Safety Lines

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Hat Trick for Current Forklift Champion

The 2004 Nissan National Forklift Drivers' Competition was won for the third consecutive year by Mike Pennall of Fonterra, Paihiatua.

A champion concentrates

The event took place at Loadlift New Zealand's headquarters in Penrose on October 14th and was attended by members of the New Zealand Warriors rugby league team, including Richard Villisanti and Lance Hohaia.

This was the first year that new Associate Minister of Labour Ruth Dyson attended the competition, and she announced the winners and presented them with their prizes.
Ms Dyson said that the Department of Labour is involved with the event as it continued to build partnerships with New Zealand industry. "The National Forklift Competition is designed to enhance workplace safety and health by encouraging `best practice' and discouraging `bad practice"', she said.

Chief judge, Maurice Flood of OSH, commented at the prize-giving that every year the judges expected the skill level to begin to plateau, and every year they are pleasantly surprised by the further improvements demonstrated. 2004 was no exception, the standard being the best yet. In addition to ten repeat finalists, there were four newcomers, who performed very well.

Despite good competition, nothing could prevail against the sheer precision and skill demonstrated by ultimate winner Pennall.

Continued ...

Merry Christmas

to all our readers. We look forward to bringing you Engineering Safety issues in 2005. Have a happy, healthy and safe break.

from all the Engineering Safety team.

This quiet achiever finished head and shoulders above the rest in the final scoring to win a trip for two to the 2005 Formula One Grand Prix in Melbourne.

Runner-up Andrew Toye from Juken Nissho Ltd, another quiet achiever, received $500. Coming in third for $250 was Paddy Didovich of SCA Hygiene, a finalist now for a number of years.

Donna Karena, from Cerebos Greggs, scored very creditably in the middle of the field on her first attempt at a final, and as the first female finalist of the competition series. All finalists received trophies commemorating their entry in the 2004 final.

The competition, sponsored by Nissan Forklifts, Loadlift Equipment, OSH, Mainfreight, and Timpack, had a wide representation of industries entering over 320 competitors from the regions, these being narrowed down to a final fourteen.

To test skill levels there were five on-course practical assessments using different course layout configurations, and using both internal combustion and electrically powered forklifts. A comprehensive forklift pre-operational check and six written theory examination papers were also included. Results were collated after the final round with nobody knowing their actual placing throughout the event.

The finalists were:

Alan Davis	Fonterra	Hamilton
Paddy Didovich	SCA Hygiene	Hamilton
Danny Evans	Toll Tranz Link	Ashburton
Andy Isle	TNL Freighting	Nelson
Donna Karena	Cerebos Greggs	Auckland
Kalo Karepa	Scholastic	Auckland
Stuart Mitchell	Fisher & Paykel	Dunedin
Keith Mudgway	Mainfreight	Palmerston North
Mike Pennall	Fonterra NZMP	Paihiatua
Steven Reid	Woolworths Distribution	Palmerston North
Bill Simmiss	Mainfreight	Nelson
Ronald Thomas	Foodstuffs	Palmerston North
Andrew Toye	Juken Nissho	Masterton
Maadi Waikato	Amcor Packaging	Hastings

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Boiler Code Update

The *Approved Code of Practice for the Design, Safe Operation, Maintenance and Servicing of Boilers* has been updated and is available free from our website. To obtain a copy, visit www.osh.dol.govt.nz and select 'Services' from the menu bar, then 'Engineering Safety'. This takes you to the Engineering Safety home page — worth marking as a favourite. Select 'Documents' from the menu on the left of the page, and you will find a link to the code prominently displayed.

An amendment to the 2000 edition of the code (Amendment number 1) was approved on 29th November 2004 and is effective from 13th January 2005. The amendment is integrated into the document, so it is ready to use once downloaded. In the same web location as the code are two other documents, provided for information and guidance:

- Amendment 1 - This is the actual amendment, which shows the changes which have been made from the 2000 edition; and
- Change and Equivalence Table which gives the equivalence of clause numbers across the 1996 edition, the 2000 edition, and the 2000 edition with amendment. It also highlights significant changes between the versions.

