



SAFETY INVESTIGATION REPORT

202206/030

REPORT NO.: 09/2023

June 2023

The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

NOTE

This report is not written with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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This safety investigation has been conducted with the assistance and cooperation of the Transport Safety Investigation Center (UEIM), Republic of Türkiye.

MV KIRAN ANATOLIA **Fatal burn injuries to a crew member** **during maintenance work on deck,** **while drifting in position** **31° 32.7' N 029° 52.1' E** **05 June 2022**

SUMMARY

In the morning of 05 June 2022, whilst *Kiran Anatolia* was drifting outside Egyptian territorial waters, the crew members observed a fire rising from the port side of the main deck. Soon after, they saw the deck fitter, covered in flames, jumping overboard.

The deck fitter was recovered and evacuated to a shore hospital. However, he succumbed to his injuries a few days later.

The fatally injured deck fitter had commenced hot work on a leaking section of hydraulic oil pipes on the main deck. The safety investigation concluded that the fire started either from a flashback at the oxy-acetylene torch, or by the ignition of hydraulic oil.

The Marine Safety Investigation Unit (MSIU) has issued one recommendation to the Company to include angle grinders as hot work equipment.



FACTUAL INFORMATION

Vessel

Kiran Anatolia (Figure 1) was a 36,353 gt bulk carrier, owned by Border Shipping Ltd. and managed by Pasifik Gemi Isletmeciligi ve Ticaret A.S., Republic of Türkiye (the Company). The vessel was built by Zhejiang Zengzhou Shipbuilding Co. Ltd., China, in 2013. Lloyd's Register of Shipping (LR) acted as the classification society, while Bureau Veritas (BV) acted as the recognised organisation, in terms of the International Safety Management (ISM) Code, for the vessel.

Kiran Anatolia had a length overall of 199.90 m, a moulded breadth of 32.26 m and a moulded depth of 18.50m. The vessel had a summer draft of 13.30 m, corresponding to a summer deadweight of 63,478.10 metric tonnes (mt). At the time of the occurrence, *Kiran Anatolia* was drawing forward and aft draughts of 4.55 m and 7.55 m, respectively.

Propulsive power was provided by a 5-cylinder, two-stroke, slow speed, YMD-MAN B&W 5S60ME-C8.2 marine diesel engine, producing 8,050 kW at 89 rpm. The main engine drove a fixed-pitch propeller, enabling the vessel to reach a service speed of 14.2 knots.

Crew

Kiran Anatolia's Minimum Safe Manning Certificate stipulated a crew of 14¹. At the time of the accident, the vessel was manned by 21 crew members of Turkish, Azerbaijani, and Filipino nationalities. There were two fitters on board – an engine fitter and a deck fitter, both of whom were Turkish nationals.

The fatally injured deck fitter was 38 years old. He had about 11 years of seafaring experience, all of which were served in the

¹ Provided that the UMS or the bridge control systems were operational, and at least two deck officers held Global Maritime Distress and Safety System (GMDSS) General Operator's Certificates.

