for the ASD-3. Within ten minutes of the occurrence, a Police Coast Guard patrol craft, a

⁷ According to the Master, the Pilot ordered a helm order to Port thereafter due to traffic in the vicinity.

⁸ Singapore Port Operations Control Centre (POCC) and Marine Safety Control Centre (MSCC).

Maritime and Port Authority (MPA) patrol boat and the Pilot boat were near AQB's location searching for ASD-3. On receiving instructions from POCC, AQB was anchored at the nearest appropriate anchorage to wait for further instructions. With the permission from the relevant authorities, AQB continued their voyage to Phuket, Thailand, on 9 January 2019.

- 1.1.16 MPA continued to coordinate the Search-And-Rescue (SAR) operation⁹ until 15 January 2019 when ASD-3's body was found at the eastern coast of Pulau Pedang (Indonesia), about 70nm (130km) west of Singapore.

1.2 Environmental conditions

- 1.2.1 The incident occurred during clear weather in the hours of darkness with a new moon (i.e. moonless). The visibility recorded by AQB was between 6 to 8nm. Wind was variable, from northwest to northeast at about force 2 on the Beaufort Scale. The Tidal stream at that time was predicted and observed to be flooding between 1 knot – 1.5 knots.

⁹ Assisted by the Republic of Singapore Navy's patrol vessel and two Police Coast Guard's patrol crafts

1.3 Crew Experience, Rest Hours¹⁰ and Watchkeeping Schedule

1.3.1 AQB was manned with 17 officers and crew from Myanmar. All of them, except for one Oiler, joined the vessel on 30 December 2018 (i.e. seven days before the occurrence), when the vessel was taken over from the previous Company.

Designation	Master	Chief Officer	4 th Officer
Qualification	Deck Officer Class 1 STCW II/2, IV/2 Issued 2009 Revalidated Sep 2018	Deck Officer Class 2 STCW II/2, IV/2 Issued 2011 Revalidated 2016	Deck Officer Class 3 STCW II/1, IV/2 Issued Sep 2018
Certification Authority	Myanmar Ministry of Transport – Department of Marine Administration		
Nationality	Myanmar	Myanmar	Myanmar
Age	52	58	25
Experience in Rank	4 years	4 years	7 days
Period with Company	4 years	7 days	1.5 years
Period on board	7 days	7 days	7 days
Harbour Duty Schedule	N/A	0800 – 1200 2000 - 0000	0800 – 1200 2000 - 0000
Designation	Bosun	ASD - 2	ASD – 3 [Missing Crew]
Qualification	STCW II/5 Issued 2013 Revalidated 2016	STCW II/5 Issued 2007 Revalidated 2016	STCW II/5 Issued 2017
Certification Authority	Myanmar Ministry of Transport – Department of Marine Administration		
Nationality	Myanmar	Myanmar	Myanmar
Age	39	40	32
Experience in Rank	1 year	11 years	2.5 years (13months as Ordinary Seaman/ 12 months as Deck Cadet)
Period with Company	7 days	11 years	7 days
Period on board	7 days	7 days	7 days
Harbour Duty Schedule	0600 – 1200	1200 - 1800	1200 - 1800 ¹¹

¹⁰ Maritime Labour Convention (MLC) 2006 provides guidelines on minimum number of hours of rest required for seafarers on merchant ships. Also established in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW Convention). A minimum of 10 hours of rest is required to be maintained in any 24-hour period, of which six hours must be continuous.

¹¹ Most probable work schedule on the day of the incident. See para 1.3.3

- 1.3.6 The investigation team's interactions with the crew on board revealed that most of the deck crew had insufficient rest prior to the incident. Reasons cited were the additional workload during taking over, coupled with preparations of tank cleaning and loading operations, and in addition to facilitating visits by Company and other personnel for inspections etc. The appended rest hour records of the deck crew indicated his rest hour requirements fulfilled STCW and MLC requirements.
- 1.3.7 In the interview, the CO confirmed that, in the previous six days, he had about 4-5 hours of rest per day and would use short breaks to catch up on his lost sleep, while some crew members highlighted to him that they had intermittent 2-3 hours of sleep on a few days. The CO's rest hour records logged in the system indicated his rest hour requirements fulfilled STCW and MLC requirements.

