Investigation report

D8/2007M

M/S GRACHTBORG, hatch crane accident in the port of Kokkola. Finland, on 11 August 2007

Translation of the Finnish original report

Onnettomuustutkintakeskus
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1 EVENTS AND INVESTIGATIONS

The vessel

Figure 1. M/S GRACHTBORG.

Name	*M/S GRACHTBORG*
Call sign	*PJPC*
Gross tonnage	*2820*
Length	*89,72 m*
Draught	*5,67 m*
Year of construction	*1997*
Flag	*Netherlands Antilles*

Cargo

Bagged calcium chloride in pallets and FIBCs.

Weather conditions

The accident took place indoors in a large port terminal, into which the vessel can be driven in. The wind was from behind the vessel. Indoor lighting was a few dozen lux (estimation).

The scene of the accident

The AWT terminal (All Weather Terminal) of the Kokkola Port, into which the vessel can be driven in. The back wall of the terminal is open.

The accident event

The accident took place late on 11 August 2007 on Saturday night. The vessel was loading bagged calcium chloride in pallets and FIBCs. The dock workers had finished their work at 23:40 and they were leaving for the weekend. The dock workers were lifted from the hold of the vessel by means of a man cage. The dock workers were in the man cage when the accident took place and they saw the whole event.

According to the master of the vessel he ordered the chief mate to close the hatches in the aft part of the vessel, because wind and rain were coming from the sea behind the vessel. The vessel was in an all-weather terminal, into which the vessel can be driven in. The back wall of the terminal is open.

According to that told by the master, when he and the other mate were on their way to assist in the move of the hatches, the chief mate was already on top of the deck-hatch crane. It was the purpose of the master to go to the portside of the vessel (BB) and for the other mate to go to starboard to ensure that the hooks were properly placed in the hooking pockets.

According to the safety instructions of the shipping company, when deck hatches are moved, two persons have to ensure that the lifting hooks are placed in the hooking pockets of the hatch on both sides of the cargo hold. As they were still on their way, the mate had already lifted the deck hatch using the crane and the crane was along mid-ships. The chief mate was lifting hatch number 7, which weighs 13 tons. According to the master the crane moved in an odd way and a moment later the deck hatch and the crane fell down. The lower right-hand side of the crane, the rail wheels, slid over the end of the hatch and the hatch fell into the cargo hold, about 7–8 metres. The right edge of the hatch remained against the edge of the cargo hold. The chief mate was at the con-trols of the crane, from where he then fell into the cargo hold as the crane capsized.

Action after the incident

An ambulance was immediately called to the vessel and the mate was taken to hospital. According to the examination, the mate broke his rib and he received bruises, but no more serious damage. One of the wheel loaders in the cargo hold of the vessel, the Volvo L 70, was badly damaged as the hatch fell on top of it. The machine was so badly damaged that the insurance company redeemed it. The second wheel loader remained intact.

The master notified the shipping company and the authorities of the event. The police visited the vessel and interviewed its master and the injured mate. The police took breath tests of the persons with the result zero and performed its own investigation.

The maritime inspector was notified by the Vaasa emergency centre. The maritime inspector further notified his own superiors of the matter. The maritime authority also notified the occupational safety inspector. The maritime inspectors (2 persons) and the occupational safety inspector visited the vessel on Monday morning. The occupational safety inspector examined the matter as a work accident and the maritime authorities as a maritime safety issue.

According to the working-hour record, there was nothing unusual in the working hours of the injured mate in the days before. A new seaman was ordered to the vessel to replace the injured mate and the injured mate did not sail onboard the vessel.

The vessel would have been ready on Monday August 13th without the accident. Now it had to be unloaded for the seaworthiness inspection. Because it was estimated that the deck hatches did not go in place well and tightly enough to avoid the risk of the load getting wet, the decision was made to order another vessel to fetch the load. The damaged vessel was allowed to sail to the shipyard in Poland for repairs. The purpose is for the shipyard to repair the deck crane as well as hatches 6, 7 and 8. Before the voyage the water tightness of the hatches had to be improved with tarpaulins. The Ms Grachtborg could leave Kokkola for the shipyard at 16:30 on Wednesday April 15th.

Injuries to the persons and damages to the vessel

The mate was injured and both the hatch crane and the machine in the hold were damaged. There was also damage to the deck hatch and the structures of the vessel.

Figure 2. The hatch cover and the crushed tractor in the cargo hold.

Figure 3. M/S GRACHTBORG's collapsed hatch crane.

