

1 Overall the idea for review, and the report and findings are excellent, a step forward, well researched and presented and are supported. It does not address high tech nor some similar matters eg certification as in Ref 1 " This is a difficulty with many laws, but the review is essential to keep law up with a changing world and needs

2 My comments are aimed at helping to improve all AU health, safety as well as environment, essential services, infrastructure and industry and national well-being; and also supplement the report with some technological and practical issues.

They primarily relate to **pressure equipment (PE)** as referenced in WHS [Regs. ie](https://www.safeworkaustralia.gov.au/pressure-equipment)

a) "boilers, pressure vessels, gas cylinders, pressure piping and associated equipment", and referred to for high-risk work.

b) were probably the subject of one of the first industrial safety laws, in UK in mid 1800s and late 1800s in AU (used in mining);

c) in AU became the subject of an excellent standard "SAA Boiler Code" in 1931, developed by some very bright post-WW I engineers and regulators through Standards AU Committee ME-1 "Unification of Boiler Regulations" - formed about 1926, now renamed "Pressure Equipment". Currently with much help they are revising a major Standard AS/NZS [3788-2006](https://www.safeworkaustralia.gov.au/pressure-equipment) "PE In-Service Inspection" called up in some regulations, and two other PE standards - one also called up in all Regs. The SAA Boiler Code was gradually modularised with AS/NZS 1200 heading the group of important PE safety Standards, and last revised in 2016 to cater for further changes in technology, global experience and how to do things better. It is now approximately 800 pages - much high tech on criteria and how to be safe, incorporating much from earlier regulations which helped to greatly improve safety from PE.

d) number about 100 million in AU, with many of very high hazard;

e) have been involved in big disasters globally and in a few in AU eg

i) Hobart, a new boiler explosion in about 1960 killed 10 persons and resulted in a Royal Commission and major changes to laws and technology (We gain almost all **knowledge** from our and others experience - successes and failures)

ii) Longford, Vic PE Failure, 3 deaths, some injured and about \$ 1 billion impact - mainly loss of gas supply to a million users

iii) Port Hedland, WA. Hot briquetting plant - some deaths and about \$3 billion

iii) Varanus Island, WA. Pipeline and plant. - no deaths but about \$ 1 billion like Longford

iv) Kilmore, Vic. LPG road tanker explosion (Bleve) in accident on Hume Highway - no deaths due to good Regs., design, manufacture, conformity assessment, use and optimum emergency action by all. - unlike the one in Spain which killed 150 people, or the rail tanker in Cairns, Q with one death of a public man not knowing the huge hazard.

Probably the the most deadly incident was Bhopal, India with about 4000 deaths due to failure of a pressure system in a chemical plant.

f) have greatly improved globally from the 1880s when UK, USA and AU deaths were about 5000/a to now about 100/a - due to: good law, R&D, technology, shared experience, Standards (providing authoritative **knowledge**) and education and training - despite 10,000 times the number of PE. (This huge improvement was a big justification for the gradual AU regulatory PE changes from about 1980, and the new National Standard for Plant by Safe Work in 1994 and the unified? WHS law in 2011.

3 Context.

.1 I have no conflict of interest relating to the report or anything, but my interest is helping AU with 3 coinciding reviews that I have been asked to comment on or am working on:

a) WHS Law Review Report.

b) NSW Legislative Council "Inquiry into regulation of building standards , quality and disputes" - triggered off by serious building failures in UK, Vic, and a number in NSW.. (Ref 1 below)

c) Revision of AS/NZS [3788 - 2006](https://www.safeworkaustralia.gov.au/pressure-equipment) " PE In-Service Inspection" 198 pages with some high tech **knowledge** - triggered off to fill developing growing gaps from big changes in WHS law which virtually mandated nothing and withdrew all guidance, and from improvements in technology that can improve performance, economy, trade and safety.

