MARINE OCCURRENCE REPORT

FATALITY ONBOARD DURING CARGO OPERATIONS

SELF-UNLOADER “CANADIAN ENTERPRISE”
DETROIT, MICHIGAN, U.S.A.
6 AUGUST 1996

REPORT NUMBER M96F0023

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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Fatality onboard during cargo operations

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SUMMARY

At about 1825, while the vessel was preparing to discharge its iron ore cargo, the chief mate started the conveyor belt discharge system and instructed both cargo maintenance personnel to begin unloading the cargo, operating the cargo gates located in the tunnel. The cargo maintenance men then proceeded to the tunnel through the loop belt compartment. The assistant was about to climb down the ladder to the tunnel when he noticed in his peripheral vision that his partner was falling into the loop belt. The assistant immediately directed the chief mate by radio to stop the belts. However, his partner was carried through the rollers. Emergency medical services arrived, but the victim's injuries proved fatal.

OTHER FACTUAL INFORMATION

Particulars of the vessel

Name	"CANADIAN ENTERPRISE"
Port of Registry	Toronto, Ontario
Flag	Canada
Official Number	391204
Cargo	27,045 m/t iron ore pellets
Type	Self-unloading bulker
Gross Tonnage	23,344
Crew	27
Length	222.4 m
Built	1979, Port Weller, Ontario
Propulsion	Twin diesel, single screw
Owners	Upper Lakes Shipping Corp., Toronto, Ontario

The "CANADIAN ENTERPRISE" departed Sept-Îles, Quebec at 0040 on 2 August 1996 bound for the National Steel dock at Zug Island, Detroit, Michigan. The vessel was in position at the dock to start its cargo discharge shortly after 1800 on 6 August. The chief mate, in charge of cargo operations, was in the forward control room located in the forecastle and initiated the starting sequence for the unloading gear at about 1825. Shortly after this, he briefed the Head Cargo Maintenance Man (HCMM) and his partner, the Assistant Cargo Maintenance Man (ACMM) on the required discharge sequence. These two crew members are required to enter the tunnel and operate the hydraulic gates in the cargo hold bottom, thereby regulating the cargo flow to the conveyor systems.

They both left the deck and proceeded to the tunnel via the engine room where they stopped momentarily to check valve positions and hydraulic pump status. They then entered the lower loop belt compartment from the lower engine room port side door. The HCMM stepped onto the forward part of the landing while the assistant stood at his side. The HCMM reminded his assistant of the discharge plan, assigned gates and told him to be careful not to overload the belt with cargo. As per usual, they both scanned and listened for anything unusual in the machinery's operation. All appeared normal. About this time, the chief mate began speaking over the headset; communication between the chief officer and the two maintenance men was by way of portable VHF. Since the conversation appeared to be mainly directed at the HCMM, the ACMM went a few feet aft to go down a short ladder to the tunnel. While doing so, he scanned the loop belt rollers aft for anything untoward. Again all appeared normal. As he reached the ladder and was about to step down onto the second rung, he saw something out of the corner of his eye and glanced back in the direction of his partner and saw that he was no longer inside the railing at the forward end of the landing, but was falling onto the loop belt. He had not seen his partner go outside the railing, trip or fall. The conveyor belt was at its full unladen speed of 600 feet per minute when the HCMM fell onto it and was carried through and under the rollers. The ACMM screamed three or four times into his radio microphone to stop the belt. The ACMM did not use the emergency stop for the conveyor belt located nearby as he considered it was just as quick to use his radio. When he released the talk button, the chief mate replied that the belt was stopped, and asked the nature of the problem. The ACMM

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[1] All times are EDT (Coordinated Universal Time minus four hours) unless otherwise noted.

replied that his partner had gone through the rollers. He then left the area and went to the engine room to calm himself.

When he heard the emergency radio call at 1827, the chief mate activated the emergency stop button. He quickly left the forward control room for the accident scene, where he checked the HCMM for a pulse but found none. He next went to the engine control room and telephoned the master advising him of the situation. The master called the paramedics, who arrived about 10 minutes later. The chief mate returned to the victim in the loop belt area and again not finding a pulse, covered the HCMM with a blanket and secured the area. He then proceeded to the wheel-house to assist the master with his responsibilities. A medical examiner arrived shortly after the paramedics and subsequently pronounced the HCMM dead and had his body removed from the ship. Post-mortem examination revealed that the HCMM died as a result of massive internal injuries when he was caught in the loop belt.

Professional post-traumatic stress counsellors were made available to all crew members within a very short time after the occurrence.

As the occurrence took place in U.S. waters, the U.S. Coast Guard, under section 33, part 95 of the Code of Federal Regulations (CFR), states that testing for evidence of drug and alcohol use can be required of a foreign national who is involved in any marine casualty. Consequently, a number of crew members were tested and all results were found to be negative. These tests could not be performed on the victim, however, there was no prior indication of drug or alcohol use.

Safety Procedures

The HCMM had been introduced to and signed off on the company's Safe Job Introduction list, which outlines among other items basic safety, protective clothing, lines of responsibility and job-specific tasks.

In addition to normal safety equipment, personnel working in the tunnel were also equipped with a radio head set/ hearing protection appliance designed for very noisy locations. The HCMM used a boom microphone, while his assistant opted for a separate microphone with a press-to-talk switch. The microphone, clipped to his coveralls, was readily accessible. This arrangement allowed for good communication despite the high ambient noise levels, and left their hands free.

