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Crew member injury and fatality, Albany– 7 September 2003

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Pacific Wisdom: Crew member injury and fatality

On 7 September 2003, two crew members on *Pacific Wisdom* were injured and one subsequently died. The two men fell about 12 metres to the bottom of an empty cargo hold after a scaffold on which they were working collapsed.

Pacific Wisdom

Pacific Wisdom is a Hong Kong flagged, five-hold, geared bulk carrier of standard design with the accommodation block aft and the five cargo holds forward. The ship is 180 m long, has a beam of 30.50 m and a depth of 15.80 m. The summer draft is 11.228 m giving a deadweight of 42 010 tonnes. The holds are serviced by four cargo cranes, each with a SWL of 30 tonnes. The ship was built in Nagasaki, Japan in 1992 and is owned and managed by a company in Hong Kong.

The ship is crewed entirely by Chinese nationals, all of whom were appropriately qualified holding STCW 95 certificates. The ship had the necessary ISM and other safety certificates.

The Incident

Pacific Wisdom arrived in Albany, Western Australia from Cochin, India on Friday 5 September 2003 to load a cargo of wheat for South Korea. The ship anchored in the outer harbour (King George Sound) as instructed and tendered Notice of Readiness to load. The first day after arrival, the ship's crew started work preparing the ship's holds for the cargo. This involved washing each hold and scraping and touching up the interior paintwork ready for the grain cargo.

FIGURE 1:
Pacific Wisdom

The crew completed cleaning number one hold on Saturday 6 September, using the ship's mobile tower scaffolding to access the areas around top of the hold and under the main deck.

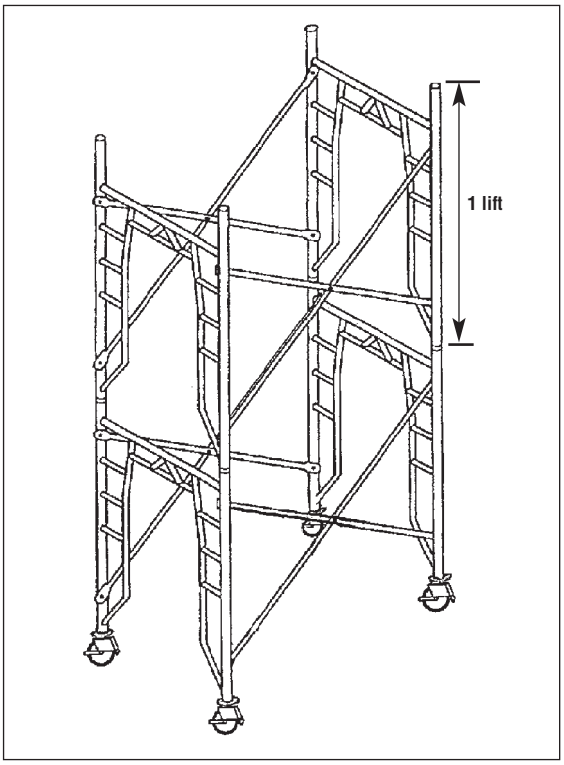
On Sunday the crew started work in number two hold. The ship's draught of 3.24 m forward and 6.65 m aft resulted in a slight angle on the tanktop of about 1½° by the stern. In the forenoon the wind was reported as being from the north force 3-4 with a slight sea. By the afternoon the wind had backed to the south west and increased to 4-5 (up to 21 knots). The ship was yawing and occasionally snatched at the anchor.

The work, using the scaffold, was started at the forward end of this hold and continued from the starboard to the port side. At about 1600 the forward end was completed and the scaffold was moved to the after end of the hold to continue the work there. After this repositioning, two seamen immediately rescaled the tower to resume work on the underside of the deckhead. As soon as they had climbed onto the platform at the top of the tower, the entire tower fell towards the after bulkhead. The two men fell about 12 m to the tank top as the platform scraped down the bulkhead.

The master and chief officer, who were at the scene at the time of the incident, went to the bridge to radio for assistance. The second mate went below to assist with first aid and to prepare for the injured men's removal from the hold and their evacuation ashore for further medical assessment and treatment.

FIGURE 2:
No. 2 hold

FIGURE 3:
Diagram of scaffolding arrangement (one 'lift' = 1.7 m)



The initial three calls from the ship using VHF Channel 16, made at about 1615, failed to raise the Albany Port Authority. The port authority radio was only monitored during office hours. At about 1620 the radio operator at the Albany Sea Rescue Service (ASRS) base responded. The operator initiated the ASRS emergency plan and two boats were made ready and dispatched to the ship. At 1635 the local Western Australian Police were notified and they assumed overall control.

Meanwhile, the master had also informed his main agent ashore of the accident and this was relayed to the Albany harbour master who was alerted by pager. The harbour master assessed the situation based on the Albany Port Emergency Response Plan and, in consultation with the local ship's agent, arrangements were made for a doctor to be taken to the ship using the harbour pilot boat.

The first Albany Sea Rescue Service boat arrived at the vessel at 1733 with police onboard. The doctor arrived at the ship sometime after 1815. The two injured men were taken ashore, one to Albany Hospital. The more seriously injured man was taken to Perth Hospital, but subsequently died of his injuries. The man taken to Albany eventually recovered and returned to the ship.

