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22nd June 2023

The Hon Grace Grace MP
Minister for Education,
Minister for Industrial Relations, and
Minister for Racing
Queensland Government

Dear Grace,

CMEIG Submission regarding the Review of Queensland's Electrical Safety Act 2002

The Construction and Mining Equipment Industry Group (CMEIG) respectfully submit the following in relation to the Queensland Office of Industrial Relations' Review of Queensland's Electrical Safety Act 2002.

CMEIG is the peak industry association representing construction and mining equipment (i.e. earthmoving machine[1]) manufacturers and importers. With annual sales revenue of more than $17 billion AUD, CMEIG members supply and maintain equipment for the nation's mining, quarrying, construction, electric power generation and forestry industries. Most of the world's major earthmoving machinery manufacturers are represented in the Association's membership. We represent over 20,000 directly employed Australians, and serve an industry employing tens of thousands of Australians across the construction and mining sectors. For familiarity, some examples of the types of machinery we represent are illustrated below.

CMEIG members strongly support, and are working diligently towards global, Australian, and Queensland decarbonisation and environmental sustainability objectives. Over coming years, the rate of new, lower emission offerings is set to increase with CMEIG members expecting to introduce a significant number of earthmoving machines that replace conventional diesel engine powered machines, with diesel electric hybrid (both plug-in and non-plug-in forms), and fully battery electric machines. While the design of the electrical systems on these earthmoving machines varies (e.g. different types of machines are optimised for different operating voltages), they are all designed to eliminate the need for operators and maintainers to be exposed to high voltage live parts. These advanced machines incorporate the latest operational and maintenance safety features, and meet or exceed the latest applicable Australian and International safety standards. This includes global best-practice standards specific to electrical safety of machinery.

The industry's ability to roll out these advanced technologies and machines in Queensland is being adversely impacted by lack of clarity in current legislation such as Queensland's Electrical Safety Act 2002. Our initiatives will likely be further impeded depending on some of the options proposed in the recently published Discussion Paper on Queensland's Electrical Safety Act 2002[2]. Some of these key issues and our proposed solutions are outlined for your awareness.

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[1] While often referred to colloquially as construction or mining vehicles, we have used the internationally standardized terminology of earthmoving machine for the purposes of this response.

[2] "Electrical Safety Act to enter a new era as public consultation opens"- accessed via https://statements.qld.gov.au/statements/97743

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1. **Issue**

The present Queensland Electrical Safety Act 2002 and the current Review discuss the following "electric vehicle classes":

Table 19: Comparison of voltage for electric vehicle classes

Electric motorcycles	48 to 52V
Electric cars	200 to 800V
Electric passenger buses	380 to 800V
Electric heavy trucks	800 to 900V
Electric mining vehicles	3000V+

Note: the level of voltage identified in the table is for discussion purposes only, and vehicle models can operate at different voltages even within the same class of vehicle.

While the review identifies the potential need for introducing classes for buses and trucks, there is no classification included or discussed for earthmoving machines, except a specific reference to "Electric mining vehicles" with a voltage presented of 3000V+.

In reality, modern earthmoving machines leveraging hybrid or fully battery electric machines will typically operate in the Extra Low Voltage (ELV <50V AC, 120V DC) or Low Voltage (LV <1000V AC, 1500V DC) range. This is in addition to existing diesel electric haul trucks which typically operate at High Voltage (> 1000 VAC, 1500V DC).

The absence of any recognition of this class of machines, and the lack of distinction of variations in operating voltages, raises a concern for CMEIG that the present trajectory of government policy may not effectively address industry needs.

Proposed Resolution

- CMEIG requests to be directly involved in any related industry consultation.
- CMEIG proposes that *Earthmoving Machines* be included as a class of vehicle/plant.
- CMEIG recommends that all 'vehicles and earthmoving machinery' policy should be dictated by two criteria:
    i. operating voltage (e.g. differentiated policy based on ELV, LV and HV), and
    ii. the potential risk to health and safety to Queenslanders posed by specific vehicles or machinery

2. **Issue**

It is CMEIG's present understanding that Queensland's Office of Industrial Relations presently requires, or is considering requiring work on hybrid and battery electric earthmoving machines to be carried out by a fully licensed electrician.

