

Safety Lines



ISSN 1171-9354

ENGINEERING SAFETY NEWSLETTER, OCCUPATIONAL SAFETY AND HEALTH SERVICE

No. 43,
September 1999

Trans-Tasman Mutual Recognition Arrangement

Engineering Safety has had several queries about application of the Trans-Tasman Mutual Recognition Arrangement (TTMRA) to equipment coming within the scope of the Pressure Equipment Cranes and Passenger Ropeways (PECPR) Regulations. In particular, clients have questioned whether the PECPR Regulations are overridden by the TTMRA.

OSH has obtained a legal opinion on this matter. This was expressed as follows:

“It is my opinion that the TTMR Act 1997 does not override OSH’s applying the PECPR Regulations and requirements for design verification and fabrication inspection during manufacture in Australia.

The relevant sections of the Act are 10 and 11.

Section 10. “Trans-Tasman mutual recognition principle in relation to goods.

1) Trans-Tasman mutual recognition principle in relation to goods is that, subject to this Act, goods produced in or imported into an Australian jurisdiction, that may be lawfully sold in the Australian jurisdiction either generally or in particular circumstances (as the case may be), without the necessity for compliance with any of the requirements relating to sale that are imposed by

or under the law of New Zealand and are prescribed in sub section (2)

Section 11. “Section 10 not to affect operation of certain laws—

(2) Nothing in section 10 affects the operation of any laws in New Zealand regarding the inspection of goods within New Zealand, so long as those laws—

a) Apply equally to goods produced in or imported into New Zealand; and

b) Are directed at matters affecting the health and safety of persons in New Zealand or at avoiding, remedying, mitigating any adverse effects of activities on the environment in New Zealand; and

c) Do not require the inspection of goods as a prerequisite to the sale of the goods in New Zealand.

Section 10 of the TTMR Act must be read subject to section 11 of the TTMR Act. In regards to the PECPR Regulations, s.11 overrides s.10 of the TTMR Act. The PECPR Regulations require equipment to be design verified and inspected during manufacture by an OSH recognised inspection body. However although the inspection of these goods, is not a prerequisite to the sale of goods, it is a prerequisite before the machine is



put into service. The laws apply equally to both locally produced and imported goods and are directed at protecting health and safety.

You are correct to advise importers that while they may import and sell such equipment it must have a certificate of inspection before it goes into service. The

equipment to be certified must have been subject to design verification and fabrication inspection by an inspection body recognised by the Secretary.

Inspection bodies are recognised by the Secretary of Labour, not by OSH. Ed

Boiler Operator Qualifications

The New EnChem Qualification System

Certificate: Responsible Person Unattended Plant

This is a new qualification designed to ensure that Responsible Persons in unattended boiler plants and operating small boilers, are trained to the requirements of the *Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers*. This qualification is **not mandatory**, but it ensures that candidates are trained and assessed to a recognised standard. It supplements other training provided by controllers for Responsible Persons.

Certificate: Boiler Attendant

This recently introduced qualification replaces the former boiler attendant's certificate (see the tables below). It is made up of four unit standards (three boiler-specific units plus one safety unit) for a total of 21 credits. This certification is "upgradeable" to a national certificate - level 2 or level 4 below.

National Certificate: Level 2

This replaces the former 2nd class engine driver's certificate. It is made up of 17 core unit standards (53 credits) plus three specialised steam strand unit standards (16 credits) for a total of 69 credits.

National Certificate: Level 4

This replaces the former 1st class engine driver's certificate. It is made up of 23 core unit standards (87 credits) plus three specialised steam strand unit standards (34 credits) for a total of 121 credits.

Minimum Qualification Requirements

The boiler manufacturer, in consultation with the controller and inspection body, must recommend supervision and staffing levels for a boiler installation. These levels must be in accordance with the *Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers* (currently under revision).

