



Safety Lines



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ENGINEERING SAFETY NEWSLETTER, OCCUPATIONAL SAFETY AND HEALTH SERVICE

No. 57, March 2003

Boiler Safety Audits

Approximately every two years Engineering Safety carries out a boiler safety audit of each limited attendance and unattended boiler installation. These take place throughout the year and are an important means of monitoring the status of the safety of such plant. This article explains what takes place and what the auditor is looking for.

Audits take place routinely and, whilst they are by appointment, no special arrangements should be necessary on the part of the controller. Generally about a week's notice is given, and if the plant is in operation there should not usually be any reason to postpone the visit. Normally the required documents will be readily available and there is no disruption to productivity, with the minor exception of some host involvement. The duration of an audit, if things are in order, should not normally exceed a couple of hours. The time taken depends on various factors such as whether or not it is a first visit, plant layout and complexity, availability of documents, and the nature of any problems uncovered which may need discussion. The auditor will normally follow up the audit with a letter, which will outline any action required on the part of the controller. Audits also provide an opportunity to ask questions of the auditor, and if an answer cannot be supplied immediately every attempt will be made to include it in the outcome letter.

As in all occupations, auditors vary in the way they do things, so the outline which follows does not necessarily portray the order of events, but rather the scope of the exercise. The location of documentation will also often influence where an audit commences and the sequence in which items are dealt with.

The person responsible for the boiler installation will be identified, along with the position within the organisation. The quality management system will be consulted and checked as being appropriate. If an ISO 9000 management system is in operation, the management representative will be identified, and provisions for internal auditing of the boiler management confirmed. Documentation for appropriate staff training (usually by the boiler manufacturer) will be examined.

The external agency which carries out the quarterly testing and inspection will be noted, along with its authority to do so (if other than the manufacturer), as will the external IANZ accredited laboratory which performs the monthly boiler water tests.

Routine maintenance and minor repair arrangements will be ascertained to ensure that they are carried out by appropriately trained and approved personnel.

A visit to the boiler house will establish positive identification of the boiler(s), starting with the important unique identifier(s). Boiler parameters such as type, attendance category, MW rating, steam

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output, pressure, and fuel, will be confirmed. If multiple boilers are coupled, appropriate valve arrangement will be noted. The boiler letter of exemption should be in the vicinity of the boiler, and preferably also the current certificate of inspection (or a copy). Normal boiler operation will be observed for a short period, security arrangements noted, and general layout and housekeeping assessed.

At the chemical handling location, the presence of suitable personal protective equipment will be noted. Daily water testing records (at least recent ones normally held at this location) will be inspected for completeness, anomaly notes (if any), range guidance, and signatures checked as corresponding to those of listed trained personnel.

The existence and completeness of the full boiler operations manual is important and will be ascertained. Additionally, certain key documents will be expected at all installations and will be examined for currency. These include:

- Letter of approval of maintenance contractor (if other than the manufacturer);
- Training documentation naming successful trainees and scope of training;
- Letter of exemption;
- Current certificate(s) of inspection;
- Current pressure gauge calibration certificate(s);
- Quarterly testing and inspection reports;
- Monthly boiler water test reports (bearing evidence that the laboratory has IANZ accreditation);
- Daily boiler water records;
- Boiler operation records;

- Maintenance, service and repair records; and
- Test records for controls and alarms

Finally, although not specific to the boiler installation, the existence and appropriate use of first aid facilities, accident register, and accident notification, investigation and reporting procedures is noted.

A few factors that have tended to slow the audit and generate required actions for the controller are:

- Lack of training proof and clear authority for staff. It is not acceptable for personnel, however experienced and competent, to carry out duties in relation to a boiler installation without evidence of training and written approval from the manufacturer (or sometimes the inspection body).
- Use of a non-accredited laboratory.
- Pressure gauge calibration certificate not available. We require to see a certificate of calibration by an IANZ accredited laboratory for the pressure gauge which was used to set the safety valves. This must have been current at the time of survey when the valves were set.
- Poor security.