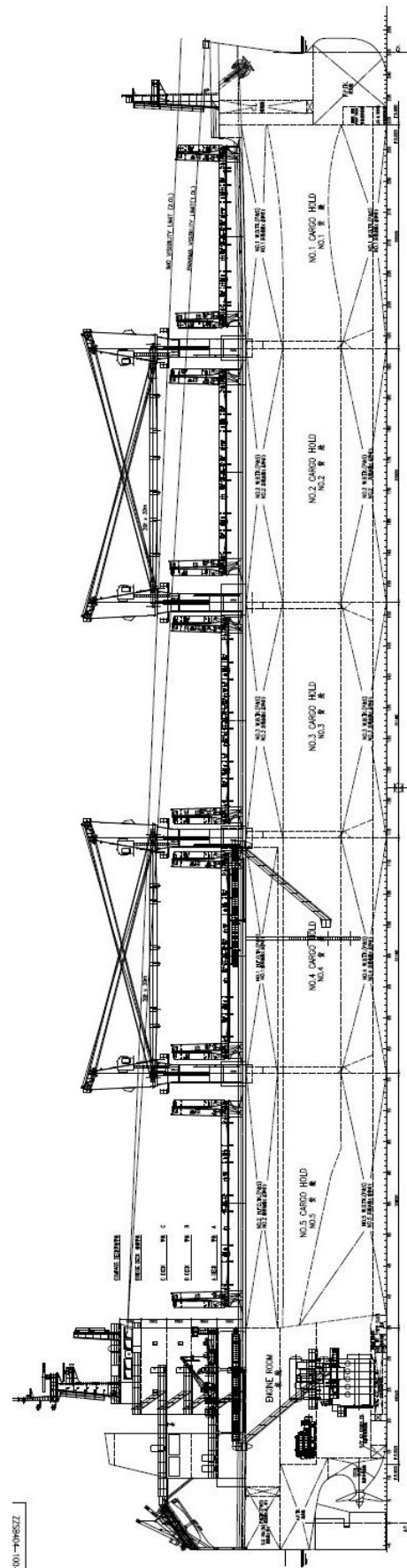


Figure 1: Extract of *Kiran Anatolia's* GA Plan

rank of a fitter. He had been serving on board Company's vessels for about seven years. The deck fitter held a certificate of proficiency for an ordinary seafarer (STCW² II/4), which was issued on 11 August 2020, by the Ministry of Transport and Infrastructure, Republic of Türkiye. He had joined the vessel on 02 June 2022, at the port of El Dekheila, Egypt.

The chief officer (C/O) was 43 years old. He had about 22 years of seafaring experience, 10 years of which were served in the rank of a chief officer. He held a certificate of competency for a chief officer (STCW II/2), which was last renewed in 2018, by the Ministry of Transport and Infrastructure, Republic of Türkiye. He had joined the vessel on 07 March 2022, at the port of San Antonio, Chile.

Environment

The vessel's records indicated that around the time of the accident, the sky was clear, and the visibility was seven nautical miles (nm). A light breeze was blowing from the Northeast, while the sea state was slight, with low swell. The air and sea temperatures were recorded at 21 °C and 20 °C, respectively.

Narrative³

The crew members of *Kiran Anatolia* had been observing leaks in several locations in the hydraulic oil pipes for the cargo hatch cover operating system. The engine-room fitter was regularly tasked with replacing the leaking sections of the pipes. Eventually, the Company arranged for an additional fitter (deck fitter) to join the vessel for this task, as well as to replace corroded sections of the guardrails and air vents on deck.

Over the next couple of days after embarking on *Kiran Anatolia*, the deck fitter was familiarized with the vessel and the equipment relevant to his tasks on board, by the C/O and the engine-room fitter.

On 04 June 2022, at 2355, *Kiran Anatolia* departed from El Dekheila, in a ballast condition. Since further voyage instructions had not been received, the vessel proceeded outside Egyptian territorial waters, after which, the main engine was stopped, and the vessel remained drifting.

The next morning, the Company advised the vessel that loading of grain cargo was being planned for a nearby port and that the cargo holds would have to be washed to prepare them for loading. At 0900, the C/O instructed the deck crew members (the bosun, able seafarers – deck, and ordinary seafarers) to commence washing of the cargo holds. Around that time, the third officer (OOW) was keeping the navigational watch. The master was also present on the bridge. Being a Sunday, the deck fitter was not assigned any tasks for the day.

However, about 20 minutes later, the deck fitter met with the C/O in the vessel's office and informed him that he had observed a hydraulic oil leak from the cargo hold hatch cover operating system, near the port side hatch coaming of cargo hold no. 4. The C/O informed him that it would not be possible to carry out any repairs at that time, as cargo hold washing was in progress and the cargo hatch covers would need to be operated frequently. However, the deck fitter advised the C/O that the leak may affect the opening of cargo hatch cover no. 4 and insisted on commencing repairs. Both proceeded on deck to inspect the leak, by which time, the washing of cargo hold no. 1 was in progress.

Whilst the C/O and the deck fitter were inspecting the leak, the bosun called the C/O over the portable radio and requested for the bilge wells of cargo hold no. 1 to be pumped out. The C/O advised the deck fitter to wait

² IMO. (2020). *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978* (Consolidated ed.). London: Author.

³ Unless otherwise specified, all times mentioned in this safety investigation report are local times (LT = UTC + 3).

for his return and proceeded to the vessel's office to start the pumping out of the bilge wells.

At around 0940 (about 10 minutes after the C/O started pumping the bilges), the OOW noticed thick black smoke on the main deck, followed by rising and quickly receding flames, from the port side hatch coaming of cargo hold no. 4 (**Figure 2**).

