



## Safety Lines

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### Shell Boilers – Longitudinal Seam Examination

A British organisation, the Safety Assessment Federation (SAFed), in conjunction with the Health and Safety Executive and others, produced a guidance booklet entitled 'Guidelines for the Examination of Longitudinal Seams of Shell Boilers'. This article is a brief synopsis of the guidance booklet, which is relevant to horizontal multi tubular shell type boilers.

An earlier version of the booklet was produced after the failure of two steam boilers in 1998. Some 10,000 boilers have now been examined by inspection organisations in the UK, initially with the emphasis on establishing the extent of peaking at longitudinal seams (typical peaking is out of roundness at the seam welds introduced during manufacture), and the results form a basis for the new document. The booklet states 'Testing has revealed a significant number of boilers with cracks at the longitudinal seams. Some of these boilers have been repaired and others have been withdrawn from service. Had the cracks not been detected, these boilers could have failed with catastrophic results'.

The main chapters deal with initial assessment, calculation of ultrasonic inspection intervals, repairs, and non-destructive testing. The appendices include one giving worked examples.

The document recommends regular ultrasonic testing of longitudinal seams at a maximum period between tests of 5 years, a period which, it further states, may need to be shortened as a result of peaking measurements and/or consideration of steam raising times from shutdown conditions. Removal of cladding and insulation will be required to expose the seams and adjacent areas for this testing. Guidance on ultrasonic testing procedure and reporting are also included.

Recommendations for the measurement of peaking are given in detail and a method for the calculation of ultrasonic inspection intervals is provided. Where peaking measurements are to be made externally, significant removal of cladding and insulation will be required along the seams to a width adequate for gauge access. If the resulting calculation (to establish the ultrasonic testing interval) indicates a peak stress in excess of 330 N/mm<sup>2</sup>, alternative recommendations, such as reducing boiler operating pressure, are made. Among the assumptions on which the booklet's calculation procedure is based is that the time to raise steam will exceed 30 minutes. This is because steam-raising time can affect corrosion fatigue crack growth rate.

The booklet (ISBN 1 901212 30 0) can be purchased from [SAFed](#), and is likely to be of particular interest to those involved in the inspection of shell boilers.

## Auditing and Safety Engineers

Comments made from time to time by inspection body personnel indicate that there is some uncertainty about the extent and nature of Department of Labour Safety Engineers' involvement in audits in relation to various requirements of the PECPR Regulations, and the ramifications of such involvement. Some changes have also taken place recently, and the aim of this article is to bring clarity to the situation.

Safety Engineers have in the past, and in most cases continue to have, a role in the following types of audit:

- Audits by International Accreditation New Zealand (IANZ) of inspection bodies against the requirements of ISO/IEC 17020
- Certification body audits of organisations against ISO 9001 for exemption to carry out certain conformity assessment functions
- Boiler audits for renewal of exemption under the Boilers Lifts and Cranes Act 1950
- Certification body audits of organisations against ISO 9001 prior to commencement of first operation of an unattended or limited-attendance boiler under a certified quality management system

### IANZ Audits

The purpose of these audits is typically to assess the organisation's management system against ISO/IEC 17020 to ensure, for example, that its procedures and documentation are adequate, and that it employs, supervises, trains and provides appropriate infrastructural support to suitable personnel. This usually involves the Safety Engineer, principally as a representative of IANZ, in an examination of certain procedures and records, and the technical assessment of equipment inspectors and design verifiers. The Safety Engineer will make recommendations for inclusion in the IANZ report about the organisation's technical procedures and frequently on any candidate for signatory status. The PECPR Regulations make provision for this type of participation by Department of Labour staff.

Assessment of equipment inspectors and design verifiers always includes a discussion with the candidate about, for instance, their background, experience, techniques, and instances of noteworthiness. An examination of reports of past jobs (more extensive for design verifiers) and training records is usual. In the case of inspectors, it is normal to witness an inspection. These inspections should ideally cover, over the three year accreditation cycle, a representative variety of the inspection disciplines for which the inspector is signatory.

Satisfactory audit permits the organisation to gain or retain its accreditation, possibly subject to some corrective actions, and to commence or continue to operate as an inspection body. Recognition of the inspection body by the Secretary of Labour is also dependent on acquisition or continuation of IANZ accreditation.

Recently, and additional to the normal audit duties, the Safety Engineer will specifically examine processes and records in connection with effective supervision, for those inspection bodies which are working under the trainee inspector exemption. Satisfactory assessment in relation to effective supervision will impact on the overall IANZ audit, but will additionally permit the organisation to continue to operate under the terms of the exemption.

### Certification Body Audits – Conformity Assessment

Safety Engineer participation in this type of audit is in support of an exemption under the PECPR Regulations to carry out certain equipment inspection and/or design verification activities, in accordance with the provisions of an Approved Code of Practice. Similar to the IANZ audits from the Safety Engineer's point of view, the emphasis is on the practical ability of the organisation (procedures and technical personnel capability) to substitute for the role of the inspection body for the permitted activities and range of equipment.

