Final Report

Death of a crew member onboard the SRS offshore supply vessel ANAHITA on 14 May 2025 west of Soyo, Angola

TIB/MAI/CAS.197

Transport Safety Investigation Bureau
Ministry of Transport
Singapore

3 March 2026

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 Singapore Transport Safety Investigations Act 2018, Transport Safety Investigations (Marine Occurrences) Regulations 2023 and the Casualty Investigation Code under SOLAS Regulation XI-1/6 adopted by the International Maritime Organization (IMO) Resolution MSC 255(84).

The sole objective of TSIB's marine safety investigations is the prevention of marine accidents and incidents. The safety investigations do not seek to apportion blame or liability. Accordingly, TSIB reports should not be used to assign blame or determine liability.

Table of Contents

Synopsis		1
View of Vessels		2
1	Factual information	5
1.1	Narrative of the occurrence	5
1.2	Cargo description	8
1.4	Crew matrix and experience - AN crew	12
1.5	Safety Management System (SMS) of AN	13
1.6	Personal Protective Equipment (PPE) Matrix	14
1.7	Risk Assessment (RA) of AN	14
1.8	Toolbox Talk (TBT)	15
1.9	Procedure for Deck Cargo Operations (SMOS-05)	16
1.10	Cargo Securing Equipment Available Onboard	16
1.11	Technical Information	17
1.12	Stability and Loading Condition of AN	17
1.13	Meteorological Conditions	18
1.14	Location of Occurrence	18
2	Analysis	20
2.1	Overview of the occurrence	20
2.2	Handling and stowage of casing joints	20
2.3	Stability condition, weather, and vessel motion under DP	20
2.4	Risk Assessment (RA)	21
2.5	SMS implementations onboard AN	21
3	Conclusions	23

4 Safety Actions 24
5 Safety Recommendation 25

List of Abbreviations:

ABS	American Bureau of Shipping
AN	Anahita
ASD	Able Seafarer Deck
CLOV	Carnation, Lily, Orchid, Violet (name of oil field development, offshore Angola)
CM	Chief Mate
DOC	Document of Compliance
DP	Dynamic Positioning
DPS	Dynamic Positioning System
IMO	International Maritime Organisation
ISM	International Safety Management
MLC	Marine Labour Convention
MT	Metric Tonnes
NM	Nautical mile
RA	Risk Assessment
SMC	Safety Management Certificate
SMS	Safety Management System
SQ	Sonangol Quenguela
STCW	Standards of Training, Certification, and Watchkeeping
TBT	Toolbox Talk
2M	Second Mate

SYNOPSIS

On 14 May 2025, at about 0140H, a fatal accident occurred onboard the offshore support vessel Anahita during a backloading operation while the vessel was operating under dynamic positioning. The operation involved the handling and stacking of casing joints on Anahita's aft deck following their transfer from the drillship Sonangol Quenguela.

During the backloading operation, the final lift comprised two single casing joints lifted on two separate wire slings and landed on top of the previously stacked casing bundles, which were not restrained after landing onboard Anahita.

As a result of prevailing sea swells which caused rolling motion on Anahita, the casing joints moved on deck and resulted in two Able Seafarers Deck being trapped underneath a casing joint. One crew member sustained fatal injuries, and the other sustained serious injuries.

The Transport Safety Investigation Bureau classified the occurrence as a Very Serious Marine Casualty.

The investigation revealed the following:

- Anahita maintained its position and heading under dynamic positioning control and operated within approved stability limits. However, prevailing sea swells which caused rolling motion had affected the stability of the unrestrained casing joints and resulted in their movement on deck.

- The risk assessment (RA) identified general hazards associated with deck cargo operations but did not identify the risk of uncontrolled movement of casing joints during the backloading operation. Consequently, specific controls such as using stanchion posts or wooden block wedges to restrain the casing joint movement were not in place.

- The Safety Management System (SMS) required the use of stanchion posts or wooden block wedges when handling cylindrical cargo, and such equipment was available onboard Anahita. However, stanchion posts and wooden block wedges were not used during the stacking of casing joints on deck to restrain their movement between lifts

VIEW OF VESSELS

Offshore Supply Vessel Anahita (*Source: Marine Traffic*)

Sonangol Quenguela (*Source*: *Ship spotting*)

DETAILS OF VESSELS

Name	Anahita (AN)
IMO number	9737917
Flag registry	Singapore
Classification society[1]	American Bureau of Shipping (ABS)
Recognised Organisation issuing SMC and DOC certificate	ABS
Type	Offshore Supply Vessel
Year built	2022
Owner	Shina Navigation Pte. Ltd
Manager	Blue Ridge Maritime Pte. Ltd
Gross tonnage[2]	3467
Length overall	78.0m
Breadth	70.2m
Maximum loaded draft	6.4m
Deadweight	4152.96Tons
Main engine(s)	2 x 2353 kW (2x3200 PS) Daihatsu
Propellers	2 x CPP, Azimuth X-Peller[3]
Remarks	DP-2[4]