He immediately drew the master's attention on this matter, and then notified the C/O via the portable radio. Soon after, the OOW and the master saw a person engulfed in flames, vaulting over the vessel's guardrails, near the port side of cargo hold no. 4, and into the sea.

The master informed the deck crew members about this over the portable radio and instructed them to proceed to the port side of the main deck.

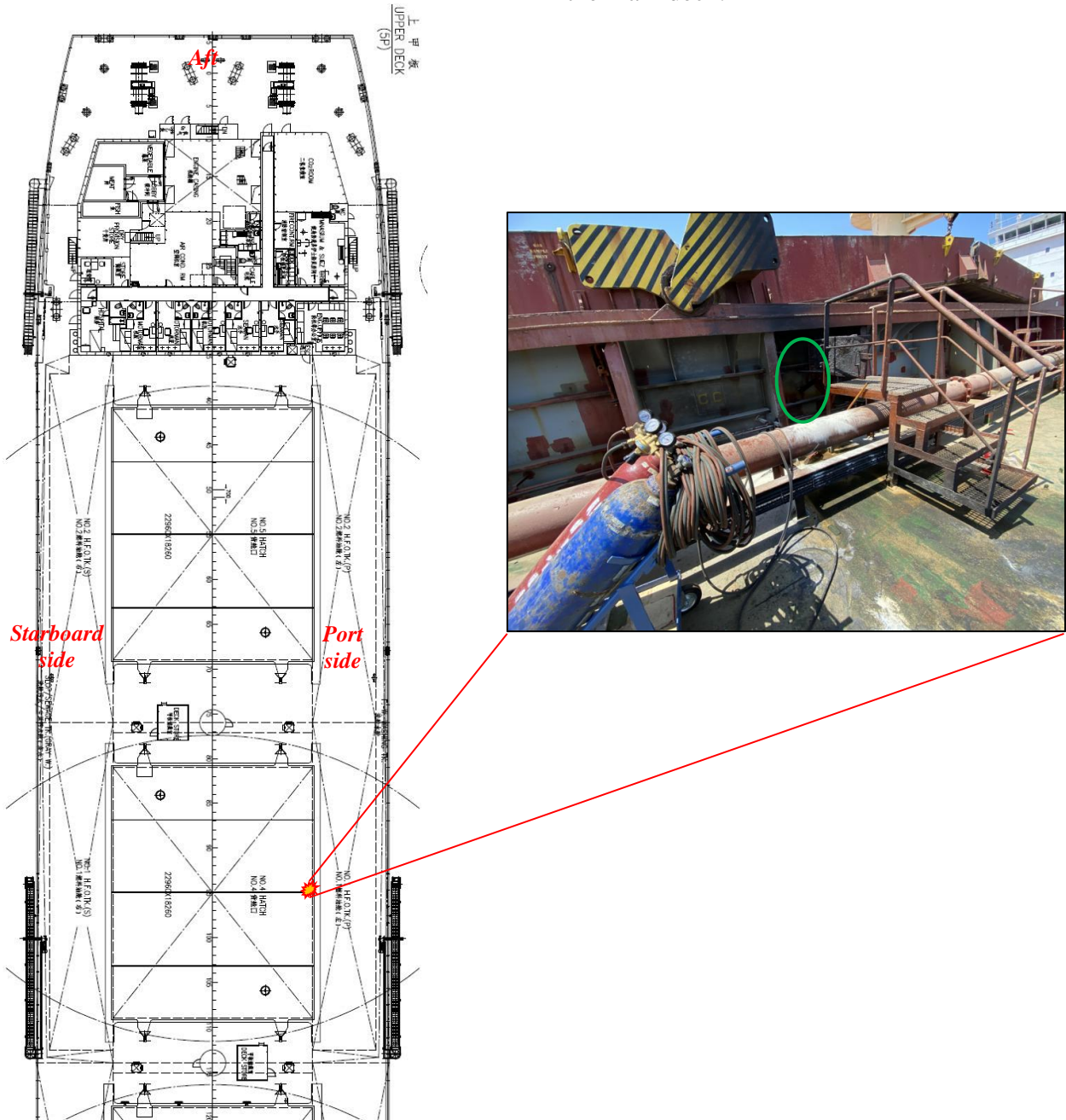


Figure 2: Location of the occurrence; the green circle (inset) shows the location where the deck fitter would have been positioned to carry out the task

The master and the OOW then rushed towards the location. Along the way, the master stopped by at the second officer's cabin, informed him of the situation and instructed him to proceed to the bridge.