CMEIG respectfully submits that requiring a fully licensed electrician for such tasks is unduly restrictive and does not provide any significant health and safety benefit to our industry. Other pre-eminent regulatory jurisdictions globally (e.g. Canada, USA, The European Union) have recognised this reality, and are not imposing barriers to trade such as is being proposed in the Review of Queensland Electricity Safety Act 2002.

Our members' machines incorporate the latest operator and maintainer safety features, and meet or exceed the latest applicable Australian and International safety standards, including standards specific to electrical safety of machinery. In doing so, they inherently limit the exposure of operators and maintainers to harmful electrical energy. These machines are designed to rapidly dissipate any voltage above ELV when in operation, such that by the time the operator shuts down the machine and exits the operator station, there is already no longer any hazardous voltage present. Troubleshooting on these machines is done through connecting and reading an instrument, de-energizing/re-energizing the machine from an inherently safe position, and unplugging and replacing entire components without breaking into, or being exposed to hazardous voltage.

The complexity of these machines and their systems means that, rather than benefitting from any generic qualification or the experience, it is manufacturer-specific and system-specific training, experience and qualifications that are required to maintain these machines and their electrical systems safely. A practitioner requires a thorough understanding of these machines holistically, covering integrated systems such as brakes, steering, electro-hydraulics and pneumatics, machine control systems etc, all of which sit outside of the training regime for a typical fully licensed electrician.

By way of example, CMEIG members currently employ thousands of trade qualified diesel fitters and automotive electricians. These skilled workers are inherently familiar with earthmoving machinery and CMEIG believes they can be effectively upskilled on the specific operational and maintenance needs of hybrid electric and battery electric earthmoving machines. Whereas in the absence of any bridging pathways and a mandated requirement to be a fully licensed electrician, these skilled workers would require 4 years of additional theory and practice. Most of this theory

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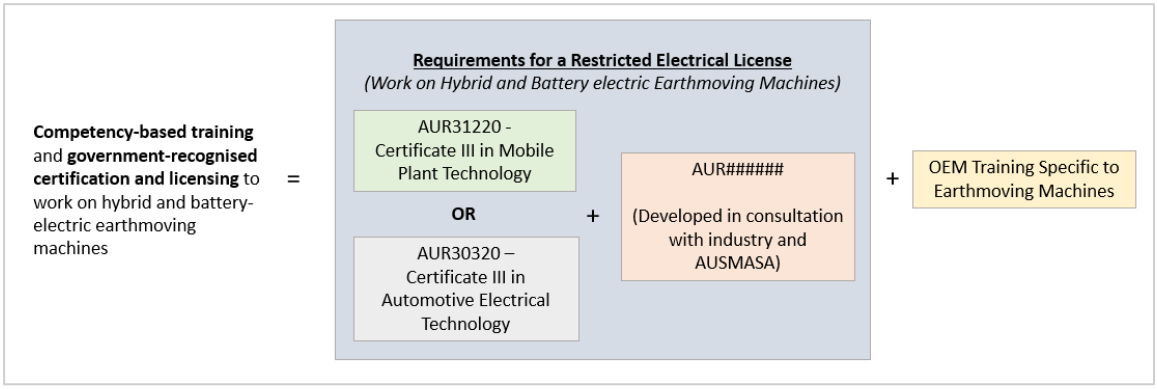
and practice presently relates to work on residential or fixed plant electrical systems. These are not analogous to earthmoving machinery electrical systems, and so means that our members will be training staff for the wrong skillsets that are not relevant, and may create a false sense of confidence around earthmoving machinery electrical systems.

CMEIG considers that requiring a fully licensed electrician for these tasks, rather than very specifically focusing the requirement for a fully licensed electrician to where that skillset is effective, will also exacerbate existing skills shortages, and limit the ability of our industry to efficiently upskill our existing workforce. We expect this issue will be further compounded considering the rapid electrification of various other means of transport (road vehicles, buses, trucks, ferries etc).