The amendment contains formatting and editorial changes, updating of references, minor and significant changes.

The significant changes include:

- The provision of appropriate backup for boiler control systems that feature programmable logic controllers;
- The requirement for certified quality management systems to be certified to AS/NZS ISO 9001:2000;
- Provision for revalidation of boiler control systems where the boiler is relocated;
- Removal of the explicit requirement to provide logic diagrams and software flow charts in the manufacturer's submission to an inspection body for the purpose of obtaining a design verification; and
- The requirement for the manufacturer's submission to the inspection body for the purpose of obtaining a design verification to include in its boiler control system statement a reference to installation.

From the effective date, the 2000 edition incorporating the amendment should be used instead of any previous version. Engineering Safety will use this edition of the code in future boiler business for as long as it remains current. Business contracted on the basis of an earlier edition before the effective date of the amended 2000 edition will be respected.

Announcements

The following organisation has been recognised under the PECPR Regulations as an Inspection Body for design verification and fabrication inspection of pressure equipment:

HSB (Australia) Pty Ltd
37-39 Commercial Road
Port Adelaide, SA 5015
Australia

The following New Zealand organisations have been recognised as Inspection Bodies under the PECPR Regulations:

J J McArdle Chartered Engineer (UK)
67 Haigh Access Rd
R D 4
Albany
Auckland

Design Engineering (SI) Ltd
P O Box 642
Timaru

A full list of recognised inspection bodies and qualification issuing agencies along with known contact details can be viewed at the Engineering Safety website, which can be accessed via the OSH website:

www.osh.dol.govt.nz

using the services button, or by going directly to:

www.osh.dol.govt.nz/services/eng-safety/index.shtml

Self-erecting Tower Crane Collapse

In July 2001 a self-erecting tower crane collapsed in Cambridge Terrace, Wellington (see photo), landing across a normally busy road, which, thanks to the traffic light sequence, was devoid of occupied vehicles at the time. There were no injuries, but the crane was extensively damaged, and a building facade also received some damage.

Cambridge Terrace crane collapse

The crane had been erected inside the empty shell of the original building and a full rubbish skip (a load of almost 3 tonne) was suspended outside the building when it tipped over. Cambridge Terrace was closed intermittently to all traffic from Courtenay Place to Wakefield Street for several days, due to the severity of the building facade damage, because:

- Retention and remedial work to stabilise the facade had to be done in at least four stages;
- The facade was too unstable to permit public exposure to the risk of collapse, and
- The crane could not be moved until the facade was stabilised.

When the crane mast struck the building, a section of the wall fell through the roof of the site office in line with its entrance.

The crane had clearly overturned due to the load-moment exceeding the permitted value, although the exact sequence of events leading to that situation was disputed and could not be unequivocally ascertained.

It was, however, ascertained that:

- The crane did not have a current certificate of inspection;
- There was a failure to ensure that the various limit devices were tested and calibrated when the crane was assembled on site;
- A copy of the crane manual was not made available to the operator, and
- The lessee was not advised that the crane had been derated from 4,000 kg to 3,000 kg.

Had the crane been examined for its certificate of inspection renewal by an equipment inspector, many of these factors (especially the limit device settings) would almost certainly have been discovered.

For committing an offence under section 16(1)(a) of the Health and Safety in Employment Act 1992, the controller, Industrial Machinery Holdings Ltd, was fined $5,000, and the controller's agent, Gary Douglas Mann, was fined $8,000.

When It Comes to Safety, IEC 61508 Has It Covered

As compliance with the standard becomes a requirement for an increasing number of companies, Stuart Nunns, Manager of Safety Consultancy for ABB and Roger Prew, Manager of Safety Systems for ABB, explain the ins and outs of achieving it. In accordance with CENELEC policy, August 2004 marked the deadline for the withdrawal of any national standards that conflict with IEC61508, the international standard focusing on safety-related systems that incorporate electrical, electronic and/or programmable electronic (E/E/PE) instruments and devices. So, do you know if you're affected and where your responsibilities lie?