If any follow-up actions are required of the controller, the timing for completion will depend on the nature of the action. Serious matters with clear safety implications will require immediate attention with completion by an agreed date. Other matters would normally be expected complete within about a month (e.g. forwarding of documentation) or other time period normally associated with the activity (e.g. phased to suit a monthly laboratory test or quarterly test and inspection). Recommendations will be followed up at the next audit.

Engineering Safety Staff Contact Details

	Phone	Fax	Email
Bryn George	(04) 915-4433	(04) 915-4370	bryn.george@osh.dol.govt.nz
Peter Williamson	(04) 915-4461	(04) 915-4370	peter.williamson@osh.dol.govt.nz
Geoff Edwards	(04) 915-4435	(04) 915-4370	geoff.edwards@osh.dol.govt.nz
Robin Bain	(04) 915-4446	(04) 915-4370	robin.bain@osh.dol.govt.nz
Maurice Flood	(04) 915-4440	(04) 915 4370	maurice.flood@osh.dol.govt.nz

Occupational Safety and Health Service
 Department of Labour
 4th floor, Unisys House
 56-62 The Terrace
 PO Box 3705
 Wellington

The following alert, effective December 2002, is reproduced (partially) with the permission of WorkSafe Victoria:

Some D-Type Boilers Were Found To Have Potentially Dangerous Cracks in Welds

Purpose

This Alert advises operators of D-Type water-tube boilers of 2-4.5 MW capacity to urgently check for the presence of cracks in welds of these particular boilers. The cracks could cause a failure of the boiler resulting in a serious risk to safety. D-Type boilers of this size are commonly used in hospitals, food processing and manufacturing industries.

The Problem

Three D-Type boilers were recently examined and substantial cracks were found in the welds between the drum shell and both dished ends of all three steam drums. The cracks in the circumferential weld run in the transverse (drum axial) direction and extend across the entire weld width and into the surrounding metal (see Figures 1 and 2). The depth of the cracks has not been established. However, in two boilers, cracks are believed to be of substantial depth.

Substantial cracks were also found in the toe of the circumferential weld of the water-level chamber standpipe to the drum shell. Cracks of this type could lead to rupture of pressure components, possibly resulting in death or serious injuries and substantial damage to property.

The particular boilers were manufactured in the late 1970s by an interstate company.

Recommendations

Operators of D-Type boilers should conduct an inspection of the weld areas in the steam drum of these boilers in particular, as soon as possible. It is recommended that Non-Destructive Testing (NDT) methods be used to examine the welds for any signs of cracking. In the case of any cracks being detected, further NDT examination may need to be carried out to determine the extent of the damage. Structural integrity of the boiler would subsequently need to be established by a competent person, prior to the boiler being put back into service, unless the affected areas are repaired/restored to the original design requirements.

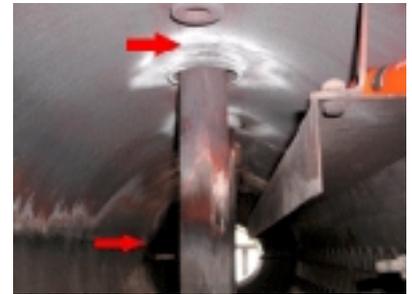


Figure 1. General location of cracks

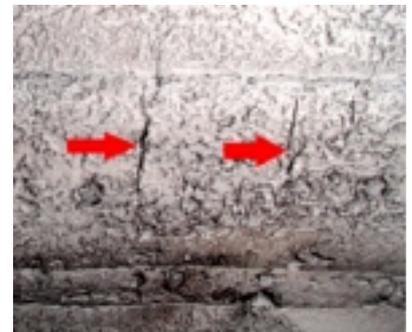


Figure 2. Cracks in the steam drum to dish end weld

Announcements

The following companies have been added to the list of recognised inspection bodies providing design verification and fabrication inspection services:

Plant & Building Safety Ltd
PO Box 19-789
Christchurch

Plant & Building Safety Ltd also offer in-service fabrication inspection services.

