



**NSW
Resources
Regulator**

**PROPOSED NEW STATUTORY FUNCTION: GEOTECHNICAL ENGINEER –
UNDERGROUND COAL MINES**

PUBLIC SUBMISSIONS

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Contents

Introduction	2
1. Name redacted - individual submission	3
2. Name redacted - individual submission	5
3. Greg Shields – individual submission.....	6
4. Name redacted - individual submission	7
5. Name redacted – individual submission.....	11
6. Name redacted – organisation submission (not included in this publication).....	12
7. Glencore Coal Assets Australia	13
8. Professors Ismet Canbulat and Bruce Hebblewhite – individual submission	20
9. NSW Minerals Council	22
10. Mine Managers’ Association of Australia	25
11. Name redacted – individual submission.....	30
12. Emeritus Professor Jim Galvin – individual submission.....	32
13. Collieries’ Staff and Officials Association.....	43

Introduction

On behalf of the Mining and Petroleum Competence Board (the board), the NSW Resources Regulator invited comment from stakeholders on the discussion paper for a possible new statutory function of geotechnical engineer in underground coal mines. The consultation period closed on 19 October 2019.

The following submissions were provided to the Regulator as part of the consultation process.

Submissions have been published in full where consent was given. Personal information was redacted if requested.

1. Name redacted - individual submission

Name	Personal information redacted
Email	
Street address	
Postal address (if different)	
Are you an individual representing an organisation	No
If you are representing an organisation, please name it	
<p>Privacy – please tick if appropriate</p> <p><input type="checkbox"/> I consent to my submission being published in full</p> <p><input checked="" type="checkbox"/> I consent to my submission being published excluding personal information</p> <p><input type="checkbox"/> I do not want my submission published on the NSW Resources Regulator website</p>	
<p>DO YOU HAVE ANY COMMENTS ON THE QUESTIONS BELOW? <i>(Please outline the reasons to support your views)</i></p>	
Is a new statutory function for geotechnical engineering warranted?	<p>Yes. It’s a critical role for an operating coal mine, and not one that should be taken lightly. In my opinion, the personnel currently holding this role on mine-sites should have greater levels of knowledge, commitment and competence than they currently do. In general, the role is under performed and this is starting to become evident in the incidents that are occurring.</p>

<p>If the function is warranted, what qualifications and experience are appropriate?</p>	<p>I have made some minor additions/comments to the proposed qualifications, which I have highlighted below:</p> <p><i>“A four-year degree in Civil geotechnical engineering and three years’ experience working in or consulting to an underground coal mines as a Geotechnical Engineer.”</i></p> <p>(To my knowledge there is no Geotechnical Engineering undergraduate degree offered in Australia, especially one aimed at the mining industry. Civil Engineering students can major in Geotechnical Engineering but this field of study is vastly different to what’s required of an underground geotechnical engineer. A civil engineering degree is the most suited to becoming a UG Coal Mine Geotech, because it teaches really solid foundations of strength, stress and structures. It also has strong ties to geology and rocks (much more important than soils – which is what civil geotechs focus on).</p> <p><i>“A degree in either geology, geophysics or mining engineering with a one-year postgraduate qualification in geomechanics or geotechnical engineering and three years’ experience working in or consulting to an underground coal mines as a Geotechnical Engineer.”</i></p>
<p>If the function is warranted should it be a key statutory function?</p>	<p>No, I don’t think so. It would probably suit for multiple people to be able to hold the ticket of geotech at a site, or one person hold the ticket over several sites.</p>
<p>Do you have any comments of a general nature?</p>	<p>It would be worth considering the implementation of an assessment package (written or oral or both) prior to awarding the Stat Function to individual engineers. The holding of the above degrees or experience does not necessarily make for competence. South Africa have a similar process, and produce very high calibre geotechs. Please feel free to contact me if you would like to discuss anything further.</p>

Proposed new statutory function:
Geotechnical engineer – underground coal mines

2. Name redacted - individual submission

To: [RRD SE Resources Regulator Feedback Mailbox](#)
Subject: HPE CM: Geotechnical Engineer Stat Role
Date: Friday, 20 September 2019 10:51:18 AM
Attachments: [image001.png](#)

Good morning,

I have just read the discussion paper and would love to give some feedback. I am in support of the movement to a Statutory Role.