Table 1: Details of Anahita

[1] ABS was the Recognised Organisation for carrying out surveys and issuance of statutory certificates, ISM related SMC for AN and DOC for the Company.
[2] Gross tonnage is calculated by measuring the total internal volume of a vessel's enclosed spaces, like cargo holds and crew areas. This measurement helps to determine what regulations and fees apply to the vessel, such as safety standards and port charges.
[3] CPP and Azimuth X-Peller thrusters would mean AN has both efficient main propulsion (CPP) and highly manoeuvrable azimuth thrusters, aligning with the role of DP-2 class for offshore support.
[4] A DP-2 vessel is fitted with a dynamic positioning system that uses dual-redundant computer control, reference systems, sensors, and thrusters to automatically maintain position and heading. The redundancy ensures that no single failure, such as the loss of a computer, sensor, or thruster result in total loss of position keeping. DP-2 systems are certified in accordance with IMO MSC/Circ.645 guidelines and class society requirements.

Name	Sonangol Quenguela (SQ)
IMO number	9730555
Flag registry	Bahamas
Classification society	ABS
Recognised Organisation issuing DOC certificate	ABS
Type	Drillship
Year built (Keel Laid)	2015, Daewoo, South Korea
Owner/ Company / Operator	Seadrill
Gross tonnage	67,101
Length overall	238.0m
Breadth	42.0m
Draft (Operation)	12.0m
Displacement	41,948mt
Main engine(s)	6 x Himsen 8,000 kW
Thrusters	6 x Rolls Royce 7,200 hp with transit speed up to 11.5 knots
Remarks	DP-3[5]

Table 2: Details of Sonangol Quenguela

[5] DP-3 vessel is fitted with a dynamic positioning system that employs triple-redundant computers, reference systems, sensors and thrusters to automatically maintain position and heading. The system is segregated by physical separation of equipment and compartments, ensuring that no single failure or even a fire or flood in one compartment results in total loss of position keeping. DP-3 systems are certified in accordance with IMKO MSC/CIRC.645 and class society requirements.

1 FACTUAL INFORMATION

Unless otherwise stated, all times used in this report were expressed in Ship's Mean Time (SMT), which was one hour (H) ahead of Coordinated Universal Time (UTC).

The investigation team was provided with closed-circuit television (CCTV) recordings, supporting documents, and crew statements from the offshore supply vessel Anahita (AN). Documents and information were also obtained from the drillship Sonangol Quenguela (SQ).

1.1 Narrative of the occurrence

1.1.1 By Anahita's Crew (AN-Crew)

1.1.1.1 On 13 May 2025 at about 1530H, AN commenced backloading[6] operations with Sonangol Quenguela (SQ) at Offshore Block 17, Angola, using SQ's starboard forward crane. Various stores were backloaded, including tubular casings, hereafter referred to as casing joints[7], which were lifted individually or in bundles. At about 2350H, AN Master instructed the SQ crane operator to place the next backload on AN's port quarter of the deck.

1.1.1.2 At about 0020H on 14 May 2025, AN Master handed over responsibility of the dynamic positioning (DP) watch to the Chief Mate (CM), advising that backloading operation would continue at the port aft deck. CM monitored the operation from the DP chair, assisted on deck by Second Mate (2M-1), who had earlier relieved another Second Mate (2M-2).

1.1.1.3 Backloading operation continued under CM's supervision, with 2M-1 on deck overseeing the loading and stacking of casing joints and maintaining communication with the SQ crane operator using a portable VHF radio on Channel 87[8]. At about 0132H, 2M-1 returned to the bridge to update the Daily Progress Report, while CM continued to monitor the backloading operation. The final lift, consisting of two single casing joints, had been landed on AN's aft deck.

---

[6] The operation of returning equipment, materials, or casing joints from an offshore installation to a supply vessel.
[7] A single length of steel pipe used in drilling operations, usually connected with other joints to form a casing string. See also: Casing shoe joint.
[8] Communication between AN and SQ was conducted using VHF radio. Both vessels maintained a VHF watch on Channel 16, with Channel 87 designated as the working channel for the backloading operation, as recorded in the pre-operation checklist.

1.1.1.4 Following the final lift, two Able Seafarers Deck (ASD-1 and ASD-2) were seen approaching the casing joints that had just been landed on AN's deck. After they unhooked the crane bridle[9] from the wire slings, the crane was observed to swing out and clear of the deck area. While the ASDs were ensuring that the wire slings were clear of any obstruction in preparation for the next operation, i.e. for discharge at berth, AN suddenly pitched and rolled heavily due to a deep swell. CM noticed the sudden movement[10] and suspected this might have shifted the casing joints and affected the two ASDs. CM then instructed 2M-1 to proceed to the deck to check on the two ASDs.

1.1.1.5 On arrival at the main deck, 2M-1 found that both ASDs were trapped underneath a casing joint (see **Figure 1**) and reported the incident to CM. 2M-1 then signalled and contacted SQ's crane operator via the portable VHF radio to draw attention to the situation. Subsequently, CM communicated with SQ via VHF radio, requesting assistance in lifting the casing joint to free the two ASDs.

