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Fatality off the Queensland port of Hay Point – 11 March 2004

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Yu Long Shan: Fatality during cargo hold repairs

On 11 March 2004, while assisting with cargo hold repairs at anchor off the Queensland port of Hay Point, an engineer cadet fell from a hold ladder, landing on the tank top about ten metres below. He died from his injuries before an emergency medical helicopter, with a doctor on board, landed on the ship.

Yu Long Shan

Yu Long Shan is a seven hold, Chinese registered 'panamax' size gearless bulk carrier with a deadweight of 64 443 tonnes at its summer draft of 13.35 m. The ship is owned by the Guangzhou Maritime Transport (Group) Company of China and is managed by the China Development Tramp Company. The ship is classed with China Classification Society.

The ship was built by Mitsubishi Heavy Industries Ltd, Nagasaki, Japan in 1980. It is 224 m in length and has a beam of 31.86 m and a depth of 18.35 m. It is powered by a single Mitsubishi Sulzer 7RND76 main engine, giving an output of 10 439 kW (14 192 BHP), driving a single fixed pitch propeller. The service speed of the ship is 14.5 knots.

FIGURE 1:
Yu Long Shan

At the time of the incident, the complement of *Yu Long Shan* consisted of thirty-one Chinese nationals. The master and officers held the appropriate qualifications for their positions and the ship had the required certificates and ISM[1] documentation.

The engineer cadet

The engineer cadet had joined *Yu Long Shan* in Guangzhou, China, on 17 February 2004, twenty-three days before the accident. He was twenty-three years of age and had been with the company since September 2002. This was his first trip on *Yu Long Shan*, but he had sailed on other bulk carriers in the company's fleet. During his time on the ship, he had completed several tasks which provided familiarisation with the SMS[2] onboard and had attended at least one safety meeting, immediately prior to the accident. He had also completed a shipboard familiarisation checklist on 2 March 2004.

The incident

Yu Long Shan arrived in ballast off the port of Hay Point on 2 March 2004 and anchored in the northern anchorage. At anchor the crew carried out maintenance tasks on board, including the repair of grab damage to ladders in the cargo holds. One of the holds was number six hold, in which the incident occurred.

The forward ladder arrangement in number six hold consists of three horizontal platforms linked by two angled ladders (at an angle of 65° from the horizontal plane of the lower two platforms). The lower angled ladder is 3.9 m in length and the upper, 3.6 m. There is a vertical ladder leading from the bottom platform to the tank top (approximately 6.1 m below the platform) and another vertical ladder leading from the top platform to the deck (approximately 4.1 m above the platform).

On the morning of 11 March, preparations were made to crop and replace some damaged hand rails on the ladders in the forward part of number six hold. At 0800 the chief engineer, the first oiler and the engineer cadet began identifying which hand rails were to be cropped. The chief engineer and the

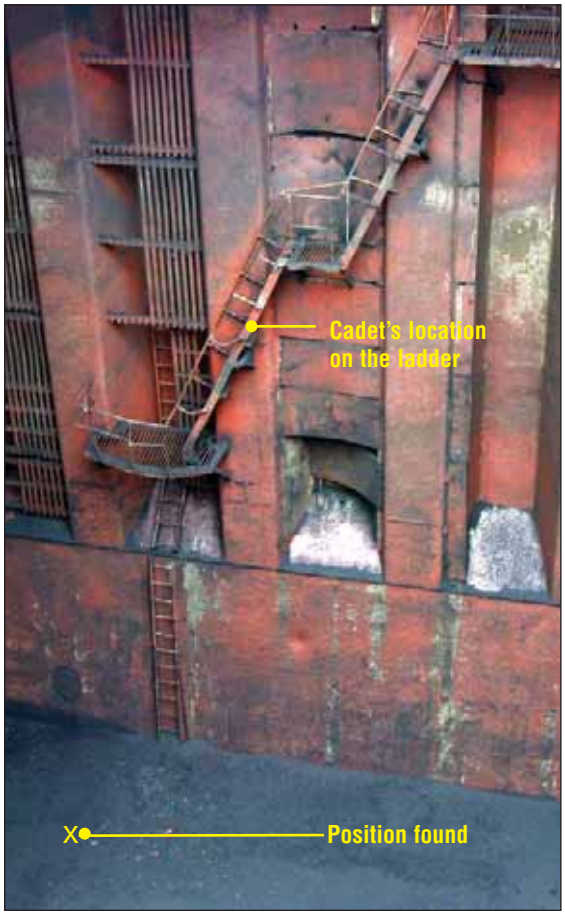
1 International Safety Management

2 Safety Management System

oiler then set about cropping the damaged rails and welding new hand rails in place, starting from the uppermost horizontal platform in the hold. All three men wore safety equipment, including safety harnesses.

