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Crew member fatality, Gladstone Qld
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Crew member fatality on board *Probo Panda*

On 11 May 2005, the electrician on board *Probo Panda* died while working on one of the ship's engine room light fittings. The electrician had been missing for several hours and was only found after a search of the vessel was instigated by the master.

Probo Panda

Probo Panda is a Marshall Islands registered products / oil / bulk / ore carrier. The ship is 182.80 m long, has a beam of 31.95 m and a depth of 18.01 m. The summer draft is 13.087 m giving the vessel a deadweight of 47 997 tonnes. *Probo Panda* was built in 1988 in Pusan, Korea by Korea Shipbuilding & Engineering Corporation.

At the time of the incident the ship was under Det Norske Veritas classification and managed by Prime Marine Management of Athens, Greece. The ship's complement of twenty one consisted of seventeen Ukrainian, three Georgian and one Russian national.

Probo Panda carried a Safety Management Certificate valid till 11 July 2008 and the management company held a Document of Compliance for this type of vessel.

FIGURE 1:
Probo Panda



The electrician

The electrician joined *Probo Panda* in July 2004, eight months prior to his death. He was fifty one years of age and had served at sea as an electrician since 1995. He was first employed by Prime Ship Management in August 2002.

The electrician held a first class certificate in electro engineering issued by the Georgian Maritime Administration.

Two performance appraisal reports completed during the electrician's time on the vessel indicated he was very capable and held in high regard by the ship's senior officers. The reports also indicated that he had demonstrated a good understanding of the ship's Safety Management System (SMS).

The incident

At 2130 on 8 May 2005, *Probo Panda* arrived off the port of Gladstone, Queensland. The ship anchored awaiting berth availability to commence a split discharge of its cargo of 38 000 tonnes of caustic soda at Fisherman's Landing and South Trees wharves.

The period at anchor was a busy time as the ship's crew were preparing the vessel for the cargo discharge operations and an up coming vetting inspection[1] planned for Gladstone.

At 0800 on 11 May 2005, the chief engineer and electrician had their normal morning meeting to discuss the day's work program. The electrician was asked to attend to defective lights around the ship, predominantly the changing of fluorescent light tubes and starters, and to be available to install a new welding unit after lunch.

No electrical isolation permit was issued for the work on the lighting because the task was considered to be simple and did not warrant this precaution.

1 Inspection carried out by a prospective charterer.

At various times during the morning the electrician was seen removing fluorescent tubes from his workshop adjacent to the engine control room. He attended the normal morning tea break at 1000 in the engine control room and then returned to work.

The fourth engineer saw the electrician at about 1110 working on light fittings on the bottom plate level, in the starboard aft end of the engine room.

The electrician was not seen at lunch and his absence was not noticed. Lunch on the day was a buffet style due to the need for various crew members to eat at different times.

After lunch the electrician failed to appear for the welding unit installation. At 1400 the chief engineer asked his staff to look for the electrician but the search was unsuccessful. The master was informed that the electrician was missing and a second more thorough search was started at 1420. The electrician was found a short time later. He was located close to where he had earlier been seen, on the starboard side of the bottom plate level in the engine room.

When found the electrician appeared to be unconscious with his legs jammed between a transverse deep frame and a pipe running parallel to the frame (Figure 2). The crew then checked for signs of life and found none. They also noted that the electrician showed signs of rigor mortis.

Tools, florescent tubes and parts hanging from the light fitting above his body indicated that he had been working on this unit.

At 1440 the master was informed that the electrician had been found and he appeared to be dead. The master advised the ship's management and local agent. The agent then liaised with local authorities and the Rescue Coordination Centre in Canberra.

FIGURE 2:
Location of the electrician



Local authorities made arrangements to board the ship at anchor but found that it was not possible because of adverse weather conditions.

The local authorities, including police and a doctor attended the vessel on its arrival at Fisherman's Landing at 1250 on 12 May 2005. The electrician was pronounced dead and transported ashore at 1535.

Comments and analysis

On 13 May 2005 investigators from the ATSB conducted interviews with the master and chief engineer on board Probo Panda. Discussions were held with local police, the ship's agent and legal representative.

A post mortem examination of the electrician was conducted by the coroner in Rockhampton. The coroner's report was provided to the ATSB and cited the cause of death as coronary artery occlusion (heart attack) attributable to coronary artery atheroma (a build up of fatty patches inside the lining of the coronary arteries).

The contents of the electrician's pockets, which included tools, insulating tape, starters and old tube end fittings, and the fact that a new tube end fitting was found hanging from the light fitting (Figure 3) indicate the electrician had been in the process of changing this item.

The light fitting was situated directly above a transverse deep frame outboard of the main engine charge air cooler cleaning filter, starboard aft at the bottom plate level.

The light fitting was still live, with its circuit breaker closed and no danger tags fitted. Prior to the ATSB's arrival, the ship had organised for a shore based electrician to render the equipment safe while preserving the evidence to the greatest extent possible.

It is likely the electrician was crouching on the deep frame so he could reach the light fitting. It seems that he received an electric shock which knocked him off balance, causing him to fall between the deep frame and the parallel pipe. The subsequent exertions, attempting to climb free probably induced the heart attack.

FIGURE 3:
Light fitting



The electrician's health

The ship's medical log listed the only medication that had been issued to the electrician during his time on the ship was an expectorant cough medicine.

