

**Danish Maritime
Authority**

Ministry of Trade
and Industry

CASUALTY REPORT

Division for Investigation of
Maritime Accidents
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18 March 2002

Case 199921716

Occupational accident

CEC FORCE

18 December 2001

Division for
Investigation of Maritime
Accidents



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1. The Casualty

Type of casualty: *Occupational accident*

Location of casualty: *Aarhus harbour, Multiterminal*

Date and time: *18 December at 14.50*

Injuries: *A worker from PS Aarhus Flydedok A/S died after severe fall on the quay*

2. Collecting of data

Immediately after the accident the police investigated the scene of the accident. They took statements and informed the Danish Working Environment Service and the local office of the Danish Maritime Authorities in Aarhus.

The local office in Aarhus immediately informed the Investigation Division which examined the scene of the accident on 19 December 2001 and took statements from the following involved persons:

- the technical superintendent from the shipping company
- the repair engineer from PS Aarhus Flydedok A/S who supervised and coordinated the work in question along with other work in the ship at the time of the accident
- a foreman from PS Aarhus Flydedok A/S who helped mounting the dynamometer

On 8 January 2002 the colleague of the injured who helped carrying the plastic barrels into the MOB-boat gave statement to the Investigation Division by telephone.

The Investigation Division has furthermore received information on details from:

- the ship surveyor from the Isle of Man Marine Administration who conducted survey on the ship on 14 December 2001
- the master
- the surveyor from Bureau Veritas who was intended to attend to the load test
- VIKING Life-Saving Equipment A/S, Esbjerg

The Investigation Division received the reports from the police on 19 December 2001.

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The investigation Division has received photographs of the launching arrangement from Clipper Elite Carriers A/S who has technical management for the ship. Some of the photographs are used in the report.

3. Ship Particulars

<i>Name of Ship:</i>	CEC FORCE
<i>Home Port:</i>	Douglas Isle of Man
<i>Call Sign:</i>	V S P J 8
<i>IMO No:</i>	9088433
<i>Type of Ship:</i>	Cargo Ship
<i>Construction year:</i>	1995
<i>Tonnage:</i>	4980 GT
<i>Length/breadth/draft:</i>	94.35 / 18.80 / 9.30 (metres)
<i>Engine Power:</i>	4500 kW
<i>Owner:</i>	“Scanomat” c/o Clipper Elite Carrier, Skudehavnsvej 5 2100 Copenhagen O
<i>Classification Society:</i>	Bureau Veritas

4. Summary

During preparation for a dynamic load test of MOB-boat davit the boat fell from its cradle on the boat deck to the quay. A worker from the PS Aarhus Flydedok A/S was severely injured by the fall when he was filling water into some plastic barrels in the boat and he died shortly after.

The cause of the accident was that lashings were taken off and the boat’s release hook was hooked off at the time of the accident.

None of the persons involved were experienced with the MOB-boat’s launching arrangement and thus no one knew that the boat was brought into a condition with a great risk of falling down.

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5. The Crew

The ship changed flag and registration 4 days before the accident from Danish International Ships Register to Isle of Man. A whole new crew signed on in this connection.

The crew consisted of:

- master
- 3 mates
- 3 engineers
- 1 cook
- 3 AB's

All the officers and the crew members were from the Philippines except from the second mate who was from Russia.

6. Narratives

The technical superintendent

The ship was alongside quay in the “Multiterminal” of Aarhus harbour. The “Isle of Man Marine Administration” had carried out a survey in connection with the change of flag and management on 14 December 2001.

In connection with the survey one condition was “*MOB boat and life raft davits to be dynamically load tested*” with a respite of fulfilment of 6 months. It was arranged that the PS Aarhus Flydedok A/S should carry out the test – in addition to a number of other tasks.

In the morning on 18 December 2001 a number of workers from PS Aarhus Flydedok A/S came on board the ship and began the work. The load test had to be done with a weight corresponding to all the equipment and 3 men with a weight of 75 kg plus 10 % which was approximately 1300 kg according to the knowledge of the technical superintendent.

The load test had to be done in the presence of a surveyor from Bureau Veritas and it was arranged that they should call for the surveyor (in Fredericia) when they were ready to do the test.

