REPUBLIC OF TURKEY
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE

UEIM Transport Safety Investigation Center

FINAL REPORT ON VERY SERIOUS MARINE ACCIDENT

NAME / IMO No. OF THE VESSEL	**:** ALİ OSMAN E / 8218378
FLAG OF THE VESSEL	**:** TURKISH
ACCIDENT LOCATION	**:** DERİNCE PORT/ KOCAELİ
ACCIDENT DATE / TIME	**:** 10.01.2018 / 15:30 UTC
CONDITION OF CASUALTIES (DEAD / INJURED)	**:** 1/-
CONDITION OF DAMAGE: / ENVIRONMENTAL POLLUTION	**:** -/-

Board Decision No.: 23(DNZ- 03)/2020 *Date: 09/03/ 2020*

LEGAL BASIS

This marine accident is investigated in accordance with the "BYLAW ON THE INVESTIGATION OF MARINE ACCIDENTS AND INCIDENTS" which came into force after being published at the Official Gazette No.30961 on the date of 27.11.2019.

Investigation procedures and principles are applied by considering Resolutions of International Maritime Organization concerning International Standards and Recommended Applications for Safety Investigations Directed to MSC 255(84) (Accident Investigation Code) and Resolution A.1075(28) Marine Accidents or Incidents, and European Union Directive 2009/18/EC.

Purpose of the marine accident investigation is to provide the improvement of the legislation and applications directed to the safety of life, goods and environment by reaching the real reasons which cause the occurrence of marine accidents, and to make recommendations to contribute to the prevention of similar accidents and incidents to occur in the future.

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ABBREVIATIONS AND DEFINITIONS

Handling : Loading, unloading, transferring, stacking and piling up,

IMO : International Maritime Organization

Lashing : Fastening, securing (tying down) the container in the stack (or other load) by rope, wire, turnbuckle (bar) or chain,

Operation At Port; handling operations such as; unloading, loading, stacking, transferring,

Operator : Qualified and skilled staff using heavy machines,

Shift : Working team consisting of slingers, heavy machine operators and signaler carrying out handling operations on board and in port areas,

Risk : The possibility of occurrence of loss, injury or other harmful consequences caused by the hazard/danger,

Risk Assessment : The necessary studies to be carried out to determine the dangers that exist in or may come from the workplace, to analyze and grade/classify the factors that cause them to turn into risks and the risks arising from these dangers, and to define the control measures,

Sling : Apparatus for lifting and carrying the cargo,

Slinger : Skilled and educated fieldworker who connects the general cargo to the heavy machine sling using apparatus and mechanisms,
Subcontractor : Sub-contractor,

INFORMATION SOURCE AND REFERENCE LIST

- Master and Crew of the Vessel M/V
- Documents of the port management organization
- National legislation

SUMMARY

Figure 1: Accident Location

Note: All times used in the Report are local times (GMT +3)

After the accident, it was understood that the vessel listed to starboard and that the location of the forklift was on the starboard side of the hold No. 1.

As a result of accident investigation; Recommendations were made to the Port Authority and the Vessel's Manager.

SECTION 1 – FINDINGS

1.1 Information on the Vessel

M/V Ali Osman- E

Flag	Turkish
Classification Society	Türk Loydu (TL)
IMO Number	8218378
Type	Dry Cargo
Place and Year of Build	Tuzla,1984
Gross Tonnage	1249 GT
Length Overall	79,3 M.
Main Engine and Power	SKL/8 WD-A-24 / 970 Kw

Figure 2: Vessel Named Ali Osman-E

1.2 Information on the Navigation

ALİ OSMAN E

Port of Departure	Elefsis/Greece
Port of Arrival	İzmit/Turkey
Cargo Information	Empty
Number of Personnel	11
Minimum Manning Number	11
Navigation Type	International

1.3 Information on the Accident

Type of Accident (IMO)	Very Serious Marine Accident
Date and Time of Accident	10 January 2018 Time: 15:30(TSİ)
Kind of Accident	Work accident
Location of Accident	İzmit / Turkey
Injured/Dead/Loss	-/ 1 dead /-
Damage	No damage to the vessel and the port.
Pollution	None

1.4 Information on Environmental Conditions

Wind	Calm
Sea State	Calm
Vision	Clear
Weather Condition	Cloudy

1.5 Vessel Information

The vessel Ali Osman-E is a gearless dry cargo vessel. The vessel was built in 1984 in Tuzla/İstanbul Shipyard and it is classified by Türk Loydu. The vessel's length overall is 79.3 m, the moulded breath is 10.4 m and the moulded depth is 6.2 meters. The vessel's summer load line draught, corresponding to 2370.52 DWT, is 4.96 meters.

At the time of the accident, the vessel's legal and classification certificates were valid and the survey periods were not passed.

