**KOMITE NASIONAL KESELAMATAN TRANSPORTASI**

**REPUBLIC of INDONESIA**

# FINAL

**KNKT-17-12-34-03**

## Marine casualty investigation report

## Fatality on board Singapore registered coal barge

## *Surya Nawa 23*

## At Musi River near Ampera bridge, Palembang - South Sumatera

## Republic of Indonesia

## 10 November 2017


**2019**

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1. Indonesia Shipping Act no 17 year 2008, chapter 256 and 257 along with it explanatory
2. Indonesia Government Regulation No 62 year 2013 on Transport Accident Investigation
3. President Regulation No 02 Year 2012 on the Komite Nasional Keselamatan Transportasi
4. IMO Resolution MSC.255 (84) on Casualty Investigation Code

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Jakarta, January 2019

Chairman of

KOMITE NASIONAL

KESELAMATAN TRANSPORTASI

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ISBN: -

# FACTUAL INFORMATION

## *The Accident*

On 10 November 2017, at about 05.00 LT[1], the tug boat *Surya Wira 21* was to tow the coal barge *Surya Nawa 23* in the Gandus section, upstream of Musi River in South Sumatera. 2°59′30″S 104°45′49″E. The *Surya Nawa 23* was fully loaded with coal and going to be towed to Kelantan, Malaysia. To prepare for the voyage, the anchor was heaved up. The pilot boarded *Surya Wira 21* and set up the plan for passing out of the Musi River.

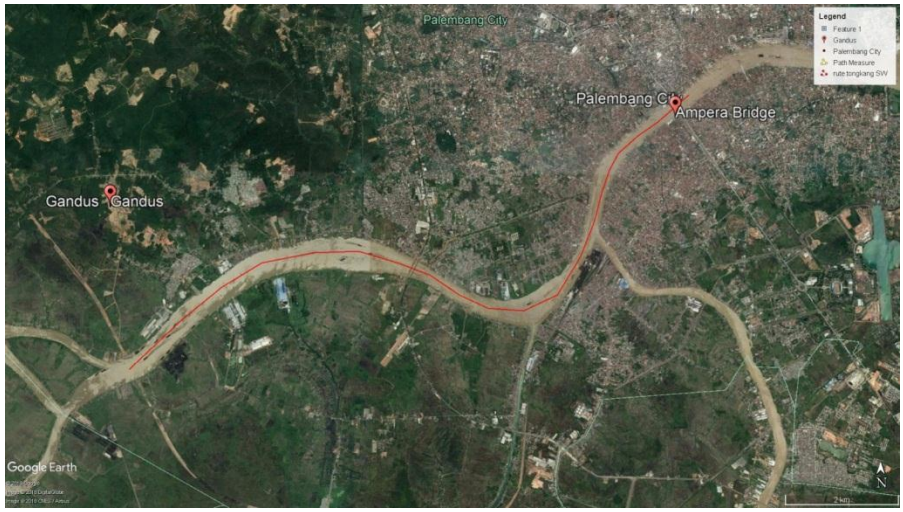


***Figure 1: Red line indicates the towing route crossing musi river from Gandus to Ampera Bridge. The line was about 6.9 nm long.***

At 05.30 LT, *Surya Wira 21* had its anchor aweigh.

To assist the towing operation, a Pilot of Palembang Port ordered harbour tug *Tanjung Buyut 2* as the towing tug whilst the *Surya Wira 21* was to be the assist tug at the stern of the tow. At that time, the 2nd Officer and 2 able bodied (AB) seamen from *Surya Wira 21* were assigned onboard the barge *Surya Nawa 23* to be lookouts for the ship position while passing the bridges of the Musi River. The 2nd Officer and an AB (herein after called AB-1) were at the portside aft end and another AB (herein after called AB-2) at barge's starboard aft end. To maintain the communication among the towing members, each party was using portable VHF Radios on ch 12.

At about 06.30 LT, *Tanjung Buyut 2* arrived and took over tow from *Surya Wira 21*. Later *Surya Wira 21* was positioned at *Surya Nawa 23's* aft end, working as the assist tug. The Pilot ordered another harbour tug called *Teratai* to also support the towing operation.

At 07.10 LT, *Teratai* approached the towing group and promptly replacing the *Surya Wira 21* as the assist tug. Two mooring lines were connecting *Teratai* and the barge. At this time *Tanjung Buyut 2* was acting as the towing tug and *Teratai* as the assist tug. Meanwhile, *Surya Wira 21* was free running following the towing group.