Neither the technical superintendent nor the officers and the crew had the expertise to do the load test. This test was the technical superintendent's first experience with a MOB-boat and davit arrangement of this type. For this reason among others they chose to let PS Aarhus Flydedok A/S carry out the load test. The technical superintendent trusted that the persons from PS Aarhus Flydedok A/S were able and experienced men in doing the test because they had accepted to do it and because the ship was built at Aarhus Flydedok A/S in 1995.

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A repair engineer and a worker (who was injured later on) from PS Aarhus Flydedok did the work with the MOB-boat. It was the intention to load the boat with 6 plastic barrels each of 200 litres, which had to be filled with water. It was also the intention that the load had to be controlled on a dynamometer fitted between the wire and the release hook fixed on the boat. 4 of the plastic barrels were placed in the MOB-boat as shown on the sketch in chapter 10.

None of the ship's officers or crew members or the technical superintendent was present during the preparations for the load test. At one moment the repair engineer found the technical superintendent and asked for somebody to help deploying the MOB-boat. The technical superintendent said that everybody was busy, but he could do it himself.

When the technical superintendent came to MOB-boat, the worker (who was injured later on) was in the boat filling water into plastic barrel No. 4 – starboard side aft. The boat was in its cradle on the boat deck.

The technical superintendent took off the lashings from the boat. They had no tension before he took them off. The worker in the boat and the repair engineer saw the technical superintendent taking off the lashings.

The employees from PS Aarhus Flydedok had shackled on the dynamometer to the short piece of chain (approx. 50 cm) hanging below the wire and its iron bob. Thus the connection between the wire and the boat was extended by the length of the dynamometer and two shackles (approx. 50 cm).

The connection between the wire and the boat was too long as it could not be tightened more by use of the winch. The technical superintendent and the repair engineer discussed whether the connection should be tightened, and how to do it. They agreed in dismantling the short piece of chain and for that they needed some tools, which the technical superintendent would go and get from the engine room.

(Questioned by the Investigation Division if the shackle below the dynamometer was hooked on to the release hook that was fixed on the boat, the technical superintendent answered "*I assumed so!*").

The repair engineer went to the main deck and spoke with some other employees about other tasks while the technical superintendent went to get the tools from the engine room. When he left the MOB-boat the worker was still filling water into barrel No. 4.

A little later, when he was on his way to the engine room the technical superintendent was waiting a moment to have a talk with the repair engineer, who spoke with some employees, a loud crash was heard. Everybody looked to starboard side and found that the MOB-boat had fallen to the quay where the worker who had been filling water into the barrels had fallen out of the boat.

After that a lot of things happened at the same time. Some ran down to the injured worker on the quay, crewmembers fetched the ship's stretcher and an ambulance was called for.

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The repair engineer

PS Aarhus Flydedok A/S should carry out a dynamic load test on the MOB-boat davit. To achieve weight in the MOB-boat it was decided to use 6 plastic barrels to be placed in the boat and filled with water.

The repair engineer ordered the barrels. The barrels were brought to the boat by two workers - one of the workers was injured later on. In the beginning 4 barrels were placed in the boat.

One of the workers began filling water into the barrels by use of a plastic hose and the other worker went to do some other work somewhere else in the ship.

When the repair engineer came to the boat a foreman had already arrived and stood in the boat together with the worker. The repair engineer entered the boat and helped mounting a dynamometer to gauge the load.

When the dynamometer was shackled on somebody called for the foreman who went to the forepart of the ship to look for or to do some other work.

When the dynamometer was mounted to the chain but not hooked on to the release hook that was fixed in the MOB-boat it was obvious that the shackle under the dynamometer was hanging far below the hook, so that the entire connection would become slack when hooking on. This was supposed to be a problem in regards to deploying the boat and the repair engineer called for a rigger to help shortening the connection. However the rigger was busy and hindered in helping on that time. The shackle below the dynamometer was not hooked onto the hook.

Because neither the repair engineer nor any of his workers had any knowledge about the MOB-boat and its launching arrangement he found the technical superintendent and asked for expert assistance: *“Is here someone who knows anything about this?”*

“I do!” the technical superintendent said and offered to help and went up to the MOB-boat.