The ISM (Safety Management System) Certificate of Conformity of the vessel's management was published on the date of 05 June 2017. Safety Management System certificate of the vessel Ali Osman-E is dated 21 July 2015.

1.6 Vessel's Holds and Hatch Covers

There are 2 holds on the vessel, according to the loading plan (Annex-1); It is planned to load 1070 MT shaped tubes to the hold No. 1 and 1000 MT shaped tubes to the hold No. 2. However, there is no information in the loading plan regarding to the way to the cargo stowage and the way to cargo lashing.

Vessel's holds and cover dimensions of these holds are shown in the table below. (Annex-2)

Hold and Hold Cover Dimensions in Meters	Hold Width (Widest)	Cover Width (Widest)	Hold Length	Cover Length	Hold Height	Cover Height
No. 1	9,50	7,45	30	24	4,92	1,6
No. 2	9,59	7,60	22	16,85	4,92	1,6

Table 1: Cover Dimensions of Vessel's Holds

1.7 Amount of Ballast Available on Board

There are 9 ballast tanks on the vessel ALİ OSMAN E, and the ballast receiving capacity of the vessel is 462.76 m3. Before starting the loading operation of the vessel, the table showing the amount of ballast available on board and the distribution by tanks is as

follows. In addition to these tanks, there is 18 m3 of fresh water in the aft peak tank of the vessel.

Tank No.	Tank Capacity m3	Amount Available in Tank m3
Fore Peak	47.13	-
DB No 1P	30.29	30.29
DB No 1S	30.29	30.29
DB No 2P	48.97	-
DB No 2S	48.97	-
DB No 3S	62.34	62.34
DB No 3S	62.34	62.34
DB No 4S	67.98	67.98
DB No 4S	67.98	67.98
Total	462.76	321.22

Table 2: Capacities of Vessel's Ballast Tanks and Amount of Ballast Available on Board

1.8 Vessel Crew

According to the Minimum Safe Manning Certificate published by the flag state, a crew of 11 is required for the vessel ALİ OSMAN E. The vessel was manned with a sufficient number of seamen according to the Minimum Safe Manning Certificate published by the flag state. All of the crew members are Turkish citizens and the working language is Turkish. On the day of the accident, there were 11 crew members on board, including the Master, and the vessel's crew did not witness the accident.

The shipmaster is 54 years old. He started his career as a seaman in 1986 and worked on different vessels for 32 years. He has been working as a Shipmaster for 11 years on this type of vessels. At the time of the accident, he was in the accommodation space due to customs controls.

The Chief Officer is 64 years old. He started his career as a seaman in 1976, was promoted to be watckeeping/shift officer in 1986 and has been working on the vessel ALİ OSMAN E

for the last 15 years. He was in his cabin due to customs controls at the time of the accident. He works in loading and unloading operations on board.

Seaman, who was on the shift at the time of the accident; had been on board for about 3 months and the port shift times were arranged to be 06:00 - 17:00. He was on the forecastle deck at the time of the accident.

1.9 Dockers

At the moment of the accident, 2 dockers and forklift operator were in the hold and the crane operator was on the shore crane. Besides, 1 more person engaged in tying down the cargo was lashing the cargo, which was already loaded, at the time of the incident.

The forklift operator is 26 years old and has a forklift operator certificate. He was using a forklift in the hold where the accident happened at the time of the incident, and did not witness the moment of the accident.

The crane operator is 44 years old. He has a crane operator certificate and his shift routine is between 08:00 - 16:00. He was carrying out the loading operation with a crane at the time of the incident. He did not witness the accident as he turned to the shore side to get a load from the truck on the shore at the time of the accident.

Slinger is 38 years old. He was putting wedging under the cargoes loaded onboard with shore crane in the loading operation. At the time of the incident, he had put the wedging on the stack which was in the middle of starboard side in the hold No. 1 where the accident occurred, and he was on another stack on the starboard side. When he saw the victim last time, the victim was near the right rear wheel of the forklift.

Foreman is 33 years old and has been working in the same company for 12 years. He was on another vessel at the time of the incident.

Lashing personnel is 50 years old and he was carrying out lashing on the stack at the portside bow of the hold, where the loading was continuing, at the time of the accident.

1.10 Heavy Machine (Forklift)

The Forklift was put down into the vessel hold No.1 by the shore crane to be used as an aid in stacking and lashing the cargo in the vessel hold. Another duty of the forklift is to carry the cargo to the places that the shore crane cannot reach within the vessel.

There are 17 forklifts belonging to the port and the forklift's model used on the day of the accident is the CF 30 PS. The aforementioned forklift was manufactured in 2011, its maneuver is fast and the height of forks is 3.2 meters. Its carrying capacity is 5.43 tons. Its last periodic inspection was carried out on the date of 17.05.2017.