At 1050, while standing on the ladder about two metres above the chief engineer, the cadet fell approximately ten metres into the hold, landing near the base of the lower vertical ladder. The chief engineer, on hearing an unusual sound, removed his welding mask and looked up the ladder, expecting to see the cadet. When he didn't see the cadet, he looked below him and saw the cadet lying on the tank top. The cadet was lying on his chest, and on the right side of his face. He was bleeding from his ears, nose and mouth. The chief engineer made his way to the tank top and checked for signs of life, which were present, administering what first aid he could.

FIGURE 4:
Ladder arrangement



The oiler, who was standing on the top platform, was told by the chief engineer to get the master and assistance. At 1055, the master made a telephone call to the ship's agent in Hay Point to inform him of the accident and to ask for immediate medical assistance and evacuation. At 1057 the agent made a '000' telephone call and arranged through the Queensland Ambulance Service (QAS) for an Emergency Medical Service (EMS) helicopter to fly an appropriately qualified medical officer to the ship as soon as possible.

While waiting for medical assistance, the cadet's condition deteriorated. The fact that there was no word of a helicopter on route gave the crew, and the agent, increasing cause for concern.

At 1205, a helicopter of the Mackay based Central Queensland Helicopter Rescue Service (CQ RESQ), with a trauma specialist doctor onboard, landed on number five hatch. The doctor and the helicopter's crewman made their way down to the accident site. When they arrived, the cadet was unresponsive to stimuli. At about 1220, the doctor pronounced him deceased. The local police were informed. The cadet's body was later removed from the hold and taken ashore by boat.

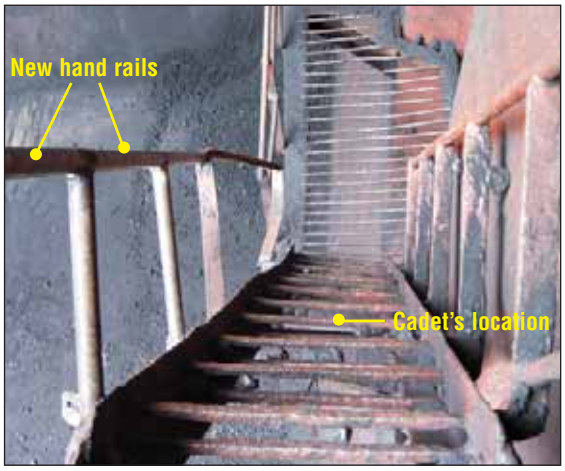
Contributing factors

The reason the cadet fell from the ladder is not known, but the evidence supports the theory that he overbalanced rather than slipped. Had he slipped on the ladder, he would have collided with the chief engineer, who was below him on the lower platform.

Prior to the incident, the cadet had descended the ladder and passed some material to the chief engineer. He was making his way back to the middle platform when he turned, about 1.8 m from the top of the ladder. He apparently stood with the heels of his boots on the rungs of the ladder, possibly to look down the ladder at the repair operations on the bottom platform. Because he was in the process of returning to the middle platform, he had not attached his safety rope to a strongpoint on the ladder.

The chief engineer was working on the stanchions on the open side of the platform. His body could have blocked the cadet's view of the work from the cadet's vantage point on the ladder. The cadet would have had to lean out over the hand rails on the ladder to see any of the work being done.

FIGURE 2:
Cadet's position on ladder



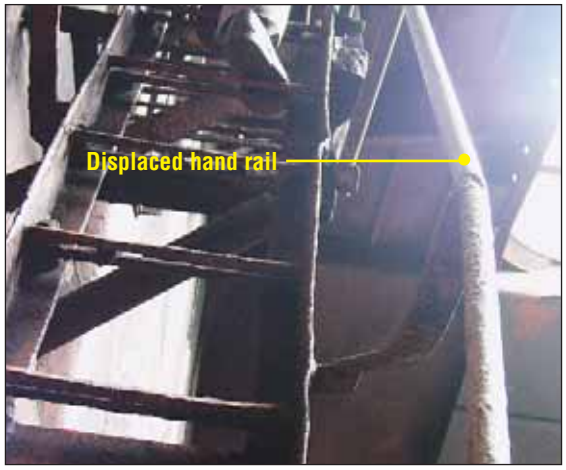
The section of railing where the cadet was standing had just been replaced with new galvanised pipe and as such, was smooth to the touch and did not offer a great deal of grip. At the time of the accident he was wearing woven cotton gloves of the type frequently used by Asian crews. These gloves afford a small degree of protection from dirt but do not have very good gripping ability.

