

**Submission
No 43**

PROFESSIONAL ENGINEERS REGISTRATION BILL 2019

Organisation: Engineers Australia

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CELEBRATING
OUR CENTENARY

Professional Engineers Registration Bill

Submission to the NSW Legislative Assembly
Committee on Environment and Planning

January 2020



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OUR CENTENARY

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1. Introduction

Engineers Australia welcomes the opportunity to provide a submission to the NSW Legislative Assembly Committee on Environment and Planning in response to its inquiry into the Professional Engineers Registration Bill (the Bill).

The Bill exists in a political context that is heavily focused on the building sector. With that in mind, Engineers Australia’s overarching advice is that, as well as providing much-needed detail to extant Government reforms for the building sector, the Bill also extends new controls for professional engineering standards to all industries. That is a vital and widely-supported outcome that should be supported by Parliament.

1.1 About Engineers Australia

Engineers Australia is the peak member-based professional association for engineers. Established in 1919, Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

The term ‘community’ is used in its widest sense, and the issues raised in this submission seek to improve outcomes for everyone. Engineers Australia’s contribution is designed to help create a legislative framework to deliver a better-performing engineering sector with greater accountability of those involved—especially professional engineers.

Our work is supported by around 100,000 members, including about 25,000 in NSW. Information provided directly by our NSW-based members informs this submission and the organisation’s policy position on the Bill.

Engineers Australia maintains national professional standards, benchmarked against international norms. As Australia’s signatory to the International Engineering Alliance, this includes accreditation of undergraduate university engineering programs. Furthermore, Engineers Australia manages Australia’s largest voluntary register for engineers, the National Engineering Register (NER).

Given the broad membership coverage and knowledge we have of the engineering profession, Engineers Australia is well placed to provide informed views to Parliament on how a compulsory registration scheme could operate. For example, we developed the voluntary NER in 2015, are an approved assessment entity for the QLD Government’s registration scheme and have been involved in consultation processes as part of developing the Victorian Government’s Professional Engineers Registration Bill 2019, which passed Parliament in August last year.

1.1.1 Contact details

To discuss the contents of this submission further, please contact Jonathan Russell, National Manager for Public Affairs, at [REDACTED]

1.2 Inquiry Terms of Reference and submission structure

The Terms of Reference for this inquiry are “[t]hat the Legislative Assembly Committee on Environment and Planning conduct an inquiry into the Professional Engineers Registration Bill 2019, including:

1. *The most appropriate way to regulate professional engineers in the building and construction industry.*
2. *How engineers and other building industry professions are regulated and monitored, and proposals for reform under the Bill and consideration of alternate proposals.*
3. *Any other related matter.”*

It should be noted at the outset that the Terms of Reference imply that the Bill is intended to deliver benefits only to the building sector, but that is not the case.

The objects of the Bill, at clause 4, make it clear that the registration scheme for engineers is designed to ensure that professional engineering services are provided competently across any industry. Furthermore, Clause 6 prescribes five areas of engineering practice to be subject to the new laws but makes no restriction as to the industry in which the practice is to be applied. Similarly, the Clause 3 definition of a ‘professional engineering service’ does not restrict its application to any specific industry.

The Terms of Reference might focus on the building sector because the provisions contained in the Bill were also proposed as an upper house amendment to the Design and Building Practitioners Bill 2019. Engineers Australia gave its support to that amendment. We held that position in the knowledge that the provisions of the amendment (and the Bill on which they were based) are the best enabler of the reforms outlined in the Design and Building Practitioners Bill (insofar as that Bill relates to standards of practice for professional engineers), and would also be an outcome that would have significant benefits for the community when applied to engineering services more broadly.

This submission will begin with an exploration of why registration of engineers is a vital policy objective for NSW and offer related information to help the Committee form a view on the merits of the Bill. The submission will then move to address all Terms of Reference.

2. Comprehensive registration of engineers is good for NSW

The community trusts engineering without realising it. The buildings we live in. The cars we drive. The devices we use every day. We trust that they are safe and will work as they are designed to. Rarely do we realise that much of the world we inhabit was created by engineers.

When trust is unconscious, it's even more important to protect the integrity of engineering practice.

The great majority of engineers provide their services competently, ethically and with diligence. However, use of the title 'engineer' is unrestricted and is likely to remain so because it has become a generic term. In the absence of regulation for engineering in NSW, anyone can purport to be an engineer and provide engineering services without appropriate competencies and with disregard to standards.

Engineering services are vital to state and national economic prosperity and social well-being, yet there is no uniform regulatory regime covering engineering practitioners in Australia. Instead, it is ad hoc and largely voluntary.

This point was highlighted by the NSW Minister for Better Regulation and Innovation, Hon Kevin Anderson MP, when he was reported as saying: *"I can't believe that in this state engineers don't have to be registered."*¹

Engineers Australia does not promote registration as a 'silver bullet' to all ills of industry. For example, in the building sector, Registration is the first recommendation of the Building Ministers Forum (BMF) Shergold & Weir report, and of the NSW Government's Opal Tower report, because it is the first step; it creates a system to recognise people likely to perform competently, and a mechanism to exclude those found to be unsuitable to work as an engineer.