Meanwhile, on reaching the location, the C/O saw an oxy-acetylene cylinder set⁴, with its hoses on fire and swaying wildly in mid-air. The C/O immediately shut off the valves of the cylinders and went back to the accommodation to fetch a portable powder fire extinguisher.

The C/O stated that he initially thought that the fire had started by itself, as he did not see anyone in the vicinity. He only became aware that a person had jumped overboard when the OOW told him about it.

By then, the rest of the crew members also arrived at the location and on looking overboard, they saw the deck fitter in the water. The OOW threw him a lifebuoy, with a line attached. The deck fitter managed to hold onto the lifebuoy and was pulled towards the vessel, below the accommodation ladder.

In the meantime, the rest of the crew members lowered a pilot ladder in combination with the accommodation ladder. The bosun descended carefully to assist in bringing the deck fitter up to the main deck. The crew members recalled that the deck fitter managed to climb the pilot ladder by himself, after which the bosun assisted him to ascend the accommodation ladder.

Once the deck fitter reached the main deck, he seemed to be in a severe pain and a state of shock. He was taken towards the vessel's

hospital. Cutting off his boiler suit, the crew members observed that he had suffered severe burns all over his body.

The master went up to the bridge and reported the matter to the Company, via telephone. He then advised the chief engineer to prepare the main engine. He then reported the occurrence to Alexandria Port Control, via the vessel's fixed two-way VHF radio. At around 1020, the vessel started proceeding towards Alexandria, which was about two hours away from the vessel's location.

Close to the entrance of Alexandria, at around 1220, the vessel was stopped by the port control authorities. A pilot boat soon arrived, and the injured deck fitter was disembarked onto the boat. At 1320, the master was informed that the injured deck fitter was transferred to a local hospital in Alexandria.

Injuries

The medical reports from the hospital in Alexandria indicated that the deck fitter had suffered second to third degree burns over 90% of his body.

At the request of the Company, the deck fitter was flown to a hospital in the Republic of Türkiye on 14 June, for further medical treatment. However, he succumbed to his injuries on 20 June 2022, while still undergoing treatment.

Autopsy

While the death certificate issued by the hospital stated that an autopsy was conducted, the Company confirmed that this was not the case. The safety investigation approached the Transport Safety Investigation Center (UEIM), Republic of Türkiye, to further confirm this information. The UEIM advised that according to official information, which it has obtained from the

⁴ The C/O recalled that he did not notice the oxy-acetylene cylinder set when he was on the main deck to inspect the leak, earlier, thus suggesting to him that the deck fitter had prepared the equipment after the C/O had left for the vessel's office. He also stated that there was no discussion between him and the fitter on how the task was to be carried out.

hospital, no autopsy and toxicological reports had been written⁵.

Damages to the vessel's equipment

The crew members found that the hoses of the oxy-acetylene set were damaged around the region at which they were connected to the torch (Figure 3). The torch was also damaged and had parted from the oxygen and acetylene hoses (Figure 4).

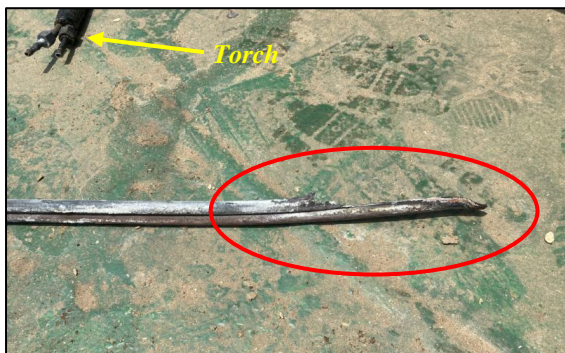


Figure 3: The damaged oxygen and acetylene hoses (circled in red)



Figure 4: The damaged torch

⁵ The MSIU's interpretation of this statement is that no autopsy / toxicological tests had been carried out.

While no other damages were observed by the crew members, they noticed that four bolts' heads on one flange of the leaking section of the hydraulic oil pipe had been cut and hydraulic oil was dripping slowly from the flange. They also noticed that hydraulic oil had accumulated below the pipes and they had to spread sawdust around the area to absorb and contain the oil (Figure 5).