## **Boiler Audits - Exemption Renewal**

As the Boilers Lifts and Cranes Act 1950 has now been repealed, controllers of unattended and limited-attendance boilers no longer need to obtain an exemption under section 37(3), and these boiler audits are no longer carried out by Safety Engineers.

## **Certification Body Audits – Unattended/Limited-Attendance Boilers**

The purpose of this audit is to satisfy the Department that an ISO 9001 management system has been set up by the controller of the boiler, which provides suitable systems and procedures for its safe operation. This audit is usually carried out only once (with the Department represented) and provision for the involvement of a Safety Engineer is made in the Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers.

The Safety Engineer will, during this audit, view the boiler and examine the installation records, certification, operations manual, documentation, operator personnel records (particularly those relating to training), maintenance contractor and IANZ approved water-testing laboratory provisions, etc.

The purpose of this audit is to satisfy the Department that the initial set-up of the boiler (usually over 6 MW) is satisfactory. It also previously satisfied the requirements of an initial exemption boiler audit.

Due to the fact, mentioned earlier, that this audit is usually only performed once by a Safety Engineer, coupled with the fact that the approved code of practice is not mandatory, it is necessary for the recognised inspection body to be satisfied, at time of issue of a certificate of inspection, that the organisation's management system is satisfactory. It is a matter for the judgement of the inspection body to determine the extent to which it feels that it can place reliance on the organisation's ISO 9001 certification.

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## **Boiler Component Failure**

It was recently reported that during operation of an attended, under 15 hp boiler, the bottom sight glass drain valve block fractured causing a low water trip and alarm.

A possible cause that was considered was stress corrosion cracking induced fatigue from over tightening. The component was believed to be approximately 30 years old. Visual examination of the failed component indicated the presence of additional circumferential cracking at the termination of the male threaded section and possible inter-granular corrosion of the bore section.

Dye penetrant examination was requested for the balance of the sight glass assembly components.

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## **Designated Design Life**

The design life of equipment may not be the same as its actual life and depends on such factors as its usage and its operating environment.

Regulation 18(c) of the PECPR Regulations requires designers to determine and specify in the design, the design life of the equipment.

Regulation 20 (3) of the PECPR Regulations requires suppliers to take all practicable steps to ensure, when importing for supply equipment manufactured in an overseas country, that it has not already exceeded its design life. Equipment, which has exceeded its designated design life prior to importation, may not be put to use in New Zealand.

Regulation 10 (c) of the PECPR Regulations requires controllers to operate equipment within the limits that it was designed to operate within. These limits include the designated design life. If equipment has been in use in New Zealand prior to reaching its design life, it may be inspected with a view to permitting continued use after establishing the remaining life of the equipment and what maintenance, replacements or repairs may need to be done to enable its continued safe operation. Subsequent inspections after the term of the design life will also need to establish the remaining life of the equipment. Thus the designated design life of equipment operated in New Zealand is viewed as potentially extensible.

## CBIP Minutes

The Certification Board for Inspection Personnel (CBIP) has put the following minutes on its web site at [www.cbip.org.nz](http://www.cbip.org.nz):

2006 AGM Minutes  
 May 2006 Governance Board Meeting Minutes

Minutes of all future board meetings will be available on the above web site within a reasonable time following the meeting.

## HERA Courses and Seminars

HERA Training Centre is offering the following courses and seminars in 2007:

Activity	Date
Pressure equipment inspection	22 – 26 January 21 – 25 May 3 – 7 September
Welding inspection	5 – 9 March 10 – 14 September
Refresher welding inspection	10 – 11 April 25 – 26 September
Surface methods	2 – 6 April 20 – 24 August
EWP inspection	12 April 4 October
Ultrasonic testing theory and Ultrasonic weld testing	7 – 11 May
Radiographic theory and interpretation of weld radiographs	14 – 18 May
Ultrasonic wall thickness	29 – 31 May
Welding defects – Causes, remedies and inspection	25 October

The venue for the above courses and seminars in Auckland is:

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

For seminars outside Auckland the venue is bracketed.

**Note:** Enrolment closes 7 days before start of course or seminar.

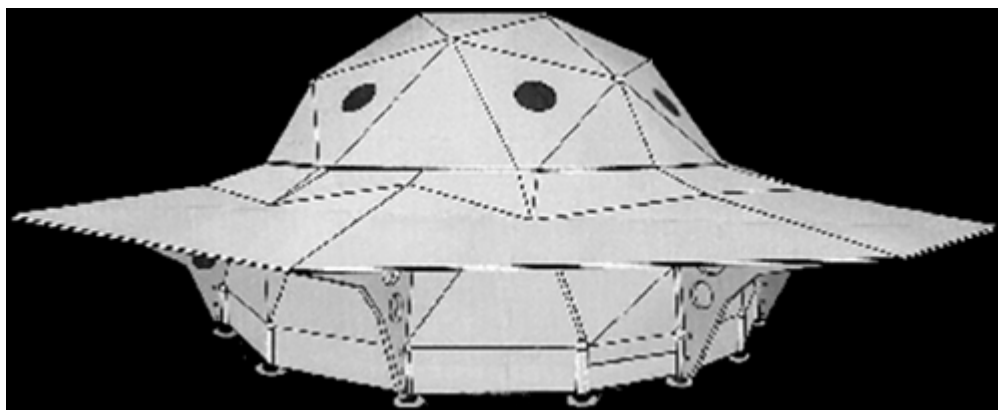
To enrol contact:  
**HERA Training Centre**  
P O Box 76134  
Manukau City