Compulsory registration for anyone providing professional engineering services will enable significant enhancement of public safety and consumer protection. More broadly, there are five key benefits of a registration system for engineers:

2.1 Industry and consumer information

Engineering services are purchased by governments, large and small business, and individual consumers. In the absence of a common standard for ordinary engineering practitioners, consumers are limited in terms of the extent they can measure the professionalism of an engineer they wish to engage.

A registration scheme will aid the market by providing advice to consumers on the competence and experience levels of engineering practitioners. This enables consumers to make more informed decisions and reduces the common tendency to choose services based on price alone.

By way of comparison, it should be noted that doctors, lawyers and architects all have to be licenced/registered to practice but, as things stand, engineers do not.

2.2 Reducing risks to public health, safety and welfare

A significant risk to consumers of engineering services in the current registration environment—where there is little or no regulation of the engineering profession—comes when some people attempt to undertake work without adequate skills or competencies. Registration helps to ensure that only those with suitable baseline qualifications (that is, an appropriately recognised engineering degree), enough relevant experience, and a proven commitment to ongoing training and professional development can provide engineering services.

Risks to the public resulting from the provision of engineering services by unqualified or incompetent persons have three elements:

¹ Elias Visontay, "Minister to reform building industry", *The Australian*, June 24, 2019. Available at: <https://www.theaustralian.com.au/nation/minister-to-reform-building-industry/news-story/7eafbf904b49b1c2293a2bec6549f098>. Accessed 21 July 2019.

- Health: through such things as badly designed or ‘sick’ buildings (poor air-conditioning, rising damp, low natural light levels). Beyond the building sector, health effects can include things such as contaminated drinking water and other environmental incidents.
- Safety: through the collapse or other significant failure of buildings such as was seen in the Opal and Mascot Towers of Sydney in 2018-2019. Safety issues can also arise beyond the building sector with infrastructure failures (for example, bridges) or through the failure of hazardous services such as gas, electricity or mechanical works.
- Economic: involving financial costs such as design and construction costs, litigation expenses, lost production and rectification costs. The economic costs associated with the Opal and Mascot Towers offer relevant contemporary case studies.

Requiring engineering practitioners who offer services that place public safety, health and welfare at risk to be registered can minimise these risks. It does this by creating a system to recognise people likely to perform competently, and a mechanism to exclude those found to be unsuitable to work as an engineer.

2.3 Professional recognition

Businesses and the community expect a certain set of standards and skills from engineering practitioners. As with other professionals, engineering practitioners have a high degree of responsibility and liability imposed on them by courts and regulators. A statutory registration scheme would identify those persons whose academic qualifications, cumulative and current experience, competencies and commitment to ethical conduct and continuing professional development are the standard expected of the ordinary skilled person exercising and professing to have that skill.

This point was highlighted in the independent expert report into Opal Tower, commissioned by the NSW Government, which recommended, “[t]he creation of a government Registered Engineers database developed in partnership with an appropriate professional body.”²

In addition, regulators can choose to create a register to signal that registrants, in the provision of engineering and engineering-related services, can maintain and have the benefit of appropriate insurance coverage in the event that a professional services provider fails to discharge his/her duties properly.

2.4 Enhanced international mobility and trade in engineering services

In many countries, engineering is seen as an essential profession whose practitioners should be recognised and registered. Standards of practice that are recognised by government have the potential to improve overseas trade and are essential for trading in accordance with the World Trade Organisation trade and services obligations, and under bilateral trade agreements.

A statutory compulsory registration scheme for all engineers in NSW can provide a competitive edge for a state that is seeking to export services to the global market.

2.5 Legislative efficiency

A statutory registration scheme with requirements that match those of other jurisdictions creates legislative efficiency. It is a means of ensuring that both a common standard for engineering practice is in place in all states and territories and that engineers do not have to comply with the different requirements in each jurisdiction.

² John Carter, Mark Hoffman and Stephen Foster, *Opal Tower Investigation Final Report*, 19 February 2019. Available at: <https://www.planning.nsw.gov.au/-/media/Files/DPE/Reports/opal-tower-investigation-final-report-2018-02-22.pdf?la=en>. Accessed 21 July 2019.

2.5.1 Assessment entities

In QLD, the government recognises independent Assessment Entities to conduct the initial checks of applicants for registration (examples include Engineers Australia, Australasian Institute of Mining and Metallurgy, and the Civil Aviation Safety Authority).

Using assessing authorities can help simplify compliance requirements and avoid red tape. It offers a mechanism for assessing the qualifications and experience requirements of a statutory register, with a letter of assessment that is issued once but can be used in all jurisdictions that require registration of engineers. The assessment provided by Engineers , for example, can nominate an individual's areas of engineering, which is especially useful for jurisdictions that require engineers to be registered for selected types of engineering work.

3. Essential elements of a statutory registration scheme

All registration systems have the same basic characteristics in that standards must be set, courses accredited, candidates examined or assessed, and a register maintained. Performance must be monitored and failures disciplined. A register has greater effect if supported by licensing arms of government.