***Figure 2: typical towing company configuration***

At 07.35 LT, the towing group was passing freely and safely under the Ampera Bridge. The tow assist operation next came to its final service point and made ready to hand over the towing for their onward voyage.

At 07.45 LT, *Tanjung Buyut 2* handed over the tow to *Surya Wira 21*. *Teratai* still maintained her position as the assist tug and continued to maintain the barge position and speed. On *Teratai*, the master

[1] Indonesian western time (UTC+7)

[2] PK: power unit equal to 0.991 Horse poewr

[3] Code of Safe working practice for merchant seamen (2015 edition – Amendment 3, Oct 2018) issued by Maritime

had the con and two ABs were standing by on the forecastle deck. At this time, the river was ebbing and the current flowed downstream.

At 07.50 LT, as the assist service was completed, the master of *Surya Wira 21* ordered the release of the mooring lines from *Teratai*. On the radio, he also requested the master of *Teratai* pick up his crew from the barge and transfers them to *Surya Wira 21*. The master of *Teratai* agreed and made ready to pick up the crew on the barge.


***Figure 3: reconstruction of event, possible position of the deceased AB while he attempted to climb over the afterend sideboard***

To slacken the mooring lines, *Teratai* came close and attached to the after end of *Surya Nawa 23*. The master of *Teratai* gave the starboard engine throttle "a kick" and the bow got closer to the *Surya Nawa 23's* after end. When the mooring line came slack, AB-2 detached the starboard line while 2nd officer and AB-1 still worked on the portside mooring line. On the *Teratai*, the ABs were working on retrieving the mooring lines.

Having released the starboard mooring line, AB-2 climbed over the after end sideboard, in order to move to the *Teratai*. While climbing around the beam, he was facing forward. At about the same time, the *Teratai* came close to the afterend sideboard where the AB-2 still climbing the sideboard (inward). The master of *Teratai* glanced someone's head which appeared suddenly between the bow tyre fenders and the barge vertical beams. He then quickly reversed the engines by pulling both throttles full astern. Unfortunately, the bow's fenders tyre of *Teratai* strucked AB-2's back. AB-2 shouted in pain and was heard by the *Teratai* ABs. The *Teratai*'s master reduced the ships speed and saw that AB-2 had attempted to climb over the *Teratai* tyre fender. Two *Teratai* ABs assisted AB-2 and put him down on *Teratai*'s bow deck. *Teratai*'s AB asked AB-2 about his condition and he replied that his chest was in deep pain. After remove the portside mooring line, 2nd officer and AB-1 also rushed to *Teratai* and enquired after AB-2.


***Figure 4: left: position of AB-2 onboard Teratai after the incident. Right: transferring the injured man***

At 07.55 LT, the master of *Teratai* informed the master of *Surya Wira 21* about the accident. The Master of *Surya Wira 21* asked to transfer AB-2 to *Surya Wira 21*. *Teratai* later moved from after end of the barge to the portside of *Surya Wira 21*.

At 07.58 LT, AB-2 was transferred to *Surya Wira 21* by the crews of *Teratai* and *Surya Wira 21*. AB-2 was later placed on the ship's deck. After transferring the injured man, *Teratai* manoeuvred and went alongside in the port of

Palembang. Whilst the tow continued her voyage, the master of *Surya Wira 21* was communicating with AB-2 asking about his condition. AB-2 replied that he had a painful chest pain. The master asked AB-2 whether he needed to go to hospital, but AB-2 refused the offer and said it was not necessary. The master later inform his agent and asked for a speed boat immediately. The master stopped the towing party at Banjar Island (about 7 Nm from Ampera Bridge).

At 08.12 LT, a speedboat arrived at the *Surya Wira 21* and promptly transported AB-2 to the nearest hospital which was the Pelabuhan Palembang Hospital. The Hospital was about 200 metres away from the Port of Palembang.

At 09.00 LT, following a doctor's examination of AB-2, the hospital declared him death on arrival (DOA).

## *Cause of fatality*

The medical cause of the fatality was uncertain due to no close medical examination being undertaken. There was no detailed authopsy performed at the request of AB-2's next of kin.

Even though the cause of fatality was unclear, the deep chest pain felt by AB-2 could be a strong indication that the crushing impact on the chest had damaged the internal life support organs and caused the fatality.