1.4 Company's SMS

- 1.4.1 From the interviews, it was established that due to the heavy workload¹³ on the vessel since taking over, there was insufficient time to complete the shipboard familiarisation¹⁴ for the whole crew, including Company's Safety Management System and associated Risk Assessments. The crew confirmed that they had signed some papers during this period. A comparison of signatures on the acknowledgement of training conducted with the signatures¹⁵ on the Shipboard Familiarisation records for ASD-3, revealed that they were different.
- 1.4.2 The Shipboard Familiarisation records for all the deck officers and crew also contained signatures of the Master.
- 1.4.3 The Company's "shipboard administration manual" stipulated that the rest hours were to be recorded daily by ship's crew and to be monitored on daily basis. These records were to be submitted to the DPA via email, weekly, while this dedicated software also allows personnel ashore to have privileged viewing and monitoring of these records.

¹³ The CO added that although due to multiple activities since taking over, the rest hours for all may not have met the statutory requirements but he tried to compensate them by giving them rest when possible

¹⁴ In accordance with ISM Code – Part A – Implementation – Resources and personnel, each Company should establish procedures to ensure that new personnel and personnel transferred are given proper familiarization with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given. In addition, under Shipboard operations, procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of personnel should be established, with the various tasks defined and assigned to qualified personnel

¹⁵ The signature "scripting-style" does not match the ASD-3's signature (compared with other TSIB obtained records).

1.4.4 The Company's SMS (shipboard administration manual) stipulated that the Chief Officer of each ship is responsible to arrange the deck watches during port stay and to ensure that both the deck officers and ratings have sufficient rest, and to comply with the following (i.e. STCW and MLC requirements):

- a) Minimum total rest comprises no more than 2 periods
- b) Minimum of 6hrs consecutive rest period
- c) Minimum 77hrs rest in each 7-day period
- d) Minimum 10hrs rest in any 24hrs period.

Within this manual, watch schedules were required to be posted in the Bridge, Engine Control Room, Cargo Control Room, Officers' and Crew Mess Rooms.

1.4.5 In the event the software calculated insufficient rest for an individual, according to the CO, it was a practice to enter the reasons in the comments section. Examples of such reasons could be "cargo operations, arrival port, shipboard operations".

1.4.6 The SMS allowed the Master to close out the rest hour records with discretionary¹⁶ "compensatory rest" and thereafter to plan the watchkeeping duties to ensure that the affected watchkeeper(s) are adequately rested. The investigation team sampled records of some ships in the Company's system after the accident and noted that compensatory rest had been given on those ships.

1.4.7 The rigging of the razor wire was required as per the Ship's Security Plan (SSP)¹⁷ when the vessel was expected to transit High-Risk Area (HRA) en-route to the next port, so that anti-piracy measures could be implemented. Aside from wearing protective gloves, there was no specific process of rigging wires documented, as it was a routine operation carried out by the crew. There were no documented procedures to indicate whether this activity required completion of a tool-box meeting, risk assessments or assignment of roles and responsibilities including supervision of tasks.

1.4.8 A section in the SMS referred as "slips, trips and falls" cited the generic safety awareness of the working environment. In another separate section referred as "personal injury prevention", a matrix of PPE guide in accordance with the tasks/ activities, lists the need for safety shoes, safety helmet, gloves, safety apron and goggles (see **Figure 6**).

¹⁶ Master's discretion

¹⁷ Ship Security Plan – mandatory under the International Ship and Port Facility Security Code (ISPS) in laying out protective measures according to security level requirements for each activity on board.