.2 All deal with the same basic issues from different views and involve the same principles aimed at the good of humans. Examination of the various principles and practices for different industries, equipment, professions, trades and actions helps improve principles and subsequent laws, technology, **knowledge**, safety etc

Recommendation 1 Three Tier Principle

.1 The current **Act** is good in adopting this principle and gives main requirements, and also is supported

.2 However for PE and probably other high-risk **plant, structures** and **substances**, the **Regulations have gone** a bit too far at this stage and removed virtually all requirements or guidance to industry on the **criteria** for judging safety or health or **how** to do it. My reading of the Act and Regs is it is performance-based, mainly reactive, little help to SMEs with the only requirement for PE performance being "be safe and healthy, heed the incentive to avoid big prosecution, and register some designs and soon? no PE items" - then you can do anything. I am all for all freedoms but minimum controls to control "man's inhumanity to man".

It greatly differs from PE regulations in USA, EU and probably all advanced countries; also significantly with some other AU safety Regs. eg Transport by National Heavy Vehicle Regulator(NHVR) where the **accountability chain** of 7 persons are involved for control of driver fatigue and a driver was fined \$380 for an error in addition of 15 minutes and thus time entered into his daily Work Diary. The Transport Industry is also very active in safety and cost/benefit improvement and using an evidence-based and risk management approach (Ref 4)

All the risks to regulators or law seem to have been passed to industry with greatly reduced guidance and feedback or control from government. This is excellent finance and risk management for governments, and to minimum government size and tax - but?

.3 The Regs. are highly **prescriptive** for regulators and a valuable **guide** for the legal profession. Their views on possible improvement and national cost reduction of compliance would be worthwhile

.4 The report rightly records the **inadequate practical value** of Regs. for over a million SMEs (I am an S of 1) and also for most large enterprises.- all are users of PE

.5 This was the same problem in drafting AS/NZS [3788-1991](#), which was overcome by specifying **both prescriptive** requirements based on years of regulators practices to suit most PE SMEs, **and performance** requirements which gave **criteria** and **how to do**. This thus also catered for cases where prescriptive requirements were far too conservative and the extra effort and cost in using good science, engineering and risk management was often far outweighed by savings. eg recent advice states the loss of a day's production can cost up to \$15 million in some major AU PE plants - and thus a big economic loss to AU.

This solution was based on the **principle** of "Not only black or white" but black, white **and** all between - as in all nature and optimum modern AU. This also = "More than one way to skin a cat" etc.

.6 Thus to make the next step towards an ideal law and our long term aim of zero PE deaths, the 1st Tier - the Act is OK, the 2nd - Regulations needs minor adjustment to give a few essential critical requirements and to strengthen the 3rd Tier - Codes of Practice which with Standards will number many to cover essential specific needs of industry, society and hence governments and not throw out much useful good practice from Regulations often gained the hard way with people's lives.

.7 Codes of Practice (COP). I must confess I was raised early with access to only 2 books and used slate rather than paper or computers, and hence my poor computer skill etc limited access to SafeWork latest COPs. Those I have seen are good to suit their general purpose and are readily and freely available for all; but they provide limited **authoritative knowledge** to help AU. Some repeat with differences what is in some AU Standards which confuses me. They only address safety and health whereas many high-risk plant and structures now have bigger impact on environment, essential services, industry performance, economy and people's well-being as in Ref 1. Also some States give different status to COPs, thus de-harmonising to the detriment of AU

.8 I fully support the concept of providing **authoritative knowledge** via law, COPs and Standards for the national and global benefit, wherever practicable; and for it to be readily available on-line to all at minimum total national cost. Thus I do not believe that, with our limited human resources compared with the rest of the world and our support for International Standards, we need or can afford a COP **and** an AU Std. and possibly an ISO Std on the same subject.