## *The crew of the towing parties*

At the time of the accident, *Surya Wira 21* was manned with 10 crew of Indonesian nationality.

The master of *Surya Wira 21* held deck officer class-III navigational certificate of competency issued in 2015 in Indonesia. He had extensive experience in tug operations. He started his seagoing career in 1998 working in various tugs and barges in domestic waters. He had joined the tug *Surya Wira 21* a number of times since 2016.

The 2nd officer of *Surya Wira 21* held a deck officer class-III certificate. He joined the *Surya Wira 21* in April 2016. He started his seagoing career in April 2016 working as a second officer in various tugs.

AB-1 held a ratings certificate which was issued in 2015. He started his seagoing experience in 2015 as a deckhand in various tugs and barges. He joined *Surya Wira 21* in May 2017.

The AB-2 held a ratings certificate which he obtained in 2000. He has been onboard *Surya Wira 21* since April 2017.

The *Teratai* was manned with 3 crew members of Indonesian nationals. The Master of *Teratai* held a deck officer class-III certificate which he obtained in 2017. His extensive seagoing career began in 2001. In 2013, he worked as master of a tug in various ships. He had been working onboard as Master of *Teratai* since August 2017.

## *The tug, the barge and the assist tug*

The towing party comprised of the tow tug, barge and assist tug. The tow tug mainly towing the barge with her pull power while the assist tug helped by manoeuvring the barge and maintaining the safe position while passing the bridges in the Musi River.

The *Surya Wira 21* (IMO No. 9554432) is Singaporean registered tug boat. The steel constructed boat was built in 2008 at Tang Tiew Hee Sons SDN. BHD. Malaysia. The boat was owned and operated by the SMC Marine Service Pte, Ltd Singapore. The boat has a length overall of 27.56 metres, a beam of 7.94 m and depth of 3.83 metres. At maximum draft of 3.1 metre, the boat would have a deadweight of 321 tonnes. The boat is classed with Nippon Kaiji Kyokai (NK). *Surya Wira 21's* propulsion system is provided by two sets of four stroke, single acting, 12 cylinder V-diesel engines, Caterpillar model 3412D built in 2008. At its maximum continuous rating of 1800 RPM, each engine could generate power of 632 kW (885 HP). Each engine was connected to a gear reduction and rotating a fixed pitched propeller. The ship's service speed was 11 knot.

*Surya Nawa 23* (official number 395357) is an unmanned Singapore registered coal barge. The barge was owned by SMC Towage PTE Ltd Singapore. The flat top deck barge is constructed of steel, built in 2009 at Pacific Marine & Shipbuilding PTE Ltd Indonesia, and classed with the NK. The ship's gross tonnage was 2979 and net tonnage was 894. The barge has total length of 87.78 m, a beam of 24.38 metres and depth of 5.49 metres. At an extreme draft of 4.315 metres, the barge has payload of 7169.68 metric tonnes. To protect the cargo and coal loading purpose, the barge is fitted with steel constructed so called "sideboard" all over the ship with height of 2.8 m from the main deck. This sideboard is supported by a number of vertical supports

***Figure 5: afterend view of Surya Nawa 23. Red circle indicating location of AB-2 when the accident happened***

The assisting tug *Teratai* (IMO No. 8957962) is an Indonesian registered tug boat. The boat was steel constructed and built in 1998. The boat was owned by PT. Pelayaran Putra Samudra Palembang and operated by PT. Jasa Armada Indonesia (a subsidiary company of PT. IPC). The boat is classed with PT. Biro Klasifikasi Indonesia (Persero). The ship has a length overall of 30.66 metres, a beam of 8.6 metres, and a depth of 3.7 metres. At maximum draft of 3 metres, the ship has deadweight of 132 tonnes.


***Figure 6: bow shape of Teratai***

The *Teratai*'s propulsion system was provided by twin screw fixed pitch and ducted propellers. Each propeller was connected to a four-stroke single acting diesel engine NIIGATA model 6MG 25BX. At 720 RPM, the engine could generate 1000 PK[2] and providing ship speed of 12 knots.

A number of tyre fenders were fitted across the front end and tied to it with chain. The tyre fender is used as protection for the ship while assisting the barge.

## *Musi River Tug and its Towing regulation*

The Musi River recently filled up with large number coal barges due to an expansion and exploitation of coal mining in the upstream areas of the Musi River. Due to difficulties in traversing the river with its bridges, the Musi River considered as compulsory pilotage waters class-1.

