Safety Lines

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WorkSafe Week '98

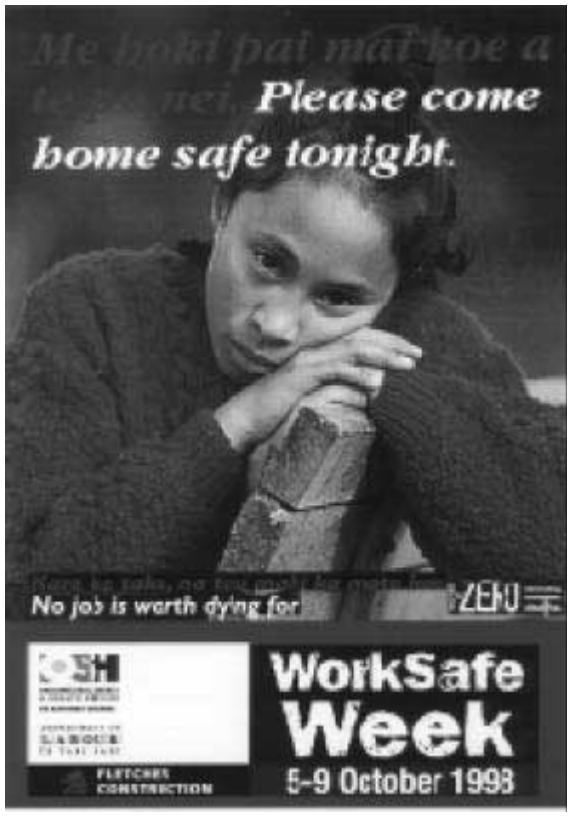
New Zealand's second national week devoted to workplace health and safety will be held in October this year.

In the year ending June 1998, 56 people died as a result of workplace accidents. Many other workers were seriously injured or became ill or increasingly sick while at work.

WorkSafe Week 1998 will run from October 5th to 9th and aims to raise awareness of the precautionary measures and attitudes needed to eliminate workplace deaths.

The "Together to Zero: Eliminating Workplace Deaths" strategy was launched last year by the Department of Labour's Occupational Safety and Health Service (OSH) in conjunction with industry groups throughout the country. Together industry, employers, employees and the wider community were encouraged to work with OSH towards the common goal of ending deaths at work. This strategy also encompassed the 'richer picture' of working towards eliminating serious harm and illness at work.

As part of this strategy, a national WorkSafe Week was held with OSH's 18 branches throughout the country organising events to promote safer workplaces. National events were also held which brought widespread media attention to workplace fatalities, firmly putting the issue on the social and economic agenda. OSH and its



partners intend to reinforce this message in the 1998 WorkSafe Week.

This year's WorkSafe Week will build on the success of last year's and hopes to spread even wider the message that New Zealanders are dying and are becoming seriously hurt or ill as a result of workplace accidents.

TOGETHER to ZERO eliminating workplace deaths

Key Messages of WorkSafe Week 1998

This year's WorkSafe Week is continuing to target the three "killer" industries of construction, agriculture and forestry (which combined accounted for 41 of the 56 workplace deaths in the year ending June 1998).

However, the message has been widened to beyond the workplace to bring in families and to make people think of the consequences for their families if they suffered a serious injury or tragically were killed while at work.

Posters have been developed using real families promoting the key messages of:

"Please come home safe tonight"

"No job is worth dying for"

"You've got a lot to live for"

Safety Lines readers who would like colour copies of these posters can obtain them by contacting their local OSH office. Ed.

NZS BS 5500 Specification for Unfired Fusion Welded Pressure Vessels

Engineering Safety advises readers that amongst other changes to BS 5500, amendment Issue 2 - September 1997, has modified Table 3.4.1 of Section 3.

The table has been altered so that a lower temperature limit of 0 degrees centigrade has been set for Category 3 vessels.

New vessels which are to be operated at subzero temperatures, must be designed and manufactured to Category 1 or 2.