1.11 Loading Organization at Port

130 people work in the port management, 30 people work under the sub-employer (subcontractor) for the load handling services, 115 people work under another subcontractor for loading vehicles on board. Besides, the personnel of the companies from which a external service is get for port works also in the port. It is ensured that training is provided to the personnel, which is its own structure and other than the subcontractor companies engaged in cargo handling and loading the vehicles onboard, by providing training and risk analysis by the occupational safety specialists and workplace doctor. Documents such as official statement of employment, occupational safety training, medical report, vocational training, etc. for the personnel to start to work at the port are checked and they are allowed to start afterwards.

Port management provides crane and forklift service. Crane and forklift operators are the personnel of Port Management.

The subcontractor is responsible for handling the cargo onboard and on land during loading. The working system of the personnel is planned in 3 shifts, as eight hours per one shift. There are 6 foremen in the port operations, one foreman in each shift. The foreman and the slinger engaged in the loading on the vessel ALİ OSMAN E are personnel of this subcontractor company. The duty of the foreman is to ensure coordination between the vessel/loader and the dockers (slingers) in the vessel loading operation. Slingers working onboard fulfill their duties under the responsibility of the foreman. The duties of the

slingers during loading are to pun wedging and unfasten the sling. The victim died was working in the hold No. 1 in order to fulfill his duty of unfastening the sling in the hold.

Cargo manufacturer shipping officer's main duty is to monitor during the process from the time the cargo leaves the factory until it is loaded onboard. Prior to the loading, he took the cargo plan (Annex-1) prepared by the vessel ALİ OSMAN E and related to how many tons to be loaded to which hold, and did planning together with Chief Officer in regards to how the cargo will be loaded into the holds. He then accompanied the loading operation and coordinated the loading and tying down the cargo in the hold. The shipping officer of the cargo has performed similar operations on the vessel ALİ OSMAN E 2 times before this loading.

2.1 Course of Events in the Accident

The vessel Ali Osman-E alongsided to the port on the date of 10.01.2018 to load 2070 MT shaped tubes (6m long). The cargo plan on how much cargo to be loaded to which hold was prepared by Chief Officer in consultation with the shipping officer. However, no planning was done by the vessel regarding the tying down procedures of the cargo. The Chief Officer carried out a marking in the holds to which the cargo will be loaded and marked the places to which the cargo will be stacked according to the length of the cargo. Afterwards, the slinger were informed by the Chief Officer and the shipping officer of the cargo about that 6 rows of 4 full size tubes will be loaded into the hold No. 1 according to the cargo plan. Foreman was informed about the loading to be carried out by the shipping officer of the cargo. No interview related to the loading to be carried out was made between Shipmaster/Chief Officer and the port facility operation officer and the foreman.

At 13:00, the forklift was checked and put down into the hold with a shore crane. At the beginning of loading, loading was planned to be that a row of shaped tubes will be placed on the port side (sea side) and a row will be placed on the starboard side (land side), and they continued to load in this way. Before the accident, the customs officers came onboard to carry out the customs procedures at 15:10. Customs officers started to search the cabins, one by one, in which the vessel's crew members stays. At around 15:20, when it was time to search the cabin for the Chief Officer, the Chief Officer was called in who was by the hold.

In the meantime, two bundles of tubes were being placed in the middle of the hold by the shore crane during the loading operation, and from there, the loading continued as those were taken by the forklift from there, to be with the height of 3 full size and 6 bundles one on the other, and to be from the port side towards the starboard side within the hold. After 6 bundles are stacked one on the other on one side, the load is tied down to itself, and the load is carried on the other side while the load tying down/lashing process continues (Figure 3).

Figure 3: Lashing Continues While Loading on the Vessel ALİ OSMAN E.

After the operator put 3 rows of 6 bundles of shaped tubes one on the other, the shaped tubes that were stacked in the middle of the port side fell at 15:30 while the 7th rows of shaped tubes was being placed on the stack in the middle of the starboard side with the instruction of the shipping officer (Figure 4).

In the meantime, the slinger (victim) located near the forklift was injured as a result of being stuck between the fallen stack and the forklift (Figure 5). 3 packs of shaped tubes on the victim were taken by a shore crane using sling. Approximately 15-20 minutes later, the medical team arrived at the scene. During this time, the victim was conscious and his pulse

was beating. The victim was evacuated and taken to the hospital in company with the medical personnel. Despite all the interventions to save the victim, he died.

Figure 4: After the Accident

Figure 5: Victim Stuck Between Shaped Tubes and Forklift[1]

[1] The person in the picture/figure is at the scene of the accident as a representation to make how the incident occurred understandable.

SECTION 3–ANALYSIS

While evaluating the marine accident investigated, it was aimed to determine the safety factors that caused the occurrence of the accident in order to arrive at useful results leading to safety recommendations on the root causes of the accident, taking into account the sequence of events and the data obtained during the investigation.

3.1 Vessel's Loading Plan

Under Regulation 2 – Cargo information of Part A - General Provisions of Chapter VI - Carriage of Cargoes of International Convention for the Safety of Life at Sea (SOLAS), the provision "The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect" is included.