.6 Thus instead of people knocking one or other, industry and government should agree on the best way of using the great benefits and experience of all three COP, AS and ISO sources of **authoritative knowledge** - (another "Not only black or white" and not "silo or self-interest thinking"). **Authoritative knowledge** can be a huge national and global asset to us all including politicians tackle our current and emerging problems

Recommendations 2 - 26 Agree. Mental health and stress are big factors in safety and human performance and well-being

Recom. 27 Risk management is fully supported and is the basis of all safety laws and Standards. Ref 3 produced a 1st class basis for RM of AU Standards and WHS Regs. dealing with PE. The current revision of AS/NZS [3788 - 2006](#) "PE In-Service Inspection" has spent much effort by a number of PE specialists on its practical application for improving PE safety and performance. It is using AS/NZS ISO-IEC 31000 "Risk management" which recognises both positive (beneficial) and negative (detrimental) risk. This work is based on AU industry and regulator huge experience in PE operation and framing AU Stds.

Recom. 28 -30. Agree. Dangerous Goods & MHF (ran out of time)

Recom. 30a & b. Standards.

.1 We thought the NSP in 1994 was to be adopted and were disappointed with no reference in WHS Reg. to Standards which advise the **criteria** and **how** to be safe with PE. It affected the major revision of AS/NZS PE Standards updates

.2 The criticism of Standards gained for this Model WHS review is correct but being negative is not balanced enough to justify commenters' delegation to remote unwanted 5th tier

.3 Comment 2 c) above shows an excellent and successful method and principles for development of law, (COPs) and Standards for an emerging technology. All governments were members and agreement by their representatives was necessary before the Standard was issued - thus were accepted and required by, I think, all WHS Departments and referenced in laws. I don't know what was wrong with the method as it worked well. The only problem it could not keep up with world events outside AU control

.4 PE law and standards worked well from 1932 until WW II, and then both required massive revision and update for industry catchup and expansion, new technology, demand of power stations, refineries etc and for a proven "we have to and can do" attitude, closer links to USA as a result of WW II and need for tech expansion, etc.

.5 Big clashes occurred from outdated standards and regulations which were only resolved by good and flexible government and industry. By about 1975 progressive changes had been made in Standards to adopt new PE principles and practices using local innovations and the best of many overseas Standards.

.6 Today the range of AS and AS/NZS PE Standards covers most aspects of PE safety etc, and cater for globalisation and international and interstate trade eg AS/NZS 1200-2016 formally answers regulators and industry by recognising proven overseas PE Standards including Chinese on the basis of "**equivalence**". This also is in line with AU as a signatory to the WTO Agreement on Technical Barriers to Trade.

.7 "**Equivalent**" is also defined in AS/NZS 1200-2016 "Pressure equipment" which with AS [4343-2014](#) "PE Hazard levels, and the proportionate principle" is the basis of the risk management approach used by both Regs and PE Standards through their reference to AS 4343. These approximate, and improve on, the EU "Pressure Equipment Directive" which is law to ensure **safety** and fair **trade** to and between EU States.

.8 Standards Development The basic method has been proven in AU since 1920s and equals the best in the world, and is equivalent to the highly respected to ISO and IEC. It has prevented malpractice (2 USA Stds bodies were fined US\$ multi-million in 1960s) by having wide, objective representation with no majority group of interest. They were developed by industry government and other volunteers with project management and editing by StdAU staff and public exposure for comment and input i.e. democratic with objective resolution of differing views

.9 Referencing Standards. Can be important and significant stuff ups have occurred

a) In 1952 I used the latest technology in an up-to-date AU Standard for the design of a heat exchanger. It was rejected because the law had not caught up although the Regulator had voted for the change.

b) One was (is ?) an omission in WHS Regs Schedule 5 Part 2 which exempts Serially Produced Pressure Vessels without defining it or referencing its origin. This was right initially and was based on AS [2971-1987](#) an Important innovative performance-based Standard to help industry with consumer and domestic pressure equipment i.e. about Hazard level E about 4 years before AS 4343 PE hazard levels was first issued.

