



Australian Government

Australian Transport Safety Bureau

Fatality aboard *Golden Bell*, Dampier WA

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Fatality following fall in engine room

Just after 0920 (ship's time) on 16 May 2005, the engineer cadet on the bulk carrier *Golden Bell* fell through an open section of deck grating while working in the ship's engine room. He landed on the bottom deck plates, approximately seven metres below, suffering severe head and internal injuries. The ship was at anchor off the Western Australian port of Dampier.

The cadet died as a result of his head injuries a short time after being evacuated by helicopter to the Nickol Bay Hospital in Karratha, about 20 km from Dampier.

Golden Bell

Golden Bell is a Korean registered 'cape-sized'¹ bulk carrier. The ship was built in 1990, is 312.0 m in length and has a beam of 50.0 m. *Golden Bell* has a deadweight of 207 724.9 tonnes at a summer draught of 18.019 m. It is owned and operated by Korea Line Corporation, Seoul and is classed with the Korean Register of Shipping.

At the time of the incident, the ship's crew of 22 consisted of Korean, Chinese and Burmese nationals.

The engineer cadet

The engineer cadet joined *Golden Bell* in Kwangyang, Korea on 15 February 2005. At the time of the incident, he was 20 years of age. *Golden Bell* was the first ship on which he had served, having joined it after several years studying marine engineering ashore in Korea.

Since joining the ship, he had worked alongside the engine room staff to the satisfaction of the chief engineer.

After joining *Golden Bell*, he completed a shipboard familiarisation safety checklist. Before the incident, he had also completed an on board familiarisation/safety handbook.

This handbook was designed so that all new crew members of Korea Line ships:

... are familiarized with their specific duties and responsibilities and with the handling procedures of all safety arrangements, installations, equipment, procedures and ship's characteristics that are relevant to their routine or emergency duties before being assigned to specific duties ...

(Introduction of KLC-SQM Guidance handbook).

FIGURE 1:
Golden Bell loading iron ore in Dampier



¹ Dimensions too large to enable the ship to pass through either the Suez or Panama canals.

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The incident

Golden Bell arrived at the Dampier anchorage from Kwangyang at 1530 on 15 May 2005. On the morning of 16 May, the ship was lying quietly at anchor, awaiting a berth to load a full cargo of iron ore for various Korean steel mills. At 0800, the engineering staff were allocated their duties for the day by the chief engineer.

The first engineer, second engineer and engineer cadet were tasked to clean the drains condenser, located to starboard of the main engine, on the third deck (the deck above the bottom plates in the engine room). This work started at about 0815.

Also that morning, the third engineer and an oiler were tasked to repair a leaking steam valve. This valve was located on a small intermediate deck adjacent to the port side of the main engine, between the bottom plates and the third deck.

At about 0900, in order to gain access to the steam valve, the oiler removed a section of deck grating from the third deck, forward and to port of the main engine (figure 3). He placed a danger sign near the open section of grating as a warning to crew using the area. The oiler then passed a long aluminium extension ladder through the hole to the third engineer standing on the intermediate deck below. The ladder was to be used to stand on while repairing the valve, with its feet on the bottom deck plates.

FIGURE 2:
Deck grate and hole immediately after the accident



The ladder was heavy and the third engineer could not hold and manoeuvre it into position without assistance from below on the bottom plates.

The oiler left the third deck and went down to the bottom plates of the engine room to help.

The third engineer then lowered the ladder to the oiler, who directed it into position, just forward of the ship's lift shaft, on the port side on the main engine.

While the two men were positioning the ladder, the section of grating on the third deck remained open. According to statements made by the third engineer and the oiler, the open grating was left unattended for approximately ten minutes.

While the two crew were positioning the ladder, the cleaning of the drains condenser was completed by the other engine room team. The second engineer put the tools they had used, and a container of cleaning chemical, onto a small trolley, intending to take this equipment back to the engine room workshop, on the deck above, using the ship's lift.

The second engineer pushed the trolley from the drains condenser around the forward side of the main engine towards the port side of the engine room (Figure 3). As he was approaching the lift, the trolley came to a sudden stop. Looking down, he saw that one of the front wheels of the trolley had dropped into the open section of deck grating (Figure 2).