Accidents Involving Cranes

The following accidents highlight some of the dangers of working with cranes. They were accidents that may occur where training is inadequate or where there is a momentary loss of concentration on the job.

Drivers responsible for operating knuckle boom cranes must be trained in crane operations as well as truck work.

Persons working around a crane need to be aware of its movements and the load position at all times.

Equipment type	Date	Accident	Causes	Injuries
Knuckle boom crane	20/8/97	A truck driver was struck when sheets of particle board were being unloaded to the first floor of a town-house under construction.	Operator was between the load and the vehicle. Load not bound and a spreader not used to stop slings moving together.	Fatal
Mobile crane	4/9/97	A rigger was struck when a communications tower dropped suddenly while being lowered in place.	Rigger was working under the suspended load.	Fatal

Inspection Body Advisory Committee

A committee has been convened by OSH which has the following terms of reference:

> "A committee to advise OSH on inspection matters coming under the draft 'Pressure Equipment, Cranes and Passenger Ropeways Regulations".

The committee was set up as a result of requests from inspection bodies that an industry group meeting be convened, to allow matters of common interest to be discussed.

While the committee is at present composed of inspection body and OSH representatives it is anticipated that other parties could be invited to join or attend specific meetings as the need arises.

To date an inaugural and one other meeting have been held, these were in August and September respectively. The agendas covered matters such as:

- Progress with the Pressure Equipment, Cranes and Passenger Ropeways Regulations and their attendant codes of practice.
- Accreditation of inspection bodies.
- Inspection of equipment coming within the scope of the regulations.
- CBIP examinations.
- IANZ issues.
- Mutual recognition agreements.

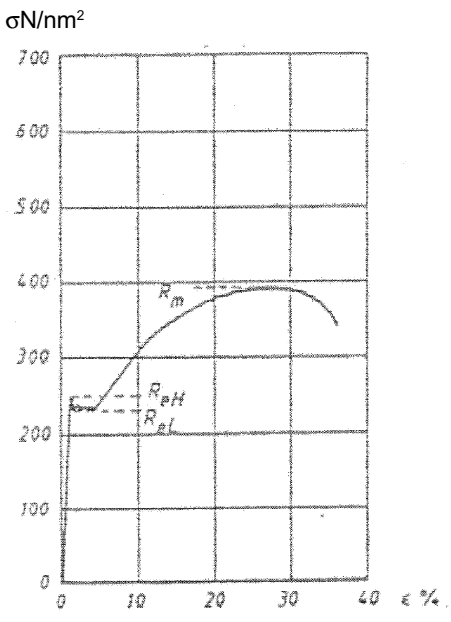
Cold Stretched Pressure Vessels

Ruling 1 of AS 1210 referred to in this article has not been recognised for use in New Zealand. However, it has been in use in Australia and many cold stretched vessels have been manufactured for both static storage and transportation service. Once Supplement 2 has been incorporated into AS 1210 it will be considered by OSH for recognition in New Zealand. ***Ed***

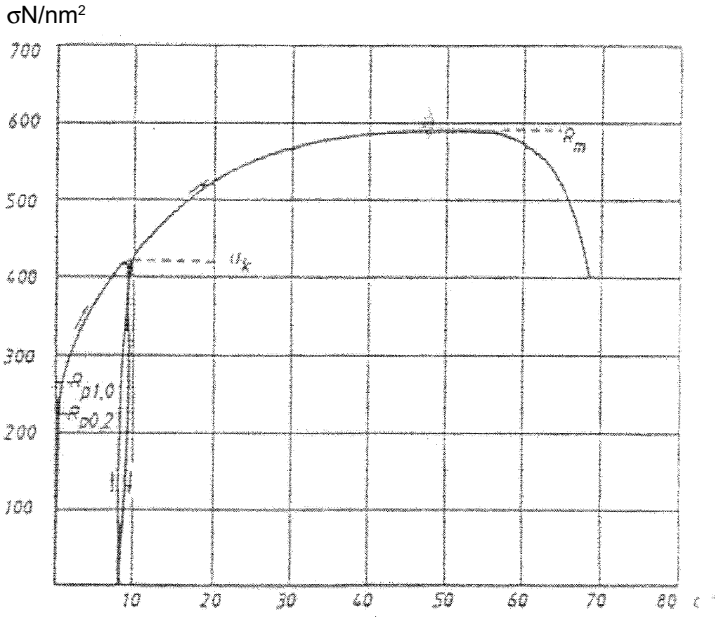
The joint Standards Australia/Standards New Zealand Committee ME/1 is preparing a Supplement 2 for AS 1210 which will incorporate requirements for cold stretched austenitic stainless steel vessels into AS 1210. This will supersede SAA Rul PE/1 Ruling No 1.