Post-occurrence examination of the machinery, its operation and emergency shutdowns in the loop belt compartment, tunnel and cargo control room were conducted and all operated satisfactorily. The company's safety practices and procedures for the startup of the cargo discharge were followed. There was no pressure on the personnel to expedite the cargo discharge.

Occurrence site

Entry to the site is through a non-watertight door located in the port forward side of the lower engine room. This door is hinged on its forward side and can only open away from the platform in the loop belt compartment. During the occurrence, the door was reportedly secured open and the ship was secured alongside the dock with no rolling motions. The all-welded steel, grated and railed landing is typical of those generally found on ships. The construction, height, number and spacing of upper and lower rails of the boundary railing meet the applicable Canadian regulations, normally preventing a person from tripping over or falling through the rails. While standing on the landing, no moving machinery can be reached, except by

extraordinary efforts. Post- occurrence examination of the area did not reveal any railing or grating defect. The welding and construction appeared sound. The grating was reported to be free of any slippery substances and in good repair. The landing and surrounding area, as well as access to it from the engine room, were adequately lit with all fixtures in service.

The soles of the HCMM's boots as well as his working gear were reported in good condition. There were no obstructions or equipment on the grating or on the way in from the engine room that would require removing or climbing over to gain access to the loop belt compartment landing.

Within the loop belt compartment there are several removable gratings, situated in various locations, which permit maintenance and inspection to be carried out on the rollers and associated equipment when the machinery is shut down. Below the landing, the gratings do not cover the entire area, nor are they required to cover the portion of the lower loop belt that is exposed and is believed to be where the HCMM landed.

Prior Activities and Experience

Both men were experienced and familiar with the machinery and Upper Lakes Shipping (ULS) safety procedures and practices regarding the ship and its unloading gear. The HCMM had been employed as an industrial millwright before joining ULS two years previously. He was known to be a careful and safety-conscious worker; the ACMM has 10 years experience in this capacity.

On the morning of the occurrence, the HCMM and his assistant performed light maintenance duties. They both rested after lunch from 1300 until 1700. After supper, having checked and tested their safety equipment, they were back on duty at 1800, ready to begin cargo discharge operations. While awaiting discharge instructions, they engaged in conversations with other crew members who later reported that both men appeared normal. The two co-workers had known each other and worked together for many years on this vessel and elsewhere. The HCMM and his assistant were both stable family men who enjoyed each other's company, as well as the friendly, cooperative atmosphere on the ship. They had a professional attitude toward their work and their responsibilities regarding the discharge machinery.

ANALYSIS

The ACMM was the only person in the occurrence area. He saw little in his peripheral vision and as he turned around, saw his partner already falling onto the moving belt. A number of scenarios were re-enacted with a person of similar build to the HCMM. However, each showed that the combination of the railings and grating consistently prevented anyone from flipping over, or falling between the bars and coming into contact with or near any moving machinery in the area.

The non-watertight door leading to the loop belt casing space opens outward and therefore cannot strike a person standing on the landing.

The information available suggests that the most likely and reasonable scenario is that the HCMM for reason(s) known only to himself, climbed over the railing and on losing his balance or grip, tripped, fell or slipped onto the moving loop belt. His reason(s) for climbing over the railing remain(s) unknown. There were

no obviously apparent mechanical problems nor unusual noises seen or heard by the ACMM as he scanned the machinery. It cannot be ascertained what the HCMM may have seen or heard, which would apparently have caused him to climb over the railing without first shutting down the machinery. The stopping of the discharge machinery either prior to or during discharge is not an unusual occurrence and can occur for a number of reasons, either ship- or shore-related. Again, there was no pressure on shipboard personnel to hasten cargo discharge.

The HCMM got along well with his fellow shipmates, no personnel problems were apparent, and this ship was sought out by other mariners within the company; it was known as a 'happy' ship.

FINDINGS

1. The ACMM did not use the emergency stop for the conveyor belt located nearby as he considered it was just as quick to use his radio.

2. Post-occurrence operational tests of the emergency shutdowns were all satisfactory.

3. The platform railings and grating were such that they would prevent a person working in the area to either slip through or fall over them onto the conveyor belt.

4. There is no obvious reason for the HCMM to have climbed over or gone outside the platform railing.

5. The results of the required drug testing of selected crew members were negative.

6. Emergency medical services and the medical examiner responded quickly to the emergency, however, the physical injuries sustained by the victim were such that nothing could have been done to save his life.

7. The company's safety practices and procedures for the cargo discharge were followed.

8. Both men were experienced in this type of equipment, its operation, safety procedures and cargo discharge operations.

9. There was no pressure on ship personnel to hasten the cargo discharge operations.

10. It is most likely that the HCMM fell or slipped onto the moving belt after having climbed over the guard railings.

CONTRIBUTING FACTORS AND CAUSES

It appears most likely that the HCMM lost his life after he climbed over the railing, lost his balance or grip, and tripped, fell or slipped onto the fast-moving conveyor belt machinery.

ACTION TAKEN

Upper Lakes Group Inc. conducted an independent internal investigation into the accident, including

inspections of similarly designed vessels operating in their fleet. Procedures were reviewed combined with training requirements, railing protection, communication, and alarm systems, etc. Reportedly, the company investigation could not identify hazards or unprotected risk areas. As a result, no changes were made to existing equipment, structure or procedures. However, ULG held safety meetings to disseminate pertinent safety information and reinforce safety procedures.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 04 March 1998.