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Engineers Australia Submission – Work Health and Safety Regulations for Western Australia

25 November 2019

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About Engineers Australia

Engineers Australia is the peak body of the engineering profession. We are a professional association with about 100,000 individual members. Established in 1919, Engineers Australia is a not-for-profit organisation, constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Our members sign up to a Code of Ethics that guides their professional practice. We maintain a register of engineers who are assessed and audited on their level of qualification, areas of professional practice and continuing professional development. The register can be referenced by the general public and by those Australian states that legislate a registration system for Engineers. However, membership and Chartered status through Engineers Australia are voluntary and our available sanctions are limited at cancellation of membership and removal from our register.

Historically only Queensland and more recently Victoria have a legislated registration system. The gaps in compulsory and enforceable registration for engineers have led Engineers Australia to strongly advocate at state level for a legislated system of registration for Engineers using a co-registration model and to look more widely at legislation that engages with engineering competency.

Engineers Australia's Submission

Engineers Australia is concerned that workplace injuries and deaths are recurring due to elements not covered or not well covered by either the existing or the proposed legislation. This was also noted by presenters from the Department of Mines, Industry Regulation and Safety (DMIRS) in their 2018 Roadshow. In addition, we have concerns that public safety is not well addressed in current legislation, as evidenced by numerous incidents concerning design, construction and maintenance issues – some examples are the collapse of a house pier and a jetty at Rottnest Island, flammable building cladding, the collapse of the Alluvion footbridge and structural failure of high-rise residential buildings.

Department of Mines WA Significant Incident Reports (SIR) and Mines Safety Bulletins (MSB) have been drawn on below to support our submission. These issues constitute prior knowledge of recurring events and lack of compliance related to large energies which have the potential to cause multiple fatalities. As such they are not only applicable to mine sites but to all of industry where similar plant or structures are present.

Many past mine safety bulletins and significant incident reports indicate a continued lack of appreciation of injury potential due to inadequate structural integrity in equipment and structures (including buildings) lifecycle stages. Lifecycle stages typically include concept, design, construction, commissioning, operations/use, maintenance (including changes or modifications during operations) and decommissioning.

Health and Safety Regulation appears to be reactive, there are well-developed and comprehensive controls for some elements but insufficient coverage of other known hazards. New and emerging hazards are also not well covered. An overall systems approach is hard to discern. The legislation is generally drawn towards site-based activity, which does not lend itself to identifying contributing forces that set up the site conditions. Calls for higher-level responsibility for workplace deaths are not facilitated by adequate chain of causation elements in the legislation: industrial manslaughter provisions must not simply target co-workers and immediate supervisors, particularly where systemic issues are present.

Engineers Australia is primarily concerned with how engineering competency is addressed within the legislation and our comments go mainly to that area. This submission does not address the regulations on a clause-by clause basis. Comments below are given with reference to selected clauses and may apply further across other clauses. The issues raised are relevant to both the General Regulations and the Mines Regulations.

1. Evidence from the Regulator

The following are cited as examples for why the workplace health and safety regulations and their enforcement require some reform. Significant incident reports (SIR) and mine safety bulletins (MSB) numbers are noted along with a summary of the Regulator's assessment including requirements to be addressed, causations identified and recommendations by the Regulator.

SIR 66 - Fatality - Bucket wheel reclaimer failure.
Requirements include:

- undertake design checks during the life;
- design checks if changes are made;
- inspections involving detailed checking and testing (i.e. verification and validation);
- appropriate maintenance.

SIR 244 - Fatality - Collapse of thickener bridge.
Requirements include:

- assessment by competent persons;
- maintaining structures in safe and stable conditions at all lifecycle stages.

SIR 274 - Fixed stacker failure – structural collapse with high energy, and

SIR 269 - Large water tank – failure with high energy.
Causations include:

- inadequate assessment;
- lack of inspection and maintenance by competent persons;
- non-adherence to the original design intent.

MSB 43 – Bin collapse, wharf walkway collapse, bucket wheel and reclaimer failures
Two fatalities, one serious injury and several significant near misses -.
Causations include:

- structures not built per the design details;
- designs not independently verified;
- structures not monitored and maintained by competent persons.

Recommendations include:

- inspections during construction of concrete and steelwork to be by an engineer to confirm it meets the design drawings and specifications (i.e. validation by a competent person);
- independent verification of design;
- Structural Engineers required to inspect and verify the adequacy of structures (i.e. specific competencies per the plant or structure type is required);
- modifications and upgrades of equipment is to be risk assessed and appropriate maintenance instituted where applicable, including electrical controls and mechanical equipment requirements.