The revision in 2002 made big changes to suit manufacturers to rationalise testing and reduce manufacturing costs. It significantly increased the hazard to Hazard Level B which does not warrant exemption of safety controls for serially produced vessels he need for

c) An important case arose in WA with a mix up of dates with AS/NZS 1200 and WA law

.10 Standards development then unrealistically relied on regulators to quickly update Regs. Hence the importance of **cooperation** all ways ie between industry, public and regulators in making

interconnected laws and Standards. Also care is needed with the use and dating of documents referenced - if they are likely to change and have serious impact.

11 Elimination of reference to all Standards and other documents in Regulations is one way of solving but is strongly not recommended. The solution to case 9 b) above should be to eliminate that exemption in WHS Reg Schedule 5 or omit plant item Registration proposed by COAG (see comment below for desirable retention)

.11 Cost of Standards

.12 NSW Inquiry standards

Recom. 32 - 34. Agree

COMMENT ON ADDITION WHS Regulation Improvement

A1. PE Registration No mention is made of COAG proposal to eliminate registration of PE item registration. I don't know if they have considered **all** information needed for the optimum solution. The following are suggested as a main means of retaining a bit more teeth in the Reg: and more global respect for our safety system for import, use and export of high-hazard PE (this helped an "AU Export Company of the Year" about 1993):

- a) retain registration of each **design** of PE of hazard level A - D
- b) retain item registration for each PE of hazard level A, B and probably C, and re-registration each 5 years after an automatic reminder
- c) registration to be free, direct on line, by designers of design etc, and by owner- users, using a self correcting or warning system and with confirmation and rego. number.
- d) registration to be by States and Territories with copy to SafeWork AU for national data, and using the same computer system and terminology
- d) regulators have the right to check the designs and PE at anytime like that already done, or for specific designs, PE make or type, industry sector, or company (Transport companies don't want to be on the "Top 100 List" who get checked randomly but more frequently); and prosecute with costs and publicity where desirable.

The above requires accountability and commitment by legal declarations by competent persons of:

i) compliance of each design and manufactured PE with reputable Standards (having built-in criteria to ensure necessary safety), and

ii) inspection and overall in-service management to ensure Fitness for Service of PE

Such system would:

be of negligible cost and effort and less than already, for industry and regulators

very importantly, provide national data on PE type & Haz.level population which with data on incidents/failures collected from States/Territories would provide valuable data on national safety performance for - comparison with leading overseas countries, national and company risk management, and an evidence-base for various improvements by regulators **and** industry. Such practice is like more

A2. Authoritative Knowledge. Noted above in a few places is the importance of this knowledge in making optimum decisions. These include knowledge in all 3 or 4 Tiers and used by almost all including educators/trainers and students/trainees and the public including inquisitive young and unemployed people by excellent free services like Google - not perfect but miles better nothing or 50 years ago.

Hence the 3 or 4 Tiers must be first class, up to date and easily available.

A3 Unification & Harmonisation Unification of such an apolitical subject as Safety and Health should be clearly the AU long term aim with a national law determined by all government's cooperating **objectively** for the national good. Also with each government having the ability to have additional laws to suit local circumstances eg snow and crocodile work

The current system is inefficient and costly; and all AU governments should wake up and agree on a national harmonised Act, Reg, and set of Codes of Practice which treat selected AU and other Standards as equivalent. If EU States can do this for many matters why cannot we do and voter know who is specifically preventing it

A4 Competent persons. The concept is excellent for the regulation and law purpose but avoids helping millions of users.