Figure 5: Sawdust soaked with the hydraulic oil that leaked out

Properties of the hydraulic oil

The hydraulic oil used for the cargo hold hatch cover operating system was Shell Tellus S2 V 32. Its material safety data sheet (MSDS) indicated that the hydraulic oil was not classified as flammable but was susceptible to burn. It also stated that the *hazardous combustion products may include a complex mixture of airborne solid and liquid particulates and gases (smoke), unidentified organic and inorganic compounds [sic.]* and that carbon monoxide may be released in the event of incomplete combustion. Its flash point was determined to be 175 °C.

The used oxy-acetylene set

The oxy-acetylene set used by the deck fitter was a portable one *i.e.*, the cylinders, hoses and torch were secured on a trolley (Figure 6). This portable system was neither fitted with flashback arrestors, nor with non-return valves.



Figure 6: The oxy-acetylene set used for the task

Personal Protective Equipment (PPE)

The C/O stated that the deck fitter was wearing overalls, safety shoes and a safety helmet, when he last saw him on deck, prior to the occurrence.

Both the master and the company confirmed that the overalls worn by the deck fitter were similar to the ones used by other crew members on board *Kiran Anatolia* (Figure 7). There were no labels on it to indicate whether it had any degree of fire resistance.



Figure 7: Overalls similar to the one worn by the fitter around the time of the occurrence

An inspection of the area by the crew members, after the occurrence, did not reveal the presence of face protection or hot work gloves. However, considering the nature of the work and the elevated temperatures, the safety investigation did not exclude the possibility that the gloves and the face shield were lost when the fitter jumped overboard.

Previous methods used to replace leaking sections of the hydraulic pipes

Crew members stated that several leaking sections of the hydraulic oil pipes for the hatch cover operating system had been replaced on board *Kiran Anatolia*, prior to this occurrence. A chisel and hammer would generally be used to cut off the bolts which were corroded / seized. However, they also mentioned using an angle grinder, at times, to speed up the task.

The safety investigation was informed that, on the day after the accident, the crew members used an angle grinder to cut the remaining bolts of the leaking section of the hydraulic oil pipe, which the deck fitter had been working on.

The C/O stated that, in his opinion, using an oxy-acetylene torch for this task was hazardous and would involve the preparation of a hot work permit. He also submitted that he would not have recommended this method, had he been aware of the work which the fitter intended to carry out.

Similar past occurrences

The MSIU has records of several similar occurrences. These occurrences had been investigated and safety investigation reports have been / will be published.

*Iolcos Unity*⁶: a fitter was tasked to rectify a hydraulic oil leak from a flange in the ballast line valve operating system pipes on deck. As the bolts of the flange were corroded and

⁶ [MSIU Safety Investigation Report No. 15/2021.](#)

their hexagon head had worn down, the fitter used an angle grinder to cut the bolts. The fitter's coveralls caught fire, which then spread all over his body. The fitter succumbed to his injuries about 10 days later, while still receiving treatment in hospital. The safety investigation concluded that during the job, the fitter's synthetic overalls became contaminated with hydraulic oil, and were ignited by the sparks from the angle grinder. The work site had only been prepared for cold work.

*Seascout*⁷: an explosion occurred on deck when an angle grinder was being used to cut through corroded bolts in the vicinity of bunker tank air vents. The safety investigation concluded that sparks generated by the angle grinder reached the vent head of a bunker tank, where flammable gases had accumulated. In this case, the work site had only been prepared for cold work.

*Milagro*⁸: the fitter was tasked with replacing a leaking section of the hydraulic oil pipes for the ballast line valve operating system on deck. A hot work permit was issued, as the crew members had agreed to use an oxy-acetylene set for the task. After removing all bolts on the flanges at both ends of the leaking section, the fitter began to cut a corroded U-bolt with the torch.

It appeared that as soon as the bolt was cut, this section of the pipe slipped off, and hydraulic oil sprayed on the fitter. The torch was still on and the clothing caught fire. The fitter suffered second and third degree burns over 60% of his body. The fitter recovered well and was discharged from hospital, about three months after the accident. He was then repatriated to his home country to continue further treatment.

ANALYSIS

Aim

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

Cooperation

During this safety investigation, the MSIU received all the necessary assistance and cooperation from the Transport Safety Investigation Center (UEIM), Republic of Türkiye.

Cause of death

In the absence of an autopsy report, the safety investigation was unable to confirm the cause of death. However, considering that he had suffered second and third degree burns over 90% of his body, the safety investigation considered it likely that his death may have been caused by the severity of the burn injuries and the consequential complications that probably arose.