Engineers Australia supports a co-regulatory model of registration, which involves statutory bodies and professional associations undertaking various roles. The co-regulatory model provides greater assurance of the competency of registered engineering practitioners and reduces the risk of physical and financial harm to consumers. This approach allows industry and assessment entities like Engineers Australia to control the qualifications and competency standard applied to a practitioner, and allows government to oversee the assessment and monitoring system and standards applied to practitioners through the approval process.

A guiding principle of the voluntary registration model introduced by Engineers Australia (the NER), is to increase the professionalism of the broadest possible cohort of practising engineers. Under a co-regulatory approach, Engineers Australia believes that legislation governing the delivery of engineering services in states and territories ought to:

- contain restrictions on who may deliver engineering services
- restrict the 'registered' title to those who are on an engineering register
- register engineers in the broadest possible areas of engineering practice aligned with the areas of practice and not by industry sector, with the onus on each registered engineering practitioner to only undertake work that he or she is competent to undertake
- base registration on a competency assessment by approved assessment entities
- include a mandatory continuing professional development regime for ongoing registration

The essential elements described above are all evident in the Professional Engineers Registration Bill. The policy principles in the Bill are therefore recommended as a suitable framework for registration of engineers in NSW.

3.1 Apply registration across all industries

Statutory registration of professional engineers should apply to anyone who provides professional engineering services, and in any area of engineering in any industry. The carve out for such registration is that it should only be for those performing professional engineering services under the supervision of an appropriately registered engineer, or if only applying prescriptive standards or designs.

The Government's building industry reform process is necessarily focused on engineers in the building sector, and the public focus on that industry is apparent in the Terms of Reference for this inquiry. However, engineers provide complex services in many industries, like public infrastructure, power generation, manufacturing and mining, where professional engineers provide critical services. It would be a missed opportunity if a new registration scheme for engineers was not applied more broadly, and could indeed risk transferring risk to sectors in which engineering work is not subject to registration.

The Annex to this submission provides several examples of how poor professional engineering decisions can affect the community beyond the building sector.

The essential elements described above—including application to all industries—are evident in the Professional Engineers Registration Bill. The policy principles in the Bill are therefore recommended as a suitable framework for registration of engineers in NSW.

4. Support for comprehensive registration

4.1 Engineers

Registration is a long-standing and high priority issue for Engineers Australia. It is often raised with members through e-Newsletters, social media, our monthly magazine “create”, and many engagements in mainstream media. It is therefore a topic of which Engineers Australia members are well-aware and on which they regularly engage with the organisation.

In July 2019 Engineers Australia sent an email to all 25,000 NSW-based members alerting them to the NSW Government building sector reform process and the potential for new registration laws. We invited members to either provide a response directly to the government, or to submit views for consideration by Engineers Australia.

Of those who responded, 91.5% expressed specific support for the introduction of a registration scheme for professional engineers. Just 3.4% expressed opposition. A further 5.1% were silent on the matter. This represents an extremely high level of support. At the time, there was very little detail around what a registration scheme would look like in practice, so this result reflects the in-principle view amongst engineers that a registration scheme is positive for the community and the engineering profession.

On 17 December 2019, a similar alert was sent to members based in NSW and the ACT and they were asked to comment on the Professional Engineers Registration Bill specifically. Now that there is legislation before Parliament, the views expressed by members are much more detailed. Notably, even with the ‘warts and all’ detail of a new law to regulate their profession laid out in detail, the level of support by members continues to be very high.

When the period for comments closed on 17 January, of those who responded, 77.3% continued to state clear support for registration and the Bill specifically. Fully 68% provided unequivocal support, and a further 9.3% support the Bill but would prefer to see some amendments or clarity on its implementation. These views are examined in more depth at Section 6.3 of this submission.

4.2 The general public

To test the level of public demand for action, Engineers Australia commissioned polling nationally and in NSW. This showed that broad-based registration of engineers has very high levels of public support across all demographics. The poll of 1,222 people aged 18 years and older was conducted on 18-23 July 2019.³ It asked:

“Now a question about engineers in Australia. Engineers are involved in a range of things such as designing and building residential towers, making public infrastructure like bridges and roads, or delivering manufacturing and high-tech innovation. Do you think engineers in Australia should, or should not have to be registered in order to practice, in the same way as other professions such as architects, doctors and lawyers?”

Nationally, 88% of respondents answered that, “Yes, engineers should have to be registered.” Just 4% answered “No, should not have to be registered” and 8% answered “No opinion / can’t say.”

NSW respondents showed even higher levels of support: 91% support, 3% oppose and 6% can’t say.

Public support for broad-based and compulsory registration of engineers is incredibly high. When the results are broken down to various demographics, support never drops below 82%. If the NSW government legislates for a broad-based statutory register for engineers, it will have the support of city and rural voters, those on high and low incomes, men and women, and people of all age groups.

³ The poll was conducted for Engineers Australia by OmniPoll. The poll was conducted nationally among 1,222 people aged 18 years and over. Respondents were drawn from the online consumer panel managed by Lightspeed Research, OmniPoll's online partner. Sample quotas were set for each state, city and regional area, along with sex and age. To help reflect the overall population distribution, results were post-weighted to Australian Bureau of Statistics data on age, sex, area and highest schooling.