In this new supplement, significant changes are made to the original Ruling to take account of recent research, developments and extensive successful experience, and to clarify a number of areas where interpretation difficulties have arisen.

The Supplement uses AS 1210 and its Supplement 1 as its general basis of design and manufacture and provides additional or modified requirements and conditions for pressure vessels cold stretched to enhance proof strength.



Stress/strain curve for typical carbon steel



Stress/strain curve for typical austenitic stainless steel

Background to Cold Stretching Process

The cold stretch process utilises the property of an austenitic stainless steel to work harden as it is deformed. The stress required to produce deformation of austenitic stainless steels continuously increases as deformation is increased. (Austenitic stainless steels do not have the distinct flow region or yield point of carbon and low alloy steels.) If the load which produced deformation is removed a permanent elongation will be found to have occurred. If the load is then reapplied the material will behave elastically under increasing load until the stress level equals that which produced the original plastic deformation.

These characteristics of carbon and austenitic stainless steels are shown in the diagrams on page 3.

Once the material has been stretched in this manner the relevant proof stress will have increased in proportion to the stress level used to produce the plastic deformation.

The vessel design is then based on this higher proof stress thus making best economic use of a relatively expensive material. Typically cold stretching to 5% nominal strain can be used to produce an increase in proof stress of about 25 per cent.

The Cold Stretching Process

Following fabrication the pressure vessel is cold stretched by filling it with water and applying hydraulic pressure to produce the required strain.

The vessel strain is usually “measured” by a tape around the least constrained section of the vessel circumference.