Known by some as 'the mother of all safety standards,' IEC61508 is truly international. Although it is not mandatory it is a widely held measure of good practice, so companies are adopting it for a variety of reasons, including commercial advantage, contractual obligations, or to demonstrate to regulators that they are protecting their employees and the environment.

Yet even though the final sections of the standard were published by the International Electrotechnical Commission as far back as 2000, the level of understanding and implementation differs widely between industries and even between regulators in various countries.

First, we need to be clear about what's covered. The standard is generic, so it is designed to cover all industrial sectors. It is being followed up by a number of sector-specific standards that refer upwards to IEC61508. For example, IEC61511 was published last year to cover the process industries, and IEC61513 (nuclear generation) and IEC62061 (machinery) are on their way.

Due to its generic nature, the range of E/E/PE safety-related systems to which IEC61508 can be applied is incredibly diverse - but, in every case, the standard applies to the system as a whole, including human operators where relevant.

The emphasis is on achieving an acceptable overall level of safety, or safety integrity level (SIL), not on installing the right bits of kit. IEC61508 is global, which means it covers all aspects of the process, including operation, maintenance and validation.

The standard must also be considered throughout the full life cycle of the process, from inception and initial design, through implementation, operation, maintenance, modification, de-commissioning, and final disposal: in other words, from cradle to grave.

Minimising risk

Increasing safety is all about minimising risk, so next we must define what we mean by risk. Risk is a combination of the probability and severity of an adverse effect - how often can it happen and what will be the consequence if it does?

The standard is concerned with the likelihood of events that can have an impact on: safety of personnel; integrity of the environment; risk of damage to capital equipment; risk of lost revenue from lost production; risk of litigation from any cause; and risk of damage to the company's image and hence its value.

This effectively means that all processes should be assessed against the standard to determine whether it applies. The tool for spotting and quantifying the risks is a HAZOP hazard and operability study, which is usually carried out by a team from the plant.

Although IEC61508 is concerned primarily with the integrity of safety systems, its also important to specify the correct systems in the first place. Why impose an additional layer of complexity with an electronic safety system if good engineering design can mitigate the risk in the first place?

The HAZOP study will help to highlight any areas where risks can be eliminated. Once you've determined the risks, you can start to design a system to minimise them. Depending on the severity and frequency of the hazard, the safety system will have to reach one of four safety integrity levels, ranging from SIL1 for relatively low risks to SIL4 for the highest risk applications.

It's important to note here that a SIL is not the property of a component or subsystem, but of the safety function. So a manufacturer of a limit switch, valve or other component may promote it as being suitable for, say, SIL2 applications, but that will only be true if it's installed and maintained correctly.

All manufacturers can really say is that their products meet certain requirements of IEC61508. They may have published and independently audited figures for the probability of failure on demand (PFD), for instance, which can then be used in the assessment of the safety function.

This means that it's not essential to use certified products to achieve SIL compliance, but the task of justification will be much easier if you do. Once the system is up and running the next crucial activity is the functional safety assessment, which checks that functional safety has actually been achieved.

The people carrying out the assessment must be competent and independent, but that doesn't mean that every company will have to call in the consultants. The level of independence required of the assessor ranges from an independent person in the same organisation for SIL1 to an independent organisation for SIL4.

The required level of independence for levels 2 and 3 is affected by additional factors such as the complexity of the system, the novelty of the design and the previous experience of the developers.

Smaller companies

For some smaller companies, even the most basic requirement for independent people from a separate department may have to be met by an external organisation. On the other hand, companies that have internal organisations skilled in risk assessment and the application of safety-related systems, which are independent of and separate (in terms of management and other resources) from those responsible for the main development, may be able to use their own team.

The key to compliance lies in providing documentary evidence to support the validity of all the data used in the assessment. The final link in the safety chain is periodic proof testing, which ensures that the safety loop continues to meet the required SIL. Once again the standard provides guidance on what constitutes adequate proof testing, along with how to calculate the interval between proof tests. There are always conflicts between the ideal proof test interval and the practical availability of the plant to carry out this type of check. So it's important to consider proof testing at the design stage to avoid unnecessary downtime later while test cycles are carried out.