TABLE of TASKS / DUTY	
1	ANCHORING
2	BUNKERING
3	CARGO WORK
4	CATERING DEPARTMENT WORK
5	CLEANING
6	ELECTRICAL MAINTENANCE
7	HAZARDOUS SUBSTANCES
8	MOORING OPERATIONS
9	OPERATING HAND TOOLS
10	OPERATING MACHINE TOOLS
11	PAINTING / SPRAYING
12	STORING
13	USING LIFTING EQUIPMENT
14	WELDING or BURNING
15	WORK in MACHINERY SPACES
16	WORKING ALOFT (Above 2M)
17	WORKING IN LIFEBOATS
18	WORKING on DECK
19	WORKING OVSIDE
20	RIGGING OF RAZOR WIRES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Boiler Suit	R	R		C	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Safety Shoes	R	R		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Safety Helmet	R	R		C	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Gloves ¹	R	R		C	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Safety Aprons																					R
Ear Protection	C	C							C	C	C				R				C		
Goggles ²	R	C		C	R		R	R	R	R	R	C						R	R	C	R
Safety Harness	C	C						C				C					R	R	C	R	
Buoyancy aid	C	C						C				C					R	C	R		
SCBA	C				C		C		C	C	C			C					C		
Chemical Suit ³					C		R														
Refer COSWP ⁴ Chapter	2	30		14	22	22	27	25	20	20	24	19	21	23	22	15	15	8	15		
Warning Signs ⁵		C				C	C		C	C	C			C		C	C				

Figure 6: Relevant portions of the SMS on PPE requirements based on the task to be performed

1.4.9 The Red box with 'R' indicated the essential equipment was required for the activity. Yellow box with 'C' indicated that the equipment should be considered for the activity and a Green box meant that it was unlikely for the equipment to be needed for the activity. The box for rigging razor wire (item 20) had a red box but did not contain the legend (R) for safety harness and buoyancy aid. The Company opined that rigging a razor wire was not considered as a task of working over-side, and as such the requirement for safety harness and buoyancy aid were not required as there was no risk of falling overboard¹⁸ from the deck.

¹⁸ The Company's SMS has an existing RA and a Permit-To-Work system in place for working over side

1.4.10 The Company's SMS had a strict Drug and Alcohol policy on board, which was further corroborated during the evidence gathering stage. There was no evidence to suggest that alcohol was consumed on board the vessel since she was taken over under this Company.

1.5 Additional information

1.5.1 The Master told the investigation team that the razor wire was already stowed on AQB when he joined. On the day of the incident when AQB departed the terminal, he recalled the CO seeking his permission to commence rigging the razor wire for anti-piracy measures. He approved the request, instructing the CO to do the needful as per the former Company's¹⁹, practice for preparing the vessel for HRA transit. The Master was not aware of or had seen any RA on this task²⁰.

1.5.2 The Master stated that he did not enquire from the CO about rigging the razor wire as he was aware that the CO, BSN and ASD-3 were from the former Company of AQB and would be aware of the safety precautions to be taken for rigging the wires. Similarly, CO was also of the opinion that he did not need to supervise the task of rigging razor wires as the BSN and ASD-3 being from HLM like him, would know the procedures to rig them safely.

1.5.3 According to the CO, this RA was done prior²¹ to the accident but he did not brief the crew on the content of this RA. He added that before he went into the accommodation to relieve himself, leaving the deck crew under the supervision of the BSN on 6 January 2019, he had verbally informed them to ensure that the work environment was safe when conducting the rigging task. However, he could not remember whether the safety chains near the ship's manifold on the railing for pilot access were in-place after the vessel departed the terminal or prior to the commencement of the task of rigging the razor wire.

1.5.4 The 4O had prior experience in rigging the razor wire during his time as a cadet on other vessels of MTM. On the day of incident, he had about 4-5 hours of sleep from the evening of 5 January 2019, before he was required to commence work at about 0500H on 6 January 2019 and he had not

¹⁹ Master was referring to HLM

²⁰ A copy of Risk Assessment (RA) for the work activity of "rigging Razor Wire" was provided to the investigation team. The RA was dated 6 January 2019, reviewed by the CO and signed by the Master.

²¹ In establishing a timeline on when this RA was conducted, considering the cargo operations, departure, man-overboard, the CO clarified that there was no RA done specifically for this rigging of the razor wire.

received adequate rest from the time the loading commenced at about 0800H till the time of departure from the terminal.