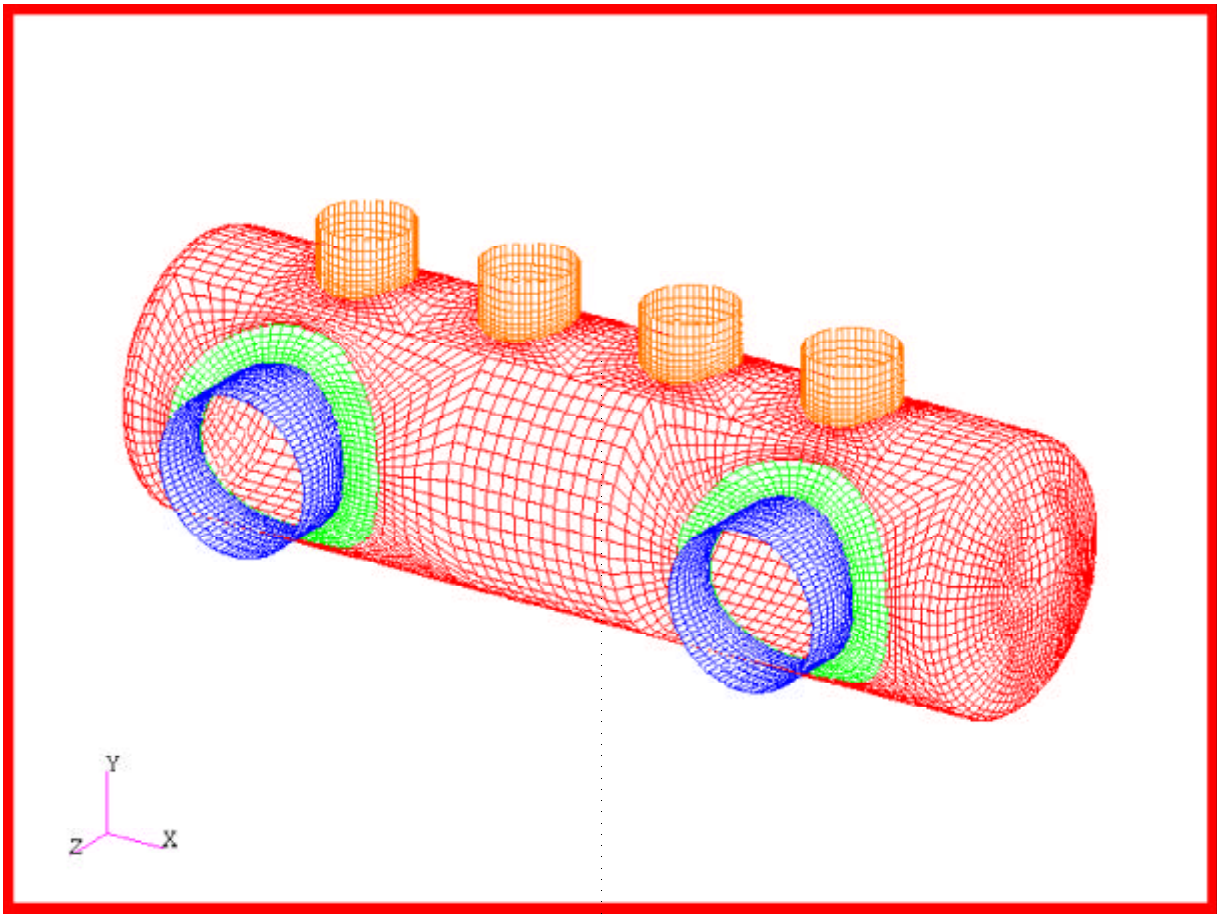
The draft Supplement 2 requires that cold stretching produce a 5% nominal strain around the circumference of the vessel with the local strain at any point not exceeding 10%.

Using Finite Element Analysis with Vessel Design Codes

For many pressure vessel designs, the “recipes” supplied in BS5500/ASME VIII are sufficient for design certification. However, when these empirical rules can’t be applied (for example when a nozzle is too close to a vessel head), a detailed analysis is required to demonstrate code compliance. Finite element analysis (FEA) is the usual tool applied for this task.

The steps in performing a finite element analysis include:

- Creating the three-dimensional geometry of the



structure - for pressure vessels this includes the nozzle(s), ring stiffeners, vessel head etc. Small fillets and weld details are typically ignored.

- The geometry is subdivided into discrete (finite) elements, with nodes at their corners. A set of simultaneous equations can then be solved for the deflections at the nodes and the stresses in the elements. The complete assembly of elements and nodes is referred to as the finite element mesh. The diagram shows a typical finite element mesh of a vessel and nozzle, modelled using thin shell elements.
- Loads, including point loads/moments, self weight, internal pressure and temperatures are applied to the model, together with the appropriate support conditions.
- The model must be verified - this includes examining resultant loads and the deformed shape, ensuring the mesh is sufficiently fine to accurately reproduce any stress gradients, and checking the results against hand calculations where possible.
- Any stress component (including Von Mises or maximum shear), deflections and reaction forces can be displayed graphically.

Based on the code stress limits, the design can be submitted for approval or modified and reanalysed. Buckling performance can also be analysed, though this often requires a finer mesh than a static analysis.

The above article was supplied by Matrix Applied Computing Ltd. They have over 30 man-years of expertise in finite element analysis, including extensive experience with the vessel design codes. They can supply software, hardware, training and consulting services to suit a client's CAD/CAM/ FEA requirements. Ed.

Inspection Body Accreditation

Engineering Safety is pleased to advise readers that the following inspection bodies have added EN 45004 accreditation to their existing ISO 9000 certification. These changes anticipate the draft Pressure Equipment, Cranes and Passenger Ropeways Regulations which require inspection bodies to become accredited within six months of the regulations coming into effect.