The repair engineer understood the technical superintendent’s willingness and answer such as he had the expertise to the arrangement. They conferred upon what to do to the connection being too long. They agreed in shortening the connection by dismantling the chain and subsequently shackle on the dynamometer directly below the wire.

The repair engineer saw that the technical superintendent took off the aft lashing from the boat. However, the repair engineer and the worker in the boat did not take any notice of that since the boat apparently stood firmly in its cradle.

The repair engineer had an errand on the main deck where some repair gear had arrived.

A little later while the repair engineer was on the ladder on his way down to the main deck a loud crash was heard. He ran up to the next deck and saw that the MOB-boat and one worker had fallen to the quay.

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The repair engineer gave alarm by his mobile phone on alarm number 112 and ran upstairs to see whether the accident also included the technical superintendent. On his way up he met the technical superintendent, very shocked but apparently not physically hurt. He then hurried down the to the injured on the quay by the gangway, which was damaged by the MOB-boat during its fall. On his way down he called another employee in PS Aarhus Flydedok A/S asking her to call and inform the injured worker's wife who had arrived to collect him.

The injured was unconscious and severely bleeding from wounds in his head and from one ear. He had fallen into a puddle of water, and while the repair engineer still spoke in the mobile phone with the alarm control centre he lifted the head of the injured to prevent drowning. Another engineer from the PS Aarhus Flydedok A/S arrived with some clothes to put under the injured worker's head. The repair engineer still had to hold the injured worker's head above the water.

When doing this, the repair engineer first had to notify a telephone operator who after having received the information redirected to the alarm control centre in Aarhus to whom the repair engineer had to repeat what he already had told the telephone operator. This appeared very time-consuming, frustrating and problematic to him in this difficult situation when, at the beginning, he was alone taking care of the injured. Furthermore, it frustrated the repair engineer that the duty officer in the alarm control centre did not know where the Multiterminal was situated in Aarhus harbour.

A little later – approximately at the same time as the ambulance arrived – another person came and offered his assistance in giving first aid. Shortly after the injured was taken by ambulance to a hospital.

The foreman

PS Aarhus Flydedok A/S should carry out dynamic load test on the MOB-boat davit. To achieve weight in the MOB-boat it was decided to use 6 plastic barrels, which should be placed into boat and filled with water.

The repair engineer ordered the barrels, which were brought and placed into the boat by two workers. To begin with 4 barrels were placed in the boat.

The foreman brought the dynamometer and helped lifting it while the repair engineer shackled it onto the chain below the wire.

When the dynamometer was shackled on somebody called for the foreman, who went to the forepart of the ship to do some other work. A little later he was informed from another employee from the PS Aarhus Flydedok A/S that an accident had occurred.

The foreman was aware that there was no connection between the chain below the wire and the MOB-boat when he left the boat deck. It is uncertain to him when and by whom the connection was dismantled. He remembers that the chain hang loosely by the side of the release hook when he arrived to the boat.

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The foreman did not know that the cradle would be like a pair of skids when the lashings were loosened. He saw the cradle as a fixed one and nobody had noticed that the legs were being able to fold/unfold.

The colleague of the injured worker

On the day before the accident the colleague had worked on the MOB-boat. He was altering the ship's name and port of registration on the boat. By then the release hook that was fixed in the boat was hooked on to the chain.

The repair engineer ordered the barrels, which were taken to the boat deck by the two workers. They placed 4 barrels into the boat.

When they came to the boat and began preparing the work the release hook fixed in boat was still hooked on, as it was the day before. The foreman arrived with the dynamometer and helped staggering it into boat. The foreman tried to hook off the release hook fixed in the boat by loosening the shackle. This was a little troublesome.

They needed water supply on the fire main to fill the barrels and some problems or confusion occurred in finding somebody from the new crew who was able to take care of that. The worker who became injured later on began filling water into the barrels by use of a plastic hose and the other worker went to do some other work somewhere else in the ship.

The situation was hectic as often when many tasks are to be done in a ship. It seemed like there was no comprehensive view on the task in preparing and carrying out the load test.

7. Additional information

A medical ambulance and an ordinary ambulance were sent to the ship. The doctor and the paramedics gave on-the-spot treatment to the injured until 15.20 hours whereupon he was taken to Aarhus Kommunehospital where they declared the injured to be dead on 15.30 hours according to the police report.