Probable cause of the fire

The data provided to the safety investigation confirmed that hot work was a contributory factor to the fire. However, even because none of the crew members witnessed the start of the fire, the safety investigation was unable to identify the exact cause.

The C/O recalled asking the injured deck fitter about the cause of the fire, after the latter was assisted back on board from the water. The deck fitter informed the C/O that the oxy-acetylene hoses started burning. This observation would be indicative of a flashback⁹ at the hose connections of the

⁷ [MSIU Safety Investigation Report No. 05/2022.](#)

⁸ This accident occurred on 26 September 2022. The safety investigation is still active.

⁹ A fire within the torch, that progresses upstream of the gas flow, through the hoses and possibly up to the cylinder(s). Its consequences range from a burst hose to an explosion of the cylinder(s).

torch; the damages observed on the torch and the hoses (**Figures 3 and 4**) suggested that a flashback may have occurred.

Furthermore, the safety investigation had also observed that along with signs of sprayed hydraulic oil on the hatch coaming, the paint on the hydraulic oil pipes in that area appeared charred (**Figure 5**). This suggested that a spray of hydraulic oil from the leaking section of the pipe may have ignited when it came into contact with the flame of the torch. As the crew members found four bolt heads of one other flange cut, with hydraulic oil dripping slowly from the flange, after the occurrence, it is possible that hydraulic oil may have sprayed out from this flange.

The safety investigation therefore hypothesized that the fire may have started either due to the flashback, or the ignition of a spray of hydraulic oil, any one of which may have led to the other.

Additionally, the master and the OOW stated that they saw thick black smoke and flames on the main deck and soon after, they saw the deck fitter, engulfed in flames, vaulting over the vessel's guardrails. The above was witnessed to have occurred within a span of a few minutes. Based on the master and OOW's accounts, the safety investigation formed the opinion that the flashback and the ignition of the hydraulic oil occurred within a short time frame.

Hot work for tasks related to hydraulic oil pipes on deck

The C/O had stated that there was no discussion between him and the fatally injured deck fitter on how the task was to be carried out. Unaware of the deck fitter's intentions, neither was a hot work, nor a cold work permit prepared for this task. The safety investigation also observed that the C/O had his reservations on commencing the repair works at that time, since cargo hold

washing was in progress and the hatch covers would have to be operated frequently.

The safety investigation, therefore, understood that no discussions had been carried out, and that the deck fitter commenced the task, applying his own professional experience.

Considering that the remaining bolts of the leaking section of the hydraulic pipe were cut using an angle grinder the next day, it is highly likely that the bolts and nuts on this section were corroded. This may have prompted the deck fitter to use the oxy-acetylene set to cut the bolt heads. It was likely that the use of a hammer and chisel may not have been considered because the location of the flange bolts did not allow for its use and / or the task would have taken longer.

As mentioned earlier in this safety investigation report, the MSIU has come across several accidents where hot work (including the use of angle grinders) was used to cut corroded bolts on deck. This practice was also common on board *Kiran Anatolia*.

The use of hot work could very well be the quickest means to cut corroded bolts (although, with thorough hot work preparations prior to the commencement of the task, hot work would not necessarily remain the quickest means). Considering the findings of previous occurrences and this one, the safety investigation believed that the acceptance of risk related to this particular work may be influenced mostly by the challenge of accessing pipes.

Whatever the option chosen by the practitioner, it was not free from risk. The MSIU has investigated occurrences involving the use of oxy-acetylene but also angle grinders. In this case, it was a choice among conflicting goals of rectifying an almost

inaccessible source of leak and using an extremely restricted choice of tools¹⁰.

These were the dilemmas, which the fitter had to mitigate – even at a cognitive level with respect to the decision-making process. Such decisions would materialise into actions after considerations of the potential outcomes, implications and possible consequences as understood by the fitter at the time and even if, as in this occurrence, there did not seem to be any time pressures.

PPE and burn injuries suffered

The safety investigation noted that the overalls did not bear any labels indicating whether they offered some degree of fire protection or not. However, considering that the deck fitter was witnessed to have been covered in flames, before he jumped overboard, it is highly likely that the overalls he was wearing did not offer fire protection.