MSB 124 - Failures of a large mixing tank, acid leach tank, stacker part, jib crane, stack, winder sheave shaft.
Significant near misses
Causations include:

- those noted in MSB 43 and were expanded upon.

Recommendations include:

- better management of the entire lifecycle;
- use of competent persons in all stages; and
- undertaking appropriate change management using competent persons.

In addition to the above, "Structural Corner" articles in the Resources Safety Matters Magazine indicate that mine sites have not appreciated the structural integrity requirements of plant and buildings during their commissioning and use. The articles included examples such as buildings failing during wind events, a large process tank with too thin wall thickness, concrete decks with corroded soffit decking, practices causing internal accelerated corrosion and damage indicators to runway rails and their fasteners.

2. Engineering Competency and Registration of Engineers

Western Australia does not have a law to require engineers to be registered so there is no legislation governing who can call themselves an engineer and no regulatory body or framework under which their competence level or area of practice is independently assessed. Engineers Australia can only assess those engineers who voluntarily step forward to undertake this process. As a result of recent building failures around Australia and ensuing discussions at the Building Ministers' Forum, the Western Australian Government is proposing consultation on the registration of building professionals (including engineers in that industry), however, this falls short of registering all engineers who design elements that impact the health and safety of workers and the general public.

In addition, management and other positions that may have in the past been held by a qualified engineer are now often held by non-engineers (Yates 2012, *Government as an Informed Buyer*, Engineers Australia Report [1]). This means that managers of engineering tasks or purchasers of engineered solutions may not have the skills themselves to assess the engineering requirements or the level of engineering risk.

Drivers that lead to a systemic reduction in engineering competency include lowest–cost bidding (where a partial or incorrect solution is selected because it is cheaper than a properly-engineered outcome), lack of client or management awareness (of the level and extent of engineering competence required for a task) and a lack of regulatory oversight.

Example 1: in 2014 the Department of Mines carried out an analysis of crane designs which identified a significant issue with respect to compliance and safety. After feedback to industry a follow-up audit in 2015 showed a slightly reduced but continuing high rate of issues. The Department contacted Engineers Australia in 2015 and a joint working group was formed to consider how the continuing inadequacies could be addressed. Causes identified included all three of the above-mentioned drivers. Outcomes effected by Engineers Australia included delivery of tailored professional development, ongoing support for registration of engineers and a push to have plant design recognised as a Special Area of Competence on the National Engineering Register.

Recommendations

Recommendation 2.1: Introduce laws to require engineers in WA to be registered in WA as a matter of urgency and make future reference to this in the Regulations with respect to the competency of Engineers.

Recommendation 2.2: Consider how to address the widespread lack of ability to assess the required level of engineering competence and the scoping/management of engineering tasks by non-engineering personnel.

[1] Yates, A., 2012 "Government as an Informed Buyer" Engineers Australia 2nd Edition

3. References in the Model Regulations to Registration of Engineers

235 Major inspection of registered mobile cranes and tower cranes
*(4) In this regulation, a **competent person** is a person who:*
(a) complies with both of the following:
(i) has acquired through training, qualification or experience the knowledge and skills to carry out a major inspection of the plant; and
(ii) is registered under a law that provides for the registration of professional engineers; or
(b) is determined by the regulator to be a competent person.

The draft Regulations refer to registered engineers in several clauses, for example regulations 235 and 241. This will need to be re-drafted since there is currently no such legislation in WA. Note that point (a)(i) should also apply in the case of point (b).

Recommendations

Recommendation 3.1: Redraft clauses to ensure they refer to new laws that require engineers to be registered to practice. Ensure that the requirements for appropriate knowledge and skills are retained. Note that Engineers Australia maintains a voluntary register of Engineers (The National Engineering Register) that could be referenced here.

4. Competency

5 Definitions
(1) In these Regulations:
competency assessment*, in Part 4.5, means an assessment in relation to the completion of a specified VET course to carry out a class of high risk work.*
competent person *means:*
(c) for a major inspection of a mobile crane or a tower crane under regulation 235—see regulation 235;
(d) for inspection of amusement devices and passenger ropeways under regulation 241—see regulation 241;
(e) for design verification under regulation 252—a person who has the skills, qualifications, competence and experience to design the plant or verify the design;
(g) for any other case—a person who has acquired through training, qualification or experience the knowledge and skills to carry out the task.

Schedule 4 High risk work licences—competency requirements
Regulation 81
1 Purpose of this Schedule
This Schedule sets out the qualifications for high risk work licences.