Phone: 09 262 2885  
Fax: 09 262 2856  
Email: [admin@hera.org.nz](mailto:admin@hera.org.nz)

For further information about courses and seminars visit  
[www.hera.org.nz](http://www.hera.org.nz) and click training centre or contact:

**Peter Hayward**  
Phone: 09 262 4847  
Email: [peter.hayward@hera.org.nz](mailto:peter.hayward@hera.org.nz)

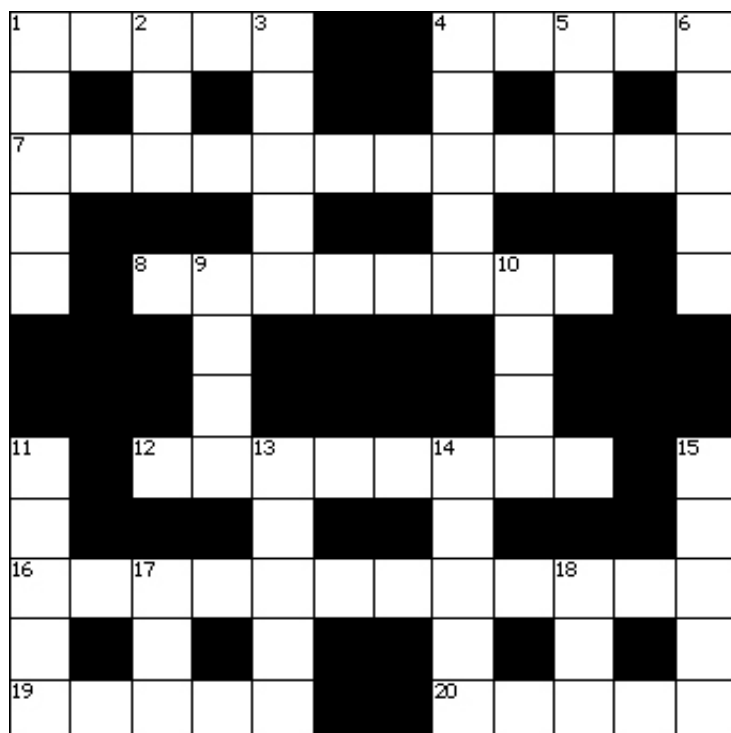
## Santa's new transport?



... Not quite – this is a sketch of a new simulator recently registered as an amusement device. It is called the 'Space Dome Simulator' and is based in West Auckland. Amusement Device Registrar, Maurice Flood, wishes more amusement devices were of the simulator type, as they are relatively safe.

# Season's Greetings!

## Puzzle Place



Answers include abbreviations and acronyms.

**ACROSS**

- 1 Splendid
- 4 Exposed to combustion
- 7 Not divided (of word)
- 8 Sticking
- 12 Not good growing country
- 16 Presenting again for consideration
- 19 Falls in drops
- 20 Joins together in space

**DOWN**

- 1 Haggard
- 2 Residue from burning
- 3 Top down measurement; wisdom
- 4 e.g. mushrooms
- 5 Decay
- 6 Father
- 9 Famous woman singer
- 10 Require
- 11 Unit of capacitance
- 13 Amounts owed
- 14 Recorded
- 15 Makes sad or weary sound
- 17 Sliding device
- 18 Indicates joined into one body

Answers can be obtained by email from [Robin Bain](mailto:Robin.Bain@osh.govt.nz).

**Answers to Safety Lines Issue 71 Crossword****ACROSS**

- 1 Reassurances
- 7 At
- 8 RI
- 9 Twaddell
- 11 Ova
- 12 Ill
- 13 Befallen
- 16 Si
- 17 MA
- 18 Inferior
- 21 Sin
- 22 End
- 23 Gardened
- 26 He
- 27 Ia
- 28 Nonaddicting

**DOWN**

- 1 Reconversion
- 2 Saw
- 3 Staff
- 4 Areal
- 5 Nil
- 6 Spellbinding
- 9 Tabooing
- 10 Lingered
- 14 ASME
- 15 Liar
- 19 Fired
- 20 Ionic
- 24 Aha
- 25 Eat

**Disclaimer**

Every care is taken in the provision of information in Safety Lines but 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.

For more information about Safety Lines, contact [Robin Bain](mailto:Robin.Bain@osh.govt.nz)

**Issued by the Department of Labour, New Zealand**  
<http://www.osh.dol.govt.nz>