Eye witness

The accident was observed from the quay by a lorry driver bringing stores to the ship according to the police report. He had parked approx. 30 metres from the scene of the accident and was just going to open into the lorry's cargo room when alerted by hearing loud noise from the barrels that hit the quay. He turned around just in time to see the MOB-boat fall and hit the quay. In the immediate vicinity of the boat he saw the injured worker, lying on his front side with his head in a big puddle of water. The lorry driver did not see any of the sequence of events before the fall. He went and helped the repair engineer holding the injured worker's head above the water until the paramedics and the ambulance arrived.

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Fixing of the MOB-boat to the release hook

At the moment of the accident the dynamometer was not hooked on to the release hook which was fixed on the boat. The involved employees of PS Aarhus Flydedok A/S have stated separately that they were aware, that there was no connection between the chain below the wire and the MOB-boat when they left the boat deck. It is not clear by whom or when the release hook was hooked off. The repair engineer and the foreman have stated that they remember the chain was hanging loosely by the release hook when they came to the boat. The worker who assisted in the preparation of the load test has stated that he remembers the release hook was hooked on when he and his colleague came with the plastic barrels, and it was hooked off by opening the shackle when mounting the dynamometer.

Anyhow, it was necessary to hook off in preparation to mount the dynamometer between the chain and the release hook.

Cradle

The cradle consists of two sets of legs, each set assembled by a bolted joint that can be folded and unfolded like scissors. When taking off the lashings from the boat one leg in each end of the cradle will be loosened and both legs can be put in line. Thus the cradle will be like a pair of skids and the boat can be launched directly over the ship's side (see pictures in chapter 10).

The technical superintendent and the involved employees from PS Aarhus Flydedok A/S have stated that they did not know about the cradle acting as a pair of skids when the lashings were taken off. They had seen the cradle as a fixed cradle and nobody had noticed that the cradle's legs could be opened and folded as described.

The repair engineer watched that the aft lashing was loosened by the technical superintendent. But because the technical superintendent had given the expression of having the knowledge of the arrangement he assumed that the boat stood safely in the cradle.

Instruction

On the superstructure beside the davit and cradle a poster with illustration and instruction in how to launch the MOB-boat was set up.

Investigating parties

The police immediately investigated the scene of accident, drew up a report and notified the Danish Maritime Authorities' local office in Aarhus as well as the Danish Working Environment Service.

The Danish Maritime Authorities' local office in Aarhus immediately notified the Division for Investigation of Maritime Accidents who inspected the scene of accidents and took statements from the persons involved on 19 December 2001.

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At the inspection it was found that the MOB-boat had been fixed upon its place in the cradle neither by lashings nor by hook. Thus the boat had been kept on its place in the cradle solely by its own balance because the function and the construction of the cradle imply that the boat can be launched without being lifted by the davit and the winch. The siting of the MOB-boat has consequently been unstable from that moment when the lashings were loosened. The boat fell out from its cradle because it was brought out of balance on account of water being filled into the plastic barrels and probably on account of the worker's movements in the boat while filling water into the barrels.

The load test

In connection with change of flag on 14 December 2001 the Isle of Man Marine Administration had made the following condition: *"MOB-boat and life raft davits to be dynamically load tested"*.

In accordance with IMO Life-Saving Appliance Code (LSA Code), Resolution MSC.48(66), Ch. VI 6.1.2.5.2 the launching appliances shall be of sufficient strength to withstand: *"a dynamic test with a proof load of not less than 1.1 times the maximum working load at maximum lowering speed"*. Referring to information from the ship surveyor from Isle of Man Marine Administration this condition should be fulfilled accordingly.

According to information from VIKING Life-Saving Equipment A/S the MOB-boat with engine, fuel and equipment weighs 600 kg. In addition to that should be added the weight of 6 persons each of 75 kg = 450 kg.

With that, according to the regulations mentioned the test load during a dynamic load test should be $(600 + 450) \times 1.1 = 1155$ kg totally. Thus the boat should be added $(1155 - 600) = 555$ kg to achieve the full test load. According to the Bureau Veritas surveyor who should be present during the load test, this was concordant to what he had calculated and informed to the repair engineer the day before the load test performance. He had not instructed that they should use the dynamometer during the load test.