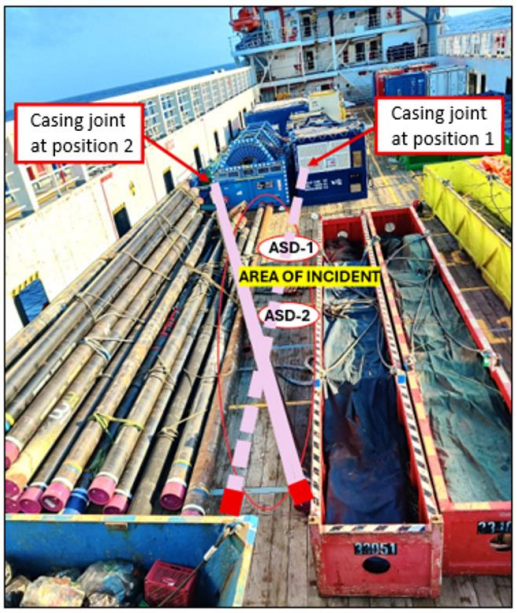

Figure 1: ASD-1 and ASD-2 trapped beneath a casing joint at position 1, casing joint was subsequently shifted to position 2 as viewed from the stern. *(Source:* The Company of AN, annotated by TSIB)

[9] A multi-leg wire rope assembly used for connecting loads to a crane hook for lifting.
[10] Though not reported by AN's bridge team, CCTV recordings indicated movement of the vessel's stern due to swell prior to and after the rolling of the casing joints.

1.1.1.6 The crane operator swung the hook over to AN. With the assistance of other crew members who arrived at the deck, 2M-1 reconnected the crane hook to the wire slings, and the crane lifted and shifted the casing joint, freeing the two ASDs. During this time, CM informed AN Master[11] by telephone and made announcements of the situation on the Public Address system.

1.1.1.7 At about 0140H, medical assistance was requested from SQ via VHF radio. ASD-2 was freed first and stabilised on deck, while ASD-1 was freed at about 0204H. First aid was administered by 2M-1 and 2M-2, who had returned to assist, until the SQ medic[12] boarded AN at about 0231H who took over the treatment. Cardiopulmonary resuscitation was performed on ASD-1 for about 50 minutes without success. ASD-2, who had sustained leg injuries, was stabilised.

1.1.1.8 At about 0306H, ASD-2 was transferred to SQ for further care. At about 0345H, a medic from FPSO[13] CLOV[14] boarded AN via rescue craft to provide additional support. With AN Master's agreement, ASD-1 was transferred to SQ at about 0400H, accompanied by a medical assistant and 2M-2[15]

1.1.1.9 At about 0530H, AN Master was informed that ASD-2 had been evacuated by helicopter in stable condition, while ASD-1 had been declared deceased.

1.1.2 By Sonangol Quenguela (SQ)

1.1.2.1 According to SQ's records, AN was positioned under DP at about 1600H on 13 May 2025 to commence the backloading operation. At about 2330H, a pre-tour meeting was held for the incoming SQ crane operator and deck crew, during which the Marine Section Leader briefed the team and the "Marine Pre-Load/Backload Supply Vessel Checklist" was completed.

1.1.2.2 At about 2350H, the crane operator assumed duty, was briefed on the lifting of 10¾" (inch) casing joints and told to receive instructions from AN Master for the backloading of casing joints onto AN's port aft deck. At about 2357H, the crane operator met with the roustabouts (SQ crew), conducted a pre-task meeting, and carried out lifting checks, with the checklist formally approved at

[11] AN Master reported the incident to the Company's Designated Person Ashore at about 0209H.
[12] SQ medic and an assistant were transferred by personnel transfer capsule to AN and commenced treatment.
[13] FPSO – Floating Production, Storage and Offloading unit.
[14] CLOV – Carnation, Lily, Orchid, Violet (name of oil field development, offshore Angola)
[15] 2M-2 had assisted ASD-1 in the earlier medical effort and, being of the same nationality as the ASDs, could provide communication and support.

about 0122H on 14 May 2025.

1.1.2.3 The backloading operation continued with sequential lifts, with the final lift comprising two 10¾" casings joints, each secured by a wire sling but lifted together. The two casing joints were placed on top of the previously loaded casing joints on AN's aft deck. AN's crew (ASD-1 and ASD-2) then disconnected the wire slings from the crane hook, and the crane was swung away, returning with the bridle assembly.

1.1.2.4 At about 0135H, the SQ crane operator, after receiving a VHF call from AN and observing commotion on AN's deck, swung back the crane to AN to assist in lifting the casing joint as directed by AN's deck crew.

1.1.2.5 Following the occurrence, SQ's Drilling Manager suspended the backloading operation and initiated a safety stand-down. Company emergency procedures, including crew and family support, were subsequently activated.