5. Cost of a registration scheme

The potential cost of not applying registration to all professional engineering services is significant. The Government is striving to reduce the risk of buildings being evacuated or left uninhabitable, reduce the risk of infrastructure like bridges and roads being unsafe, and reducing the risk of ‘everyday living’ being disrupted by failures in utilities like power and water supply. A less visible risk to the economy is that, without a comprehensive scheme to register the services of engineers, there may be continued effects on confidence due to lingering uncertainty about the efficacy of reforms.

Conversely, the cost of instituting a comprehensive registration scheme is very low. The three main cost components are as follows:

1. **Cost to government of setting up a scheme:** Victoria is the latest state to develop a process to set up a comprehensive compulsory registration scheme for professional engineers and passed a bill to do this in August 2019. In that state’s 2018-19 budget, \$5.9m was allocated to fund the creation of a scheme, spread across two years. This equates to less than the cost of seven median value Sydney homes.⁴
2. **Cost to government of managing the scheme:** In QLD, a comprehensive registration scheme has been in place since 1929. It is administered by the Board of Professional Engineers Queensland (BPEQ). The BPEQ’s annual report for 2018/19 notes that it operated on a surplus of \$0.9m.
3. **Cost to the profession of attaining and retaining registered status:** Individual engineers will incur costs associated with:
 - a. **One-off assessment fee:** Using the QLD model as an example, and the fees applied by Engineers Australia if it is used as the assessment provider (noting that several assessment providers exist), the *once-only assessment* fee is less than \$600. For anyone who is already registered in QLD or Victoria, this cost is not relevant due to the provisions of the *Mutual Recognition (New South Wales) Act 1992* which entitles an individual to have their registered status recognised across borders.
 - b. **Regular registration fee:** the registration fee to the government regulator may be payable at periods that can be determined by Government and could be annually or every three or five years. Using QLD as the example, the current annual registration fee is \$232.74.
 - c. **Continuing Professional Development (CPD):** responsible engineers already undertake CPD, so costs associated with CPD will only be a new cost for anyone who is not already doing the right thing (that is, not already completing CPD). Engineers Australia estimates that the cost of doing 50 hours of CPD per year is about \$500. The cost is relatively low because CPD can be achieved in a wide variety of ways, most of which are either free, very cheap, or provided on-the-job. Simple examples include reading technical journals, work-based training, attending presentations and private study. Engineers Australia is just one of very many providers of CPD and our offerings are open to anyone—not just members.

⁴ CoreLogic, *CoreLogic Hedonic Home Value Index, December 2019 Results*, Thursday, 2 January 2020. Available at: <https://www.corelogic.com.au/sites/default/files/2020-01/CoreLogic%20home%20value%20index%20Jan%202020%20FINAL.pdf>. Accessed 13 January 2020.

6. Response to the Terms of Reference

6.1 Term of Reference 1: The most appropriate way to regulate professional engineers in the building and construction industry.

6.1.1 General comments

The most appropriate way to regulate professional engineers is with an Act of Parliament that applies a registration requirement to people who wish to provide professional engineering services.

To secure public confidence in the engineering profession, a government-run register of engineers should be implemented that is modelled on what is in operation in QLD and has recently been introduced for Victoria. Queensland has had statutory registration requirements since 1929, and Victoria passed its own *Professional Engineers Registration Act* in August 2019.

The majority of engineers apply their skills competently, but registration is necessary to reduce the risks presented by anyone who attempts to deliver engineering services without relevant qualifications, experience or currency, or is not sufficiently competent to deliver services without supervision. In the interests of community safety and consumer protection, registration should apply to anyone who provides professional engineering services.

As stated previously, the carve out for such registration should only be for those performing such services under the supervision of an appropriately registered engineer, or if only applying prescriptive standards or designs.

Professional bodies should be appointed to conduct assessments on individuals' qualifications and experience to keep costs low. This is the system used in Queensland and will soon be applied in Victoria.

Engineers Australia supports a nationally coordinated system - we don't want red tape from different standards in every state. The *Mutual Recognition (New South Wales) Act 1992* provides for mutual recognition which will eliminate any need for individuals to have their skills assessed more than once. More on the topic of mutual recognition is provided at Section 6.3.1, below.

6.1.2 The Bill complements other government reforms

In terms of design and construction of buildings, in addition to consumers, there are three major parties: engineers, architects, and builders

Architects are separately registered and regulated in NSW by the *Architects Act*. Builders are registered and regulated in NSW by the *Building Professionals Act* and, where it applies, the *Home Building Act*.

Only engineers are not presently registered and regulated within NSW by the government. Yet engineers of many disciplines have a major role to play in both the structural fabric of the building and the associated building services.

The Government's reforms in the Design and Building Practitioners Bill would be greatly improved if the Professional Engineers Registration Bill is also enacted. There are several reasons for this:

- The Professional Engineers Registration Bill could be very simply referenced in regulations as the means by which someone can be deemed suitable as a "registered designer" for engineering work within the Design and Building Practitioners Bill.
- The Design and Building Practitioners Bill specifically provides for mutual recognition of people who are registered under law in other jurisdictions as registered practitioners, and it is assumed that this is a reiteration of the provisions of the *Mutual Recognition (New South Wales) Act 1992*. However, without a NSW scheme to register someone to practice as an engineer, it is hard to see how the benefits of mutual recognition laws can be easily achieved.