- 1.5.5 After AQB departed the terminal, as 4O was heading to take rest (he was supposed to keep the 4-8 navigation watch), he was asked by the BSN to assist in the rigging of the razor wire together with other deck crew. He recalled having conversations with ASD-3 and the deck crew that they were tired too and did not have adequate rest for the whole day since alongside the terminal. The 4O did not recall having seen the RA for this activity.
- 1.5.6 Prior to the occurrence, 4O was standing next to ASD-3 but could not recall seeing how ASD-3 fell overboard, as he was securing the razor wire to the railings while facing aft towards ASD-2. He only realised ASD-3 had fallen when he heard a splash and saw a helmet in the water. He added that, he took the instructions from the BSN, presuming that he was in-charge of the rigging task.
- 1.5.7 The BSN, who kept the 6-12 watch had prior experience rigging the razor wire in the preceding five years with HLM. He stated that life-vests or lifejackets were typically not required for this task as the crew would not be expected to go over-side (beyond the ship railings) or be in a position that could cause them to fall overboard.
- 1.5.8 The BSN was also of the opinion that the use of SOLAS lifejackets²² would hinder this task. BSN also did not recall seeing any RA for this task. Life-vest (for work on board) or inflatable lifejackets were not available on board. On the day of incident, he had been awake since 0430H to prepare the AQB for loading at the terminal. He, too, like the rest of the deck crew had not received adequate rest, in the preceding six days since being on board AQB. He was told that rest hours would be filled in the software by the 4O. The BSN also clarified that, although he was the most senior deck crew, he had not been specifically tasked with a supervisory role for this task of razor wire rigging. He opined (in hindsight) that a safety officer should have been nominated to ensure and monitor the safety of the crew.

²² Provided on all ships as part of the ship's Life Saving Appliances capacity in accordance with SOLAS Chapter III – Reg.7.

1.6 CCTV footage

- 1.6.1 The investigation team reviewed the AQB's CCTV footage at the time of occurrence. From the recording, it was established that at about 2111H, ASD-3, fell laterally through the ship's railing. Prior to this fall, the CCTV footage also indicated that the action of heave and pull (associated with picking up and straightening the razor wires) would cause the body to lean towards the ship's railing. (See **Figure 7**).



Figure 7: Snapshots of CCTV footage showing ASD-3 falling into the water at about 2111H

1.6.2 Additionally, the investigation team obtained the CCTV footage from the oil terminal where AQB was berthed, for the period prior to its departure. From the footage and speaking with terminal personnel, it was established that the means of access from the terminal to the ship's starboard side was by a fixed platform which was a part of the terminal jetty. The opening of this platform on that day was nearly in-line with the pilot access point located near the ship's manifold. It was further confirmed that there was a single chain on the starboard side at this pilot access point during the time AQB was berthed. Shore personnel recalled bending under this chain when leaving the AQB (see **Figure 8**).

