



Accident Investigation

SAFETY BULLETIN ISSUE 6 2006

May 2006

Safe Operation of Mitsubishi Heavy Industries Hydraulic Deck Cranes

This Bulletin is For:

- Stevedores in New Zealand ports
- Ship's Agents
- Classification Societies Surveyors
- Maritime NZ Inspectors
- Port Companies

Introduction

Maritime New Zealand is investigating an accident in which the jib of a Mitsubishi Heavy Industries (MHI) hydraulic crane collapsed while the vessel was loading logs in New Zealand.

A number of similar crane accidents have occurred in the past whilst logs were being loaded, resulting in cranes being severely damaged. Fortunately, no one has been killed or injured, although there have been several near misses.

All the accidents have occurred when the retaining bolts, attaching the crane jibs to their heel pins, either broke or loosened. This caused the crane jibs to detach from their fittings and fall back against the crane turret. The retaining bolts were hidden by steel cover plates so it was not apparent that they were either broken or had worked loose until the crane jibs collapsed.

After a crane accident in 1992, MHI carried out a stress analysis of the retaining bolts on their crane. This showed that for the 30 tonne Safe Working Load (SWL) MHI cranes, fitted with four 20mm diameter heel pin bolts, the safety factor reduced from 1.83 to 1.04 when the direction of the lift was changed from the vertical to 20° from the vertical. To overcome this, all new and some existing MHI cranes have since been fitted with six 30mm diameter retaining bolts. There have been no reported accidents involving these cranes.

However, there are still many ships built before 1992 that were fitted with MHI deck cranes, which have not been similarly modified. The following safety precautions apply to those ships.

Recommendations/Actions

The MHI publication "*Technical Information of Mitsubishi Deck Crane Inspections*" recommends that end plate fittings and retaining bolts for jib heel pin bearings are inspected every six months or, in the case of cranes manufactured before 1988, every 3 months.

Maritime New Zealand has frequently found that after a change of vessel ownership or crew, that the above information regarding inspection has not been passed on. During the last 12 years, Maritime NZ Port State Control Inspectors have come across several loose or broken heel pin bolts, each of which could have resulted in a serious accident, if no remedial action had been taken.

Recommendations to Stevedores and Port Companies

- Before cargo commences, check the ship's records to ensure that MHI cranes built before 1992 that have not been upgraded, are being maintained and inspected as specified in the *MHI Technical Information* booklet.
- While loading, do not permit crane hoist wires to be used at angles beyond those specified in the crane manufacturer's instructions. there is a risk of this occurring while dragging out slings from under logs.

Recommendation to Ship Surveyors

At every inspection or examination of ship's cargo gear, ensure that all heel pin bearing cover plates are removed and each bolt is tested with a spanner. Broken, loose or suspect bolts should be replaced with the manufacturer's specified parts.

Recommendation to Maritime Safety Inspectors

During Port State Inspections or any inspections carried out at the request of a concerned party, ensure that:

- The required inspections of Mitsubishi cranes, as specified in the *MHI Technical Information* booklet, have been carried out and recorded in a format shown in the Technical Information's "*Check List of Thrust Stopper Bolts*".
- There is a record of heel pin bearing cover plates having been removed for inspections during the last 3 or 6 months as appropriate.

If there is any doubt about the condition of the cranes or whether inspections have been properly carried out, heel pin bearing cover plates should be removed and each bolt tested for tightness using a spanner.

Further Information

Contact John Mansell, Maritime New Zealand, General Manager, Maritime Operations on 04-494 1228.