The minimum qualifications required for supervision of attended or limited-attendance boilers are as follows:

Boiler Capacity	ENCHEM Qualification
0 to 1.2 MW incl.	Responsible person as defined in the boiler code of practice
>1.2 MW to 6 MW incl.	Boiler Attendant's Certificate - National Certificate in Energy and Chemical Plant (Process operation)
Up to and including 20 MW	Level 2 - National Certificate in Energy and Chemical Plant (Process operation)
Any boiler	Level 4 - National Certificate in Energy and Chemical Plant (Process operation)

The Old Qualifications Are Still Valid

Boiler Attendant's Certificates

This qualification has been superseded by the NZQA Certificate - Boiler Attendant. Existing Boiler Attendant certificates remain valid.

Engine Driver's Certificates

From 1997, the National Certificate in Energy and Chemical Plant (Process Operation) Level 2 and Level 4 replaced the Second and First Class Engine Driver's Certificates respectively. These latter qualifications remain valid but examinations for them were phased out in 1998.

Marine Engineer's Certificates

The holder of a first-class steam engineer's certificate issued under the Shipping and Seamen Act 1952 is deemed to be the holder of an extra first-class stationery engine driver's certificate. The holder of a second-class steam or a third-class engineer's certificate issued under the Shipping and Seamen Act 1952 is deemed to be the holder of a first-class stationery engine driver's certificate.

Boiler attendant's certificates and stationary engine driver's certificates (including those qualifications deemed equivalent) remain valid for use as follows:

Boiler Capacity: (old HP rating)	Qualification:
15 HP or under	Responsible person
>15 to 200 HP incl.	Boiler Attendant's Certificate
>200 to 500 HP incl.	Second-class Engine Driver's Certificate
Over 500 HP	First-class Engine Driver's Certificate

Candidates wishing to have these qualifications credited towards an ENCHEM qualification must undergo a review process, by a recognised assessor, to establish their competency relative to the standards concerned. No automatic translation from the old qualifications to the new qualifications is possible.

For more details, please contact:

Mr. Carl Ammon
Dairy Industry Training Organisation
Ph: (07) 839 7370
Fax: (07) 339 7606

The Dairy Industry Training Organisation is recognised by NZQA as the national training standards body for energy and chemical plant unit standards. Ed

Recognition of Standards Under the PECPR Regulations

The following standards relate to the design, manufacture and operational safety of equipment and will be recognised under regulation 17 of the PECPR Regulations. They will be either directly recognised as primary applicable standards or, indirectly recognised as a result of being referenced from within a primary applicable standard. (Note: There will be other indirectly recognised standards, within the primary applicable standards, not included in the following schedule.)

These standards are also referenced in the approved codes of practice for boilers and passenger ropeways and the draft codes of practice for cranes and pressure equipment.

Until working drafts of the cranes and pressure equipment codes of practice become available about October 1999, the recognised standards relating to this equipment should be used in conjunction with the relevant ES Doc.

Pressure equipment

BS 470	Specification for inspection, access and entry openings for pressure vessels
BS 759	Valves, gauges and other safety fittings for application to boilers and to piping installations for and in connection with boilers
BS 806	Design and construction of ferrous piping installations for and in connection with land boilers
BS 853	Calorifiers and storage vessels for central heating and hot water supply
BS 855	Welded steel boilers for central heating and indirect hot water supply (rated output 44 kW to 3 MW)
BS 1101	Specification for pressure containers for paint and other similar substances
BS 1113	Design and manufacture of water-tube steam-generating plant (including superheaters, reheaters and steel tube economisers)
BS 1746	Specification for domestic pressure cookers
BS 2790	Design and manufacture of shell boilers of welded construction
BS 3274	Specifications for tubular heat exchangers for general purposes
BS 3970 Parts 1 to 5	Sterilising and disinfecting equipment for medical products
BS 4814	Specification for expansion vessels using an internal diaphragm, for sealed hot water systems
BS 4994	Specification for design and construction of vessels and tanks in reinforced plastics
BS 5169	Fusion welded steel air receivers
BS 5500	Unfired fusion welded pressure vessels
BS 2486	Recommendations for treatment of water for land boilers
BS 6759	Safety valves
BS/EN 286 Part 1	Simple unfired pressure vessels designed to contain air or nitrogen — design, manufacture and testing
BS EN 287 Parts 1 to 2	Approval testing of welders for fusion welding
BS EN 288 Parts 1 to 4	Specification and approval of welding procedures for metallic materials
BS EN 60045 Part 1	Guide to steam turbine procurement
NZS 5351	Code of practice for the installation, operation and maintenance of building service and small industrial boilers
NZS 5418	Transportation containers for hazardous substances

