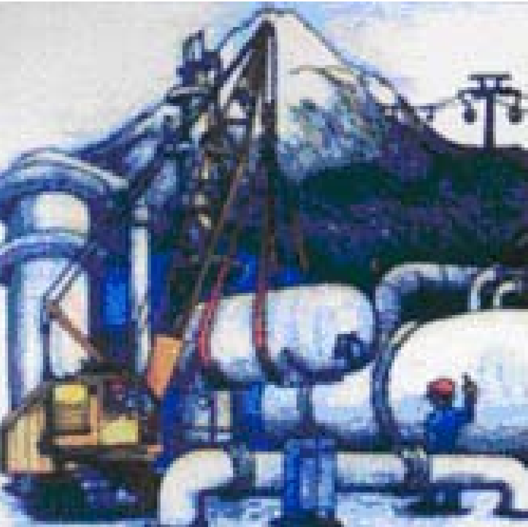

Department of Labour
TE TARI MAHI

# Safety Lines

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ENGINEERING SAFETY NEWSLETTER, DEPARTMENT OF LABOUR

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## NEW AMUSEMENT DEVICE – SCALING NEW HEIGHTS

The picture shows one of the more glamorous items of equipment of professional interest to Engineering Safety. In January, this large Ferris wheel variant came to Auckland from England, bringing with it some interesting challenges for the engineering certification process. The owner, Mr David Taylor of Cumbria in England, informed us that his amusement device, known as the 'Giant Ferris Wheel', had already been operated in some exotic locations on different continents, and continues to be in demand.

This device, which was manufactured in Italy in 2003, is somewhat different from the traditional Ferris wheel design, in that the passengers, instead of being seated in chairs, are carried in glass-surrounded modules, or gondolas. Entry and exit is by way of a hinged door, locked from the outside. The main piece of equipment is a large wheel structure reaching 30 metres from the ground and weighing in excess of 60 tonnes. The whole device, despite its impressive dimensions, is referred to as a 'trailer model', and is transported on two articulated trailers. It takes about 20 hours to set up. There are 20 gondolas, in each of which up to six adult riders can be seated. Ferris wheels are the highest passenger-carrying capacity amusement devices, and the largest one based in New Zealand, by comparison, has a maximum passenger loading of 72 (12 chairs of 6 riders), so this latest 120 seat attraction has clearly the highest passenger rating of any device on the New Zealand register.

**The Giant Ferris Wheel**

Uniquely, each gondola is also capable of being rotated (independently of the large wheel structure) by means of a centrally located handwheel within the gondola, which can provide an additional 'thrill' to the already impressive ride.

What made the engineering certification interesting was that the New Zealand Amusement Devices Regulations 1978 require 'Ferris wheel' type devices to be fitted with a

means of passenger restraint to prevent riders from standing. This ride is designed such that no restraints are fitted at all and riders can move within the gondola whilst it is rotating, thereby creating a compliance issue. However, the certifying engineers, in addition to making the normal examination, carried out a risk analysis and satisfied themselves that it was intrinsically safe, enabling a Certificate of Examination to be issued, subject to certain operational conditions.

Normally the Giant Ferris Wheel would be in storage during the British winter off-season because of the inclement weather, and would therefore not be generating any income.

For this reason it was brought to New Zealand for a three-month period under an arrangement with an Auckland promotions company, initially to operate at Auckland Viaduct Basin over Auckland Anniversary weekend. It was then transported to Wellington and set up in Frank Kitts Park on the waterfront for three weeks. Finally, an added bonus of the trip was being able to operate the device at the Auckland Easter Show, prior to returning to England in readiness for the new season over there. Mr Taylor claimed that the venture had been even more successful than planned, and he hoped to bring the device back here again in the future.

## NOT-SO-NEW AMUSEMENT DEVICE

A second amusement device recently brought to New Zealand from the United Kingdom is a 'Vintage Merry-Go-Round', *circa* 1882. Now in Christchurch on loan to a local operator, the equipment is completely original and is a wonderful example from a bygone era, with carved horse figurines, a musical organ, and having its own steam traction engine of the same period to generate the power.

This device has been inspected and certified in the normal manner with no engineering issues, despite its age.

**Classic old amusement device**

South Islanders (and visitors) will be able to experience this piece of historic equipment at various events during the twelve-month loan period. It will then be returned to its UK owners in March 2007.