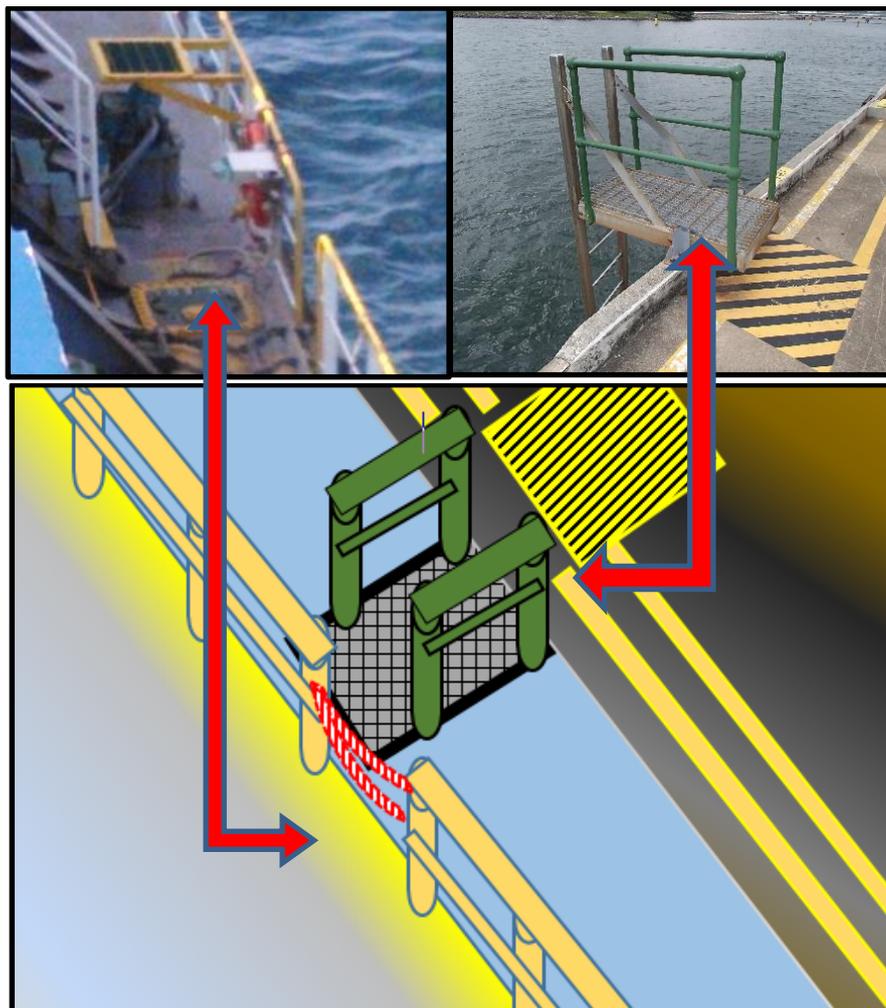


Figure 8: Illustration of the means of access between AQB and the oil terminal with a single-chain between the openings of the railings

1.6.3 The terminal CCTV footage indicated that when AQB was ready for departure, all shore personnel disembarked by bending under the chain and the ship's crew went for unmooring. Since departing the terminal, there was no other work performed near this pilot access area on the starboard side and the rigging of razor wire commenced after she unberthed from the terminal.

2 ANALYSIS

2.1 The Occurrence

- 2.1.1 This coiled razor wire was laid from aft to forward of the ship. ASD-3 was holding the front of the razor wire and was lifting and stretching it to the front of the ship. From the ship's CCTV footage, it appeared that ASD-3 was leaning towards the railing each time he lifted the razor wire as he stretched them and pulled towards the bow while facing towards aft. In doing so, he had likely fell over board when he was at the pilot access area.
- 2.1.2 After analysing the CCTV footage from the oil terminal, the investigation team noted that the last shore person disembarking AQB before the vessel unberthed, was seen to bend under the height of the railings when moving to the fixed platform (ashore) at the location of the pilot access area.
- 2.1.3 It was thus likely that the single safety chain was in place at this location prior to AQB unberthing and was not touched by any crew member or adjusted, prior proceeding for mooring operations once the Pilot boarded (see paragraphs 1.1.5 and 1.5.3). The single safety chain was likely not sufficiently secured to prevent a person from falling over, either owing to the slack in the chain or it being looped around the railings.
- 2.1.4 After the vessel departed, the task of rigging the razor wire commenced soon after (as an unplanned activity) without supervision. There was no tool-box meeting or risk assessment carried out to assess whether it was safe to perform the task, especially considering the operating environment, i.e. in the hours of darkness. It was likely that this task was not deemed as a hazardous task by the Company (see paragraph 1.4.9) and consequently by the ship's crew.

2.2 Fatigue

- 2.2.1 Based on the information available to the investigation team, it is believed that the deck crew on board AQB had not rested adequately. This is due to the busy activities being performed, especially in the 36-hours preceding the occurrence. Therefore, the task of razor wire rigging was likely being performed by a group of fatigued deck crew, which included ASD-3.
- 2.2.2 The responsibility of filling up rest hours for the crew was entrusted on one single officer (in this case the 4O), instead of individual crew member filling it by themselves. Such practice would not allow the individual crew member to be alerted and guided on the work / rest hours through the system, as per

the STCW and MLC requirements. Inaccurate entries of rest hours to show compliance, had also defeated the purpose of the system.

2.2.3 It is also quite likely that the Company did not consider the plethora of activities that the new crew had to undertake after taking over of the vessel and likely had confidence in the rest hour management system to mitigate the risk of work planning that followed.

2.2.4 This reiterated the importance of accurately recording rest/ work hours individually and for the management to monitor these records for operation schedule planning, in order to mitigate fatigue.