Comment

Interviews were conducted with the master and officers on *Pacific Wisdom*, the Port Authority and Albany Sea Rescue Base volunteers. Discussions were also had with the Albany Police who are the Emergency Management Agency in this case. This report draws upon these interviews, police reports and discussions and also an independent examination of the scaffolding by an expert inspector from the Western Australian Department of Consumer and Employment Protection.

Hold cleaning is a routine operation on board bulk carriers, particularly those carrying grain. Most of the crew involved were familiar with this work and with the equipment used.

FIGURE 4:
Metal planks

Note the hooks that fit over the frame of the platform. This arrangement helps to make scaffolding more rigid.

On 7 September, in number two hold, seven 'lifts' were used to enable the crew to clean and paint the underside of the main deck and the hatch coaming. The scaffolding consisted of a set of seven prefabricated frames assembled and then secured in tiers or 'lifts' each of 1.7 m in height. The entire structure was 12.3 metres high when complete. The work platform on the top lift was made up of metal 'planks' fitted over the frame of the platform. This platform is also fitted with guard rails. It was of sound construction, in reasonable condition and correctly erected. At the base of the scaffold, rubber tracked castors fitted at each corner allowed the structure to be moved easily from position to position. These castors could be locked to prevent unintended movement. Each tier, or lift, was 1.26 m wide by 1.875 m long. With seven tiers fitted, the scaffolding had a height to base length ratio of about 5.2 to 1. Although not a requirement for this ship, a ratio of 3 to 1 for height/width is considered by the Australian authorities ashore to be the maximum for safe working.

To help secure and stabilise what is an inherently 'unstable' structure, with its high centre of gravity and narrow base, rope lashings or guy ropes were secured to the scaffolding at the lift below the working platform. These ropes were then led through permanent eyes welded around the inside of the cargo holds and then down to the tanktop (deck) level.

It appears that after the scaffolding tower had been moved to the after end of the hold, the two men climbed back to the platform before, or while, the rope lashings were being resecured. It also is likely, from the lack of witness marks (rubber skid or scrape marks), that the castors had not been locked. Most of the weight, the metal 'planks' and the two men, was concentrated at the top of the scaffolding. At the time of the collapse, it is probable that the two men were on the same, aft, side of the work platform at the top of the whole structure.

For the structure to remain stable, the forces acting vertically downward through the resulting, very high centre of gravity had to act within (or very nearly within) the area enclosed by the castors at the base.

A single force or combination of dynamic and/or static forces (either a slight movement – roll – of the ship, or one or both men leaning over the platform guard rail, or a force applied as a restraining lashing was secured) acting downwards or outward through the very high centre of gravity would easily cause a rotational force and the scaffolding to fall.

Although both men were reportedly wearing hard hats, safety belts and lanyards, these were not secured and both men fell to the tank top as the tower toppled.

FIGURE 5:
Photo taken earlier that day showing two seamen working on the top platform

ISM code and working practices

The ship carried valid ISM certification. The work was subject to ship procedures covered under 'Working Aloft'. The procedures covered bosun's chairs and staging, but not specifically scaffolding, and required briefing by the chief officer, completion of a check list, the wearing of safety harnesses and supervision by the bosun.

Despite the procedures and safe guards, there is anecdotal evidence that proper, usual, safe working practices were not followed. It seems that when moving the scaffold across the forward end of the hold, the castors were released, the lashings loosened and the men stayed on the platform. The area of deck head that could be reached in safety from the platform was limited and would have needed a number of moves to clean the area and apply any paint that was necessary. Each time the scaffolding was moved the men working on it should have descended to the deck; but they almost certainly did not on every occasion. This form of 'optimising violation' may have, in part, been due to the fact that the ship had given 'notice of readiness' to load and the imperative was to ensure the ship was ready for the impending inspection prior to loading.

In the case of the two men mounting the scaffold before it was secured, the need to complete the work and the lateness of the hour in the afternoon may also have been an incentive to 'get on with the job'.

Following the accident, in accordance with the ISM procedures, all crew involved took part in a thorough de-briefing, at which they were encouraged to express their views.

Emergency response

The response to the emergency involved some duplication and confusion as regards the roles of the ASRS, police and the Albany Port Authority. This duplication of response has since been addressed by the various parties. Any misunderstanding did not unduly delay treatment or the outcome for the two men injured in the fall but was a waste of resources which may have been needed in different circumstances.

Conclusions

These conclusions identify the different factors contributing to the incident and should not be read as apportioning blame or liability to any particular individual or organisation.

Based on the evidence available, the following factors are considered to have contributed to fall of the scaffolding and the resulting death of one seaman and injury to another:

1. The base of the scaffolding was too narrow for the assembled height making the scaffolding inherently unstable.
2. Guy ropes were not secured and the castors were not locked prior to the men going back up the tower.
3. The two men had not secured their safety harnesses to the ship's structure.
4. It is probable that some combination of ship movement in the seaway and the distribution of weights at the working platform level were factors in the fall of the scaffolding.
5. Both company ISM procedures and normal seaman-like practices were violated, some at least in an attempt to optimise the work in hand.

Recommendations

MR20040016
The shipping company's ISM procedures should be amended to specifically cover working with scaffolding.

MR20040017
Responsible persons should ensure that the height to base ratio of a scaffold should not exceed 3 to 1 without guy ropes or preventers in place prior to use. Wheels must be locked before anyone is permitted aloft.

MR20040018
The various responsible bodies in the Port of Albany should regularly consult so as to identify all the risks in common and to efficiently coordinate their responses.