1.2 Cargo description

1.2.1 The backloading operation involved the lifting of three types of casing joints and one type of casing shoe joint[16], arranged as in **Table 3**:

Item	Description	Quantity/ Arrangement	Total Weight (kg)	Remarks (kg/ joint)
1	10¾" casing joint	19[17] pieces in 5 bundles	19,950	1,050
2	10¾" chrome[18] casing joint	4 pieces	4,500	1,125
3	5¾" casing blank[19] joint	5 pieces	6,000	1,200
4	10¾" casing shoe joint	1 piece	1,500	1,500

Table 3: Details of the casing joints and associated components backloaded from SQ to AN.

[16] The bottom section of a casing string, fitted with a shoe to guide the casing into the well and assist in cementing.
[17] A total of 19 (10¾") casing joints, arranged into 5 bundles, with each bundle containing casing joints secured together for handling.
[18] Casing joints manufactured from Chrome-alloyed steel, used in corrosive downhole environment.
[19] A plain length of casing joint without threads, couplings, or special end connections at either end.

1.3 CCTV recordings

1.3.1 The investigation team reviewed a total of nine AN CCTV recording, each about 15 minutes in duration[20]. The recordings captured the backloading operation, including the sequence of lifts, the positioning of casing joints on AN's deck, the presence of AN's crew on deck, and AN's movements in relation to SQ.

1.3.2 The footage also showed the stowage of casing joints on deck. The casing joints were landed on the port-side aft deck, close to the bulwark, and AN's crew cleared the wire slings after each lift.

1.3.3 Several bundles of casing joints had already been landed on AN's deck before the final lift of two 10¾" casing joints which were placed on top of earlier bundles on AN's deck.

1.3.4 Between 0035H and 0134H on 14 May 2025, five lifts were conducted. The CCTV also showed that the casing joints were stacked in multiple layers on the port-side aft deck. For ease of understanding, a simplified illustration was prepared with information from CCTV footages to indicate the sequence and stacking arrangement (see **Figure 2** and **Table 4**).

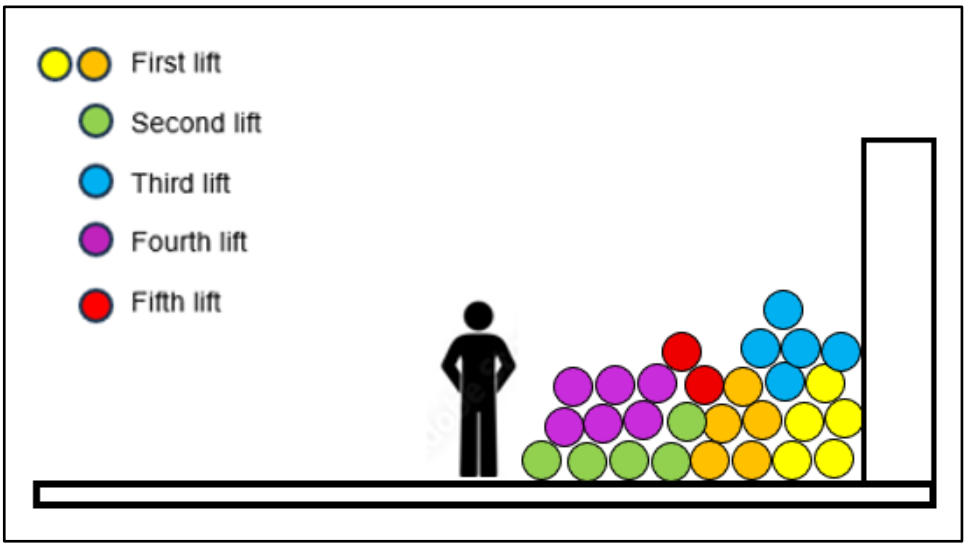

Figure 2: Simplified illustration of the casing joints stacking arrangement and approximate positions of two ASDs, as observed from CCTV footage.

[20] The CCTV times are estimates for reference only, as the recordings did not display a continuous time stamp.

Lift No.	Colour code (as observed)	Description	Approximate deck position*
1	Yellow and orange	Two bundles of five 10¾" casing joints each	stacked against AN's port bulkhead on the deck
2	Green	One bundle of five 10¾" casing joints	stacked next to the first lift on the deck
3	Blue	Two bundles of three 10¾" casing joints each	stacked on top of the first lift
4	Purple	Two bundles of three 10¾" casing joints each	stacked on top of the second lift,
5	Red	Two single 10¾" casing joints	stacked on top of the third and fourth lifts

Table 4: Sequence and approximate deck positions of casing joint based on CCTV footage.

1.3.5 CCTV footage showed both ASDs standing clear of the final lift of two casing joints. After the final lift had landed, they approached the casing joints and unhooked the wire slings and began ensuring that the wire slings were clear of any obstruction in preparation for the next operation. The two casing joints (the fifth lift) from the final lift were stacked on top of, and added weight to, the existing stacks of casing joints. During the vessel's rolling motion caused by the deep swell, (see **Figure 3**), movement was observed on the casing joints from the second and fourth lifts (see **Figure 4**). Shortly after, both ASDs were seen trapped under a casing joint[21].

[21] The lower bundles that supported the final lift appeared to move during the vessel's motion, resulting in one of the casing joints rolling down and trapping the two ASDs.