- The proposal in the Design and Building Practitioners Bill is that “registered building practitioners” may alter the original designs without securing a declaration from a “registered design practitioner” if the work does not relate to a “building element” or a performance solution. Appropriately, they will however have to provide a list of such variations and attest to their meeting the Building Code of Australia. Without comprehensive registration for professional engineers, builders will be exposed to a risk of engaging people to do professional engineering work for which they are not appropriately trained or experienced.

The Professional Engineers Registration Bill will greatly enhance regulatory efficiency by making it clear to consumers and industry stakeholders what all competencies and compliance requirements are.

6.2 Term of Reference 2: How engineers and other building industry professions are regulated and monitored, and proposals for reform under the Bill and consideration of alternate proposals.

In the building sector, architects are separately registered and regulated by the *Architects Act*. Builders are registered and regulated in NSW by the *Building Professionals Act* and, where it applies, the *Home Building Act*.

Looking beyond the building sector, other examples of professions that are subject to registration include doctors via the *Health Practitioner Regulation National Law*, and lawyers by the *Legal Profession Uniform Law*.

The engineering profession is an anomaly in terms of its regulation in NSW: it is not subject to comprehensive registration requirements similar to other professions. There are several schemes in place that have limited application, but none are satisfactory for achieving the policy objective of establishing minimum standards for professional practice by all engineers. These are:

- Competent fire safety practitioner scheme (NSW Government)
- Building and Development Certifiers Regulation (NSW Government)
- Strata Building Bond Inspection Panels (NSW Government)
- The voluntary National Engineering Register (Engineers Australia).

6.2.1 Competent fire safety practitioner scheme

Under the Environmental Planning and Assessment Regulation 2000, the competent fire safety practitioner scheme (CFPS) was recently introduced by the NSW Government. It is “a co-regulatory framework that relies on the expertise of industry associations to accredit individuals with the skills, knowledge and experience required to be competent fire safety practitioners. When the framework is fully operational, only practitioners with accreditation from an approved organisation will be recognised as competent fire safety practitioners.”⁵

On initial view, this scheme seems like that proposed by the Bill, but it is in fact a very different proposition, and one that misplaces the obligation for enforcement action. It allocates the obligation for enforcement on the basis of a misunderstanding of the powers of professional associations.

The CFPS will require scheme owners, which will typically be non-profit professional or industry associations, to not only assess the initial and ongoing competence of applicants, but also to manage the regulatory functions of the register and conduct enforcement and sanction actions.

The role of regulator rightly belongs to Government. Unlike professional bodies, governments have the resources and legal power to conduct comprehensive investigations of the kind required by the CFPS, and to enforce sanctions. Not least of the disincentives is the potential for scheme owners to be involved in several and protracted legal cases when the time comes to discipline practitioners who may also be association members.

⁵ NSW Fair Trading, *Fire safety practitioners*. Available at: <https://www.fairtrading.nsw.gov.au/trades-and-businesses/business-essentials/information-for-specific-industries/fire-safety-practitioners>. Accessed 24 January 2020.

6.2.2 Building and Development Certifiers Regulation

At the time of writing, the new Building and Development Certifiers Regulation (under the *Building Professionals Act 2005*), is still in draft form. However, what has become clear is that the absence of a comprehensive registration scheme for engineers is complicating achievement of the objective to identify people who have the necessary experience and skills to perform the role of engineering certifier in a professional and competent manner.

Also, the fact that diverse schemes are being created—one for fire safety practitioners, and another for certifiers (which can also include fire safety engineers)—is evidence that regulatory burden (red tape) can be reduced if a simple and comprehensive Act for the registration of engineers is introduced.

6.2.3 Strata Building Bond Inspection Panels

The NSW Government, in seeking to redress the outcry of building owners in body corporate strata developments whose lots do not reflect the proposed development in inclusions or quality, has proposed amendments to the *Strata Schemes Management Act 2015* to increase bond values and require formal inspection reports to recommend release of the bond. Professional associations, including Engineers Australia, are nominated to establish panels of building bond inspectors.

Certain details in the legislation, official report templates and sensitive information requirements has deterred Engineers Australia from establishing a panel. However, competent engineers will be ultimately sought out for their forensic skills and capability to design remedial works. Greater confidence in those capabilities would be possible if the NSW Parliament establishes a register of professional engineers, as proposed by the Professional Engineers Registration Bill.

6.2.4 National Engineering Register

The National Engineering Register (NER) was introduced by Engineers Australia in 2015 and is recommended as the benchmark for competence in a co-regulatory system of registration for engineers.

The NER is the largest publicly searchable register in the country with 21,363 people registered as of July 2019. It delivers a uniform national benchmark of professionalism in the broadest areas of engineering practice, both general and special, in both the private and public sectors. It is possible for professional engineers to be registered on NER, whether or not they are members of Engineers Australia.