The towing regulation stipulated in the Port of Palembang Harbour Master Decree no. K104/ 5/1/KSOP.PLG.14, issued in 2014, stipulate the rules on pilotage procedures. In the pilotage mandatory water class-1, Port of Palembang, vessels above 500 GT, should be under the control of a pilot and the towed barge should be supported by an assist tug. This pilot service started from the Musi upstream until clear off Ampera Bridge as the end point of assist tug service. At the time of the accident, the pilot and tug service in Musi River is provided by PT. JAI.

[2] PK: power unit equal to 0.991 Horse poewr

A specific requirement for the pilotage service in crossing Musi River states that the tow tug should have certain minimum power subject to the length of the vessel and shall have minimum speed of 2 knots. In addition, the decree mentioned that a number of assisting tugs is subject to the length of the vessel. For example, ship with a 70 to 100 metre lenght should be assisted with at least 1 tug which has minimum power of 1000 HP.

# ANALYSIS

## *The impact*

There were no clear communications on how the barge crew transport to the tow tug would be done. Nobody observed any other parties activities as each of towing party crew member were busy releasing and securing the mooring line. The master of *Teratai* was also did not pay attention to the crew member as he focused on maintaining the tug position. The assist tug bow maintained closer to the barge's afterend during releasing the mooring lines. The master mentioned that this was done also in preparation for crew transfer. This situation had put all unmooring parties in a higher risk. There was a lack of clear oversight and management, a failure of supervision of the overall operation. Officer on duty should manage safety all operation and provide clear guidance to the involved crew member. No specific guidance was provided on how the unmooring would be done.

Regardless of no clear information from AB-2 about why he climbed over the sideboard, it is fair to mention that there was no collective safe action to maintain a safe operation among the towing parties. There was no clear information provided by AB-2 to attract attention from the *Teratai* so the master could take sufficient action while tendering the barge. On the other hand, Barge *Surya Nawa 23* was loaded with 7098.922 tons of coal. This created the barge in 'full and down' condition. On the barge after end the freeboard is about 50 cm, whilst the bow of *Teratai* is 'bow-up' as is typical of harbour tugs. The visiblity from the Teratai conning position has a wide blind spot at a close distance.

## *Communication*

Communciations between tow tug and assist tug was establised via VHF radio from the beginning of the towing operations. Three crews who were assigned on the barge were equipped with two portable radios. Their primary task was to inform the master of side clearances of the barge hull to the bridge legs columns while the tow transited under the Ampera Bridge.

During the unmooring processes, there was no clear communication between the tugs and the barge. The crew on the barge were listening to conversations over the radio. *Surya Wira 21* was settled down towing and then she gave instructions to *Teratai* to release the stern tow lines. There was no direct instruction from the tugs to the assigned crew on the barge to loosen the lines and also which side of the lines would be released first. What *Teratai* did was 'kick' the engine ahead in order to slacken the lines. It is most likely that AB-2 saw the starboard tow line was slack and then he spontaneously released the starboard tow line. Meanwhile, the 2$^{nd}$ Officer and AB-1 were focusing on releasing port tow line.

Code of Safe Working Practice for Merchant Seamen[3] could be used as reference for safety overview. For mooring and unmooring operations, all parties should have established proper communication and towing plan. Proper risk assessment conducted and transferred. The mooring plan understood and agreed by all. If operations involve the use of portable radios, then the ship should clearly identify itself by name to prevent confusion with other users. Clear communication is supposed to develop between the assist tug and crew on the barge prior to unmooring operations. Sound signals could be as another means of communication to make the crew around aware of movements.

[3] Code of Safe working practice for merchant seamen (2015 edition – Amendment 3, Oct 2018) issued by Maritime and Coastguard Agency, Department of Transport UK 2018

### *Working clothes*

At that time of the accident, AB-2 was wearing dark blue overalls the same as other *Surya Nawa 21* crew members. It seems that the overalls were difficult to discern with black painted sideboard of the barge. This might lead to workers movement going unnoticed by the assist tug. The utilization of high visibility vests which has a colour that is easily discernible could enhance all parties' awareness during operations.