ANSI/ASME Section 1 (water tube boilers only)	Power boilers	BS 466	Power-driven overhead travelling cranes, semi-goliath and goliath cranes for general use
ANSI/ASME Section VIII Div 1 & 2	Pressure vessels	BS 1757	Power-driven mobile cranes
ANSI/ASME B31.1	Power piping	NZS/BS 2573 Parts 1 & 2	Rules for the design of cranes
ANSI/ASME B31.3	Chemical plant and petroleum refinery piping	BS 2452	Specification for electrically-driven jib cranes mounted on a high pedestal or portal carriage
ANSI/ASME B31.5	Refrigeration piping	BS 5744	Code of practice for the safe use of cranes
ANSI/NFPA 85A	Single burner boiler furnaces	BS 7121	Parts 1,2,4 & 5 Code of practice for the safe use of cranes
ANSI/NFPA 85C	Standard for the prevention of furnace explosions/implosions in multiple burner boiler furnaces	BS 7262	Automatic safe load indicators
ANSI/NFPA 85F	Pulverised fuel systems	Passenger Ropeways	
ANSI/NFPA 8506	Standard on heat recovery steam generator systems	CAN/GSA - Z98 - 96 Passenger Ropeways	
AS/NZS 1200	Pressure equipment	Earthquake and Wind Loadings	
AS/NZS 1677 Parts 1 & 2	Refrigerating systems	NZS 4203	General structural design and design loadings for buildings
AS/NZS 3711.6	Tank containers	The following standards relate to the administrative provisions of the PECPR Regulations and will be recognised under regulation 22. These standards are also referenced in the approved codes of practice for boilers and passenger ropeways and draft codes of practice for cranes and pressure equipment.	
AS 1210	Pressure vessels	AS/NZS ISO 9001	Quality systems—Model for quality assurance in design, development, production, installation and servicing
AS 1210 Supplement No. 1	Pressure vessels—Advanced design and construction	AS/NZS ISO 9002	Quality systems—Model for quality assurance in production, installation and servicing
AS 1228	Pressure equipment—Boilers	AS/NZS 3788	Pressure equipment—In-service inspection
AS 2873	Carbon-manganese steel cylinders for compressed gases—Seamless—0.1 kg to 500 kg	AS/NZS 4481	Pressure equipment—Competencies of inspectors
AS 2874	High tensile carbon-manganese steel cylinders for compressed gases— Seamless—0.1 kg to 500 kg	SAA/SNZ MP76	Pressure equipment—Inspection bodies and personnel
AS 2875	Alloy steel cylinders for compressed gases—Seamless—0.1 kg to 500 kg	BS EN 45004	General criteria for the operation of various types of bodies performing inspection
AS 2971	Serially produced vessels		
AS 3577	Steel cylinders for compressed gases Seamless—150 kg to 500 kg		
AS 4041	Pressure piping		
AS 4343	Pressure equipment—Hazard levels		
AMBSC Code Parts 1 & 2	Australian Miniature Boiler Safety Committee		
TEMA Code	Tubular Exchanger Manufacturers Association Code for the Design of Shell/Tube Exchanger Tubesheets		
UL 1450	Motor Operated Air Compressors, Vacuum Pumps and Painting Equipment. (For pressure vessels used as part of an air compressing unit.)		
IMDG Code	International Maritime Dangerous Goods Code		
Cranes			
NZS/BS 302	Stranded steel wire ropes - Parts 1,2,8		

All Areas Inspections

In the June issue of *Safety Lines* we advised that All Areas Inspections based in New South Wales had been recognised as an inspection body.

We did not provide full contact details for this organisation. These are as follows:

AAI - All Areas Inspections

PO Box 6404

Baulkham Hills BC

New South Wales 2153, AUSTRALIA

Tel: 0061 2 9679 1045

Fax: 00612 9679 1792

Responsible Person and Boiler Attendant Training

As a result of recent changes to the boiler qualifications structure, a need has emerged for training to fill the gap left by the demise of the old boiler attendant certificate. I.Q. Technology, a locally-based provider specialising in the delivery of technical training, has developed self-paced, CD-ROM-based courses designed to meet the specific training needs of small boiler installations.