Competence essential

Essentially then, IEC61508 requires that end users have in place the means to manage functional safety. They need to ensure they have competent staff who can operate and maintain E/E/PE safety systems to keep them doing the jobs for which they were designed.

There is help available for those companies concerned that they might not have the necessary skills in house. Equipment manufacturers, consultants and even the regulators can all offer support and advice. However, the ability to offer a true one-stop-shop to address every aspect of compliance is rare.

ABB's Automation Technologies Division has a wealth of experience in the field of safety-related systems, encompassing the complete safety life cycle for a host of industrial sectors. By applying this experience, ABB can offer the consultancy and expertise to make sure you've got it covered when it comes to meeting the demands of IEC61508.

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A useful wall chart explaining IEC 61508 compliance is available in pdf format, that can be printed in A3 or A4, from ABB Instrumentation, phone: 09 356 2166, email: abb.instrumentation@nz.abb.com.

Mobile Crane Incident—Low Winch Hydraulic Pressure

During a lift using the mobile crane's auxiliary hook, which entailed the jib having to be retracted for load placement, the load free fell some 3-4 metres to the ground, striking a worker a glancing blow to the shoulder.

As the jib retracted, the main hook started to come down too close to the ground. The crane operator, without engaging the pawl, attempted to make the deft movements necessary to switch temporarily to the main winch for the purpose of drawing in the descending main hook, and then quickly back to the auxiliary winch that controlled the load. The minimum operating hydraulic pressure was set at approximately 14 bar, which was enough to hold an empty hook but not the loaded hook, and during the switchover pressure was lost on the auxiliary side.

In this instance, where the control system permitted winch engagement with insufficient hydraulic pressure, the following measures were put in place:

1. An alarm was fitted to sound when hydraulic pressure is too low to fully engage the winch clutch.
2. The pawl will be engaged at all times when a winch is inactive.
3. The main winch rope, when not active, is to be wound back on its drum, so that only one winch is used, thereby eliminating the need to change winches during a lift.

Controllers are requested to check that the above situation cannot occur on their cranes, and if necessary, either suitably modify the control system or implement the above measures.

Lifting Equipment - A Reminder About Proof Testing

Suppliers need to be aware of the requirement for lifting equipment to have been proof tested before being used in New Zealand.

In many cases this is done by the manufacturer in accordance with the Standard to which the lifting equipment is built. This needs to be covered in the documentation that the supplier receives from the manufacturer. If this is not available then the items must be proof tested by a testing facility and the documentation from that testing held by the supplier. This is to comply with Regulation 20 of the PECPR Regulations.

This information also needs to be given to the purchaser of the equipment for his retention.

Precast Concrete Anchors - Notice

In the *Approved Code of Practice for the Safe Handling, Transportation and Erection of Precast Concrete*, table 1 and figure 6 on page 27 were recently overprinted (on the downloadable 'pdf' version) with a warning, which related to a possible unsafe condition. This warning, related to the safe working loads of anchors, has now been removed.

The warning was originally put in place as a speedy response to industry concerns about the accuracy of the table values. In the light of wider discussions it has now been seen as prudent to further review the situation prior to introducing a warning or taking such other action as may be necessary to uphold the integrity of this aspect of the code.

The Power Crane Association commissioned Opus International Consultants Limited to conduct strength tests and these are now essentially complete, with only the report to be provided. When the results are available for consideration, a meeting of interested parties will be held before reaching any proposals to amend the code of practice.

Chartered Professional Engineers

In the past the PECPR Regulations and the Amusement Devices Regulations, as well as various codes of practice, have called for certain activities to be undertaken by a Registered Engineer. Such references are now to be regarded as being to a Chartered Professional Engineer.

Until the end of 2003, engineers who performed certain activities could still be registered under the Engineers Registration Act 1924, which has now been repealed. Engineers performing these activities must now (from the beginning of 2004) be Chartered Professional Engineers as defined in section 6 of the Chartered Professional Engineers of New Zealand Act 2002.