The Regulations define several required VET qualifications as demonstration of competence. Other than those few clauses that refer to registered engineers, there is no further guidance on the level of competence required for other tasks. The competency of high-risk work license holders, electrical equipment installers and maintainers, divers, inspectors of cranes, amusement park device inspectors, classified plant verifiers, asbestos removalists are more clearly defined than designers of plant and structures.

VET courses are operators' courses and do not cover higher level assessments such as temporary works designs, stability considerations, latent conditions, construction quality etc., that would require an engineer to assess. For example, a rigger can select a sling type appropriate to a particular lifting configuration. However, a complex lift may require input from a structural engineer with an understanding of load paths, energy transfer, material strengths and factors of safety. Neither a requirement to select a higher level of competency, nor a definition of that competency level is addressed by the Regulations, perhaps contributing to the high number of incidents involving cranes.

How competency is defined for designers, manufacturers, managers, constructors, maintainers and indeed regulators is complex and not well addressed in the Regulations. Engineers Australia would offer to assist with developing a schedule to identify elements that require engineering input, including the specific competence required. Reference to Engineers Australia's competency assessment process and register may be made. Non-engineering high level competencies should also be addressed (e.g. managers, site supervisors, industrial chemists).

Example: Definition of competent Engineer - A qualified Engineer who meets the criteria for registration by Engineers Australia and who has specific skills, knowledge and experience in the works or activity being assessed or undertaken.

Recommendations

Recommendation 4.1: Review the competency requirements for higher level tasks. Reference to Engineers Australia's competency assessment process and register may be made.

Recommendation 4.2: Review how other specific non-engineering competence should be defined.

5. Chain of Causation

In October 2018, DMIRS presented their Mines Safety Roadshow. A key feature of this presentation was the analysis by Professor Michael Quinlan on the root causes of fatal incidents, as outlined in his 2014 book Ten Pathways to Death and Disaster: Learning from Fatal Incidents in Mines and Other High Hazard Workplaces. Several other factors identified by Professor Quinlan indicate that health and safety legislation should be focussed on regulation of a wider range of activities than just site-based activities. The governance, management, design, procurement and contracting functions that set up the conditions for construction, operations and maintenance work are generally implied under the general duties of a Person Conducting a Business or Undertaking (PCBU) but this general mention does not facilitate a chain of causation under the Regulations.

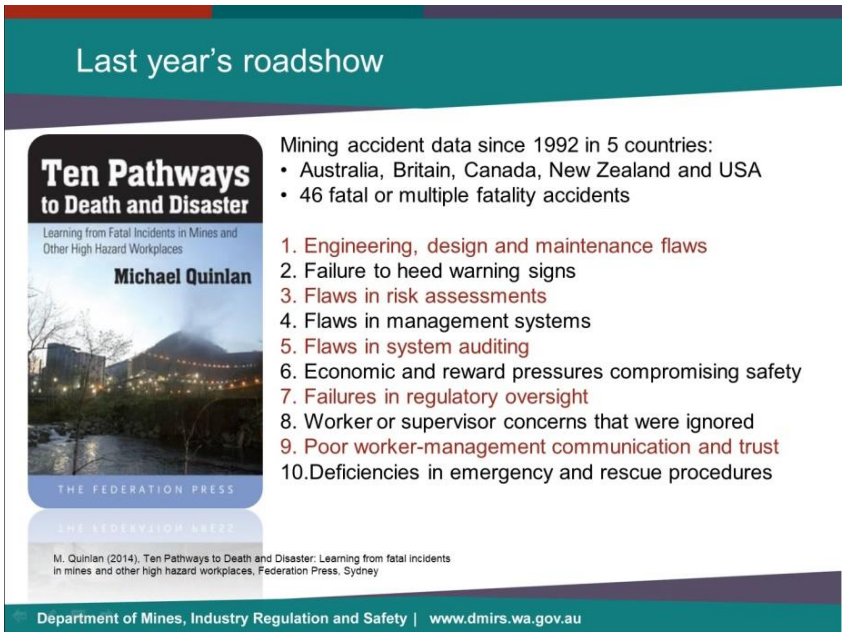

Figure 1: Slide from presentation from DMIRS Roadshow, 2018

Like the current Occupational Health and Safety legislation and Mine Safety legislation in WA, the harmonised H&S model legislation has its roots in on-site safety compliance. It is very vocal on hazards that are physically present on site because it is here that the harm to persons substantially arises. It is relatively silent on the multitude of functions which lead to the hazard becoming apparent at the work site. In the Roadshow presentation, it was noted that the deaths and injuries the DMIRS see are all the same/recurring and that most deaths and injuries are preventable through engineering. Yet the legislation is not addressing the front-end functions that facilitate that engineering input.