In the context of our support for the Professional Engineers Registration Bill, it is important to note that while the NER has made important advancements towards achieving its objectives, it is not a substitute for statutory registration of engineers. Because it is not compulsory for an engineer to be registered on the NER, an engineer looking to avoid scrutiny/regulation can simply not sign up to it. Of the roughly 60,197 engineers working in NSW, only 5,248 are on the NER (about 8.7%).⁶ The bottom line is that someone can still call themselves an engineer without having to be registered on the NER.

This information is shared because many people either support the calling up of the NER in legislation in all jurisdictions, or erroneously believe that it already is. The NER is, after all, a *national* engineering register—but it is not a means of excluding the unqualified or incompetent.

For clarity, Engineers Australia believes that the NER provides an effective *model* for the NSW Government, and that bodies like Engineers Australia are best-placed to assess the qualifications and experience of applicants to a statutory register. However, we do not ask for the NER to be called up in legislation as the sole means for recognising an engineer's competence. There are three reasons for this:

1. The role of regulator belongs to Government. Unlike professional bodies, governments have the resources and legal power to conduct comprehensive investigations of the kind outlined in the Bill, and to enforce sanctions. Also, if Engineers Australia (or other professional and industry associations) was to take on this role, we could be accused of having a conflict of interest.
2. Engineers Australia recognises that the government is unlikely to support monopoly control of a public registration system, albeit by a not-for-profit professional association.

⁶ The 60,197 figure is based on Engineers Australia analysis of the 2016 census and includes all engineers (professional engineers plus far lesser numbers of engineering technologists and engineering associates) who were in the labour force and working in engineering occupations. The NER figure stated is accurate for July 2019.

3. Engineers Australia views registration of engineers as a fundamental priority for the profession and seeks to avoid any inference of a profit motive in its advocacy.

Driving our work is the fact that Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

6.3 Term of Reference 3: Any other related matter

This section provides detailed feedback on specific clauses within the Bill, some of which have been raised by Engineers Australia members in the course of our recent consultation with them.

6.3.1 Enhanced mutual recognition

As described above, the *Mutual Recognition (New South Wales) Act 1992* will entitle an individual who is registered as an engineer in another state to be registered as an engineer in NSW. An engineer already registered in QLD (for example) would still need to apply for registration in NSW and probably pay a registration fee. However, mutual recognition means that the initial assessment of a person's eligibility for registration as an engineer would only need to happen once, which helps to keep the cost of registration in more than one state for an individual down.

Administrative and financial costs for the profession could be minimised further if NSW were to recognise registration in another state or territory as sufficient for practice in NSW. That is, NSW could adopt a model of 'register anywhere, practice anywhere.' This could be advanced in cooperation with other states, and it would be especially important to cooperate with Queensland and Victoria which already have registration laws, and the ACT which has committed to introduce them soon.

6.3.2 Investigations

To gain the trust of the profession, it will be important for the new Board to implement a robust complaints procedure and commit to balanced and fair investigations of complaints.

The Legislation Review Committee, in Digest No. 8/57 – 12 November 2019, noted that the Bill allows for an authorised officer to search a place of work without a search warrant, but accepted that this was necessary for the proper function of the proposed laws, and included safeguards to ensure residences can only be searched with either permission or a search warrant. However, feedback from our members indicates that many members of the community expect that a search can only be performed with a search warrant. If the current provisions that allow for a search without warrant are to be retained, there should be clear and rigorous safeguards in place to ensure that it is not unnecessarily applied.

The Legislation Review Committee also commented on the degree to which the reputation of engineers under investigation can be protected from undue harm. It is suggested that Clause 70 be amended to, in addition to the current requirement to remove reference to an offence from its website, also include a requirement for the Board to publish an apology or other corrective statement if an appeal against a sanction is successful.

Finally, members of Engineers Australia have raised concerns about the effect of potential vexatious complaints. An ability to take action against vexatious complaints and to seek suitable compensation should be embedded into the complaints process.

6.3.3 Extension to other areas of engineering

Clause 6 of the Bill prescribes the five 'areas of engineering' that will be subject to the new registration requirements. The long-standing position of Engineers Australia is that all areas of engineering should be subject to registration. That is the situation in Queensland.

The three main reasons for this position are that it:

- recognises that all areas of professional engineering practice are complex and would benefit from registration
- limits the risk of creating a long list of very niche areas of engineering that require bespoke regulatory management

- limits the risk of loop holes being created whereby someone might attempt to perform work without registration. An example could be someone performing electronic engineering work without registration because only electrical engineering is prescribed, despite both areas of practice having important similarities that warrant registration.

It is acknowledged that Clause 6 also provides for “(f) another type of engineering prescribed by the regulations.” That may be sufficient for expanding the current selection of areas of practice but caution would still be required to ensure that the areas of engineering are kept as broad as possible.

Recognising that this Bill is being reviewed in the context of a public and Government desire to reform the building sector, it is recommended that Clause 6 be amended to include two extra areas of engineering to ensure that, as a minimum, the areas of practice identified in the Building Ministers Forum’s report, *Building Confidence*, are all included. They are:

- Geotechnical engineering
- Hydraulic engineering.