Had he been wearing proper, more appropriate working gloves, he may have been able to get a better grip on the new rail. In certain circumstances, a bare hand provides the best grip.

The cadet was 180 cm in height and of slim build, giving him a relatively high centre of gravity. The hand rails on the ladder measured 350 mm from the perpendicular of the ladder, so his centre of gravity would have been considerably higher than the hand rails. The hand rails had also been displaced from the perpendicular by grab damage.

The available evidence supports the theory that the cadet overbalanced while leaning out over the hand rail of the ladder. The position of

FIGURE 3:
Displaced hand rail



his body on the tank top was not directly underneath but forward and out from the vertical below his last known position.

The post mortem examination established that he had suffered severe head and neck injury, indicating that the upper part of his body first made contact with the tank top. No drugs or alcohol were implicated.

An examination of the boots the cadet was wearing at the time of the fall showed that grease or similar substances were not present on the soles. It is unlikely that residue on his boots contributed to his fall.

The hatch cover was open at the time of the incident and the area of work was well lit by natural sunlight. Prior to work starting in the hold, ship's staff tested the atmosphere in the area of work. No evidence of noxious or hazardous gases was found.

The other men in the hold at the time did not report feeling any ill effects. While there was a wind of up to 20 knots on the morning of 11 March, the ship was riding quietly at anchor and there was virtually no perceptible movement in the hold.

ISM procedures

The ship's ISM procedures include guidance and instruction in working over the side of the ship, around the funnel, in enclosed spaces and for working aloft. The procedures define 'aloft' as being more than two metres above

the deck (or equivalent). All these procedures incorporate the need to wear personal protective equipment. Several procedures also warn against being distracted when moving, especially when there is a danger of falling.

There was no procedure covering working on ladders in the cargo holds, but it is not unreasonable to equate the procedures for working aloft with working on ladders in the holds. The cadet had familiarised himself with procedures on board after he joined, including the one dealing with working aloft. On the morning of the incident, his safety harness was put on him and adjusted by the master and both the master and chief engineer reminded him about the precautions to be taken before working in the hold that day.

Helicopter medical response

The Mackay based CQ RESQ helicopter is an EMS helicopter, manned 24 hours a day. It operates within a radius of about 300 km of the Mackay airport and attends medical emergencies including medical evacuations from ships. Regular flight crew manning consists of a pilot and a crewman. Medical staffing may either be paramedics from the QAS or a trauma specialist doctor or nurse from the Queensland Health Service. The actual helicopter crew are the only personnel to man the helicopter base. Medical crew drive to the helicopter base or are picked up from the hospital by the helicopter.

The QAS received the '000' telephone call from *Yu Long Shan*'s agent at 1057. The CQ RESQ helicopter departed its base with a doctor onboard for the ship at about 1150. This length of time, approximately 53 minutes, is an unusually long response time for an EMS helicopter. Response times are typically between 15 and 30 minutes after receiving a tasking. *Yu Long Shan* was anchored about a ten minute helicopter flight from the CQ RESQ base.

On this occasion, no QAS paramedic was available to respond to the call. The alternative was the doctor at Mackay hospital, who was unable to leave the hospital until his immediate duties were completed, resulting in the delayed departure of the helicopter.

Conclusions

This accident is an example of how a normal, routine task on board a ship can quickly turn into a tragedy. Whilst procedures regarding this type of maintenance work were in place on the ship and were being followed on the day by those carrying out the work, something as unexpected as overbalancing resulted in the death of a crew member.

Based on the evidence available, the following factors are considered to have contributed to the incident:

- The engineer cadet fell from the ladder as a result of his overbalancing while either trying to observe repairs being carried out on the lower platform, or having his attention drawn elsewhere.
- His orientation on the ladder, combined with his height of 180 cm (and therefore high centre of gravity) and the relatively low rise of the ladder's hand rails appear to have contributed towards him overbalancing.
- The new hand rail and the cadet's woven cotton gloves provided very little grip to prevent his fall.
- After handing materials to the engineer carrying out the repair work, he had not connected his safety belt line to a strong point while returning to the middle platform.

Recommendation

MR20040012

Shipping companies, managers and ships' masters should review ISM documentation to ensure that procedures for working in hazardous locations are adequately and unambiguously covered. These include:

- The wearing of appropriate foot coverings and gloves;
- Safety belts or harnesses being secured to a strong point; and
- The importance of concentrating on the task at hand.