Engineers Australia believes that quantum improvements can be made for workers and for the general public by widening the scope of the Health and Safety Act and Regulations from a site-based focus to a systems focus that identifies the chain of causation. This would address calls for corporate accountability from the board of directors down. Proposals to introduce industrial manslaughter should be supported by regulation that defines clear expectations at all levels of organisations from initial project approval at board level through to design, procurement, project management, construction, commissioning operations, maintenance and de-commissioning.

Below are examples of where a chain of causation may generate risk.

Example 1: a board approves a project budget that is less than the cost estimate calculated through a properly engineered feasibility study but without varying the scope of the project. This places a burden on management to deliver the project at a lower cost which introduces budget constraints throughout the project.

Example 2: a client delays the signing of a project management contract but retains the same completion date despite the shorter duration, creating a time pressure on the project.

Example 3: Procurement personnel assess tenders based on lowest cost with no understanding of the difference in the level of engineering input and competence offered. This drives a reduction in health and safety compliance and an industry loss of the required expertise.

Example 4: The management and quality systems implemented in a design office are insufficient to facilitate design review and verification. As a result, there is a lack of rigour in the design process.

Recommendations

Recommendation 5.1: Regulation should drive clear expectations for health and safety considerations at all levels of the organisation through all functions that feed into the work environment, noting that quality systems and management systems uphold safety of design.

6. Hazards Addressed and Not Addressed by the Regulations

It is not clear why several site-based hazards are addressed in detail by the Regulations, but other hazards are not addressed at all. This reduces focus on those hazards that are not explicitly addressed or not identified or new and emerging hazards. In particular, structures appear to be poorly addressed, when there is evidence of regulatory gaps and ongoing incidents. Examples are:

Example 1: lead is addressed as a material, but what about cyanide?

Example 2: buildings and process design are not addressed under the draft mining regulations, which may exclude them from the principal mining hazard management plan.

Example 3: Rottnest jetty failure due to a lack of requirement to inspect during service life.

Example 4: cranes are classified plant whereas stackers and reclaimers are not.

Recommendations

Recommendation 6.1: A more comprehensive list of hazards and a requirement for the hazards addressed to be specific to the operation.

Recommendation 6.2: Consider how new and emerging hazards are identified and addressed.

7. Engineering Controls

5 Definitions

(1) In these Regulations:

***Engineering control** means a control measure that is physical in nature, including a mechanical device or process.*

If an engineering control is to be introduced, it is imperative that the design and implementation be supervised by a competent person.

Recommendations

Recommendation 7.1: Alter the definition as follows "Engineering control means a control measure that is physical in nature, including a mechanical design or process which is assessed, designed, manufactured, implemented and maintained under the supervision of a competent Engineer."

8. Engineering Design

R295 Designer must give safety report to person who commissions design

(1) The designer of a structure or any part of a structure that is to be constructed must give the person conducting a business or undertaking who commissioned the design a written report that specifies the hazards relating to the design of the structure that, so far as the designer is reasonably aware:

(a) create a risk to the health or safety of persons who are to carry out any construction work on the structure or part; and

(b) are associated only with the particular design and not with other designs of the same type of structure.

It should be queried to what extent this clause places construction responsibility and work activity risk on the designer. While safe design is important, the designer is unlikely to know what the proposed construction methodology is, and the designer has no control over site work activities. It would be better to require the constructor to develop a construction methodology quality assurance plan and inspection and test plan (ITP) for review to the designer. Responsibility for temporary works such as interim support and stability should remain with the constructor as they are specific to the construction sequence and methodology. The constructor should ensure temporary works design is carried out by a competent person. Inspection and test should be carried out by a competent person. Materials and build quality also impact the final outcomes, i.e. the adherence to design specifications and Australian Standards.

Example 1: The footbridge between the Alluvion building and the Westralia building that collapsed in June 2019 had incorrect reinforcing visible from footage of the collapse. If the designer had (as is assumed) designed the reinforcing correctly, the contractor may have interpreted this incorrectly. However, this occurred, it is apparent that inspection of this joint did not identify the incorrect reinforcing.

Recommendations

Recommendation 8.1: This clause should refer to the designer reviewing a construction methodology, quality assurance plan and ITP submitted by the contractor. In addition, ITP completion and any modifications made by the contractor on site should be validated and approved by the designer or a suitable competent engineer with access to the design calculations and design intent.

Recommendation 8.2: Review cl 22 of the Act which similarly deals with designers.

9. Construction

R201 Duties of persons conducting businesses or undertakings that install, construct or commission plant
(2) The person must ensure that the plant is installed, constructed or commissioned having regard to:
(a) the information provided by the designer, manufacturer, importer or supplier of the plant under the Act and these Regulations; or
(b) the instructions provided by a competent person to the extent that those instructions relate to health and safety.

