

Newsletter | December 09

ENGINEERING DUE DILIGENCE



Welcome to the December 2009 edition of the R2A Newsletter

As we come to the end of another year, the directors, staff and associates at R2A wish you and your families a safe and festive season. We look forward to continuing our relationships with you over the coming year.

Current and recent projects at R2A include review of the proposed EG(0) standard for Energysafe Victoria (with Brisbane Associate Janelle Adrain), risk register review for Perilya Limited (Broken Hill), safety case development for Maritime Safety Queensland (Weipa and Cairns) and for Star Pilots (Torres Strait and Great Barrier Reef), and a number of train reviews for Connex and the Department of Transport in Victoria. A large number of in-house courses have been conducted on behalf of Engineering Education Australia, especially for power transmission companies.

Papers presented include the Australian Marine Pilots Institute conference (Friday 23 October 2009) addressing due diligence for pilotage. The topic is summarised below. R2A also recently developed a post graduate unit in Systems Safety for Edith Cowan University, to commence in 2010. The unit is formally part of the ECU's Public Health post graduate offerings and uses the 7th Edition (revised) of the R2A Text as its primary resource. See http://www.sebhs.ecu.edu.au/public_health/osh/.

Pilotage Operations Safety Management Systems (POSMS)

Most pilotage 'failures' of recent times have been due to human error. Such errors are particularly frustrating when recognised good practice to deal with a known hazard is available but not implemented. Whilst individual ingenuity may be needed to address new or novel hazards, for known hazards the collective wisdom of an expert group is almost always superior to that of a single practitioner. And for new or emerging problems, second (and further) expert opinion is still very, very desirable.

A POSMS aims to ensure that known good practices of competent pilots in a given pilotage are made available to, and reliably implemented by, all pilots in that pilotage. All pilots in a port or navigation area express and confirm what constitutes good pilotage practice for that pilotage. When these good practices are agreed, all pilots are to adopt them.

Generative interviews (not audits) with pilots are used to build a robust and transparent POSMS. A POSMS requires:

- completeness checks – to ensure no important issue is overlooked
- documentation of agreed pilot based recognised good practice
- training and competency testing for compliance with the recognised good practices

Such a POSMS can be readily reviewed and periodically audited by regulatory bodies.

Briefings and Workshops 2010

R2A has developed a suite of briefings and workshops for 2010 as shown below, to be managed for R2A by Rocarm Pty Ltd (rocarm.com). Further details will follow.

Engineering Due Diligence (½ day briefing)	Wellington - 23 Feb	Melbourne - 12 Oct	Brisbane - 23 Nov
Organisational Risk Management (½ day)	Perth - 29 Apr	Melbourne - 8 Jun	
Project Due Diligence (1 day workshop)	Melbourne - 16 Mar	Canberra - 7 Sep	
Availability Profiling (1 day workshop)	Brisbane 13 Apr	Perth 10 Aug	
SIL Allocation (1 day workshop)	Sydney - 13 Jul	Perth - 14 Sep	

For more information about presentations and Newsletters please visit our website at www.r2a.com.au.

Michael Hall

Michael has been appointed an R2A Associate. An honours engineering graduate from UNSW,

he also has Masters degrees in Aerospace & Mechanical Engineering (Arizona) and Defence Studies (Canberra).

He has previously been Chief Engineer for the Overlander Program (DMO) and a Senior Instructor at the US Army Logistics Management College.



The paradigm shift from target risk levels (hazard risk analysis) to due diligence (precautionary risk analysis) will be very difficult

As discussed in recent R2A newsletter articles, the transition from target risk levels (hazard risk analysis) to the precautionary due diligence paradigm of the Rudd government's Model OHS Act is expected to be very difficult for many sectors.

For Information:

The Rudd government's *Safe Work Act 2009* is expected to apply in all Australian jurisdictions from 1 January 2012. The act requires, inter alia, that *due diligence* must be exercised by responsible *officers*. Case law is to be relied upon to determine *due diligence*.

The High Court of Australia has considered the common law implications of *due diligence* arising from the application of the Hague Rules, scheduled to the Carriage of Goods by Sea Act, in *Shipping Corporation of India Ltd v Gamlen Chemical Co A/Asia Pty Ltd (1980) 147 CLR (12 Dec 1980)*.

An example of such difficulties is the implication for land use planning around major hazard fuel depots after the Buncefield incident in the UK on 11 December 2005. Here an unconfined petrol vapour cloud exploded, creating substantial explosive over-pressures over a large area with commensurate damage. The lack of deaths and injuries was due only to no people being present at the time.

Before this incident, unconfined vapour cloud ignitions were believed not to create explosions, only deflagrations (rapid flame fronts). That is, without any form of containment the flame front remains sub-sonic and no explosive

over-pressures occur. Explosive over-pressures due to vapour cloud ignition were not considered credible and so were excluded from tank farm QRAs.

After Buncefield, this approach is clearly no longer acceptable, as the Buncefield investigative committee agreed. Nevertheless, such explosive events remain very unlikely, as a large number of



circumstances need to align to produce them. These include numerous collective human errors, failed engineering controls, very stable weather and an unusual topological conditions.

This is well documented in the various reports of the investigative committee and in: *Illustrative model of a risk based land use planning system around petroleum storage sites* prepared by DNV Energy for the Buncefield Major Incident Investigation Board in June 2008 (available at <http://www.buncefieldinvestigation.gov.uk/reports/index.htm>). It seems that the investigative committee recommends the use of individual and societal risk targets for land use planning purposes.

In R2A's experience, a risk target approach has never been able to pass the common law due diligence test. This did not matter whilst regulations under legislative fiat required QRAs to achieve target levels of risk and safety. But the Rudd government model OHS act (which specifically includes the storage and handling of dangerous goods) requires all reasonable precautions consistent with case (common) law to be in place, overturning these existing approaches.

For example, if a plot of the over-pressures at Buncefield were to be mapped to any major hazard fuel farm in Australia, the area that can cause fatalities is huge. If the event is discounted by the unlikelihood of its occurrence in accordance with the risk target approach and individual risk contours are developed, it is a much smaller area. Under most current planning regimes, structures developed beyond such individual risk contours need only be building code compliant.

Most deaths and injuries due to explosions, especially in dwellings, occur as a result of flying debris, particularly roof tiles and glass shards, rather than over-pressure. Using the common law test of the balance of the significance of the risk vs the effort required to reduce it, the cost of the provision of sheet metal roofs and laminated glass windows rather than tiles and ordinary glass, especially for new structures is very, very small indeed.

If buildings are permitted between the the designated individual risk contour and accelerative glass over-pressure limits without such precautions, and an explosion resulting in deaths or injuries occurs, then those responsible for approving and building such structures (town planners, developers, architects, engineers, builders etc) may be found negligent under the new Australian legislation.