According to PS Aarhus Flydedok A/S it was informed from the technical superintendent that the load test should be carried out with 1225 kg in addition to the weight of boat with equipment. Therefore it was chosen to use 6 barrels each of 200 litres.

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8. Comments made by the Division for Investigation of Maritime Accidents

On the basis of statements from the persons involved the Division for Investigation of Maritime Accidents notes that

- the repair engineer, the foreman and the worker had no knowledge of the MOB-boat's launching arrangement, which they supposed the technical superintendent had
- the technical superintendent had no knowledge of the MOB-boat's launching arrangement, which he supposed the employees from PS Aarhus Flydedok A/S had
- it had not – by the communication between the parties before the accident – been made clear for any of them that neither of the other part had the knowledge of the arrangement
- all persons involved were acting in confidence that the MOB-boat stood safely in its cradle, and therefore the technical superintendent took off the lashings and the employees did not react on that nor on their knowledge that the release hook was not hooked on

Due to lack of precise communication it was not made clear neither to the technical superintendent nor to the employees from PS Aarhus Flydedok A/S that none of the parties were expert in the arrangement. Thus everybody acted in confidence that the other part was so. Therefore the Division for Investigation of Maritime Accidents is of that opinion that the preparation of the load test was carried out unsafely.

Both the technical superintendent and the employees from PS Aarhus Flydedok A/S had planned and were preparing the load test to be carried out with a substantial bigger load than prescribed in the regulations (they prepared to add approx. 1200 kg, and additional 555 kg was prescribed). This however, in the opinion of the Investigation Division, had no influence in whether the accident could occur. The MOB-boat lay loosely in the cradle and in that situation there is a reason to assume that balance was more decisive than the actual weight.

The Investigation Division considers the persons working in the MOB-boat during preparing of the load test ought to use “fall arrest systems” (life line) partly because the boat was placed in the ship side on the boat deck high above the quay, and partly because there was no railing ore gunwale on the boat for protection against fall caused by lack of balance.

The weight of the boat including equipment was known. The Investigation Division considers that the use of dynamometer was unnecessary and troublesome.

The Investigation Division considers that the preparation of the load test was carried out in an incompetent manner by an unskilled crew. The preparation of the load test was not carried out safely.

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At the time of the accident both the repair engineer, the foreman, the colleague, the rigger and the technical superintendent were occupied by other tasks. This is why the situation was hectic and stressful and the time for concentrating in the handling of the load test was limited. This can explain why the accident occurred but it is not an extenuating circumstance.

9. Conclusion

The preparation of the load test was not planned, supervised and carried out competently.

The main cause of the occupational accident was that the persons who were directly involved in the preparation of the load test had insufficient knowledge to the launching arrangement of the MOB-boat and to the carrying out the load test.

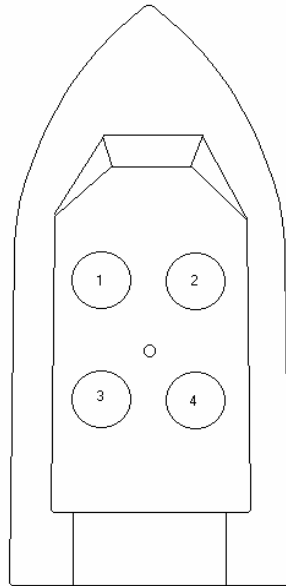
Contributory cause of the occupational accident was that they were occupied by other tasks in the ship simultaneously. This is why the situation was hectic and stressful with no time to concentrate and to get the necessary overview of the load test.

Consequently the MOB-boat was not secured in its cradle neither by lashings nor by hooking on. It fell out of its cradle because it came out of balance by the water being filled into the plastic barrels. And probably also because the worker was moving in the boat while he was filling water into the barrels.

The serious out coming of the accident could have been avoided or reduced considerably by the use of fall arrest system (life line) during the work in the MOB-boat.

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10. Enclosure



The MOB-boat on the quay after the accident

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The cradle folded



The cradle folded

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The dynamometer



The dynamometer mounted to the chain below the iron bob

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The new MOB-boat hooked on



The new MOB-boat in its cradle