It was informed in the navigation instructions sent to the vessel on the date of 08.01.2018 that iron products with 2000 M/T minimum and 2100 M/T maximum and 6 meters lenght can be loaded, as to be at the charterer's option. The cargo plan on how much cargo to be loaded to which hold was prepared by Chief Officer in consultation with the shipping officer. The Chief Officer carried out a marking in the holds to which the cargo will be loaded and marked the places to which the cargo will be stacked according to the length of the cargo. This shows that, as stated in Regulation 2, the shipper provided the vessel with appropriate information on the cargo sufficiently in advance.

3.2 Using Forklift during Loading Operation

The widest part of the hold No. 1 of the vessel Ali Osman-E is 9.50 meters and the narrowest part is 5 meters. Cover width of the hold No. 1 is 7.45 meters. The hold width at the part in the hold where the accident occurred is 9 meters. The hold cover width is 7.45 meters. There is a distance of approximately 0.775 meters from the end of the hold cover on the port and starboard side of the vessel to the wings (Figure 1).

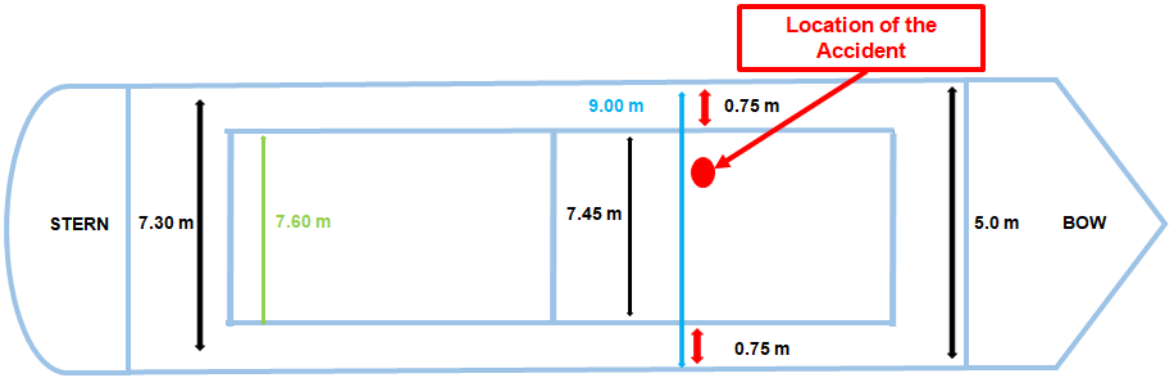


Image 1: Hold Cover and Hold Dimensions where the Loading was done

Due to this distance, the shipping officer of the cargo requested that the forklift is used for the area outside the area under the hold covers (Figure 2) so that the cargo is not damaged and the loading can be done quickly. The Ship Master stated that he had loaded the same loads in the same port before and did not want the loading to be done with a forklift. It acted in accordance with the request of the shipping officer of the cargo in regards to using the forklift. The forklift was put down into the hold No. 1 of the vessel at 13:00 and the loading to the vessel started at 13:15.

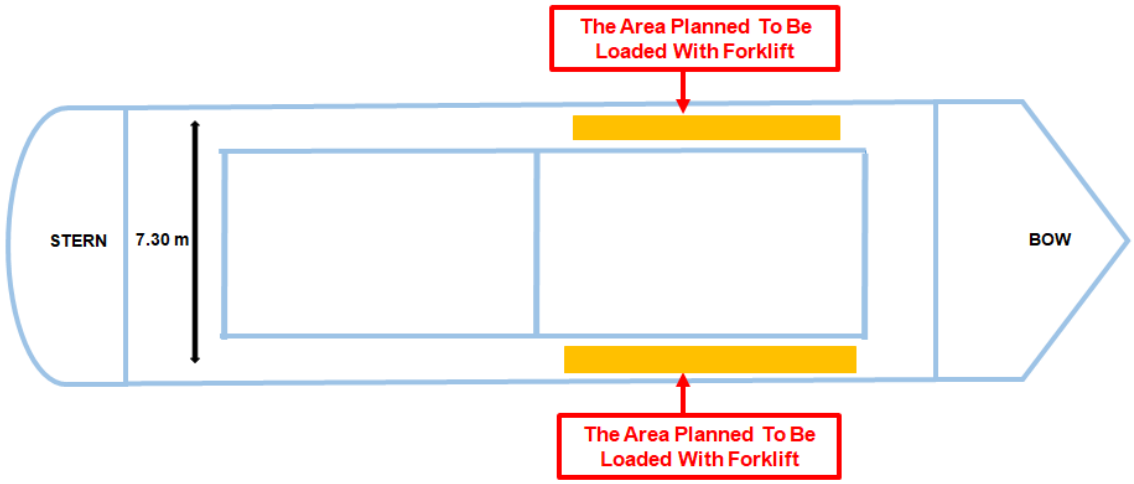


Image 2: Area in which it is planned to use forklift for loading

During the loading, two bundles of shaped tubes are placed in the middle of the hold, and as they are taken from there and first carried to the port side (sea side) and then to the

starboard side (land side) of the vessel with a forklift, the forklift is started to be used in loading.