I am a geologist with two years experience on an operation UG mine site. I believe moving the role of Geotech to a stat position will be of benefit to mine sites and industry as a whole through more frequent and technical training (not just gaining the post-grad UNSW qualification)

The implementation of MOC / CPD points with year round training and technical conferences will engage geologists such as myself. I find conferences to be less informative and at least half sales pitches, rather than case studies and identification of developing trends within UG geotechnical engineering. This may also push for ALTS / ADFRS training programs to be ran once again, as these are still considered a "triple-check" for geotechnical designs, however you cannot use it until you have been blessed with a login, which you cannot get until you have been trained, but training is no longer being ran...

I believe the implementation of Stat Reports (akin to VO reporting) would allow for the geotechnical environment to be methodically assessed more frequently, and could be tied into the Strata Control Committee communication.

3. Greg Shields – individual submission

Name	Greg Shields
Email	Greg.shields@centennialcoal.com.au
Street address	100 Miller Road, Fassifern, NSW
Postal address (if different)	
Are you an individual representing an organisation	You
If you are representing an organisation, please name it	
<p>Privacy – please tick if appropriate</p> <p><input checked="" type="checkbox"/> I consent to my submission being published in full</p> <p><input type="checkbox"/> I consent to my submission being published excluding personal information</p> <p><input type="checkbox"/> I do not want my submission published on the NSW Resources Regulator website</p>	
<p>DO YOU HAVE ANY COMMENTS ON THE QUESTIONS BELOW? <i>(Please outline the reasons to support your views)</i></p>	
Is a new statutory function for geotechnical engineering warranted?	No
If the function is warranted, what qualifications and experience are appropriate?	N/A
If the function is warranted should it be a key statutory function?	N/A
Do you have any comments of a general nature?	The value of a statutory geotechnical function for coal in NSW there is currently a legislative requirement for geotechnical input and audit in mining systems design.

4. Name redacted - individual submission

Name	Personal information redacted
Email	
Street address	
Postal address (if different)	
Are you an individual representing an organisation	No, whilst I work in the industry in a geotechnical capacity, opinions outlined are my own.
If you are representing an organisation, please name it	
<p>Privacy – please tick if appropriate</p> <p><input type="checkbox"/> I consent to my submission being published in full</p> <p><input checked="" type="checkbox"/> I consent to my submission being published excluding personal information</p> <p><input type="checkbox"/> I do not want my submission published on the NSW Resources Regulator website</p>	

DO YOU HAVE ANY COMMENTS ON THE QUESTIONS BELOW? (Please outline the reasons to support your views)

Is a new statutory function for geotechnical engineering warranted?

I believe so. Currently most mines do employ a geotechnical engineer and those who do not utilise external contractors on an as needed basis and use (in some instances unqualified) employees for mapping and data collection.

The reason why I believe it is warranted is due to the ever-changing nature of underground mining and the material being mined. Whilst TARPs are in place to self-manage most generic strata conditions a suitably qualified person is required to recognise the early warning signs of change and implement controls. In some mines utilising offsite external contractors this change may not be recognised and acted upon until it's too late. Those who utilise external contractors maybe using them in an 'as required' capacity who may not visit site for months or just conduct desktop designs using other people's data (that may not have been collected correctly). This creates a disconnect from the operation and knowledge of the specific strata behaviour encountered on site.

Advantages of an onsite geotech include; a deeper understanding of the specific challenges at the individual mine, continual monitoring, testing and improvements to support systems, input into day to day planning to assist with safe mining practices, oversee that data is being collected and utilised properly to create sound designs, a point of contact for geotechnical concerns and assigning responsibility to geotechnical matters on site.

I believe there are a lot of benefits to creating this statutory role and the main reason this motion would see objection is from operations currently not employing a geotechnical engineer who would see this as inconvenience and the perceived increased cost to the operation to employ someone. In reality the cost of an onsite geotechnical engineer would be cheaper than continual use of external contractors. From personal experience at an operation I worked at, the employment of a geotechnical engineer saved over \$200,000 in consultant reports in the first year alone.

The views outlined in the discussion paper in regards to the case against I believe are fairly weak arguments and I would like to address them.

Point one, *"Underground coal mines already have access to geotechnical expertise either through direct employment or contract arrangements with consultants."* If a mine already has geotechnical expertise through direct employment, then nothing changes. A consultant can also be nominated as the stat geotech should a site not wish to employ their own.