It is important for engineers to realize that they cannot continue to carry out activities, which once required a Registered Engineer, without first becoming a Chartered Professional Engineer. Apart from the illegality of doing so, any documents issued would be void, and would, for example, not be accepted by an Inspection Body.

HERA Courses and Seminars

HERA Training Centre is offering the following courses and seminars during 2005:

Activity	Dates
Welding inspection HERA House	7-11 March 20-24 June 19-23 September 28 November- 2 December
Coatings inspection Home study Introduction block courses HERA House	 All year 18 March & 15-16 September
Surface methods HERA House	4-8 April 22-26 August
Radiographic theory and Interpretation of weld radiographs HERA House	9 -13 May 5-9 September
Ultrasonic testing theory and Ultrasonic weld testing HERA House	23-27 May
Ultrasonic wall thickness HERA House	1-2 June
Management appreciation in non-destructive testing HERA House	29 June 5 October

The HERA House venue is as follows (for others contact HERA):

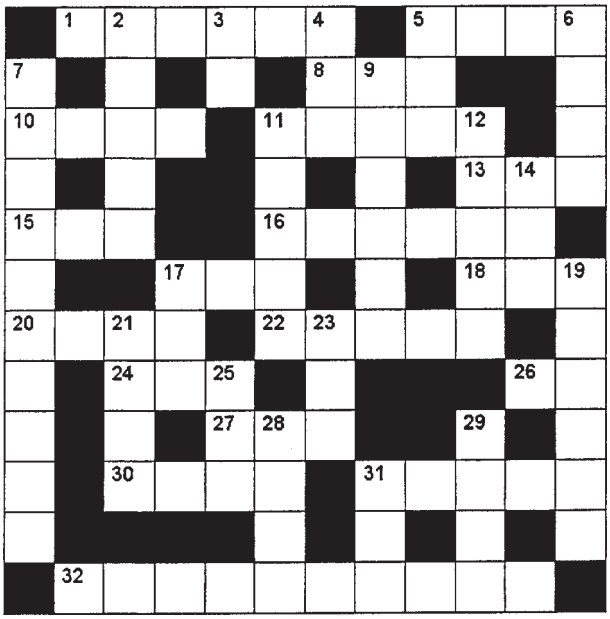
HERA House
17-19 Gladding Place
MANUKAU CITY (South Auckland)

Note: Enrolment closes 7 days before start of 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

Puzzle Place



Answers include abbreviations and acronyms.

	ACROSS		DOWN
1	Grooved pulley	2	Raise
5	Bustle	3	Astatine
8	Eggs	4	Very long period
10	Welding institute (now gone)	5	Corpulent
11	Come together	6	Sow
13	Finish	7	Uncared for
15	Small bird	9	Watched
16	Directed toward the inside	11	Individual things
17	Allow	12	Weird
18	Of it	14	Non-destructive testing
20	Make a less tight fit	17	Constellation
22	Walk stealthily	19	Packed in place
24	Very warm	21	Retail premises
26	Perform	23	Annoy
27	Enquire	25	Yellowish-brown
30	Pale red	28	Outer covering
31	Force air or inert gas the inside	29	Unit of mass
32	Establish again	31	Greek letter

Answers can be obtained by email from:

robin.bain@dol.govt.nz

Answers to *Safety Lines* Issue 63 Crossword

	Across		Down
1	Guest	1	Gauss
4	Daraf	2	End
7	Olio	3	Tot
9	Data	4	Dons
11	NDT	5	Rat
12	SI	6	Flows
14	Snugger	8	Lacerating
15	Arcs	10	Angstrom
17	Emu	13	In here
18	Tin	15	Amid
19	Prorate	16	Rune
20	Deem	17	ET
22	Re	19	Proud
24	Omen	21	Metre
26	ISO	23	Disc
28	Ages	24	One
29	Dwelt	25	Eat
30	Curie	27	Our

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Contents