Figure 3: CCTV frame showing the positions of ASD-1 and ASD-2 before the rolling down of the casing joint.

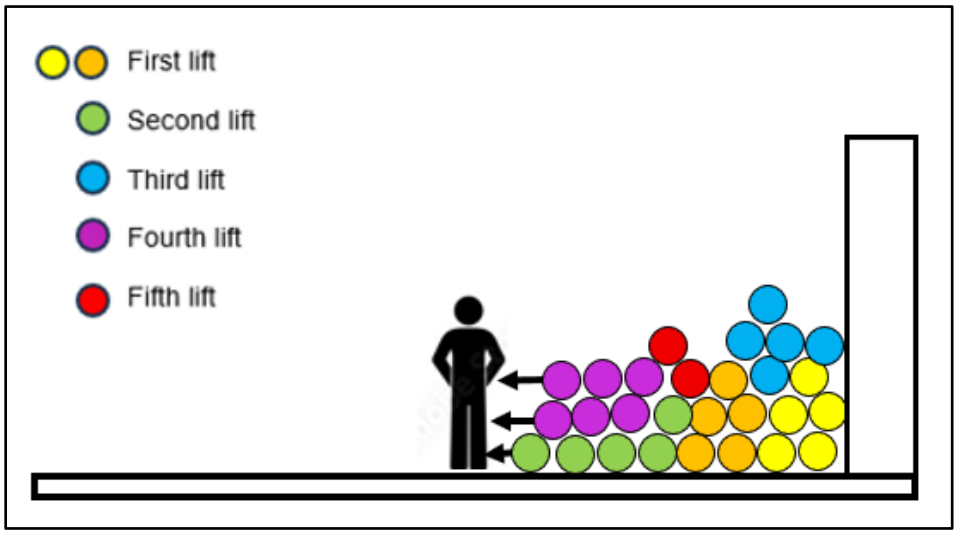

Figure 4: Approximate direction and movement of the casing joints based on CCTV footage.

1.3.6 The footage also showed constant rolling motion of AN's stern in relation to SQ caused by the prevailing swells. Both vessels appeared to maintain a steady relative position throughout the operation, as seen in the CCTV footage. AN continued to experience rolling motion under the sea conditions, which appeared more pronounced immediately before and after the movement of the

casing joints.

1.3.7 CCTV footage and statements from SQ crew did not indicate any unusual pitching or rolling movement of the drillship that could have affected the backloading operation.

1.4 Crew matrix and experience - AN crew

1.4.1 At the time of the occurrence, AN was manned by 18 officers and crew in accordance with the Minimum Safe Manning Document issued by the flag Administration. The crew comprised various nationalities. Details of the crew members relevant to the occurrence are provided in **Table 5** – Relevant crew particulars.

Rank	Nationality	Years with Company	Years in Rank	Years Sailing
Master	Indonesia	0.27	4.02	6.55
CM	Indian	0.27	1.82	5.88
2M-1	Indian	0.22	3.86	5.58
2M-2	Indian	0.24	2.02	3.27
ASD-1 (deceased)	Indian	0.29	1.39	3.84
ASD-2 (Injured)	Indian	0.20	4.26	4.81

Table 5 – Relevant crew particulars.

1.4.2 ASD-1 and ASD-2

1.4.2.1 The following information relates specifically to ASD-1 and ASD-2 (see also **Table 5** – Relevant crew particulars). ASD-1 and ASD-2 joined AN on 4 March 2025.

1.4.2.2 According to ASD-2, ASD-1 and ASD-2 were keeping a 12-hour watch from midnight to noon. Prior to the occurrence, they had taken over the deck cargo watch from the Bosun (BSN) and ASD-3. Their assigned duties were to remove the SQ crane hook after the casing joints had landed on AN's deck and to clear the wire slings, which they were performing at the time of the incident.

1.4.2.3 ASD-2 confirmed that since joining the vessel, he had attended the relevant

Risk Assessment (RA) and Toolbox briefing sessions for shipboard operations, and records of these sessions were provided. He also stated that no "red zone[22]" or exclusion area had been marked on the aft deck for the backloading operation.

1.4.2.4 At the time of the occurrence, CM was the Officer of the Watch on the bridge, maintaining the DP watch while concurrently supervising the backloading operation. 2M-1 was the officer in charge of the backloading operation on deck. ASD-2 did not recall receiving any verbal safety instructions or warnings, such as to be alert to the vessel's movement which may cause casing joints movement when working in their vicinity.

1.4.2.5 On 14 May 2025, the deceased ASD-1 remained onboard AN and was subsequently landed ashore. The injured ASD-2 was airlifted to a hospital in Luanda, Angola where the medical report indicated trauma to the right lower limb involving the knee and ankle joints, with a fracture of the right medial malleolus. ASD-2 was discharged on 22 May 2025 and returned home for further treatment and follow-up.

1.4.2.6 On 16 May 2025, an autopsy was conducted at the main morgue in Luanda City. The cause of death of ASD-1 was determined as shock resulting from severe lower limb injuries[23] caused by impact from a heavy blunt object.