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## NDT REPORT CONCERNS

An inspection body has drawn our attention to an apparent lack of attention to quality and reporting from NDT providers. Some of the problems include incorrect identification of line/drawing numbers on reports and incorrect identifications on radiographs. In some cases this may be as a result of inaccurate requests by the fabricator in the first place, so this area also needs to be addressed by the individual fabricators. Some of the concerns/comments are as follows:

- Reporting should be as complete as possible, including the use of sketches if necessary, e.g. to show the location or orientation of a weld defect; to show how a weld has been ultrasonically scanned, etc.
- Radiographic reports that cover multiple pipe sizes and/or wall thicknesses and state 'various' for exposure conditions are unacceptable. Exposure conditions, including focus to film distance/source to film distance, for each pipe size and/or thickness need to be stated, clearly and in full, on the report. The reason for this is that if the test has to be repeated at some date in the future, then the same conditions can be applied to the repeat test as were applied to the original test. This applies to all inspection methods. Repeatability of a test is fundamental to good inspection practice.
- Radiographic sensitivity and density also need to be reported accurately. In this case the inspector needs to know the material thickness in order to measure the sensitivity accurately. If the material thickness is not clearly recorded on the report then sensitivity cannot be readily calculated.
- Consumables for liquid penetrant and magnetic particle inspections should be compatible and of the same manufacturer, for example in the past there have been instances of one manufacturer's penetrant used together with another manufacturer's cleaner/remover and developer. This is not acceptable as the materials are from different manufacturers and therefore generally not compatible. The only likely exception would be if there is written agreement from both manufacturers that the consumables are compatible.
- Poor radiographic definition and radiographic densities, which are either inconsistent or fall outside the limits of the specifications. In some cases this may be a result of poor back scatter control.
- Size of film used is inappropriate for the size of the weld. Usually in this case the film is too small to adequately fit the weld, identification and location markers comfortably.
- Lack of care during the radiographic set-up which leads to identification numbers and/or location markers either encroaching on the weld image or being missed off the film altogether.
- Where radiographs are obviously not satisfactory for any reason, the NDT provider should seek to address this situation before the films and reports are submitted to the Inspection Body for review. Failure to do so may result in

**Disclaimer**

While every care is taken in the provision of information in *Safety Lines* it is the reader's responsibility to confirm the accuracy of such information against relevant current legislation and approved codes of practice prior to placing reliance on it. The earlier the issue of *Safety Lines*, the more obviously important this becomes, as legislation and approved codes of practice may change over time.

Nothing in any issue of *Safety Lines* that contradicts any current legislation or approved code of practice may be relied upon. The editor would appreciate being notified of any instance of such contradiction in an issue of *Safety Lines*, which was published after the publication of the current legislation or approved code of practice being contradicted.

additional delays, rework and ultimately, costs to the project.

- NDT must comply with the requirements of the appropriate standard and failure to do so means failing to comply with the PECPR Regulations. Any concession request to deviate from the standard must be addressed to the inspection body in writing and must have a sound technical reason. Concession requests based purely on commercial grounds are unlikely to be considered favourably by the inspection body.
- Any NDT reports that relate to work being done under the PECPR Regulations must bear the IANZ logo/statement. If elements of a report could become separated they should be individually identifiable with the body of the report.
- The inspection body may rely on the NDT results to support its recommendation for the statutory certification of an item of equipment. If the NDT reporting is deemed to be inadequate or otherwise at fault, this may result in the statutory certification either being delayed or in some cases declined, until the situation has been addressed.

It is worth remembering that IANZ, as part of its annual audit of the inspection body, reviews the NDT reports upon which certifications are based. What the NDT service provider supplies to the Inspection Body may be the subject of that scrutiny.

## APPLICATION OF NEW STANDARDS TO EQUIPMENT

From time to time we are asked if a new or revised standard is applicable to existing equipment. This often occurs when a standard is newly recognised by the Department of Labour, or when an already recognised standard is updated to a new revision.

Our view on this in the past, and likely to be in the foreseeable future, is that standards are generally not, and certainly not automatically, applied retrospectively.

When a standard is replaced by a new revision, or a completely different standard, it is applied to future affected equipment. Even in these cases, Engineering Safety would usually not require changes to be made to a project which is in an advanced stage, but would expect to be consulted in such cases. It must be remembered that standards do not come into being in a short period of time, and those involved in major equipment projects should check the current situation with the relevant standards body.