After loading to the starboard and port sides of the vessel with a forklift as to reach a height with 4 rows of 6 bundles one on the other, load tying down/lashing is started. When the photographs related to loading just before the moment of the accident are investigated (Figure 6), it is seen that the loads on the port side are tied down to each other.

Figure 6: Fallen Stack

On the other hand, after the forklift operator put 6 bundles one on the other, the shaped tubes that were stacked in the middle row on the port side fell at 15:30 while the 7th rows of shaped tubes was being placed on the stack in the middle row on the starboard side with the instruction of the shipping officer. The worker engaged in unfastening the slings of the load put down into the hold in the meantime got stuck between the load and the forklift (Picture 7).

Figure 7: Victim Stuck Between Fallen Stack and Forklift (Representational)

The port personnel involved in the loading operation, the personnel in charge of tying down/lashing the cargo, the ship personnel and the forklift operator could not predict that the ship would be out of balance due to the movement of the forklift onboard, thus the load would fall.

In normal loading operations, the use of a forklift facilitates loading speed and safe stacking. However, the weight of the forklift and the effect of the load carried on the balance of the vessel should be taken into consideration in vessels with small tonnage such as Ali Osman–E. As a matter of fact, in the investigation carried out on the vessel immediately after the accident, it was determined that the vessel inclined 5 degrees towards the starboard side. This shows that the negative effect of using a forklift onboard could not be evaluated during the accident.

The probable cause of the accident is that the forklift used in the loading is large enough to affect the balance of the vessel, and thus it caused the loads to slip due to the fact that the vessel inclined toward the starboard side in parallel with the movement of the forklift

moving towards the starboard side. Another important factor causing the accident is that the load tying down/lashing was being carried out as the loading was in progress and that the loads tied down to each other were not tied down to the vessel's body.

3.3 Loading Operation

Under Regulation 5 – Stowage and Securing of Part A - General Provisions of Chapter VI - Carriage of Cargoes of International Convention for the Safety of Life at Sea (SOLAS), the provision "Cargo and cargo units carried on or under deck shall be so loaded, stowed and secured as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard" is included.

When General Cargo vessels arrive at the port to load, if a supercargo is not appointed to load the cargo, the loading plan prepared by the vessel is shared with the port operation officer. This plan contains details such as in which hold the loading will start, how the loading will be carried out, distribution and height of the load in the hold. In addition to the cargo plan, a detailed lashing planning is done on how the load will be tied down to itself and to the vessel. Even if no lashing planning is made on paper, it is extremely important that there is, at least, an agreement between the representative onboard of the organization to carry out the loading operations and the Ship Master or his representative, Chief Officer in regards to how the lashing will be carried out to enable that the loading operation is carried out properly and to prevent, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard after the loading. Besides, according to the cargo and lashing plan, whether the loading and lashing are carried out is followed up by the supercargo and ship personnel.

No supercargo was appointed for the loading operation on the vessel Ali Osman-E. The cargo plan on how much cargo to be loaded to which hold was prepared by Chief Officer in consultation with the shipping officer. In this plan, there are no details showing the loading stages on how and in what way the cargo will be loaded into the hold. Besides, on the cargo plan or on any other document, there is no information regarding the lashing of the cargo to itself or to the vessel's body, and there is no agreement or coordination between the Chief Officer and the loading and lashing personnel regarding the lashing to be carried out during or at the end of the loading.

After the shipping officer of the cargo received the loading plan, he shared the loading plan with the port cargo handling personnel. The shipping officer of the cargo requested the use of a forklift in loading. The head of operation of the port and the personnel engaged in fulfilling the duty of slinger working in the hold stated that the instructions were provided by the shipping officer of the cargo during the loading. Moreover, the forklift operator stated that he received the instruction to put the 7th bundle of shaped tubes, which he was trying to put on the starboard side of the vessel before the accident, from the shipping officer of the cargo. As it turns out, the shipping officer of the cargo took on the duty of supercargo in the loading operation of the vessel Ali Osman-E without realizing it. However, he does not have the education and knowledge to analyze and become aware of the importance and dangers of this duty, which he tries to fulfill in good purpose, in terms of the loading operation of the vessel. On the other hand, the fact that the shipping officer of the cargo actively involved in the process from preparation of the loading plan to the implementation of this plan, although he does not have an official duty on behalf of the port operation or the vessel, stresses the weakness of the persons responsible for the loading, and the lack of coordination in the port operation organization.