There is a need for national policy on what this means practically and is basis best for AU now and in the next 10 years. . Ref 1 is now reviewing Building Certifiers, while WHS Regs do this for a few cases, governments certify vehicle drivers, and various bodies desire to make registration mandatory like in Queensland RPEQ for engineers, and AU -wide registration of doctors, lawyers etc

AS/NZS 1200-2019 and 3788 revision Appendix V attempts to solve the problem **flexibly**, at minimum cost and to cater for overseas competent persons to come into and help AU. This recognises but does not demand in-service PE inspectors certified by Australian Institute for Certification of Inspection Personnel (formed with one governments help to fill the gap resulting from the great reduction in regulator inspectors. NATA do much the same for Inspection Bodies, and AINDT for Non Destructive Testing

A5 Support documents. For excellent practice, see USA Public Register OSHA Regulation 190? in 1992."Process Chemical Safety Management"?. It is a fantastic model of good regulation - highly innovative, progressive, simple and concise in about 8 pages with two figures; and has about a 30 page basis of requirements which also answers those who commented, and a 6 page Regulatory Impact statement to show benefits will outweigh the costs of national implementation. This practice would be an excellent model for all our regulatory change and good in AU for feedback to thank industry contributors and help them understand and implement the changed law. All as a final package, makes good sense.

The PE Industry had planned (Ref2) a few support documents for key Standards, and interim guidance notes on particular solutions for national mini-problems, and for immediate advice via a couple of free Forums via the Internet but has delayed by uncertainties and initiating cost

A6. AFARP. I fully agree with the adoption of this concept and the **action** being taken to clarify its use and interpretation to more clearly convey its prime intent. There is often a time and place where it is misleading and you have to back off and wear the cost.

A7. Public Health and Safety WHS covers structures but I am not sure how this applies to buildings, ski-lifts etc where there are both workers and the **public**.

The regulation should make it clear how it relates to the public and home. eg miniature steam engines for kids to ride on.

The Std AU Committee ME-001 has framed up detailed requirements for pressure equipment to cover both workers and the public eg for road tankers etc. An explosion in Sydney of a pressure vessel (an autoclave) rocketed about 400m and was lost in a lake for a short time with one person luckily only deafened. In Mexico City a large stationary LPG vessel also rocketed over 1 km to hit a block of flats - total deaths over 200. The AMBSC have 4 excellent standards on miniature boilers which are referenced in WHS Regs.

The current revision of AS/NZS 3788 "PE In-service Inspection" is aiming to cover consumer type PE and make good safety practice easily understood by the public and all who own or use PE. COPs might also attempt this where applicable as the separation of **workplace** and home and public places has change to **work** anywhere.

A8 Feed back from Regulators. This is a powerful means of helping improve compliance, safety, economy and avoid misunderstanding, misinterpretation and argument for the benefit of all involved or interested. This could help Australians and our neighbours. See comment A1 and A5

A9 Time management is now a huge factor in all human needs including good government, law, technology, and documents. A couple of minor examples are given above. Hence continual update of all useful or mandatory documents is necessary, and systems for doing this best should be known and used. Like plant, equipment they wear out or become not "fit for service of purpose" and so require timely "corrective action". This review is good for this reason.

A10 Holistic thinking Finally, this and resultant action are the best means of achieving optimum results generally. It is therefore important to apply in determining the results of this review and in the feedback to all those effected.

References

1 NSW Legislative Council "Inquiry into regulation of building standards, quality and disputes" - triggered off by serious building failures in UK, Vic, and a number in NSW. Comments close 4-8-2019. Final report due Feb 2020

2 WTIA Report "Improving AU PE Industry" Oct 2010

3 AS [4343-2006](#) PE Hazard levels (See its Preface of 9 pages which is unique and gives the history and basis of checks needed to control risk.) It started in 1978 and took over 10 years to develop and first issue in 1991 but it made a big difference to WHS law and industry and clarified many issues. It uses the proportionate principle and based on national risk management)

4 "Staying safe" by Dr. Kim Hassall ATN July 2019 Reports on performance of 7 different certification schemes for AU transport safety. They range from 9.3 to 3.2 serious or major accidents per 100 million km driven - a valuable KPI of national risk management and trends over time. This is missing with PE?.

Thanks for the opportunity to help.
I hope the above does for all involved and AU improvement.
Stan Ambrose OAM