CMEIG is presently working with AUSMASA (*The Australian Mining and Automotive Skills Alliance)* which is the appointed Jobs and Skills Council by the Australian Government Department of Employment and Workplace Relations, to develop tailored training packages and recognised competencies to upskill our workforce for the types of electrical tasks that we envisage to be undertaken on earthmoving machines today and in the future. We believe this is a much safer and more diligent approach for our industry. The illustration below may assist in explaining our belief that competency-based OEM training and government-recognised certification and licensing can address the ability of our technical workforce to safely work on hybrid and battery electric earthmoving machines.



Proposed Resolution

a. CMEIG requests to be directly involved in any related industry consultation.
b. CMEIG believes better clarity is required for what constitutes electrical work and electrical equipment, excluding operational and non-electrical maintenance tasks on earthmoving machinery
c. CMEIG supports a regulatory framework requiring a restricted electrical license rather than a fully licensed electrician to work on hybrid and battery-electric earthmoving machinery. This restricted electrical license should be
    i. subject to completion of a tailored training package and recognised competencies developed by industry through bodies such as AUSMASA
    ii. open to anyone with industry-agreed prior trade competencies (which are then systematically upskilled), rather than restricted to fully licensed electricians.

We appreciate your consideration of our feedback and appreciate the opportunity to further engage with your Office, the Office of Industrial Relations and the Electrical Safety Office on this important topic.

Sincerely,

David Birrell
CEO – CMEIG

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Appendix A

CMEIG responses to the specific questions for which feedback has been sought by the Electrical Safety Office[3]

Discussion Paper - A response to the Review of Queensland's Electrical Safety Act 2002 – key definitions and emerging technologies

3.3 Electrical safety and electric vehicles
3.3.6 Questions seeking feedback

1. How are you, your organisation, the workforce or community affected by the problems identified and to what extent?

CMEIG is the peak industry association representing construction and mining equipment (i.e. earthmoving machine[4]) manufacturers and importers. With annual sales revenue of more than $17 billion AUD, CMEIG members supply and maintain equipment for the nation's mining, quarrying, construction, electric power generation and forestry industries. Most of the world's major earthmoving machinery manufacturers are represented in the Association's membership. We represent over 20,000 directly employed Australians, and serve an industry employing tens of thousands of Australians across the construction and mining sectors. For familiarity, some examples of the types of machinery we represent are illustrated below.

CMEIG members strongly support, and are working diligently towards global, Australian, and Queensland decarbonisation and environmental sustainability objectives. Over coming years, the rate of new, lower emission offerings is set to increase with CMEIG members expecting to introduce a significant number of earthmoving machines that replace conventional diesel engine powered machines, with diesel electric hybrid (both plug-in and non-plug-in forms), and fully battery electric machines. While the design of the electrical systems on these earthmoving machines varies (e.g. different types of machines are optimised for different operating voltages), they are all designed to eliminate the need for operators and maintainers to be exposed to high voltage live parts. These advanced machines incorporate the latest operational and maintenance safety features, and meet or exceed the latest applicable Australian and International safety standards. This includes global best-practice standards specific to electrical safety of machinery.

The industry's ability to roll out these advanced technologies and machines in Queensland is being adversely impacted by lack of clarity in current legislation such as Queensland's Electrical Safety Act 2002. Our initiatives will likely be further impeded depending on some of the options proposed in the recently published Discussion Paper on Queensland's Electrical Safety Act 2002.

2. Do you agree with the assessment of the problem identified, and are there additional risks presented by electric vehicles that have not been identified? If yes, what are they and can you provide examples of these issues?