Lloyd's Register - Stoomwezen BV
Weena-Zuid 170
3012 NC Rotterdam
The Netherlands

A full list of recognised inspection bodies and known contact details can be viewed at:

www.osh.dol.govt.nz/touch/eng-safety

Index Update

The *Safety Lines* index has been updated and now covers issues 1 to 57. The index is available for download in Word and pdf formats.

It can be reached from the Engineering Safety Web page:

www.osh.dol.govt.nz/touch/eng-safety

via 'Articles' and 'Link to issues of Safety Lines'.

Alternatively it can be reached from the OSH Web page:

www.osh.dol.govt.nz

via 'Health and safety Publications', 'Series/Bulletins etc.', and 'Safety Lines (series)'.

Approved Code of Practice for Passenger Ropeways in New Zealand - Amendment 1

Amendment 1 to the *Approved Code of Practice for Passenger Ropeways in New Zealand* was approved by the Minister of Labour on 18th December 2002 and took effect on 6th February 2003. The amendment was prepared in consultation with interested groups, the need for it having arisen due to:

1. A discrepancy relating to surface ropeway inspection levels between the code of practice and the Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999 (PECPR Regulations) which were promulgated after the code's publication; and
2. The observation that hand-held surface ropeways do not need the same level of inspection as aerial types.

The amendment, which replaces clause 2.2.3.1.1, combined with a simultaneous partial exemption for hand-held surface ropeways from the PECPR Regulations (approved by the Secretary of Labour on 8th January 2003), brings the code of practice into line with the regulations and provides for realistic inspection requirements.

Basically the amendment does the following:

- Incorporates some minor clarifications and corrections.
- Requires surface ropeways of the overhead travelling wire type (including Platter and T-Bar ropeways) to have a certificate of inspection (this was always a requirement of the PECPR Regulations).
- Continues to permit hand-held surface ropeways to be inspected annually by a competent person (this is now permitted by virtue of the new exemption granted by the Secretary).
- Stipulates that the competent person who carries out inspection of a hand-held surface ropeway must not have carried out the ropeway's design, installation or maintenance.

The code of practice, incorporating the amendment, can be obtained from our website at:

www.osh.dol.govt.nz/touch/eng-safety

(Click on 'Documentation' then see under 'Codes of Practice'). Instructions will also be found there as to which pages to print and replace to update existing hardcopy versions. Details of the exemption can also be obtained from the same web area under 'Gazetted Exemptions'.

HERA Courses

HERA Training Centre is offering the following courses during the remainder of 2003:

Course	Dates
Welding inspection	23-27 June 1-5 September 10-14 November
Radiographic theory and Interpretation of weld radiographs	10-16 May 8-12 September
Surface methods	4-7 August
Ultrasonic testing theory and Ultrasonic weld testing	26-30 May 22-26 September
Ultrasonic wall thickness	3-4 June
Management appreciation in non-destructive testing	30 June 15 October
Coatings inspection:	
Home study	All year
Block courses	11-12 September

The venue for these courses is:

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

Note: Enrolment closes 7 days before the start of the course.

For further details contact:

**HERA Training Centre
PO Box 76134
Manukau City
Phone: (09) 262 2885
Fax: (09) 262 2856
Email: admin@hera.org.nz**

Material Impact Testing Temperature - Low Temperature Pressure Equipment

Inspectors have reported difficulty in reaching agreement with fabricators and controllers on the values of test temperature to be applied, where material impact testing is required but the test temperatures have not been specified on a design verified document (e.g. drawing). The following points should be noted:

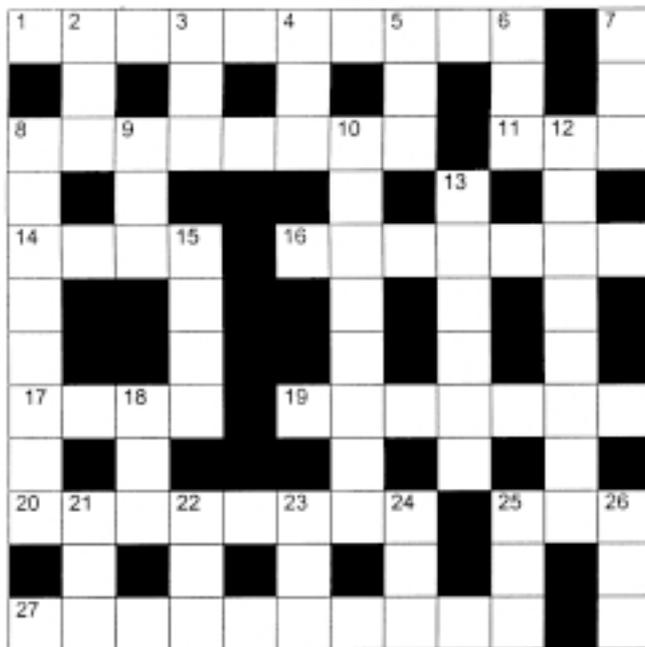
- Determination of material impact test temperatures for pressure equipment is the responsibility of the designer.
- Verification of material impact test temperatures for pressure equipment is the responsibility of the design verifier.
- The *Approved Code of Practice for Pressure Equipment (Excluding Boilers)* requires in clause 3.4.1(3) that designers record the material impact test temperatures in the design documentation (normally the equipment drawings) given to the inspection body responsible for design verification. Alternatively, where the design code does not require impact testing for a particular grade of material and design application, the

designer could just specify an appropriate grade of material to be used for each component (e.g. AS 15487-490 LT 0, LT 20, etc.). The design verifier would then verify the suitability of that grade of material for the particular application.

It should be noted that a material impact test temperature might be significantly different from the design temperature used for equipment. Design information that may not be available to the inspector or the fabricator is required for its determination. If the design temperature is mistakenly used for the material impact test temperature then this may lead to the wrong conclusions being drawn from the test results.

If the material impact test temperatures and/or grades of material (e.g. AS 1548-7-490 LT 0, LT 20, etc.) are not specified for a design that requires such information then this data must be obtained from the designer. The design verifier must verify the material impact test temperatures and/or the grades of material determined by the designer.

Puzzle Place



Answers include abbreviations and acronyms.

ACROSS

- 1 Temperature scale
- 8 Pierced
- 11 Memory
- 14 Approved statement of preferred work practices
- 16 Chooses
- 17 Purposes
- 19 Travel in a basket
- 20 Dry spells
- 25 Arrange
- 27 Sadly

DOWN

- 2 Kind of sea bird
- 3 Unprocessed
- 4 And not
- 5 Extremity
- 6 Dark sticky substance
- 7 Reciprocal of 18 down
- 8 Distinctive flag
- 9 Self-esteem
- 10 Animal
- 12 Opposing religious leader
- 13 Talk abusively
- 15 Time signals
- 18 Unit of conductance
- 21 Repent of
- 22 Utility truck
- 23 Feeling the heat
- 24 Unhappy
- 25 Put into words
- 26 Junk

Answers can be obtained by email from:

robin.bain@osh.dol.govt.nz

Answers to *Safety Lines* Issue 56 Crossword

Across

- 2 Oaf
- 4 CIC
- 8 Odds
- 9 He
- 11 Loci
- 12 Sc
- 13 DOS
- 14 NH
- 15 Tin
- 16 Hook
- 18 Crane
- 21 Nears
- 24 TT
- 25 Draper
- 28 Do
- 29 Tender
- 30 Rag
- 33 St
- 34 kPa
- 36 Snub
- 38 Free
- 40 Emus
- 41 Eyes
- 42 Exuded

Down

- 1 Conductor
- 2 Odes
- 3 As
- 5 IL
- 6 Colt
- 7 Minnesota
- 9 HSNO
- 10 Echo
- 16 Here
- 17 Knee
- 19 Rt
- 20 NDT
- 22 Err
- 23 Rd
- 26 Ans
- 27 PDT
- 31 ASME
- 32 Gnu
- 34 Key
- 35 Peep
- 37 Use
- 39 Red

Safety Lines is a publication of the Engineering Safety Unit of the Occupational Safety and Health Service, Department of Labour, PO Box 3705, Wellington.

Editor: Robin Bain

Phone: (04) 915 4446

Fax: (04) 915-4370

Email: robin.bain@osh.dol.govt.nz

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