The instructional content was prepared in close collaboration with the Dairy Industry Training Organisation and with the active involvement of two leading manufacturers of boilers and ancillary equipment. Hamilton-based Rolls Royce (NZ) Ltd. played a key role in defining the practical training requirements for Responsible Persons supervising unattended plant and in ensuring that the training is closely aligned to the requirements of the boiler code of practice. Auckland-based Spirax Sarco contributed a range of resource material including some internationally acclaimed video footage. Both companies provided expert technical support and performed content validation.

The training packages are recognised by the New Zealand Qualifications Authority and meet all of the unit standards curriculum requirements of the new certificate Boiler Attendant and the certificate Responsible Person - unattended plant, as well as

serving as a basis for ongoing study towards higher qualifications. Although responsible person certification is not a mandatory requirement, it would nevertheless be evidence supporting any claim that 'all practicable steps' had been taken to ensure safety and in ensuring a basic level of plant knowledge. The certificate - boiler attendant course may be part-funded by a Government subsidy available through the Dairy Industry Training Organisation.

The courses make extensive use of multimedia and interactive simulation. A virtual boiler room with gauge glass, boiler management and burner control simulators provides a realistic learning environment. The courses incorporate computer- or web-based self-assessment modules and they may be purchased as a complete package that includes "on-job" assessment against the appropriate NZQA unit standards. I.Q. Technology plan to extend the functionality of the training material by providing registered users with access to a range of additional resources and an "ask-an-expert" technical advice service via their web site.

I.Q. Technology Ltd provided the above article. For more information contact:

I.Q. Technology Ltd.
Ph (07) 323-9056 Fax (07) 323-7064
email: iqtech@wave.co.nz
URL: www.iqtechnology.com
NZDITO
Ph (07) 839-7370 Fax (07) 839-7606
email: office@dito.co.nz
URL: www.dito.co.nz

A New Zealand Energy Road Map

CRL Energy Ltd are organising conferences for Wednesday 20th October 1999 and Thursday 21st October 1999:

20th October 1999

"A New Zealand Energy Road Map - Vision for 2020"

This day will focus on wider issues facing New Zealand as we move into the 21st century. The range of invited speakers will present overview papers on topics relevant to New Zealand including:

- Energy resources and supply
- Energy technologies advanced and new
- Energy management
- Energy-related environmental issues
- Energy research requirements

In conjunction with:

21st October 1999

"8th New Zealand Coal Conference - Coal Powering into the Future"

This day will be devoted to coal-specific issues, with a geological/environmental symposium and parallel coal utilisation presentations.

The venue for both days will be the Park Royal Hotel, Wellington. Further information and registration forms are available from:

Anne Herbert
Conference Secretary
CRL Energy Ltd
PO Box 31-244
Lower Hutt
New Zealand
Tel: +64 4 570 3718
Fax: +64 4 570 3711

Crane Controls Upgrade

A 27-year-old tower crane used on Wellington's \$102 million Westpac Trust Stadium construction site has capabilities that much newer cranes on the site cannot match, thanks to the replacement of old control systems with AC motor controllers.

The role of the tower cranes on this site is particularly critical because about 90% of the stadium structure is made of pre-cast concrete components, most of which have to be lifted into position as soon as they arrive from the manufacturer.

The size of the job meant that four of Fletchers heavier tower cranes were utilised to provide adequate site coverage — including a 27-year-old German built crane. The 20 tonne capacity of this older crane was needed, but Fletchers had to be sure that the crane was reliable before committing it to the stadium job.

The most troublesome component of this crane was the slew mechanism. The rotation of the jib is powered by three slew drives which are designed to give equal torque on pinions at 120 degrees centres around the slew ring. The slew ring is a large ball bearing fitted with a fixed gear, which is mounted just below the cab at the top of the tower. Each slew drive unit consisted of a constant speed motor driving a reduction gearbox via an eddy current coupling. Slewing effort was adjusted by varying the DC excitement of the coupling.