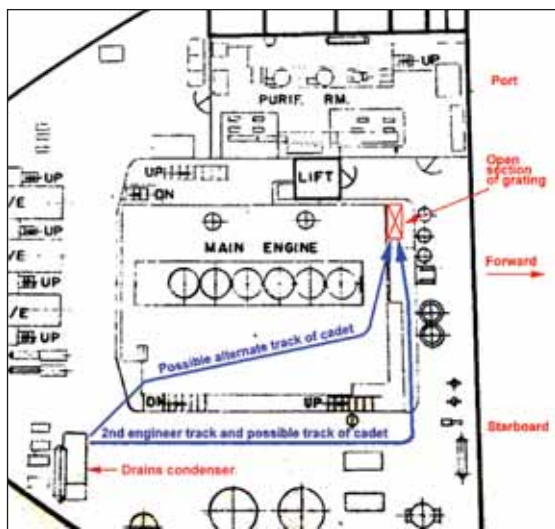
Almost immediately, the second engineer saw a movement out of side of his left eye. This was the engineer cadet who had followed him from the drains condenser and was in the process of passing him. According to the second engineer, the cadet did not appear to see the open section of grating and had stepped into the hole.

The cadet landed on the bottom plates, about a metre to the left of the oiler, who was steadying the feet of the extension ladder.

The fall was in excess of seven metres. According to the oiler, the cadet landed on the right side of his body, with his knees bent.

The crew immediately went to assist the cadet and found that he was bleeding from a laceration and indentation on the left side of his head, and from his mouth. He appeared to be conscious.

FIGURE 3:
Engine room plan section (third deck)



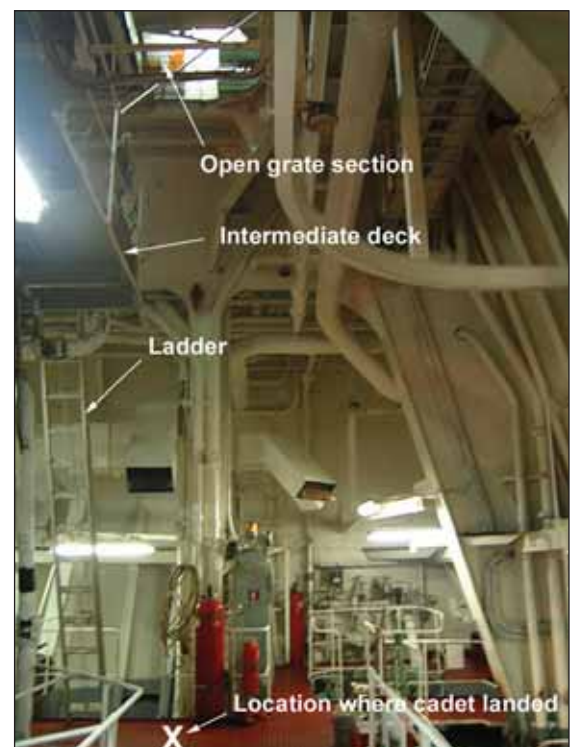
At about 0920 (ship's time), the third engineer rang the ship's bridge, looking for the third mate (the medical/first aid officer on board). The master, who was on the bridge keeping the third mate's anchor watch, answered the phone and was told of the accident. The master contacted the third mate and told him to go to the engine room. The master then began organising a medical evacuation by helicopter.

At 0923 (ship's time) he contacted Hamersley Iron's communications centre, 'Hamersley Base', (the vessel's point of contact ashore during loading operations) by VHF channel 11. He informed them of the accident and requested medical assistance in the form of an evacuation for the injured cadet. 'Hamersley Base' immediately contacted Dampier Port Authority (DPA). This call was logged by DPA as being received at 0903. DPA then contacted Dampier police and the vessel's local agent in Karratha. The agent immediately set about organising a helicopter and medical crew for the evacuation.

Meanwhile, the crew had strapped the cadet onto a stretcher to remove him from the engine room. The third mate was sent by the chief

mate to assist the master on the bridge. The chief mate then took charge of the situation. The cadet was taken to the main deck and placed in the shade of the starboard lifeboat embarkation deck. He remained in this location until the helicopter arrived.

FIGURE 4:
Engine room layout



At about 0930 (ship's time), after speaking to the ship's agent, the master contacted the Korean Emergency Medical Centre (which provides medical advice to Korean ships around the world) via satellite telephone. He was given advice on how to treat the cadet while awaiting the arrival of medical assistance from ashore. This advice consisted of:

- getting a medical evacuation as soon as possible;
- not moving the cadet;
- administering saline solution by intravenous injection;
- attempting to stop the bleeding by applying a pressure bandage;

- administering oxygen to assist breathing; and
- not massaging his body, even if he became cramped.

