



## Mines Safety Significant Incident Report No. 184

### Shiploader rail clamps fail after original parts modified in unsuccessful attempt to overcome problem of rail misalignment

#### Summary of incident

A 4.5kg rail clamp fell about 10 metres to the ground from a shiploader rail system after the nut-and-bolt assembly had loosened, allowing the clamp to vibrate free. Fortunately, no-one was injured. Rail clamps had fallen previously.

Many of the clamps had been modified from the original equipment manufacturer (OEM) design by cutting open-ended slots to the bolt holes to overcome what was believed to be a rail misalignment issue.



Photographs showing rail clamp as designed by OEM (left) and modified rail clamp (right) with open-ended slots and welded nuts and bolts.

#### Probable causes

##### Direct:

- The rails were misaligned.

##### Contributory:

- No remedial action was taken to address the underlying issue of misaligned rails, although the misalignment had been identified in reports following previous incidents and during site structural audits.
- Modified rail clamps were used in repairs.
- The clashing of bolt heads with wheels is often an indicator of misaligned or worn rails — a potential underlying cause that the repairs did not address.
- To prevent bolt head clashing, some bolts had been shorted and beads of weld used to ensure the nuts did not come loose, making them susceptible to cracking.
- The structure showed signs of wear and corrosion.

## Actions required

Before making repairs, a competent person should determine the root cause of the failure and how to address the underlying problem. This may involve a review of past incidents and repairs.

A structural integrity audit may be required for large structures. For shiploader rail systems, such an audit should include:

- a survey of the alignment of rails and shape of the structure, and comparison with design parameters (see Australian Standard AS 1418:18 *Cranes, hoists and winches – Crane runways and monorails* for guidance on rail alignment criteria)
- an assessment of the condition of parts such as rails, wheels, guides, clamps, spacers, shims and bearing pads under rails
- an assessment of the adequacy of rail end stops and rail joints.

When installing, servicing or maintaining parts, particularly for safety critical systems on machinery, follow OEM maintenance guidance, fitting instructions, recommendations and specifications.

Do not use alternate or modified parts unless they have been assessed by a competent person as meeting the OEM's performance specifications.



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