Approved codes of practice call for the latest version of a standard to be used and listed standards change over time. The codes of practice are a reflection of current best practice, but they generally make some allowance for older equipment. When a new or revised standard becomes recognised by the Department, that does not mean that existing equipment designed and built to an earlier recognised standard must be updated.

There is a possible case where a new standard, or an aspect of a new standard, may be required to be adopted for all new and existing equipment, and that is where it provides a highly significant safety improvement. If this occurs, Engineering Safety will vigorously promote that new standard, or aspect thereof, for all relevant equipment, and in an extreme case a legislated solution may be called for.

## PASSENGER ROPEWAYS – CANADIAN STANDARD

Recently the Canadian Standard for passenger ropeways, CSA Z98-01 *Passenger Ropeways*, was recognised under the PECPR Regulations for use in New Zealand. This, combined with the fact that the *Approved Code of Practice for Passenger Ropeways in New Zealand* has not been withdrawn, has caused a little confusion in some quarters.

Industry has acknowledged that the new Canadian Standard is technically superior to the existing code of practice, and by recognising it, the Department has enabled industry to use it to full technical advantage. There are still New Zealand-specific aspects of the existing code of practice that need to be relied upon. Practitioners are generally well aware of these aspects, and when the code of practice is revised, in addition to other likely benefits, those matters will be made explicit.

## ASME STAMPING

Periodically the question arises as to whether or not pressure equipment built to the ASME standard needs to be stamped. Stamping is a normal part of the ASME process, but incurs some expense and is sometimes omitted by agreement of the parties involved. Engineering Safety does not waive this requirement for items manufactured outside New Zealand, and all such ASME built pressure equipment must be appropriately stamped.

In New Zealand there is sufficient involvement of Engineering Safety with the inspection process to provide confidence in the manufacture and inspection of ASME equipment without insisting on stamping. There is therefore a relaxation for locally manufactured equipment, which does not need to be stamped.

## HERA COURSES AND SEMINARS

The table lists the course dates for the HERA Training Centre for the remainder of 2006.

The venue for these courses and seminars is:

**HERA House**
**17-19 Gladding Place**
**MANUKAU CITY**
**(South Auckland)**

Note: Enrolment closes 7 days before start of course.

For further details contact:

**Peter Hayward**
**HERA Training Centre**
**P0 Box 76134**
**Manukau City**
**Phone:(09) 262 4847**
**Fax: (09) 262 2856**

mailto:admin@hera.org.nz

| **Activity** | **Dates** |
|---|---|
| Surface Methods of Inspection | 3-7 April<br>21-25 Aug |
| Refresher Course in Welding Inspection | 11-12 April<br>21-22 Sept |
| EWP Inspection | 20 April |
| Radiographic Theory and Interpretation of Weld Radiographs | 1-5 May |
| Welding Supervisor Course<br>Block 1<br>Block 2<br>Block 3<br>Block 4<br>Block 5<br>Examination | <br>1-5 May<br>29 May - 2 June<br>26-30 June<br>24-28 July<br>21-25 Aug<br>November |
| Ultrasonic Theory and Weld Testing | 22-26 May |
| Ultrasonic Wall Thickness Measurement | 31 May - 1 June |
| Management Appreciation in NDT and Quality Control | 28 June<br>25 Oct |
| Pressure Equipment Inspection | 4-8 Sept |
| Welding Inspection | 11-15 Sept |
| Welding Defects - Causes, Remedies and Inspection | 26 Oct |

## MISCELLANEOUS INCIDENTS

The following significant incidents were reported by the Department of Consumer and Employment Protection, Government of Western Australia, and are briefly summarised here.

### Side Lifter Overturns

A container side lifter overturned whilst a fully laden sea container, weighing over 20 tonnes, was being unloaded. The driver had failed to fully extend and engage the stabiliser legs. Recommendations to avoid this type of incident include operator assessment and training in safe working procedures in accordance with the manufacturer's instructions.

### Container Lift with Truck-Mounted Crane

A crane operator was seriously injured when he became caught between his truck-mounted vehicle loading crane and the container being lifted. A two-leg chain was used across diagonal corners of the container, which had an uneven load inside. Obstructions impeded the lift and the operator investigated, leaving the controls active. The container suddenly became free and struck the operator, who had moved into the danger zone between it and the crane. Recommendations to avoid this type of incident include:

- Ensuring that the load is free before lifting;
- The use of a four-leg sling on containers;
- Putting the controls in a safe position to remove forces on the load prior to leaving the control station; and
- Avoiding going between the load and the crane.