Point two, *"Does not foster an approach where different perspectives are sought and therefore overcome potential for a repetitive approach to risk management."* This a moot point as it is not a risk unique to an onsite geotech as often a single geotech contractor (and maybe even a single geotech engineer) is engaged who have their own preferred methodologies. Good design practices by

	<p>all geotech engineers (external and onsite) state the requirement for peer review of design. The appointment of an onsite geotech does not exclude the ability to continue to utilise consultants and their use should be encouraged especially when conducting high risk or new activities.</p> <p>Point three <i>“On-Site expertise may not be regularly exposed to different conditions.”</i> Whilst this point is true I reiterate that having an appointed onsite geotech does not exclude the use of external contractors when required. Similar to other stat roles such as surveying and engineers requiring RPQ in QLD, a CPD point system should be implemented to encourage participation in industry discussions assisting to increase exposure to different conditions and issues.</p> <p>Point four, <i>“The Regulator undertakes Targeted Assessments to monitor mine site compliance with PHMP supported by a strata management Code of Practice.”</i> Whilst this is useful to audit a mine site to ensure the geotechnical frame work is in place, this does not offset the requirement for day to day compliance auditing by a responsible person on site.</p> <p>Point five, <i>“Multiple fatalities due to strata failure in Australia are rare.”</i> Multiple fatalities should not be a deciding factor, single fatalities still occur and the potential for multiple fatalities still exist the same as many other areas currently managed by a statutory function.</p>
<p>If the function is warranted, what qualifications and experience are appropriate?</p>	<p>The outlined parameters as described in the discussion paper and reiterated below are reasonable qualifications.</p> <p><i>“A degree in either geology, geophysics or mining engineering with one-year postgraduate qualification in geomechanics or geotechnical engineering and three years’ experience working in an underground”</i></p> <p>I do not believe a 4 year geotechnical degree is a requisite for this role, however if someone has this qualification then it should also be considered appropriate as outlined in the discussion paper.</p> <p>The UNSW Strata Control Grad Diploma is an excellent choice for a suitable post graduate degree which takes approximately 18 months to obtain and covers all aspects required to introduce a new geotechnical engineer to a mining role.</p>

<p>If the function is warranted should it be a key statutory function?</p>	<p>The points I have outlined thus far would indicate that a key statutory function is required, the geological and geotechnical characteristics are more highly variable than some of the other parameters at a mine site and thus a deeper understanding of the specifics are required.</p> <p>However, I believe a few select cases could still be successfully managed with a statutory function such as mine which has a rotating staff roster with more than one geotech engineer.</p> <p>I do not believe that if the role <u>was not</u> a key stat function it would “enable different expert perspectives and exposure of geotechnical engineers to different situations” as outlined in the discussion paper. Also, the statement “Mines should have the ability to use geotechnical advice across different sites” is correct and should definitely be encouraged, but I fail to see how the allocation of a key stat role would prevent this. A key stat function does not mean someone works in isolation or cannot seek external advice but is more so a single person responsible to ensure designs or consumables have been analysed and considerations have been conducted to a reasonable degree which may include seeking external advice.</p> <p>The main point of this stat role is to assign responsibility to a person who is involved and on site regularly with the relevant qualifications to ensure safe practices are being followed and not just managed by an external body on an as needed basis.</p>
<p>Do you have any comments of a general nature?</p>	<p>I believe the majority of objection to this stat role will be from operations who perceive it as an inconvenience and increased cost to business. If this was truly about the safety of personnel, why wouldn't you assign responsibility to an area which is highly variable with the potential to cause multiple fatalities.</p>

5. Name redacted – individual submission

To: [RRD SE Resources Regulator Feedback Mailbox](#)
Subject: HPE CM: Geo-technical Engineer statutory function:
Date: Monday, 14 October 2019 3:29:55 PM

Hello.

In response to the discussion paper for Public consultation - New Geo-technical Engineer statutory function:

1. Is a new statutory function for geotechnical engineering warranted?

Yes.

This would ensure there is a standard for qualifications to perform this function - and hopefully improve the outcomes.

2. If the function is warranted, what qualifications and experience are appropriate?

- A Mining engineering is highly relevant considering that the program includes: solid mechanics, fluid mechanics (and rheology), mine geomechanics, and geotechnical engineer. This degree combined with the right experience would be suitable. A grad dip in strata control would be beneficial, but not strictly necessary

- Given the right experience and the addition of the UNSW Strata control grad dip, a geology background would be suitable

- I believe a geotechnical degree may not be relevant, unless the right experience is obtained. A grad dip in strata control is probably warranted here too. To the best of my knowledge geotechnical engineers from civil schools deal with foundation design, slope stability, soil testing, rheology. Excavation stability may not be covered. From my experience working with geotechnical engineers in sydney tunnels, it was that only a few specialists that had excavation stability experience.