Finally, feedback from members in response to this Bill, and experience from member inquiries after similar Victorian legislation was passed, is that the Bill should be clear about the scope of its application. For example, to an informed reader, the Bill applies to a civil engineer working in any industry, but it would be useful if that intent could be made more explicit.

Similarly, some members have noted that the areas of practice listed at Clause 6(a) to 6(e) are most often linked to the building and construction industries, but Clause 6(f) provides for registration to apply to any other type of engineering. As such, feedback from members indicates that there is uncertainty if Clause 6(f) could apply to areas of engineering in the full diversity of industries. The specific example cited in our member consultation process was biomedical engineering. Again, it would be useful if the intent of Clause 6(f) to enable the full gamut of engineering services to be registered is made more explicit through either the Bill or explanatory material.

6.3.4 Supervision

Clause 7 states that “A person must not carry out professional engineering services in an area of engineering unless (a) the person is a professional engineer whose registration authorises the person to carry out professional engineering services in that area of engineering, or (b) the person carries out professional engineering services under the **direct supervision** of a professional engineer whose registration authorises the person to carry out professional engineering services in that area of engineering.”

The Bill could be improved through the addition of a definition of “direct supervision” to provide greater clarity to engineers and their employers on the legal standards for supervision that are required.

In the absence of a legal definition, the Board should provide clear guidance to professional engineers. By way of example, the QLD BPEQ provides a Practice Note to help engineers understand their supervision requirement.⁷

6.3.5 Board membership to include engineers

Clause 36 of the Bill requires that the new Board of Professional Engineers is to include some members who are professional engineers. This provision is strongly supported, noting that diversity of thought and a diverse skills base is of course important for any Board so people with other professional backgrounds should be included.

6.3.6 Availability of the register and code of practice

Clause 40 of the Bill states that, “The board may make the register available for inspection on its website.” It is recommended that free and simple availability of the register online should be a requirement. This will ensure that potential consumers of professional engineering services are able to easily identify if an engineer is registered.

Similarly, Clause 43 allows the Board to make the Code of Practice available on its website. To ensure that the Code is widely understood by both professionals and consumers of their services, it is recommended that the Bill be amended to *require* that the Code is freely accessible online.

⁷ Board of Professional Engineers Queensland (BPEQ), *Practice Note 4.5 (1A) Direct Supervision*. Available at: <https://www.bpeq.qld.gov.au/4-5-1a-direct-supervision/>. Accessed 22 January 2020.

6.3.7 Application to associates and technologists

There are three categories of engineer recognised as providing engineering services in Australia: Professional Engineer, Engineering Technologist, and Engineering Associate. These are described in the box below. There is merit in including all three on the proposed NSW register for engineers, though at present only those who provide professional engineering services are required to be registered in Queensland and Victoria.

In the interests of streamlined regulation, Engineers Australia therefore supports the proposal in the Bill which is to begin by only applying registration to professional engineers.

However, it is important to ensure that those who provide engineering services to the level of Engineering Technologist and Engineering Associate are not unintentionally excluded from practice. The main thing is to ensure that “professional engineering services” are only provided by “professional engineers”, but that the other levels of engineering service can continue to be provided by engineering technologists and associates.

Three members of the engineering family

1. Professional Engineer

Professional Engineers apply lifelong learning, critical perception and engineering judgement to the performance of engineering services. They challenge current thinking and conceptualise alternative approaches, often engaging in research and development of new engineering principles, technologies and materials.

Professional Engineers require at least the equivalent of the competencies in a four-year full-time honours bachelor degree in engineering.

2. Engineering Technologist

Engineering Technologists exercise ingenuity, originality and understanding in adapting and applying technologies, developing related new technologies or applying scientific knowledge within their specialised environment.

Engineering Technologists require at least the equivalent of the competencies in a three-year full-time bachelor degree in engineering.

3. Engineering Associate

Engineering Associates apply detailed knowledge of standards and codes of practice to selecting, specifying, installing, commissioning, monitoring, maintaining, repairing and modifying complex assets such as structures, plant, equipment, components and systems.

Engineering Associates require at least the equivalent of the competencies in a two-year full-time associate degree in engineering or a two-year full-time advanced diploma in engineering from a university or TAFE college.

7. Concluding comment

Engineers Australia's overarching advice is that the Professional Engineers Registration Bill should be supported by Parliament.

The Bill introduces a new mechanism for ensuring professional engineering services are provided to an appropriate standard and applies it to all industries. That is a policy objective strongly supported by Engineers Australia and the wider NSW electorate.

Most engineers apply their skills competently, but registration is necessary to reduce the risks presented by anyone who attempts to deliver professional engineering services without relevant qualifications, experience or currency, or is not sufficiently competent to deliver services without supervision.

As provided for in the Bill, an exception to the requirement to be registered should apply for those performing professional engineering services under the supervision of an appropriately registered engineer, or if only applying prescriptive standards or designs.

In terms of the detail of the proposed legislation, the essential elements of a registration scheme are all evident in the Professional Engineers Registration Bill. Some minor amendments are suggested (see Section 6.3) but none require significant re-writes of the Bill.