2 ANALYSIS

The crane manufacturer as well as in this case also the shipping company expect in their own safety instructions that there are persons alongside the cargo hold to ensure that the lifting hooks are correctly placed in the hooking pockets of the cargo hatch. The chief mate of the vessel did not comply with the safety instructions. In connection with the accident investigation of the MS SINGELDIEP[1] (B1/2006M) it became evident that working with the crane alone in violation of instructions is common.

Nor had the crane been regularly inspected. An initial inspection on the crane had been conducted in 1997 and there were no inspection records after that. The crane was manufactured by the Dutch company Coop & Nieborg Hoogezand and the reference list on its home site includes the GRACHTBORG. An earlier investigation showed that the maintenance instructions mainly dealt with the greasing of movable parts. Hoisting equipment of a vessel used to handle cargo has to be subjected to regular scheduled tests. The deck crane of deck hatches is not one of these.

The deck crane of the vessel is of a type which has suffered similar accidents in different parts of the world. In structure, the crane is light as already noted in an earlier MS SINGELDIEP accident investigation. Its acquisition price is clearly cheaper than for example that of a hydraulic hatch system, where the hatches may be raised upwards to each end of the cargo hold. Hatches lifted with a crane are slower to handle than hydraulic hatches, but they are common because of their lower price. Several accidents have taken place in the past few years when operating cranes of this type.

The hooking pockets have been constructed so that they can well bear the load caused by the hatch when the hook is in the right position. The side plate of the hooking pockets is meant to ensure that the hook remains connected to the planned spot carrying the load. It is not the purpose of the side plate to carry the load.

The weight of a cargo hatch is 13 tons and the maximum allowed load of the crane is the same. When the lifting hooks are properly in the hooking pockets of the deck hatch, the whole structure becomes stiff for the period of the lifting and the move. If the lifting hooks are not exactly in their rights places, the structure is shaky. Also regarding this accident, it can be assumed that all the lifting hooks were not correctly in the hooking pockets. The rails of the crane are at the level of the deck and the rail wheels have a flange of a few centimetres to keep them from falling off the rails. Also the trim and roll have an effect on safe work and the manufacturer of the crane has set a maximum for these values.

When the hooks are placed wrong, a small sway or tug will cause the deck hatch to slide from the top of the hook and the crane to become loose. In this case, the hatch falls lifting the wheel off the rails.

[1] MS SINGELDIEP, fatal accident in Kotka port on 11.1 2006, http://www.onnettomuustutkinta.fi/38910.htm

The crane manufacturer has instructed that the places of the locking wedges, the hooking pockets, be clearly painted. Likewise, the hooks have been painted. In addition, according to the instructions, the centre line of the hatch should be pained on the hatch cover. The hook pockets were painted white. After the accident of the MS SINGELDIEP, in spring 2006, the investigators have noticed that the hatch markings had been painted only in one-third of the corresponding vessels that visited Finnish ports.

The crane was an older model, in which there is no security to keep the rail wheel from falling off the rail and capsizing. In newer cranes the falling of the rail wheels off the rails is structurally prevented by equipping the wheel with a security plate. It prevents the wheel from rising off the rail. Also in the newest ones the crane controls are at one end of the crane so that the crane driver can himself see how the hooks are placed at the other end.

The same type of crane had a corresponding accident in Kotka. In that case the mate also fell into the cargo hold of the vessel and sustained fatal injuries. In 2003, there was also a similar accident in Sweden, where the mate died.

From the perspective of the occupational safety of the dock workers it is absolutely necessary that they are not in the cargo hold when the deck hatches of the vessel have to be moved. The communication between the vessel and the dock workers has to be clear and there is no room for misunderstandings. The stevedoring company had clarified its instructions to vessels to the effect that the crew of the vessel is not allowed to move and lift deck hatches if there are dock workers in the cargo hold of the vessel.

3 CONCLUSIONS

Accidents that have occurred with this type of deck crane should be examined more closely. What is the number of accidents and are they very common, for example at European ports. This could be done in co-operation with the authorities of different countries. On the basis of vessel traffic and the cargoes it is possible to deduct the most common ports used by this type of vessel in Europe. Also the manufacturer should be asked to submit further information on these accidents.

The clarification would give a basis for a better estimation of the requirements of safe work. At present safe work focuses on the instructions of the manufacturer to ensure the lifting work when it start and when the hatches are moved. These safety instructions are commonly breached.

The dangers of this type of deck crane should be better communicated. The dock workers have to be aware of these dangers and they must be able to prepare for dangerous situations with the help of sufficient safety instructions.

International co-operation between the authorities should be further developed.

Helsinki, 20 November 2007

Harri Halme

Appendix 1

Another hatch crane accident on 2007 (picture)

Figure 1. Another case on 2007.