Marine & Industrial Safety
Inspection Services Ltd
PO Box 27 347,
Wellington

M&I provide design verification and inspection services for all categories of equipment coming within the scope of the draft Pressure Equipment, Cranes and Passenger Ropeways Regulations. Their authorised representative is Mr Bill Black, tel: (04) 382 9666, fax: (04) 385 9311.

Nortel Ltd
PO Box 1271
Whangarei

Nortel provide inspection services for equipment coming within the scope of the draft Pressure Equipment, Cranes and Passenger Ropeways Regulations. Their authorised representative is Mr Steve Mabbet, tel: (09) 438 1512, fax: (09) 438 1234.

There are now six accredited inspection bodies operating in New Zealand. These range from 'specialists' providing design verification or equipment inspection services through to larger organisations providing a wide range of services.

First Committee Drafts for Future ISO 9000 Standards

The first Committee Drafts (CDs) of the future ISO 9000, ISO 9001 and ISO 9004 Standards are now available for public comment. The standards are available from Standards New Zealand sales from 1 September with comment closing at the end of October 1998.

Due to the volume of comment expected, Standards New Zealand is requesting that all comments are submitted in electronic form using a template that can be downloaded from the Standards New Zealand web site (www.standards.co.nz). People can then complete the template and return it by e-mail to Standards New Zealand (christin@standards.synet.net.nz).

Background

The revised ISO 9001 and ISO 9004 Standards are being developed as a "consistent pair" of standards. The drafts include a general introduction to the revision and its objectives, prepared by ISO/TC 176.

The proliferation of the current ISO 9000 family of Standards has been of particular concern to ISO 9000 users and customers. In response to this concern, ISO TC 176 has responded by designing the year 2000 ISO 9000 revisions to consist of three primary standards:

ISO/CD1 9000:	Quality management systems- Concepts and vocabulary (replaces 9000 and 8402)
ISO/CD1 9001	Quality management systems - Requirements (replaces 9001, 9002 and 9003)

ISO/CD 9004	Quality management systems - Guidelines (replaces 9004.1 and other parts of 9004)

A major requirement of the ISO 9000 revision process is that organisations which have implemented the current ISO 9000 standards will find it easy to make the transition to the revised standards. Enhanced compatibility with the ISO 14000 Standards is also an important customer need.

Next steps

Further formal drafts will be issued during 1999. Information relating to the introduction of these revised Standards will be provided throughout the remainder of the revision process with publication of the revised standards planned for the second half of the year 2000.

Safety Alert: Owners/Users of Aluminium Air Receivers

The following information was received from WorkCover Authority of New South Wales. It is possible that some of these vessels could be in New Zealand. Controllers of aluminium receivers should check them against the manufacturer's serial number scheduled below. Ed

A recent investigation into the rupture of an aluminium air receiver revealed that the failure appeared to emanate from a fault in the cylinders longitudinal butt weld.

The investigation further disclosed that ten receivers have been manufactured from the same batch of material. The receiver under investigation was one of these, the remaining 9 have not been traced. It appears that the wholesale marketing company responsible for selling these items to the end users, ceased operation approximately three years ago. The directors of the company have not been contactable. Our search for the owners or users of these pressure vessels has therefore proved fruitless.

Recommendation

The potential exists in the untraced receivers for similar failures to occur. Consequently owners or users of these aluminium air receivers having the following numbers:

Serial No.	3015000	" "	3015005
" "	3015001	" "	3015006
" "	3015002	" "	3015007
" "	3015003	" "	3015008
" "	3015004		

Should contact: Mr Darren Orchard
General Manager
O'Brien Aluminium Pty Ltd
103 Warren Road
SMITHFIELD NSW 2164
AUSTRALIA
Tel: (02) 9632 2888
Fax: (02) 9681 4969

who will provide replacement receivers.

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Contents