The eddy current couplings were prone to both mechanical and electrical failure. When a coupling failed the remaining units could over-energise, sometimes to a point where complete lockup was possible. If not identified early enough, mechanical failure of some part of the slew mechanism followed. A worst case scenario was to strip a tooth from the slew ring gear. Repairs cost \$100,000, plus the cost of dismantling and reassembling the crane. Ring gears for these cranes are not available ex-stock and are manufactured and shipped from Germany.

A mechanical solution using fluid couplings was considered but rejected.

Fletchers enlisted the help of Arthur Ede Ltd to pioneer an innovative solution using PDL Microdrive Elite AC motor controllers. The original drive motors are now direct coupled to the gear boxes and all direction, speed, acceleration, torque and braking control is provided by a bank of Elite controllers.

This has the following advantages:

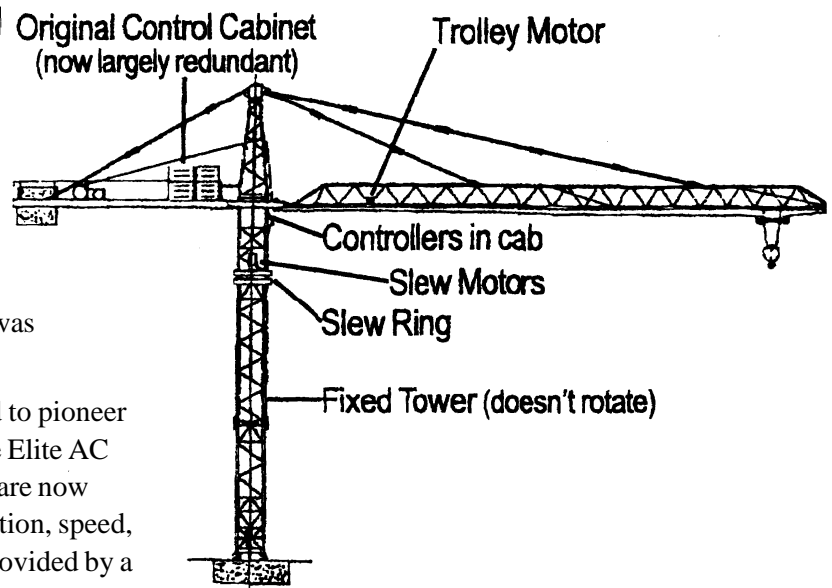
- Improved reliability;
- Lower conversion cost. About one third of that of the hydraulic option;
- Avoidance of problems arising from limited support of an older crane.

The controllers are synchronised in a 'master and two slaves' configuration, with control data transmitted between them by fibre optic cable. The slave motors' torque is set by and equal to the master. The fibre optic link is immune to the electrical noise common in industrial environments and can handle a very high digital information flow, compared with conventional wiring.

A Microdrive Elite, using PDL Vista software also controls the movement of the trolley carrying the hoist along the boom. The trolley control is speed based and incorporates a 'slow down' signal and automatic deceleration to a 'stop' position at each end of its track. This provides a safety margin against operator error. Braking of the trolley is also provided through the motor, avoiding mechanical wear and providing more positive control.

The use of AC motor controllers on tower cranes is very new internationally. The technology used for this upgrade is similar to that in the crane manufacturer's latest cranes.

Location of Components on the Crane



Shopping for the PECPR Regulations!

Engineering Safety has had many queries about the cost and availability of the Pressure Equipment, Cranes and Passenger Ropeways Regulations.

The reference is Part No. 99/128.