### *Handling the injured crew member*

AB-2 was admitted to the nearest hospital about 40 minutes after the accident. This was done when the ship was no longer close to the hospital. The port hospital was only 5 to 10 minutes away from the accident site. The timely response of providing first aid to the injured member is considered significant to prevent further injury. AB-2's symptoms and statement right after he managed to board the *Teratai* could have been indicating a serious situation and should have indicated that extra care was required.

Despite AB-2's reluctance to be admitted to the hospital for immediate care, and knowing the seriousness of the situation, there should have been a prompt action by crew in determining the effective care to preserve life.

With regard to the transferring the injured crew member from the assist tug to the other tug, the investigation found that the action might have worsened the crew members condition. Deep chest pain indicated there was something wrong inside AB-2's body. All life supporting internal organs such as lungs, and heart located inside the chest. Therefore carrying an injured crew member should be done in an extra cautious manner by using proper transport means such as stretcher and applying securing line. Immobilisation of the body should be in place to prevent further damaged.

First aid training could provide crew with sufficient information on how to handle wound or injuries. This also gives information on how to assess the body condition and symptoms for the injured. This would determine the correct handling and might preserve life or reduce further injury.

### *Relevant regulation for crew transport from barge to tug*

The Investigation found that it is common to transport crew members from the barge to the towing tug by assist tug. This was done and no commercial charge was levied for this activity. Therefore there was no specific guidelines nor procedure developed by any ship for doing so. However, in this case, the use of a crew transport was prohibited verbally by the pilot when the tow service come to it endpoint of service.

The Investigation could not find any formal reference indicating a proper safety assessment had been done by pilotage services, the ships officers or the company in any sense of risk or safety precaution in barge crew transfer operation.

## CONCLUSION

### *Findings*

The fatal accident of the AB of *Surya Wira 21* occurred while he was attempting to move to the assist tug by climbing over the barge's after end sideboard. The impact to the back of AB-2 resulted in deep pain and presumably damage to his internal organs.

The assist tug master was positioning his tug for the crew transfer but did not clearly comprehend the individuals' intention on how the transfer would be done. In addition, the assist tug movement was not properly observed by crew on the barge. On the other hand, responsible person on the barge (2$^{nd}$ Officer) was not informed regarding how the transfer would be done. There was no risk assessment done or communicated.

Handling the injured crew was also seen to be not properly done in the sense of assessing the injured condition, first aid provided and transferring the injured.

### *Contributory factors*

- No guidance or written procedure on barge crew transfer using assist tug. The communications among towing parties was minimum and inadequate in the sense of maintaining an overall safe operation.
- No collective safety awareness or common safe operation thought by all crew in how to conduct crew transfer. No risk assessment was done or communicated.
- The inadequacy of the visibility of the clothing worn by the members.

### *Other factors*

There is no written procedure of mooring and unmooring operations which involved all parties, in particular, for transferring of personnel between vessels and barges.

## RECOMMENDATIONS

Following analysis and findings, KNKT recommends the followings to prevent a reoccurrence.

According to the Indonesian Government Regulation number 62 year 2013 on transport accident investigation, point 47 stated that the involved parties shall respond to the recommendation/s as mentioned in the investigation report and report the safety action taken to the chairman of KNKT.

### *Pilot and Tug assist management*

- Ensure that crews are maintained as current in proficiency in providing first aid treatment
- Review the barge crew transfer process by service and/ or assist tug

Until the final report issued, KNKT has not received any suggestion or comment from the related parties on above mentioned recommendations

Status: Open

### *Owner/operator of Surya Wira 21 – Surya Nawa 23*

- To establish a procedure of boat transfer for personnel focusing on risk assessment and safety precaution
- Enhancing implementation of safe working practice for mooring and unmooring operation, in particular, for transferring of personnel between vessels and barges
- Providing the crew with proper safe working clothes such high visibility vest
- Re current the crew proficiency in providing first aid treatment

Following the submission stage, KNKT received comments from the shipping company but no response on the recommendation mentioned in this report. Until the final report issued, KNKT has not received any suggestion or comment from the related parties on above mentioned recommendations

Status: Open

# SOURCE OF INFORMATION

Navigational District office - Palembang

Harbour Master and Port Authority of Palembang

PT. IPC (Pelabuhan Indonesia 2) - Branch of Palembang Port

Marine Police, Kepolisian Daerah Sumatera Selatan

Crew of Tug *Teratai*

Crew of Tug *Surya Wira 21*

Palembang Port Hospital

Owner of Tug *Teratai*