2.3 Safety Management System and shipboard familiarisation

2.3.1 The deck crew's involvement in carrying out the rigging of razor wire was purely based on their past experience of carrying out similar task on other vessels.

2.3.2 The Company held the view that rigging of razor wire was a routine task, which did not require access over-side (posing a risk of falling in the water), and thus there was no requirements for a safety harness or floatation device (see paragraph 1.4.9). The investigation team was of the view that there was lack of proper supervision of this task by a safety officer. In addition, the Company's SMS did not cover this task or any safe working procedures associated with it, for instance checking the integrity of the ship's side railing before commencement of the task.

2.3.3 The deck crew were not specifically briefed on the RA nor the safety aspects of rigging the razor wire since the day of joining. The operational schedule to prepare the vessel for cargo work and other shipboard preparations had resulted in not carrying out this familiarisation.

2.3.4 It is extremely important to ensure that persons undertaking any task are properly familiarised and that the task is appropriately supervised. In addition to routine shipboard familiarisation, this requires proper briefing, such as a tool-box meeting, to be conducted with all involved personnel which should include a scan of the work area to ensure hazards are identified and risk mitigating measures put in place.

2.4 Incidental Observations

- 2.4.1 The access from the terminal to the ship via the fixed platform was assessed as posing a risk to the personnel transferring between the terminal (ashore) and the ship, as it was not aligned with the ship's access point.²³

²³ The investigation team took the opportunity during the visit to advise the terminal to take appropriate measures for ensuring safe access of the personnel.

3 CONCLUSION

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

- 3.1 The ASD fell overboard in the process of rigging razor wire through the starboard pilot access area. The rigging of razor wire was an unplanned and unsupervised task during the hours of darkness after the vessel departed the oil terminal.
- 3.2 The single chain on the starboard pilot access was not sufficiently secured to prevent a person from falling either owing to the slack in the chain or it being looped around the railings.
- 3.3 There was no requirement for safety harness and buoyancy aid for crew performing rigging of razor wire as it was deemed as a routine task which did not require access over-side.
- 3.4 There was no tool-box meeting or risk assessment carried out prior to the commencement of the rigging of razor wire, which did not take reduced lighting condition into consideration.
- 3.5 The crew was generally not well-rested in the 36-hour prior to the occurrence, including the deceased.
- 3.6 The rest hour management system by the Company was designed to provide alerts for appropriate intervention when the crew did not meet the required rest hours. This system was designed to allow the crew to be aware of their individual fatigue level but was not managed properly.
- 3.7 There was insufficient time for the crew to be properly familiarised with the Company's requirements due to a plethora of activities since taking over.

4 SAFETY ACTIONS

During the course of the investigation and through discussions with the investigation team, the following preventive / corrective action(s) were taken by parties involved.

4.1 Taken by Company of AQB

- 4.1.1 SMS (Personal Injury Prevention) amended to include (in the existing matrix of PPE Guide) the requirements to use safety harnesses and buoyancy aid for the rigging of razor-wires.
- 4.1.2 SMS (Slips, Trips and Falls) amended with the inclusions on the need of clearly marking trip hazards and obstructions, to conduct RA for rigging of razor wire and the requirement of supervision by a Safety Officer (or the Ship's Security Officer) for rigging of the razor wire.
- 4.1.3 SMS included a Permit-To-Work system for working near shipside like rigging of razor wire, where this task will only be conducted in daylight hours when the vessel is in port or at anchor, whenever possible.
- 4.1.4 Installation of hinged swing gates (see **Figure 9**) with the strength equivalent to the railings at the earliest opportunity. Introduction of new checklist to be implemented for anti-piracy with reinforced steel doors and grilled gates at the accommodation, in lieu of reducing the need to surround the vessel perimeter with razor wire, less poop deck.



Figure 9: Red arrow showing hinged swing-gate installed on board AQB
(Source: MTM)

5 SAFETY RECOMMENDATION

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 AQB

- 5.1.1 To review the SMS requirements on rest hours for ensuring individuals document and take ownership of their respective rest hour records in the Company's rest hour management system. **[TSIB-RM-2020-001]**
- 5.1.2 To review the operational schedules of the fleet for ensuring sufficient time for shipboard familiarisation and training. **[TSIB-RM-2020-002]**

- End of Report -