Furthermore, the deck fitter was working in a confined location and would have to be crouching down to access the leaking section of the hydraulic pipe (**Figures 2 and 5**). It is likely that hydraulic oil would have permeated parts of his overalls while he was working in that position, and a spray of hydraulic oil would have contaminated the overalls further. Consequently, the overalls would have caught fire and the fire would have spread rapidly across his body, after the flashback / ignition of the hydraulic oil spray.

Following the accident, the crew members neither found face protection, nor hot work gloves around the work site. While the burn injuries suffered by the fitter also suggested that such protection had not been used, the safety investigation could not exclude the possibility that the deck fitter had worn eye

protection goggles. It was possible that such goggles may have either slipped off when he jumped into the water or were even removed by the deck fitter as an immediate response to the fire.

Nonetheless, it must be remarked that as already mentioned, the extent of the fire was significant and developed rapidly. In these circumstances, the safety investigation doubted the potential effectiveness which the face protection would have had.

Condition of the work equipment used

The safety investigation was unable to verify the condition of the torch and the condition of the oxygen and acetylene hoses in the vicinity of the torch, prior to the occurrence. However, the data made available to the safety investigation did not suggest that the equipment exhibited defects which would have compromised its safe use.

Furthermore, none of the crew members indicated that the oxy-acetylene set used by the deck fitter had any defects. Therefore, in the absence of any data that would indicate otherwise, the safety investigation did not consider the condition of the oxy-acetylene set to have contributed to the accident.

Non-return valves and flashback arrestors

Non-return valves, fitted to a torch, will reduce the risk of reverse flow of oxygen into the acetylene hose and *vice versa*. While they reduce the risk of a flashback from occurring, by preventing the formation of flammable mixtures, it must be noted that they do not offer any specific protection against flashbacks¹¹.

A flashback arrestor reduces the risk of a flashback entering the cylinder. It protects

¹⁰ The use of the oxy-acetylene torch, the leaking hydraulic line and the limited accessibility of the flange were not the source of the conflicts. Rather, the conflict materialised from the relationship among the different goals arising from these factors coming together.

¹¹ Health and Safety Executive. (1997). The safe use of compressed gases in welding, flame cutting and allied processes. Retrieved from: <https://www.hse.gov.uk/pubns/books/hsg139.htm>

the cylinder from the effects of fire, by cutting off the gas supply in the event of a flashback¹². When fitted at the torch, along with non-return valves, it will offer further protection of the hoses.

The safety investigation noticed (and the company confirmed) that flashback arrestors and non-return valves were not fitted on the oxy-acetylene set used by the deck fitter. However, the safety investigation was provided with data that indicated that all the other oxy-acetylene sets were fitted with flashback arrestors at the cylinder pressure regulators, one of the portable sets was fitted with non-return valves at the torch (**Figure 8**), one spare torch was fitted with non-return valves, and another spare torch was fitted with non-return valves with flashback arrestors (**Figure 9**).

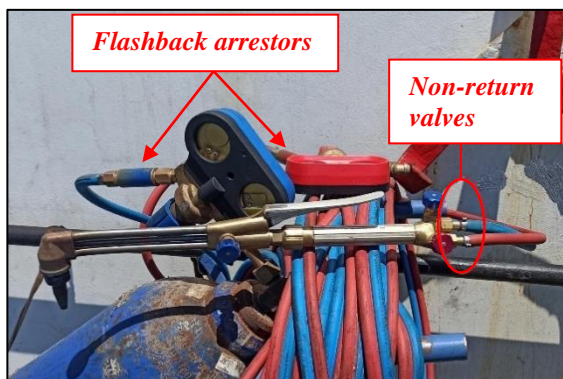


Figure 8: One of *Kiran Anatolia*'s portable oxy-acetylene sets, fitted with flashback arrestors at the pressure regulators and non-return valves at the torch

There are various causes leading to a flashback, such as incomplete purging of the acetylene hose, a leaking control valve, blockage of the nozzle of the torch, acetylene gas supply interruption due to the hose getting trapped or kinked, *etc.* However, the safety investigation was unable to verify what may have caused the flashback on board *Kiran Anatolia*.



Figure 9: Spare pressure regulators fitted with flashback arrestors, a torch fitted with non-return valves (A) and a torch fitted with non-return valves with flashback arrestors (B)

Motivation

It appeared that, while the C/O had not yet committed to have the repairs carried out, the deck fitter seemed to be already set to carry out the task. This suggested a sense of motivation from the deck fitter, to complete the tasks which, after all, he was signed on the vessel to do. The safety investigation also noted that this was the first task that the deck fitter had commenced from the time he had joined the vessel (three days prior to the accident), which could possibly explain his keenness to commence with the task.