This situation is also considered to lead that the a detailed cargo plan necessary for loading and stacking of the cargoes and the planning regarding securing the cargoes during loading, as stated in the regulation 5, is ignored in the preparation and implementation of the cargo plan.

3.4 Working Organization at Port Management

The port management has the cargo handling and stacking operations done by another company (subcontractor). Load tying down/lashing operations are carried out by the company authorized by the load manufacturer. In the vessel loading operation, loading operations are carried out orally between the shipper and the vessel.

The shift appointed for the loading of the vessel ALİ OSMAN E consists of a crane operator, a forklift operator, two slingers and a foreman. Persons in the hold at the time of the accident are shown in figure 8 and the information on their locations is given below.

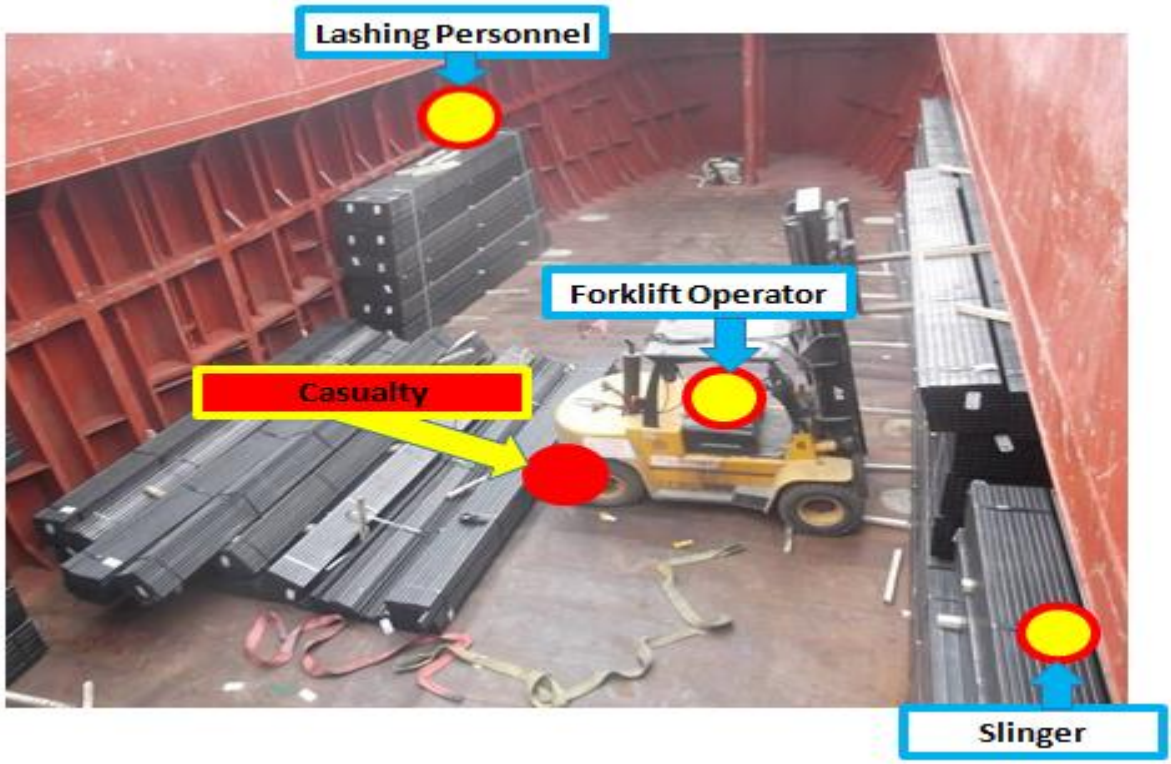


Figure 8: Locations of People in the Hold at the Time of Accident

- Slinger was on the stack behind the row on which the loading was being carried out and which was on the starboard side of the vessel.
- Slinger (Victim) was close to the location where the right rear wheel of the forklift was.
- Forklift operator was on the forklift and was trying to load 7th row of shaped tubes on the stack in the middle on the starboard side of the vessel.
- Lashing personnel was lashing on the stack on the port side.
- Crane operator: The crane operator, who was on the shore crane, returned to the shore side to take a load on the truck on the shore by the crane.
- The foreman, who coordinated the loading process during the shift, was not onboard during the accident.

The Slinger (victim) got stuck between the cargo and the forklift due to the fallen cargo while he was in a position very close to the forklift and trying to load over the 6th row on the stack on the starboard side. On the other hand, the lashing personnel on the stack of

shaped tubes on the port side was trying to tie down the cargo to itself while the loading was continuing on the starboard side of the vessel, and in the meantime, another slinger personnel was on the stack which was tied down neither to itself nor to the vessel's body (Figure 8, Figure 9).