CMEIG strongly disagrees with the policy proposal indicated in the discussion paper to require a fully licensed electrician to work on such machines safely. Without further training, a fully licensed electrician lacks the adequate skills and

[3] *Have your Say – Electrical Safety Act 2002 review - https://www.oir.qld.gov.au/public-consultation/electrical-safety-act-2002-review*

[4] *While often referred to colloquially as construction or mining vehicles, we have used the internationally standardized terminology of earthmoving machine for the purposes of this response.*

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training to safely work on these machines. We emphasise that the proposed policy to implement such a requirement will introduce new and significant risks to health and safety for Queenslanders.

CMEIG strongly aligns with the need to operate and maintain electrified earthmoving machines safely and we believe this is a function of firstly competence, and then for societal assurance and accreditation management, licensing.

The complexity of these machines and their systems means that, rather than benefitting from any generic qualification or the experience, it is manufacturer-specific and system-specific training, experience and qualifications that are required to competently maintain these machines and their electrical systems safely. A practitioner requires a thorough understanding of these machines holistically, covering integrated systems such as brakes, steering, electro-hydraulics and pneumatics, machine control systems etc, all of which sit outside of the training regime for a typical fully licensed electrician. While valuable in its own right, the training and experience gained by a fully licensed electrician over 4 years will have very little context in terms of competence, on how to diagnose and fix these issues on earthmoving machines in a safe manner.

The discussion paper and full report also causes CMEIG to question whether there is a good understanding here of exactly what work is required on these machines – troubleshooting on these machines will typically be done through connecting and reading an instrument away from any live machine parts, de-energizing/re-energizing the machine from an inherently safe position away from any live machine parts, and then while deenergized, unplugging and replacing entire components without breaking into, or being exposed to hazardous voltage.

3. What practical impact, including the costs and benefits, would the options proposed in the Discussion paper have on you, your organisation, the workforce or the community? Please provide examples where possible.

The industry's ability to roll out advanced technologies will be impeded depending on some of the options proposed in the recently published Discussion Paper on Queensland's Electrical Safety Act 2002. Taking the ability of OEM's and their local representatives to manage the manufacture, support, maintenance etc. of specialised machines away from these entities, and adding additional generic requirements will add significant cost and complexity with no safety-related value. In specific instances, onerous requirements which add limited value would result in tasks that can be done safely without this regulatory burden moving interstate or overseas, or prevent the rollout in Queensland of decarbonisation and environmental sustainability objectives.

Specific policy aspects discussed such as requiring a licensed electrician means that CMEIG members would have to train (and organise work experience for) tradesmen, in a manner or facilitate an environment that has little bearing on the actual workplace maintenance tasks they would be carrying out on earthmoving machines. Oversimplifying, obtaining 4 years of experience in wiring houses and fixed plant will add little value to these apprentices when they enter an earthmoving machine maintenance workplace.

4. What is your preferred option and why would it be best for you, your organisation and your stakeholders?

CMEIG respectfully submits that the policy options proposed lack a deeper understanding of our sectors needs. The options appear to make an assumption that having a fully licensed electrical work means that work on electrified earthmoving machines can now be done safely. This is misleading and potentially dangerous. It is not consistent with the policy approaches being taken in other global jurisdictions that place a significant emphasis on workplace safety.

CMEIG's preferred approach is as follows:

- CMEIG requests to be directly involved in any related industry consultation.
- CMEIG believes better clarity is required for what constitutes electrical work and electrical equipment, excluding operational and non-electrical maintenance tasks on earthmoving machinery
- CMEIG proposes that *Earthmoving Machines* be included as a class of vehicle/plant.
- CMEIG recommends that all 'vehicles and earthmoving machinery' policy should be dictated by two criteria:
    - operating voltage (e.g. differentiated policy based on ELV, LV and HV), and
    - the potential risk to health and safety to Queenslanders posed by specific vehicles or machinery
- CMEIG supports a regulatory framework requiring a restricted electrical license rather than a fully licensed electrician to work on hybrid and battery-electric earthmoving machinery. And this restricted electrical license should be:
    - subject to completion of a tailored training package and recognised competencies developed by industry through bodies such as AUSMASA – the Federal governments appointed Jobs and Skills Council for education and training development in this sector.