The reason behind the deck fitter's motivation to attend to the leaking section of the hydraulic pipe before receiving instructions from the C/O, remained unclear to the safety investigation. However, it did seem to be more of a proactive approach from his side, when taking into consideration that he would nonetheless be the one instructed by the C/O to carry out the task.

In addition, it is possible that the deck fitter may have wanted to commence and complete the job as soon as possible, to ensure that the other crew members would not encounter any problems in operating the hatch covers during the cargo hold cleaning operations.

¹² Vide footnote 12.

Moreover, this was not an isolated report of hydraulic leaks which the Company had received and therefore, the deck fitter may have had previous experience in doing these repairs. It was also likely that he may have successfully carried out such tasks in the same manner in the past, as he intended to when the accident occurred. It could therefore be suggested that the deck fitter was overcome by outcome bias, and his decision was based on past, uneventful outcomes, even if non-return valves and flashback arrestors on the oxy-acetylene set were not fitted.

CONCLUSIONS

1. A fire broke out on deck, but the deck fitter suffered second to third degree burns over 90% of his body, which may have led to his death.
2. The fire may have either been caused by a flashback at the hose connections of the oxy-acetylene torch, or by ignition of a spray of hydraulic oil from the pipe that the deck fitter was working on.
3. Considering the location of the work site, it is highly likely that hydraulic oil would have permeated the deck fitter's overalls, which caught fire after the flashback / ignition of hydraulic oil.
4. The deck fitter used oxy-acetylene to cut bolts off a flange on a leaking section of a hydraulic pipe of the hatch cover operating system.
5. The used oxy-acetylene set was neither fitted with non-return valves nor with flashback arrestors.
6. The task had not been discussed, and there were no hot work preparations prior to the commencement of the task. Outcome bias may have led the deck fitter to commence the task.

7. The deck fitter had been signed on board specifically to execute such tasks. He was experienced and appeared motivated to carry out the task.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION¹³

During the safety investigation, the Company had carried out an internal investigation, in accordance with the requirements of the ISM Code. Following their investigation, the Company took the following actions across its fleet:

1. completed an inspection of all welding equipment on board, rectified all deficiencies with the same;
2. provided training to all relevant personnel to raise awareness on the importance of hot work precautions and PPE;
3. issued instructions to avoid hot work unless necessary, and to use other mechanical tools, where possible; and
4. the Company's hot work permit was revised to include checks on several additional equipment.

RECOMMENDATIONS

The Company is recommended to:

09/2023_R1 include angle grinders as hot work equipment, due to the fire risks they pose.

¹³ Safety actions and recommendations shall not create a presumption of blame and / or liability.

SHIP PARTICULARS

Vessel Name:	<i>Kiran Anatolia</i>
Flag:	Malta
Classification Society:	Lloyd's Register of Shipping (LR)
IMO Number:	9650171
Type:	Bulk Carrier
Registered Owner:	Border Shipping Ltd.
Managers:	Pasifik Gemi Isletmeciligi ve Ticaret A.S.
Construction:	Steel
Length Overall:	199.90 m
Registered Length:	194.80 m
Gross Tonnage:	36,353
Minimum Safe Manning:	14
Authorised Cargo:	Dry cargo in bulk

VOYAGE PARTICULARS

Port of Departure:	El Dekheila, Egypt
Port of Arrival:	Unknown (awaiting orders)
Type of Voyage:	Unknown
Cargo Information:	In ballast - 17,705.29 m ³
Manning:	21

MARINE OCCURRENCE INFORMATION

Date and Time:	05 June 2022, at 0940 (LT)
Classification of Occurrence:	Very Serious Marine Casualty
Location of Occurrence:	31° 32.7' N 029° 52.1' E
Place on Board	Main deck
Injuries / Fatalities:	One fatality
Damage / Environmental Impact:	Damaged oxy-acetylene hoses and torch
Ship Operation:	Drifting; cleaning / washing; maintenance
Voyage Segment:	Transit
External & Internal Environment:	Clear sky, visibility of 7 nm, Northeasterly light breeze, and a slight sea with low swell. Air and sea temperatures: 21 °C and 20 °C, respectively.
Persons on board:	21