The cadet had already been moved from the engine room before the medical advice had been received.

When advised of the master's request for a medical evacuation, the ship's agent had to locate a suitable helicopter and medical crew. At about 0920, the helicopter used for Dampier marine pilot transfers, a Bell 206 Jetranger which could accommodate a patient stretcher, was tasked to carry out the evacuation.

At about 0925, DPA staff contacted the Nickol Bay Hospital, advising the staff of the serious head injuries the cadet had reportedly suffered. It was suggested that the car park be cleared so that the helicopter could land at the hospital, and that a doctor meets the helicopter.

Sometime between 0930 and 0950, the St John Ambulance Service Western Australia's Perth communications centre was advised of the accident by *Golden Bell's* agent. They were requested to provide suitable medically trained personnel to accompany the helicopter to the ship. The agent then sent one of his staff to the airport to coordinate the ambulance and helicopter.

According to the agent, the master's initial demeanour was calm. However, as the agent continued to speak to him on VHF channel 74 about the medical evacuation's progress, it became apparent that the situation on board the ship was becoming more urgent.

At 1000, the St John Ambulance Service in Karratha was tasked by the communications centre to proceed to the airport. As the volunteer ambulance officers were already en route to a non-medical event, they proceeded directly to the airport.

The agent's request for St John Ambulance officers to travel to the ship caused the ambulance service a degree of concern and uncertainty as the Karratha officers are volunteers and not trained paramedics. At the

time of the request, the degree of the cadet's injuries was not fully known. Therefore the ambulance service did not know what type of medical assistance he required.

At about 1000, the cadet lapsed into unconsciousness.

At 1010, the ambulance officers arrived at the airport. At 1015, the agent was advised that, despite the unknown extent of the cadet's injuries, one of them was willing to accompany the helicopter.

Between 1015 and the helicopter's departure, the aircraft was readied with the addition of the stretcher and medical equipment the ambulance officer thought he might need.

At 1041, the helicopter, with the ambulance officer and equipment on board, departed Karratha airport for the ship, landing on board at 1055. The ambulance officer administered what first aid he could, before the cadet was placed on board the helicopter. At 1110, the helicopter departed the ship and proceeded directly to the Nickol Bay Hospital in Karratha, where it landed at 1125.

At about 1640, despite the efforts of attending medical staff, the cadet was pronounced dead. He had not regained consciousness.

Comment and analysis

According to ship's staff, the fall occurred just before 0920. VHF recordings of *Golden Bell* conversations on channel 11, obtained from the DPA, indicate that the first VHF call made by *Golden Bell's* master was at 0903. The ship's agent stated that he received a telephone call from the DPA at about 0900. Why there is a discrepancy of some 17 minutes in the ship's reporting time is not known.

The autopsy report stated that the cadet died of head injuries sustained as a result of the fall.

Open section of grating

After the oiler had removed the section of grating, he posted a danger sign near the opening in the deck, in accordance with *Golden*

Bell's operating procedures covering this type of maintenance work.

The procedures did not require the section of floor area to be roped off, or physically guarded in any way, just the displaying of danger signs near the area.

However, the sign was placed at deck level and not at eye level, and it was facing the port quarter of the engine room. The sign's placement made it difficult to be seen by anyone approaching the area from the forward section of the engine room's starboard side.

It would appear that the second engineer was also unaware of the open section of grating as he only stopped walking when his trolley came to a stop. While he was stopped, the sign's visibility was further compromised.

FIGURE 5:
Posting of danger sign



A number of sensible preventative measures were available to *Golden Bell's* crew. These included placing the removed section of grating over the hole created (90 degrees opposed), roping off the area, putting up some other form of barrier or placing a man on guard.

The placement of the danger sign alone (as shown in Figure 5) was manifestly inadequate in the circumstances, given the degree of hazard created by the removal of the grating.

First aid administered by the crew

Despite having received medical advice prior to the arrival of the evacuation helicopter and medical crew, only very limited first aid was given to the cadet.

In his statement, the third mate said that he was used to treating minor injuries and illnesses on board. He thought that the cadet's injuries were too severe for him to deal with. However, no other more senior and experienced officer offered the cadet any additional first aid treatment either.