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- open to anyone with industry-agreed prior trade competencies which are then systematically upskilled, rather than restricted to fully licensed electricians.

5. If a licensing framework was introduced:

a. Should any specific type of vehicle be excluded for the requirement (e.g. motorcycles, cars, buses, trucks)? If so, what are they and why?

CMEIG recommends that all 'vehicles and earthmoving machinery' policy should be dictated by two criteria:

- operating voltage (e.g. differentiated policy based on ELV, LV and HV), and
- the potential risk to health and safety to Queenslanders posed by specific vehicles or machinery

We are also amenable to a different framework but believe instead of specifying types of 'vehicles', a more agnostic approach will better serve Queenslanders as technologies are introduced, evolve and/or are superseded.

In the absence of addressing the above proposal, CMEIG proposes that *Earthmoving Machines* be included as a class of vehicle/plant that is specifically discussed, and the aforementioned nuances of such machines effectively addressed.

b. Is a restricted licence (specified training) or full licence (full apprenticeship) suitable? If so, why?

CMEIG recommends a restricted license and also wishes to be consulted on the specified training that constitutes this license.

CMEIG members currently employ thousands of trade qualified diesel fitters and automotive electricians. These skilled workers are inherently familiar with earthmoving machinery and CMEIG believes they can be effectively upskilled on the specific operational and maintenance needs of hybrid electric and battery electric earthmoving machines. Whereas in the absence of any bridging pathways and a mandated requirement to be a fully licensed electrician, these skilled workers would require 4 years of additional theory and practice. Most of this theory and practice presently relates to work on residential or fixed plant electrical systems. These are not analogous to earthmoving machinery electrical systems, and so means that our members will be training staff for the wrong skillsets that are not relevant, and may create a false sense of confidence around earthmoving machinery electrical systems.

CMEIG considers that requiring a fully licensed electrician for these tasks, rather than very specifically focusing the requirement for a fully licensed electrician to where that skillset is effective, will also exacerbate existing skills shortages, and limit the ability of our industry to efficiently upskill our existing workforce. We expect this issue will be further compounded considering the rapid electrification of various other means of transport (road vehicles, buses, trucks, ferries etc).

CMEIG is presently working with AUSMASA (The Australian Mining and Automotive Skills Alliance) which is the appointed Jobs and Skills Council by the Australian Federal Government Department of Employment and Workplace Relations, to develop tailored training packages and recognised competencies for the types of electrical tasks that we envisage to be undertaken on earthmoving machines today and in the future. We believe this is a much safer and more diligent approach for our industry. The illustration below may assist in explaining our belief that competency-based OEM training and government-recognised certification and licensing can address the ability of our technical workforce to safely work on hybrid and battery electric earthmoving machines.

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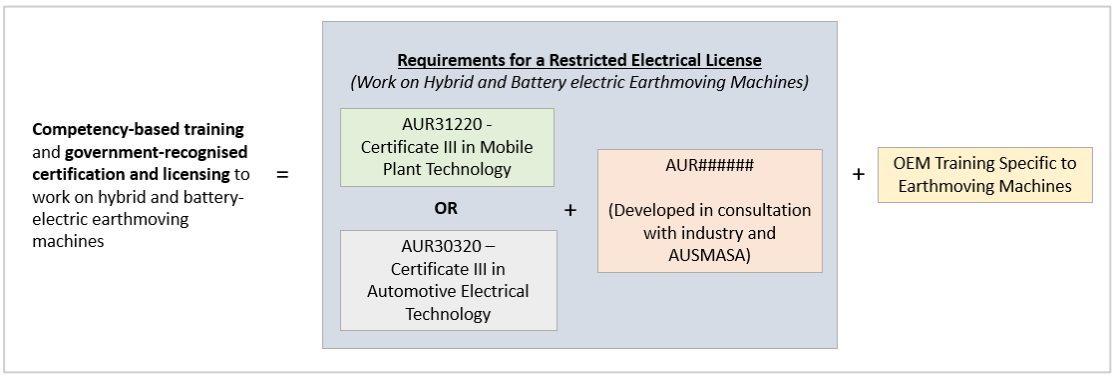


c. Should the licence type be determined based on the type of vehicle? If so, what would you suggest and why?

