VICTORIAN WORKCOVER AUTHORITY

Construction Industry Program
Incident Report:
Drilling Rig-to-Carrier Weld Failure

Category:	Powered mobile plant
Sub-category:	Drilling and piling rigs
Relevant to:	Civil and commercial construction sectors, drilling contractors, drilling rig operators
Date of Issue:	13 September 2002
Reference No:	02: 010
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The Incident

WorkSafe investigated a weld failure on a drilling rig, where the rig separated from the carrier, causing a partial collapse.

The damaged rig

The Investigation

WorkSafe's investigation revealed the following:

- The rig involved was a Pacific Ace drilling rig (commonly known as a "Pengo") mounted on a Mitsubishi carrier.
- The drilling contractor who is the current owner of the rig purchased the complete unit second-hand about 13 years ago. The rig may date from 1975.

- The rig was being slewed around from a completed hole to the next position when the welds between the slew ring and chassis failed, resulting in the rig partially separating from the carrier.
- It appears that the rig had been simply placed onto the carrier, and welded where the parts matched.
- The rig had been visually inspected about a year ago and had been passed as safe to use.
- The rig had never been subjected to any non-destructive crack testing (NDT).

Investigation Outcome

The main factors contributing to the failure appear to have been inappropriate fixing of the rig to the carrier and a lack of adequate ongoing testing for serviceability.

Remedial Action

The contractor owning the rig has withdrawn all similar machines from service until they have been tested, including crack testing of major stress areas, and until a competent person has assessed them as being suitable for further service.

Conclusions

There is currently no Australian Standard dealing with the design, construction, or safe use of drilling rigs.

Although it does not cover drilling rigs, the guidance given in AS 2550.1, *Cranes, Hoists and Winches – Safe Use*, Part One: *General Requirements*, does provide useful general assistance, and it's recommendations should be followed when applicable. Amongst other things, it recommends a ten-year major inspection cycle.

If the manufacturer supplied the complete unit, then the manufacturer's recommended maintenance procedures or, if unavailable, recommendations similar to those in AS 2550.1 should be followed.

Where any powered plant is to be attached to a chassis for which it was not originally designed:

- The plant and chassis must be compatible for the dimensions and load handling requirements, in all travelling and operating modes.

- Modern vehicle chassis manufactured from high tensile steels may need specialised weld preparation and procedures.

- Welders should be certificated in accordance with AS 1796, *Certification of Welders and Supervisors.*

- The welder should ensure that the requirements of the appropriate part(s) of AS 1554**,** *Structural Steel Welding*, are followed.

- In some cases, welding direct to the chassis of the vehicle (and/or the plant) may not be suitable. It may be necessary to provide a false frame or adaptor plate, and U-bolts or other specialised systems, to attach the plant to the chassis. The chassis and plant manufacturer's recommendations should always be checked.

- A competent person, such as an experienced mechanical engineer or a qualified welding supervisor, should be consulted to ensure the long-term integrity of the plant-to-carrier connection.

Further Information

WorkSafe Victoria's Alert, *Weld Failures in Lifting and Pressure Equipment* (04/2000), available from local WorkSafe offices or on-line at:

www.workcover.vic.gov.au

AS 2550.1, *Cranes, Hoists and Winches – Safe Use,* Part One*: General Requirements*
AS 1796, *Certification of Welders and Supervisors*
AS 1554.1, *Welding of Steel Structures*
AS 1554.4, *Welding of High Strength Quenched and Tempered Steels*

Australian Standards can be purchased on-line from Standards Australia at:

www.standards.com.au

Distribution

Posted on WorkSafe web-site Construction Page:	13 September 2002
E-mailed to all *Foundations for Safety* Delegates:	13 September 2002
E-mailed to all members of WorkSafe's Construction Safety Circulation Service:	13 September 2002
E-mailed to interstate OHS regulatory authorities:	13 September 2002
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