It is possible that the disturbing nature of the incident caused those members of the ship's crew trained in first aid to forget what training they had received. This resulted in the cadet being moved from the position he landed in, even though it was apparent that he had suffered head injuries, and in the medical advice received from the Emergency Medical Centre not being acted upon prior to the arrival of the helicopter.

Medical evacuation

The Dampier/Karratha area of WA does not have a dedicated Emergency Medical Services (EMS) helicopter. Should a medical evacuation from a ship be required, a suitable helicopter and flight crew has to be sourced from the available assets. Additionally, a medical crew must also be sourced.

Private arrangements exist in Karratha for a suitably equipped Bristow's helicopter to be used when medical assistance is required off shore. Trained medical staff from the Nickol Bay Hospital accompany the helicopter if required and ambulance officers meet the helicopter on its return to Karratha airport and transport the patient to hospital.

These arrangements have been put in place by a large petroleum company to service their extensive offshore oil and gas operations in the Karratha/Dampier region.

Dampier/Karratha police (the Local Emergency Coordinators and therefore the agency responsible for medical evacuations from ships within port limits) were aware of these arrangements.

Golden Bell's agent did not know of the arrangement with the hospital when he placed the request for medical assistance with the ambulance service. As a result, there was some degree of confusion. Considerable

delays may have eventuated had the ambulance officer not consented to fly to the ship.

Evidence indicates that there was a probable breakdown in liaison between the police and the agent which led to this degree of confusion. Had Dampier police taken over the coordination of the evacuation from the outset, the application of the port's plans for medical evacuations may have accelerated the evacuation process.

However, on the morning of 16 May, the Bristow's helicopter was out of the Karratha area and it was not available until at least 1200. Anyone coordinating the medical evacuation off *Golden Bell* would have had to source another suitable helicopter.

Conclusions

Based on the evidence available, the following factors are considered to have contributed to the death of *Golden Bell's* engineer cadet on 16 May 2005:

- A section of deck grating was left off, resulting in the cadet falling through it.
- The second engineer was unable to warn the cadet of the open section of grating.
- The open section of grating was not roped off or otherwise protected, and the danger sign was poorly sited and manifestly inadequate.
- The ship's operating procedures did not specify that any open areas of deck grating should be roped off or otherwise protected.
- The disturbing nature of the incident possibly resulted in the first aid advice received on board not being acted upon by ship's staff.
- Poor liaison between the police and vessel's agent led to confusion as to which medical service provider was able to supply a medical crew for the helicopter. However, this did not alter the eventual outcome of the incident.

Recommendations

MR20050025

Ship owners, managers and masters should revise operational procedures to reflect the need to ensure that open deck areas on board their ships are adequately safeguarded.

MR20050026

WA police, port authorities and port users should ensure that all parties likely to be involved in medical evacuations from ships are aware of standing arrangements regarding the provision of trained medical staff to accompany the helicopters used.



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Media Release

Cadet's fatal fall through open deck grating in engine room

A 20 year old engineer cadet died from severe head injuries after falling seven metres while working in a ship's engine room, according to an Australian Transport Safety Bureau (ATSB) investigation report released today.

The ATSB report into the incident states that, at about 0920 (local time) on 16 May 2005, the engineer cadet on board the South Korean bulk carrier *Golden Bell* was working with other engine room staff when he fell through an open section of deck grating. The cadet landed seven metres below, on the engine room's bottom deck plates. He suffered severe head and internal injuries.

The cadet had apparently failed to see that a section of deck grating had been removed, in order to facilitate the placement of a ladder. The opening was not physically guarded in any way and only had an inappropriately placed sign to warn engine room staff of the danger that existed.

The ship was at anchor of the Western Australian port of Dampier when the incident occurred.

The cadet was evacuated by helicopter to the Nickol Bay Hospital in Karratha (20 km from Dampier), and despite the efforts of medical staff at the hospital, he died later that afternoon.

The report concludes that the open section of grating was not roped off or otherwise protected, and the danger sign was poorly sited and manifestly inadequate. Additionally, the ship's operating procedures did not specify that any open areas of deck grating should be roped off or otherwise protected.

The report's recommendations include that ship owners, managers and masters should revise operational procedures to reflect the need to ensure that open deck areas on board their ships are adequately safeguarded.

Copies of the report can be downloaded from the ATSB's internet site at www.atsb.gov.au, or obtained from the ATSB by telephoning (02) 6274 6478 or 1800 020 616..

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