CMEIG recommends a restricted licensing policy based on voltage levels or other defined health and safety criteria. Basing policy on type of vehicle is likely to result in regulation that is unable to keep up with technology change, as well as resulting in technical non compliances that create barriers to trade that have no technical or safety-related basis.

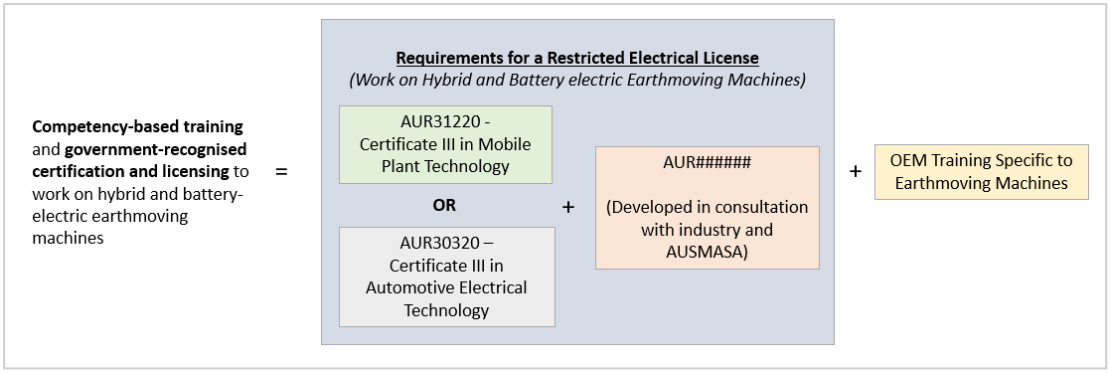
d. What types of work or occupations should be excluded from a licensing requirement? Or alternatively, what types of work or occupations should have specific licensing requirements (e.g., on-road works, general maintenance and check-ups, and/or removal and disposal)?

CMEIG submits that this is a very subjective question and depends on specific equipment and application. We wish to consult directly with the department such that we can develop effective government policy that caters to all Queenslanders.

In the interim, CMEIG suggests that licenses could be separated out into an **industry-set** curriculum similar to as shown below:

- **LV Disconnect/Reconnect** and **Diagnose/Replace**
- **LV Disconnect/Reconnect** and **Diagnose/Replace** and **Intrusive Repairs**
- **HV Disconnect/Reconnect** and **Diagnose/Replace**
- **HV Disconnect/Reconnect** and **Diagnose/Replace** and **Intrusive Repairs**

Please note, CMEIG is working with AUSMASA (The Australian Mining and Automotive Skills Alliance) which is the appointed Jobs and Skills Council by the Australian Federal Government Department of Employment and Workplace Relations, to develop tailored training packages and recognised competencies for the types of electrical tasks that we envisage to be undertaken on earthmoving machines today and in the future. We believe this is a much safer and more diligent approach for our industry. The illustration below may assist in explaining our strategy.



e. Are there any elements under the Act which should not apply? Which sections and why?

No further comments besides those put forth as part of this response.

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f. **Are there situations in which a disconnect and connect restricted licence for performing work on non-propulsion components of a vehicle would be appropriate?**

CMEIG believes this is an ideal pathway forward. The requirements for this restricted license requires industry collaboration and consensus. CMEIG is presently concerned about the effectiveness of current industry consultation, and our limited visibility to policy-making in an area that will have significant impact on our activity in Queensland. Moving forward, we request further direct industry consultation and engagement, and request to be part of this activity.

6. **Do you have suggestions for other options to address the problems identified? Please provide examples (including costs where appropriate) of your suggested options, including how it would ensure the workforce are electrically safe and conduct electrically safe work for community safety.**

No further comments besides those put forth as part of this response.