Figure 9: Lashing Personnel Engaged in Tying Down the Load to Itself

The fact that one of these three people in the hold was close enough to the truck forklift to pose a danger to him, and the other two people were on the stacks that are likely to fall during the loading shows that they were not able to evaluate the risks and dangers of their work and that they did not have the coordination to make them work in coordination.

On the other hand, when the occupational health and safety risk assessment documents of the port management are examined, it is understood that the risks and hazards that the forklift operators working at the port may be exposed to during the operation onboard and at the port area have been identified and the trainings have been provided to the forklift operators about the work they will carry out.

The prominent risks and hazards onboard and at the port identified are determined as follows.

- The suitability of the personnel for the work
- Heavy machines and loads
- Working onboard at night
- Noise, dust, lighting, vibration and etc.
- Working with heavy machines

Furthermore, in the occupational health and safety documents, there were no studies on the risk assessment for the slingers, who work in the vessel's hold and are exposed to similar risks like forklift operators, or personnel working in cargo handling, and the hazards exposed and the measures to be taken against the risks.

Besides, no evidence and documents were obtained regarding that the personnel working in lashing the cargo in the hold and the personnel, who may face similar risks, were informed about the definitions of the hazards and risks before they are employed in lashing the cargo onboard and at the port.

3.5 Cargo Stowage Procedures and Cargo Lashing Procedures

Examples of the ways of lashing the cargoes safely after loading are given in the manual on lashing the cargoes onboard. However, no evidence was reached regarding the implementation and usage of the lashing equipment related to the lashing of the cargoes available onboard by using these examples.

In good shipping practices, a planning regarding the lashing and stacking of the cargo to the vessel is made by among the Shipmaster/Chief Officer and the port management's personnel responsible for the safe loading of the cargo onboard, and the people to carry out the lashing of the cargo before starting the loading and a consensus is made by exchanging information about applications. Moreover, it is necessary to determine especially how to carry out the loading and cargo lashing operations and the timing for the cargo lashing operations in the content of the consensus.

That being the case, no information was reached regarding the agreement between the Shipmaster/Chief Officer and those involved in cargo lashing on the use of cargo lashing equipment and on the applications of lashing the cargo to itself and to the vessel.

On the other hand, loading operation was started on the vessel ALİ OSMAN E, the cargo lashing was started after 6 bundles were put one on another on the port starboard side in the hold No. 1. When the photos related to the accident were investigated after the accident, it was determined that the fallen stack and other loads were tied down to each other but they were not tied to the vessel (Figure 10). For this reason, the risk of falling of the loads was faced, which may occur as a result of the vessel's inclination to the starboard or port side. This situation is considered as one of the safety factors causing the accident.

Figure 10: Cargoes of Which Lashing Continues

SECTION 4 – CONCLUSIONS

4.1 No risk assessment was carried out by the vessel and the port regarding the stacking with forklift and lashing of the cargoes to be loaded onboard.

4.2 Although he has no official duty, the shipping officer of the cargo actively involved in the process from preparation of the loading plan to the implementation of this plan.

4.3 There was no coordination between the slinger, forklift operator and those engaged in lashing the cargoes working in the hold while loading on board.

4.4 The cargo lashing operation was not stopped while the loading operation onboard was continuing.

4.5 The shaped tubes, which exceeded a certain stack level were tied down to itself but not to the vessel.

4.6 There was no coordination between the crew appointed for lashing/securnig the cargo onboard and the vessel in terms of the lashing technique and timing of the cargo.

4.7 The forklift used in the loading caused the vessel to incline to its starboard side, and as a result, the loads on the port side of the vessel fell on the victim docker.

4.8 There was no agreement or coordination between the Chief Officer and the loading and lashing personnel regarding the lashing to be carried out during or at the end of the loading.

4.9 The foreman left the vessel to check the other vessels for which he was responsible after stacking one row of cargo to each of the wings on the port and starboard sides of the vessel.

4.1 Primary Safety Factor Causing the Accident

The fact that the forklift used in the loading is large enough to affect the balance of the vessel, and thus it caused the loads to slip due to the fact that the vessel inclined toward the

starboard side in parallel with the movement of the forklift. Another important factor causing the accident is that the load tying down/lashing was being carried out as the loading was in progress and that the loads tied down to each other were not tied down to the vessel's body.

4.2 Other Safety Factors

Other important factors causing the accident are the fact that the load operations were started without establishing an agreement between the port management and the vessel regarding the preparation and implementation of cargo and stacking plans, and the fail to determine the equipment and the team suitable for loading and the lack of coordination of this team while working.

SECTION 5 – RECOMMENDATIONS

The following recommendations were made considering the analysis and results obtained from the accident investigation carried out.

It is recommended;

For the Vessel Operator

7/03-20 Considering the results of this report, procedures in the Safe Management System manual of the vessel should be developed and measures should be taken to implement them regarding the safe loading operation at the port.

8/03-20 Before the loading/unloading plans are implemented, procedures and practices should be developed to reach an agreement between the vessel and the port management, including the determination, suitability of the equipment to be used and the methods of cargo lashing.