This Bill has the support of the vast majority of engineers who have shared their views with Engineers Australia. It presents a low-cost mechanism for delivering great outcomes for the community and offers an opportunity to significantly reduce red tape.

Finally, the Bill also provides much-needed detail to extant Government-led reform for the building sector insofar as it applies to registration of engineers in the Design and Building Practitioners Bill.

Annex: case studies

These case studies illustrate the need for a statutory registration scheme for professional engineers working in all industries.

Case study 1

Case study of an engineering failure in a building that is not a Class 2 apartment⁸

Tilt up panels are a standard form of construction for many factories and commercial properties. It involves lifting pre-cast concrete panels into place for a building. Temporary bracing is used during construction to support unfinished structures against wind and other construction loads. Failure of temporary bracing is not uncommon and prompted NSW Workcover to issue guidelines after the collapse of a 40-tonne panel:

- Temporary bracing needs to be designed by an engineer taking into account wind loading, site access, installation and dismantling
- The engineer must review and approve any modifications to the bracings' design before any changes can be made
- An experienced engineer should design the temporary bracing before starting construction works
- Installation must be according to the engineer's specification
- An engineer must review any proposed changes to the installation of the bracing
- Structural integrity of the bracing needs regular inspection.

Bracing for tilt-up panels needs the input of engineers to ensure it is fit for the purpose and will perform safely without collapse and subsequent injury and damage. Without a compulsory registration scheme for engineers that applies beyond Class 2 structures, vital areas of engineering will remain at risk.

Case study 2

Case study of an engineering failure in a Class 2 apartment, but related to something not usually considered when thinking of what goes into erecting a building⁹

Formwork is an integral element in construction and is applicable to many construction activities including high rise apartments. Formwork is a temporary (sometimes permanent) mould into which concrete is poured. It is often made of strong plywood but can be other materials. Failure of formwork can have horrific results. A multi-story formwork collapse in May 2019 in NSW saw three workers escape injury by grabbing onto and climbing up the reinforcement mesh and debris. Formwork for high rise apartments and other high-rise buildings needs to:

- Be designed by a competent person, such as an engineer, taking into account various factors including static and dynamic loads, how the formwork is to be braced, rigidity, movement of people and environmental factors such as wind and rain
- Have variations to design checked by an engineer
- Have various components from different formwork systems authorised by an engineer
- Have an engineer inspect and certify completed formwork and its supporting structures to ensure it meets the design specifications and is structurally sound



⁸ OHS News, *NSW: WorkCover Issues Guidelines on Tilt Up Panels*, 29 January 2010. Available at: <http://content.safetyculture.com.au/news/index.php/01/nsw-workcover-issues-guidelines-on-tilt-up-panels/#.XaQ84egzaUI>. Accessed 14 October 2019. Additional details about the incident involving the 40-tonne panel may be available from SafeWork NSW.

⁹ SafeWork NSW, *Formwork collapse during concrete pour*, 25 May 2019. Available at: <https://www.safework.nsw.gov.au/compliance-and-prosecutions/incident-information-releases/2019-iiir-accordions/formwork-collapse-during-concrete-pour-25-may-2019>. Accessed 14 October, 2019. Additional details about this incident may be available from SafeWork NSW.

Formwork in complex construction should be designed by engineers with appropriate training and experience. Without a comprehensive compulsory registration scheme for engineers vital areas of engineering will remain at risk.

Case study 3

Case Study of engineering failure in civil construction (bridge)

In 2010, the eastern duplication bridge of the Gungahlin Drive Extension (GDE), over the Barton Highway in the ACT, partially collapsed sending debris crashing onto the highway. The new bridge was under construction when it collapsed. One man was trapped under the rubble and nine taken to hospital for treatment. All those affected were working on the new span of the bridge.

An engineer's report on the collapse of the bridge found the project's formwork was not properly braced to stop the girders moving sideways when the concrete was poured, creating excessive stress.

The engineer responsible has also been accused of breaching building standards on eight projects in the ACT including the Barton Highway bridge, Empire Apartments in Forrest and Pulse Apartments in Gungahlin.



Case study 4

Case Study of engineering failures in the agriculture sector

A number of silo collapses have taken place in regional Australia, some of which have resulted in fatalities. Recent examples of silo collapses include:

- In May 2010, a man was crushed to death by a metal grain silo near Kyabram in northern Victoria;
- In October 2014, a farm worker near Ouyen in western Victoria died when a grain silo collapsed on him;
- In June 2015, a 3000-tonne silo, which was about three-quarters full of cement dust, collapsed in the Adelaide suburb of Osborne, despite the silo being brand new, although thankfully, no-one was injured.
- In January 2017, a 3500-tonne grain silo on poultry company, Ingham's property in Cardiff, near Newcastle in NSW, collapsed without warning, with witnesses saying it was lucky that no-one was hurt; and
- In June 2018, a full grain silo collapsed near Mallala, to the north of Adelaide, and although workers were in the vicinity at the time, no-one was injured;

Compulsory registration of engineers would make it much less likely for similar design flaws and silo collapses to happen in the future, significantly enhancing community safety and consumer protection.