1.4.3 Work and Rest Hours

1.4.3.1 The investigation team reviewed the crew's work and rest hour records from AN for the month of April and May 2025 and up to the day of the occurrence. No evidence of non-compliance with the requirements of the Maritime Labour Convention (MLC) and the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) was identified in the records, including ASD-1 and ASD-2.

1.5 Safety Management System (SMS) of AN

1.5.1 A Document of Compliance (DOC) was issued to the Company of AN by the American Bureau of Shipping (ABS) on 11 April 2025, following verification

[22] A designated hazardous area on deck where personnel should not enter while loads are being lifted or moved.
[23] The examination recorded serious injuries to both legs, including fractures of the thigh and lower leg bones, torn muscles and blood vessels, and heavy bleeding. Additional abrasions and bruises were observed on the back, lower back, and both sides of the hip. No other injuries were identified, confirming that the fatal injuries were limited to the lower body.

completed on the same day. The certificate was valid until 10 April 2030.

1.5.2 A Safety Management Certificate (SMC) was issued to AN by ABS on 18 April 2025, valid until 17 April 2030.

1.5.3 AN was operating under an approved SMS in compliance with the International Safety Management (ISM) Code and the regulations of the flag Administration. The onboard documentation included policies, operational procedures, manuals, checklists, and relevant industry publications.

1.5.4 The SMS implemented onboard AN included a safety and environmental protection policy, and incorporated procedures for safe cargo operations, RA, TBT, work and rest hour compliance, and emergency response.

1.5.5 The SMS of SQ was not reviewed as part of this investigation as the occurrence took place onboard AN after the load had landed on deck, the crane had been unhooked, and was swinging back to SQ. In addition, from the CCTV footage and crew statements indicated that there were no communication issues between SQ's crane operator and AN's crew during the backloading operation.

1.6 Personal Protective Equipment (PPE) Matrix

1.6.1 The investigation examined the PPE requirements as set out under the Company's SMS. The Company maintained a PPE Matrix (SMSP-14-01, Rev.04, dated 21 January 2025), which specified the protective equipment required for various shipboard activities.

1.6.2 According to the document, personnel working on the main deck were required to wear coveralls, safety shoes, helmets, gloves, safety glasses, and ear protection. Other tasks, such as working aloft, enclosed space entry, chemical handling, and crane use, required additional PPE as listed in the matrix.

1.6.3 At the time of the occurrence, both ASD-1 and ASD-2 were reported to be wearing the PPE required for main deck work as set out in the matrix.

1.7 Risk Assessment (RA) of AN

1.7.1 A documented RA for deck cargo operations was completed on 26 February 2025. The RA was prepared under the Company's SMS, with CM identified as the assessment leader and AN Master signing the declaration.

1.7.2 The RA identified the following hazards: communication failure, improper stowage of cargo, tiredness, inadequate lighting, and sudden changes in weather. The associated controls included:

- Use of agreed communication language, radio checks, and hand signals
- Application of the cargo securing manual and stowage plan
- Compliance with work and rest hours in accordance with MLC and STCW
- Provision of adequate deck lighting and routine maintenance
- Continuous monitoring of weather, with operations to be suspended when limits were exceeded (wind speed above 25 knots, swell height greater than 2.5 m, or visibility less than 500 m)

1.7.3 Residual risks were assessed as acceptable after the application of these controls. The RA also required TBT to be conducted prior to each operation.

1.7.4 The risk of casing joints rolling on deck between lifts was not identified, i.e. each stack of casing joints landed on deck could have rolled due to vessel movement caused by sea swells. Hence, there were no control measures in place to restrain movement of the casing joints after each lift.

1.7.5 This RA was the same document referenced by ASD-2 in his statement (see paragraph 1.4.2.3).

1.8 Toolbox Talk (TBT)

1.8.1 A TBT was conducted on 14 May 2025 prior to the backloading operation, as recorded in the Company's checklist. The TBT was held with the presence of ASD-1 and ASD-2, among the attendees, and signatures recorded.

1.8.2 The TBT discussed the following topics:

- Objectives and responsibilities of the backloading operation
- Existing procedures and RA were reviewed and understood
- Manpower and skills, safe access, PPE, and hazardous equipment
- Emergency action, environmental impact, and working environment

- Work permits, isolations, and dangerous substances

1.8.3 The TBT did not record any issues requiring follow-up. Copies of the RA and TBT were provided to the investigation team.

1.9 Procedure for Deck Cargo Operations (SMOS-05)

1.9.1 AN carried the Company's loading procedure SMOS-05 Rev.1 (07 October 2024). The procedure required deck cargo to be stowed and secured to the satisfaction of the Master, with non-cargo areas on deck clearly marked. It stated that, where fitted, stanchion posts[24] should be used to restrain the movement of casing joints, and that large soft wooden block wedges could be used to temporary restrain casing joints between lifts or while installing lashings. The procedure also required all cargo operations to be supervised by the deck officer in charge and stated that the Master had authority over the sequence of cargo discharge and backloading.