The master and chief engineer both commented that the electrician appeared to be in good health.

Prior to joining *Probo Panda* the electrician had undertaken a seaman's medical examination. The medical certificate, issued on 19 July 2004, indicated he was in good health, with no indications of coronary heart disease.

While a number of studies into coronary heart disease amongst seafarers have been undertaken, their findings have generally been inconclusive.

In one such study published by Dr. H.D. Wickramatillake, it was found that of 68 deaths due to natural causes amongst British seafarers in the period 1986 to 1995, 62 were attributable to coronary heart disease.

In another study completed by Offer-Ohlsen in 1981, it was observed that.

> ... out of 2,646 seamen 8% suffered from cardio-vascular disease and they had previous experience of pre-cardial pain...

Currently there are no international standards that require seafarers to be subjected to rigorous medical examinations that would highlight conditions such as coronary heart disease. It is possible that had the company or the statutory authority required the electrician to undergo such an examination, he may have been alerted to his condition at the time of his last medical examination.

Seafarers, particularly those completing long contracts on international trading ships, are required to spend extended periods away from adequate medical supervision. Statutory authority and company medical policies should ensure that seamen suffering from chronic medical conditions are identified and adequately monitored.

Working unsupervised

The electrician was probably alive for some time after he fell; however, he was not discovered in time to save his life.

The fact that he was missing for approximately three hours without notice is of concern.

It is the responsibility of all crew to ensure that those working alone have their whereabouts and well being regularly monitored.

Electrical isolation

The ship's SMS contained procedures for carrying out work on electrical equipment.

These procedures required completion of an electrical work permit (check list), electrical isolation, and, where electrical isolation was not possible, allowed work on live circuits where 'adequate precautions' were taken.

The permit system was in use on board *Probo Panda* for complex jobs; however, it was evident that the system was not used when undertaking what were described as 'simple' tasks. The procedures and associated check list did not differentiate between simple and complex tasks.

It is possible that a qualified and experienced electrician would not see the need to complete an electrical work permit for a task such as repairing a light fitting. The ship's procedures, however, did not allow him to make such a judgment. Not withstanding this, it is fair to expect that the electrician should have isolated and tagged the power supply prior to commencing work on the light fitting.

There were no alarms recorded during the day that may have indicated an earth on the 220 volt electrical system. Such an alarm may have prompted the duty engineer to investigate what caused it and possibly led to an earlier discovery of the electrician.

When inspected, the earth leakage detector was not operable as the fuses had been removed. The ship's staff were not aware that these fuses had been removed and indicated that the alarm had recently been working.

While the fuses were not found with the electrician, he may have removed them to prevent nuisance alarms from interrupting the duty engineer while the light fittings were being repaired.

Rendering safety monitoring devices such as earth leakage detectors inoperative should be avoided wherever possible.

Conclusions

Based on the evidence available, the following factors are considered to have contributed to the death of the electrician aboard *Probo Panda* on 11 May 2005.

- The electrician had a pre existing heart condition, coronary artery atheroma.
- Current medical examination standards for seafarers are inadequate in terms of detecting conditions such as coronary heart disease.
- Working on live electrical equipment and not implementing the measures outlined in the ship's SMS increased the likelihood of the electrician receiving an electric shock.
- The electrician may have suffered an electric shock, causing him to fall between the deep frame and a parallel pipe.
- The subsequent exertions, attempting to climb free, probably induced the heart attack.
- Working alone in an isolated area for an extended period of time without supervision or monitoring resulted in the electrician not being found in time to administer first aid.
- Rendering the earth leakage detector inoperable removed a safety device that may have drawn attention to the electrician's plight earlier.

Recommendations

MR20050023

Shipping companies, managers and ship's masters should ensure that shipboard safety management systems include procedures for working on electrical equipment that are adequate and not ambiguous. It is essential that these procedures are backed up by sufficient onboard training and auditing to ensure personnel involved in performing or supervising electrical work understand and fully implement these procedures.

MR20050024

Regulatory authorities, shipping companies and ship managers should consider the feasibility of widening the requirement for medical examinations and certificates to include more stringent testing for, and monitoring of, chronic conditions such as heart disease and diabetes.

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Media Release

Crew member fatality aboard bulk carrier

The elecrician on board the Marshall Islands registered *Probo Panda* died from a heart attack following a suspected electric shock while the ship was at anchor off Gladstone in Queensland on 11 May 2005, according to an Australian Transport Safety Bureau (ATSB) investigation report released today.

The electrician died while working on one of the ship's engine room light fittings. He had been missing for several hours and was only found after a search of the vessel was instigated by the master.

The ATSB report into the fatality on board the products / oil / bulk / ore carrier *Probo Panda*, states that it is likely that the electrician was crouching on a deep frame at the lowest level of the engine room so he could reach the light fitting. He may have received an electric shock which knocked him off balance, causing him to fall between the deep frame and an adjacent pipe. The subsequent exertions, attempting to climb free probably induced a coronary artery occlusion.

The report concludes that the electrician had a pre existing heart condition, coronary artery atheroma and, that the medical examination standards used to asses him were inadequate in terms of detecting conditions such as coronary heart disease.

The report also concludes that working on live electrical equipment and not implementing the measures outlined in the ship's safety management system increased the likelihood of the electrician receiving an electrical shock. Also, working alone in an isolated area for an extended period of time without supervision or monitoring resulted in the electrician not being found in time to administer first aid.

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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