The recommended retail price is \$3.95 and copies are available, or can be ordered from:

Bennetts Campus Book Centre Commerce House Queen Street Auckland	London Bookshop Centre City New Plymouth
Bennetts Govt Bookshop Whitcoulls Centreplace Hamilton	London Bookshop Cameron Street Whangarei
Bennetts Govt Bookshop Cashel Street Christchurch	Bennetts Govt Bookshop Broadway Avenue Palmerston North
McLeods Hinemoa Centre Rotorua	Bennetts Govt Bookshop Bowen Street Wellington
Chapters and Verses Stafford Street Timaru	Bennetts Govt Bookshop George Street Dunedin
Book's 'A' Plenty Grey Street Tauranga	Beattie and Forbes Cnr Hastings and Tennyson Streets Napier

Books and More
Trafalgar Square
Wanganui

Muir's Bookshop
Gladstone Road
Gisborne

Whitcoulls
Esk Street
Invercargill

Hedley's Bookshop
Queen Street
Masterton

Revised Code of Practice

Mato Dugalic, Technical Secretary on the Boiler Code of Practice Committee, has advised that a revision of the *Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers* is about to enter the ministerial consultation process. This is the first revision since the code was published in March 1996 and consultation is expected to take place in October - November 1999. *Safety Lines* readers wishing to take part in the consultation process and be included on the distribution list for the draft revision should contact:

Mato Dugalic
OSH, Department of Labour
PO Box 3705
Wellington
Ph. 04 915 4460 Fax. 04 915 4370
Email: mato.dugalic@osh.dol.govt.nz

Engineering Safety Staff Contact Details

Contact details for Engineering Safety staff are as follows:

	Phone:	Fax:	E-mail:
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
Mato Dugalic	(04) 915-4460	(04) 915-4370	mato.dugalic@osh.dol.govt.nz

Postal and delivery details are:

Occupational Safety and Health Service
Department of Labour
Aurora House,
62 The Terrace,
P.O. Box 3705,
Wellington

A Crane

Engineering Safety receives many queries about the application of the PECPR Regulations to cranes and their attachments. It is timely to remind readers that a crane, as defined by these regulations:

1. Means a powered device:
 - a) That is equipped with mechanical means for raising or lowering loads suspended by means of a hook or other loading handling device; and
 - b) That can by the movement of the whole device or of its beam, jib, trolley or other such part, reposition or move suspended loads both vertically and horizontally; and
2. Includes all parts of the crane down to, and including, the hook or load handling device and all the chains, rails, ropes, wires or other devices used to move the hook or load handling device; but
3. Includes only lifting gear which is an integral part of the crane, otherwise lifting gear is excluded.

Powered hoists mounted on a runway beam and which are moved along the beam by manual effort are not defined as cranes by the PECPR Regulations. They are not subject to design verification and inspection by inspection bodies.

In the above definition of a crane, the suspended load must be moved both vertically and, in at least one direction, horizontally, by powered means.

Knuckle Boom Cranes

Knuckle boom cranes, such as Hiab, Palfinger etc., are covered by the regulations. It is not intended that all such cranes will require a certificate of inspection. The pending code of practice will establish a boundary below which regular inspection and testing will be able to be performed by a competent person appointed by the controller. This will be at about 10 metre tonnes.

Lifting and Spreader Beams

Beams carried by the hook of a crane are not covered by the PECPR Regulations. They should be designed to a standard e.g. NZS 3404, certified by a registered engineer, and tested and marked with their safe working load and regularly inspected by a competent person.

If a load handling device, such as a lift or spreader beam, is permanently attached to the crane, then it forms part of the crane and is subject to the requirements of the PECPR Regulations including design verification, inspection and testing.

Rigging Gear

Rigging gear is not covered by the PECPR Regulations but must be designed to a standard, tested, marked and put on the controller's register of equipment. A code of practice for load lifting rigging is being prepared by industry.

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: Peter Williamson

Phone: (04) 915 4461

Fax: (04) 915-4370

Email: peter.williamson@osh.dol.govt.nz

Articles in this newsletter may be freely reproduced, in full or in part, in other publications, as long as the source is acknowledged and the text is not edited. Back issues and additional copies of the current issue are available free of charge at the above address.

Contents

Trans-Tasman Mutual Recognition Arrangement	1
Boiler Operator Qualifications	2
Recognition of Standards Under the PECPR Regulations	3
All Areas Inspections	4
Responsible Person and Boiler Attendant Training	5
A New Zealand Energy Road Map	5
Crane Controls Upgrade	6
Shopping for the PECPR Regulations!	7
Engineering Safety Staff Contact Details	7
Revised Code of Practice	7
A Crane	8