9/03-20 The rules regarding the suitability of the equipment to be used should be determined by evaluating the negative impact of forklifts to be used in loading on the vessel's balance.

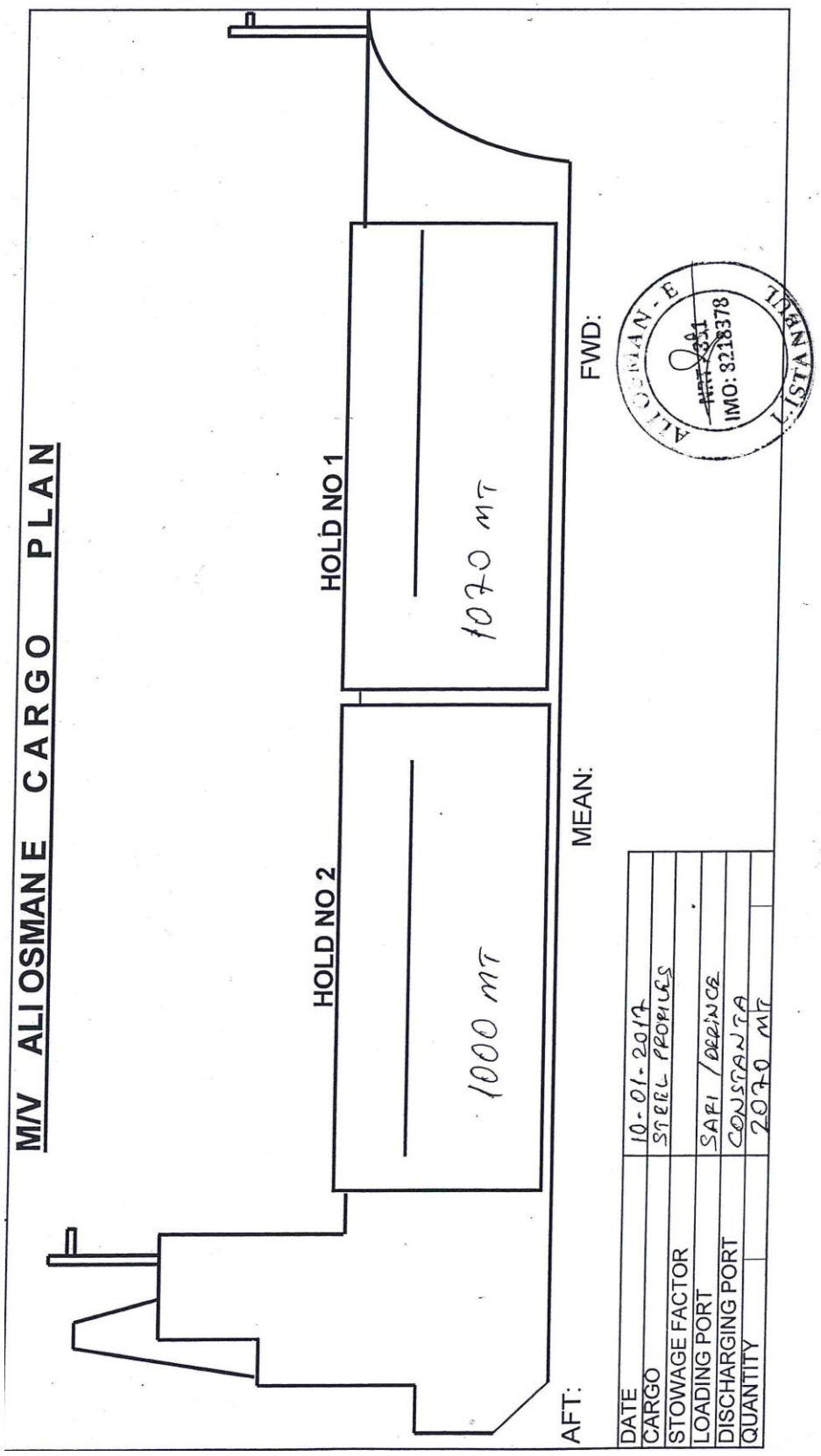
For Port Management

10/03-20 Measures should be taken by making a risk assessment in order to identify the hazards related to the work carried out by the slinger and the personnel assigned in cargo lashing operations and to prevent/reduce risks,

11/03-20 Before the loading/unloading plans are implemented, a risk assessment should be made between the port management and the vessels considering the negative impact of the forklift to be used on the vessel's balance, including the determination, suitability of the equipment to be used and the methods of cargo lashing,

12/03-20 The port working organization structure should be revised to ensure full coordination among the people involved in ship loading/unloading operations,

ANNEX- 1: Cargo Plan of the Vessel ALİ OSMAN E



***ANNEX- 2*: Vessel's Holds and Hold Cover Dimensions**