### Concrete Median Barrier Failure in Pick-and-Carry Operation

A single 2.5 tonne lifting anchor on a concrete precast median barrier failed whilst transporting the 1.7 tonne block around site by mobile crane. No injury or damage resulted but the potential for both was high. Recommendations to avoid this type of incident include:

- Conducting a risk assessment prior to transportation, taking into account the fact that pick-and-carry operations can impose loads three to four times that of a lift only;
- Providing relevant design and operational product information; and
- Transporting in accordance with the designer's/manufacturer's specifications.

### Aluminium Alloy 6351 Scuba Cylinder Failure

A scuba cylinder made from aluminium alloy 6351 exploded whilst in storage, fortunately causing no injuries, though such a failure clearly has the potential to cause injury or death. Cylinders made from this alloy were made from 1975 to 1990. This material is known to suffer from a phenomenon known as 'sustained load cracking' which usually develops over a long period of time. In this instance, the failure occurred due to a crack developing past the critical thickness of the cylinder. Cylinders which have been damaged, over-filled, or abused are more susceptible to this phenomenon. Recommendations to avoid this type of incident include:

- Testing these cylinders strictly in accordance with the requirements of AS 2337.1 2004;
- Filling only by authorised filling stations; and
- Emptying and immediate removal from service of any cylinder found to be defective.

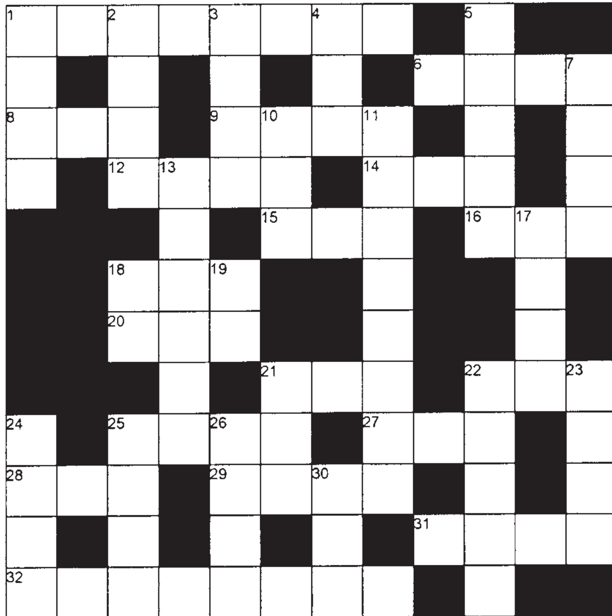
Further information can be obtained from WorkSafe's website at:

http://www.worksafe.wa.gov.au

or by email to:

mailto:safety@docep.wa.gov.au

## PUZZLE PLACE



Answers include abbreviations and acronyms.

**ACROSS**

1 Commanding
6 Type of radiation
8 Consume
9 Drug
12 On top
14 Irritate
15 Fasten; bond
16 Longing
18 Quality management system
20 Appropriate
21 Old pressure unit
22 Colouring agent
25 Forest component
27 Owing
28 System of units
29 Overdue
31 Expectation and desire
32 Supervises

**DOWN**

1 Is indebted
2 Facts and figures
3 Do again
4 Pinch
5 Substitute
7 Gape
10 Choose
11 Evening
13 Meddle
17 Discontent due to other's good fortune
18 Quality assurance
19 Street
21 Edible pod
22 Storehouse
23 Effortlessness
24 Last in first out
25 Ripped
26 Large deer (pl.)
30 Lower digit

Answers can be obtained by email from:

[mailto:robin.bain@dol.govt.nz](mailto:robin.bain@dol.govt.nz)

## Answers to *Safety Lines* Issue 68 Crossword

**ACROSS**

1 Forwards
7 Kpa
8 Glad
9 Add
10 Technologist
13 Isolationism
17 NDE
18 Into
19 Era
20 Speakers

**DOWN**

1 Franc
2 Regenerative
3 Radioisotope
4 Swami
5 Skit
6 Edit
11 Eats
12 Saws
13 IANZ
14 Ovens
15 Ideas
16 Meat


*Safety Lines* is a publication of the Engineering Safety Unit of the Department of Labour, PO Box 3705, Wellington.



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