1.10 Cargo Securing Equipment Available Onboard

1.10.1 At the time of the occurrence, AN carried cargo-securing equipment for the handling and stowage of casing joints. The equipment comprised stanchion posts, wooden chocks, and securing ropes as seen in post-accident photographs showing yellow-painted stanchion posts stowed on the main deck.

1.10.2 The Company's record confirmed that these securing items formed part of AN's standard deck-cargo equipment. The vessel's loading procedure listed the stanchion posts and chocks as equipment to be used when handling casing joints cargo. CCTV footage showed the stanchion posts stowed at the aft area of the main deck throughout the lifting sequence. They were not used during the stacking of the casing joints during backloading operation. See **Figure 5.**

[24] These stanchion posts, each weighing about 39.1 kg each, are used to prevent the pipes from shifting and/ or rolling.

Figure 5: Stanchion posts onboard Anahita. (*Source:* The Company of AN)

1.11 Technical Information

1.11.1 AN was fitted with a Dynamic Positioning System[25] Class 2 (DPS-2). The DP system maintained AN's position and heading relative to SQ throughout the backloading operation.

1.11.2 CCTV footage did not indicate any variation in the separation distance between the two vessels. The pitching and rolling motion observed on AN was due to the prevailing sea swells, which was beyond the performance limitations of the DP system. No DP-related alarms, malfunctions, or defects were reported in the available documentation. In a DPS-2, the thrusters automatically adjust to maintain the vessel's position and heading, but these controls do not counteract hull motions such as roll, pitch, or heave caused by sea swells.

1.12 Stability and Loading Condition of AN

1.12.1 AN's stability for 13–14 May 2025 was checked by CM using the vessel's stability programme. The results showed that the vessel had a strong ability to return upright when it heeled, with its restoring forces reaching their highest point at about 35 degrees of heel. The draughts were 5.59 m aft and 4.79 m forward, giving a positive trim by the stern of about 0.8 m, which is common for cargo operations, and a slight heel of 0.4° to port was recorded. All stability and strength requirements were met for this condition.

[25] DPS is a computer-controlled system that automatically maintains a vessel's position and heading using its thrusters, without the need for anchors or mooring lines.

1.12.2 AN was operating in a loading condition in which casing joints were arranged in multiple stacks on the aft deck. At the time of the occurrence, the deck occupancy was recorded as about 85 per cent[26]. The deck stowage illustration is included to show the extent of cargo occupying the aft deck during the operation, as most of the usable deck area was taken up by various types of cargo, including the stacked casing joints. As shown in **Figure 6**, the area where the casing joints later shifted (colour-coded in purple) had limited open deck space around it.

Figure 6: Loading condition of Anahita. The purple-coloured box indicates the area occupied by casing joints before the occurrence. (*Source*: Company. Annotated by TSIB)

1.13 Meteorological Conditions

1.13.1 At the time of the occurrence, both AN and SQ reported moderate weather and sea conditions, with no significant limitations to the backloading operation. SQ's records showed a heading of 035° for SQ, and 214° for AN, wind 163° at 11 knots, current 144° at 0.57 knots, roll 0.2°, pitch 0.7°, and heave 0.2m.

1.13.2 Meteorological forecasts issued for Block 17 (TotalEnergies Angola) for 13–14 May 2025 indicated light to slightly moderate conditions in the wider area. Forecast data included winds of 6–10 knots, significant wave heights of 1.5–2.1 m from the south-southwest with periods of about 10–11 seconds, visibility of about 10 km, and a low lightning risk. These forecasts were consistent with the conditions recorded by AN and SQ.

1.14 Location of Occurrence

1.14.1 The occurrence took place at Offshore Block 17, CLOV field, Angola, while AN

[26] Deck occupancy refers to the percentage of the deck area covered by cargo. A higher percentage means less open deck space is available around the cargo.

was positioned close to SQ under DP mode during backloading operation.

1.14.2 The CLOV field lies approximately 80 nautical miles west of Soyo, Angola, in the South Atlantic Ocean, at an approximate position of Latitude 07°23′ South, Longitude 011°45′ East. The area is an open-water offshore field exposed to ocean swells.

2 ANALYSIS

2.1 Overview of the occurrence

2.1.1 The occurrence was due to the uncontrolled movement of casing joints after the final lift had landed on AN's aft port deck, during backloading operation conducted under DP mode. Two Able Seafarers Deck were trapped underneath one of the casing joints. The investigation looked into the following:

(a) Handling and stowage of casing joints

(b) Stability condition, weather, and vessel motion under DP mode

(c) Risk Assessment (RA)

(d) SMS requirements on securing cargo on deck

2.2 Handling and stowage of casing joints

2.2.1 The backloading operation involved the lifting of bundled and single casing joints from SQ onto AN's deck. The final lift comprised two single casing joints, lifted together on separate wire slings and placed on top of previously stacked bundles on AN's aft deck. Stanchion posts and wooden block wedges were not used during the backloading operation to prevent movement between lifts.