202 Duties of persons conducting businesses or undertakings that install, construct or commission structures
(2) The person must ensure that the structure is installed, constructed or commissioned having regard to:
(a) the information provided by the designer, manufacturer, importer or supplier of the structure under the Act and these Regulations; or
(b) the instructions provided by a competent person to the extent that those instructions relate to health and safety.

Construction is subject to change due to many factors such as latent conditions, construction method, suitable materials and equipment availability. These may drive changes to the design that need to be supervised and undertaken by a competent person. These changes may not be interpreted by site personnel as pertaining to health and safety but any changes that impact the design should be subject to the same level of rigour as the original design.

Recommendations

Recommendation 9.1: Constructors should be required to provide records that show the installation is in accordance with the design including records such as materials supply, testing and inspection. In addition, records of design for any modifications required should be included in the design documentation including the approvals for any such modifications. These records should demonstrate verification by a competent person.

10. Maintenance

37 Maintenance of control measures
A duty holder who implements a control measure to eliminate or minimise risks to health and safety must ensure that the control measure is, and is maintained so that it remains, effective, including by ensuring that the control measure is and remains:
(a) fit for purpose; and
(b) suitable for the nature and duration of the work; and
(c) installed, set up and used correctly.

213 Maintenance and inspection of plant
(1) The person with management or control of plant at a workplace must ensure that the maintenance, inspection and, if necessary, testing of the plant is carried out by a competent person.
(2) The maintenance, inspection and testing must be carried out:
(a) in accordance with the manufacturer's recommendations, if any; or
(b) if there are no manufacturer's recommendations, in accordance with the recommendations of a competent person; or
(c) in relation to inspection, if it is not reasonably practicable to comply with paragraph (a) or (b), annually.

Maintenance of control measures and plant are addressed, but not maintenance or inspection of structures. In addition, design life is not addressed – structures are designed to a design life and this should be taken into account in the maintenance schedule. Specific provisions should identify what happens after the design life expiry.

Example: cladding falling off a building due to concrete cancer. Concrete needed to be properly tested for ion ingress and reinforcing corrosion and an assessment made by a competent person. A remediation design was required.

Recommendations

Recommendation 10.1: Address maintenance and design life of structures under the Regulations.

11. Design, Construction, Modification and Maintenance Documentation

Other than records for registered plant, there does not appear to be any requirement under the Regulations to retain and maintain records for any plant or structures. This would appear to be a large and important omission. Such responsibility should rest with the owners of plant and structures.

Recommendations

Recommendation 11.1: Design, construction, modification and maintenance records appropriate to the ongoing integrity assessment of plant and structure should be retained by owners for the life of the plant or structure until they are fully decommissioned.

12. Records for Registered Plant

230 Records to be available for inspection
(3) A designer of plant must keep the records made under regulations 228 and 229 for the design life of the plant.

Amendments are required to account for the fact that designers can go out of business. It is suggested that the owner of the plant should keep the design records for registered plant and should be updated to reflect any modifications made. Records should be available for review by the Regulator at any time. Should such design records not be available, the registration should be suspended or cancelled until a design check is carried out and documented. Records should be passed on to any new owner with sale of registered plant.

Recommendations

Recommendation 12.1: Review responsibility for the retention of records for registered plant and the consequences of loss of these records.

13. Interface with other Acts

Other Acts and Regulations that reference the Acts being replaced by the Health and Safety Act and Regulations will need to be reviewed and revised. Existing gaps in legislation (such as structures on mine sites) do not appear to have been addressed by the draft legislation.

Example 1: Building Act 2011 S.72 Buildings incidental to mines operations – refers to the Mines Safety and Inspection Act 1994 for building regulation. The Health and Safety Regulations (present or proposed) do not provide building guidance, standards, permitting or competence for such structures.

Example 2: there has been no regulatory investigation into the Alluvion footbridge collapse due to the gaps in regulatory authority jurisdiction. The permitting authority (City of Perth) were concerned only as far as clearing the thoroughfare, the Building Authority only investigate buildings up to 5 years old and WorkSafe only investigate if there has been a workplace injury. Therefore, Engineers Australia has been verbally advised by DMIRS there will be no report done by a regulator on this collapse which was a major near-miss and hazard to public and worker safety.

Recommendations

Recommendation 13.1: Include control of hazards associated with process engineering and structures including buildings.

Recommendation 13.2: Review interfaces with other Acts.

Recommendation 13.3: Review regulatory jurisdictions for incidents.


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