2.2.2 Cylindrical-shaped items, such as casing joints, are susceptible to rolling movement when not restrained. As additional loads were landed during the backloading operation, the lower stacks of casing joints were susceptible to lateral movement due to the additional weight placed on them or due to vessel rolling caused by deep sea swells. The effect of vessel rolling on the stability of the casing joints is discussed in paragraph 2.3.

2.3 Stability condition, weather, and vessel motion under DP

2.3.1 At the time of the occurrence, AN was in a loading condition that met the applicable stability and strength requirements. The vessel had a positive trim by the stern and a slight list to port, both within the acceptable limits for deck cargo operations. Cargo occupancy on deck was high, with most of the available aft deck space occupied by stacked casing joints.

2.3.2 Meteorological conditions were reported as moderate and within the

operational limits defined in the RA. Forecast and recorded data indicated light to moderate winds and the presence of long-period swells. These conditions did not exceed the thresholds established for suspending backloading operation.

2.3.3 AN was operating under DPS-2 to maintain its position and heading relative to SQ throughout the operation. No DP-related alarms or faults were reported. The DP system controlled horizontal position and heading but was not designed to control hull motions such as roll, pitch, or heave caused by sea swells.

2.3.4 CCTV footage showed continuous rolling motion of AN's stern caused by the prevailing swell conditions. Although the vessel remained within approved stability limits and maintained position and heading under DP control, the rolling motion generated dynamic forces that affected the stability of the unrestrained casing joints, resulting in lateral movement of the lower layer.

2.4 Risk Assessment (RA)

2.4.1 The RA identified general hazards associated with deck cargo operations, including improper stowage of cargo, changes in weather, and tiredness. However, it did not identify the hazard of uncontrolled movement of casing joints after landing and between lifts, prior to final stowage.

2.4.2 The RA focused primarily on the final stowage condition and environmental thresholds for suspending backloading operations and did not consider the hazard scenario relating to the movement of casing joints between lifts.

2.4.3 As the hazard relating to the movement of casing joints between lifts was not identified in the RA, the TBT did not highlight the use of stanchion posts or wooden block wedges as measures to mitigate the risk of uncontrolled movement of casing joints during this stage of the operation.

2.5 SMS implementations onboard AN

2.5.1 The SMS required the use of stanchion posts and wooden block wedges when handling cylindrical cargo, and such equipment was available onboard AN. During the backloading operation, these measures were not applied between lifts. This indicated that the SMS requirements for securing cylindrical cargo were not consistently implemented at the operational level.

2.5.2 The SMS also required deck cargo operations to be supervised by the deck officer in charge. While the deck officer's temporary absence from the deck did not directly contribute to the occurrence, as the officer had returned to the bridge to update the Daily Progress Report, the circumstances indicated that SMS controls related to deck-level supervision were not consistently implemented onboard AN.

3 CONCLUSIONS

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

3.1 The final lift comprised two single casing joints lifted on two separate wire slings and landed on top of the previously stacked casing bundles on the aft deck which were not positively restrained by stanchion posts or wooden block wedges. The unrestrained cylindrical casing joints were susceptible to rolling movement.

3.2 The two ASDs were trapped underneath a casing joint during the backloading operation due to the uncontrolled movement of casing joints as a result of the rolling motions of the vessel caused by sea swells.

3.3 AN maintained its position and heading under DP control and operated within approved stability limits. However, prevailing sea swells caused rolling motions, generating dynamic forces that affected the stability of unrestrained casing joints and contributed to their movement on deck.

3.4 The RA identified general hazards associated with deck cargo operations but did not identify the risk of uncontrolled movement of casing joints between lifts. As a result, specific controls, such as the use of stanchion posts or wooden block wedges, to mitigate the risk of casing joints movement were not in place.

3.5 The Company's SMS required the use of stanchion posts and wooden block wedges when handling cylindrical cargo, and such equipment was available onboard. These controls were not applied during the backloading operation.

3.6 While not contributing to the occurrence, the lack of continuous deck supervision during the backloading operation was not in accordance with SMS requirements.

4 SAFETY ACTIONS

Following the occurrence, the Company conducted an internal investigation and took safety actions aimed at addressing the risks associated with deck cargo handling during backloading operations. These actions included:

4.1 The Company disseminated safety information to its fleet to reinforce awareness of line-of-fire hazards during deck cargo operations, particularly when handling cylindrical cargo that has not yet been secured.

4.2 The Company reminded shipboard personnel of existing SMS requirements related to the securing of cylindrical cargo, including the use of stanchion posts and wooden block wedges during cargo handling operations.

4.3 The Company emphasised the need for personnel to remain clear of unrestrained loads and to avoid approaching deck cargo until it has been adequately secured.

4.4 The Company highlighted and shared lessons learned from the occurrence to support RA and Toolbox Talks for deck cargo handling and backloading operations, reinforcing the consistent application of established SMS controls.

4.5 The Company implemented measures to enhance deck-level supervision during backloading and deck cargo operations, including reinforcing the requirement for a deck officer to be present on deck during cargo handling activities.

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.

In view of the safety actions taken by the Company, no safety recommendations were issued in relation to this occurrence.