3. If the function is warranted should it be a key statutory function?

No

This role should be chosen based on the risk profile of the mine. It could be identified through the principal hazard management plan.

Some mines will be capable of functioning with using an external (group/corporate level) geotech to oversee activities. Those with a high risk profile or conducting more frequent

Perhaps it would be better to describe the activities that a geotech must oversee, rather than prescribing them as mandatory for the mine.

i.e.

- before conducting extraction (LW or otherwise)
- when making major changes to the ground support design
- where coalburst or outburst conditions exist
- when investigating strata failures

6. Name redacted – organisation submission (not included in this publication)

Note: Submission 6 has not been included in this publication. The author has requested the submission not be published on the NSW Resources Regulator’s website.

7. Glencore Coal Assets Australia

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SUBMISSION OF GLENCORE COAL ASSETS AUSTRALIA

IN RESPONSE TO CONSULTATION PAPER - PROPOSED NEW STATUTORY GEOTECHNICAL ENGINEER FUNCTION

Glencore Coal Assets Australia (Glencore) makes this submission in response to the *Discussion Paper – Proposed New Statutory Function: Geotechnical Engineer – Underground Coal Mines (Paper)*. The Paper has been issued by the NSW Resources Regulator on behalf of the Mining and Petroleum Competence Board.

1. INTRODUCTION

Glencore is one of Australia's largest coal producers with 16 operational open cut and underground mines across 14 mining complexes in New South Wales and Queensland. It has four underground mines within Australia, namely Oaky North Mine in Queensland and in NSW the Integra Underground Mine, Ulan Underground and Ulan West Underground.

Glencore employs about 7,800 persons in the Australian Coal business, with 5,800 employees in NSW. In 2018, Glencore managed the production of 103 million tonnes of saleable thermal and coking coal, predominantly for export, with 59 million tonnes being mined in NSW. Glencore is the single largest producer of coal in NSW.

Glencore has a strong safety and environmental performance. Safety forms an integral core value of our business.

2. QUESTIONS

The Paper seeks submissions in respect of some or all of the following questions:

1. *Is a new statutory function for geotechnical engineering warranted?*
2. *If the function is warranted, what qualifications and experience are appropriate?*
3. *If the function is warranted should it be a key statutory function?*

In summary, Glencore submits that the response to question 1 should be answered “no”. Glencore provides detailed answers to each of the questions below.

2.1 Question - *Is a new statutory function for geotechnical engineering warranted?*

Glencore considers that a new statutory function for geotechnical engineering is not warranted for the following reasons:

- (i) Existing regulatory arrangements within the *Work Health and Safety (Mines and Petroleum Sites) Act 2013 (NSW) (WHS Mines Act)* and *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 (NSW) (WHS Mines Regulation)* provide appropriate regulation for geotechnical matters, including the requirements for the development of principal mining hazard management plans (PMHMPs) for strata control and inundation and inrush management.
- (ii) Existing statutory functions, in particular the role of Mining Engineering Manager, have responsibility for geotechnical matters, including for day-to-day operations.

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- (iii) Externally sourced expertise, and internal geotechnical capability, for the assessment and management of geotechnical matters provides an appropriate level of robust advice to underground coal mines.
- (iv) Underground mine safety performance in respect of geotechnical engineering matters (including strata control), and the history of incidents in underground mines due to strata failure, does not demonstrate a need for the specific statutory position proposed.
- (v) There is not a demonstrated need for a geotechnical engineering function for each underground coal mine, and the needs for each may be different in respect of geotechnical issues arising and advice or assistance required.

The Paper promotes a belief that operators of underground coal mines are not receiving sound and robust advice on geotechnical issues because of an absence of a statutory function with responsibility for this area of mining engineering. The basis for this contention is not set out in the Paper. Glencore considers that a proper analysis of existing regulatory arrangements under the WHS Mines Act and Regulation, and mine safety performance relating to geotechnical (in particular strata) events demonstrate that there is no proper foundation for this belief.

(a) Existing regulatory arrangements under the WHS Mines Act and Regulation

The WHS Mines Act and Regulation provides appropriate regulatory arrangements for the assessment and management of geotechnical matters in underground coal mines.

In accordance with clause 24 of the WHS Mines Regulation, the operator of a mine must prepare a PMHMP providing for the management of all aspects of risk control in relation to ground and strata failure, having regard to the matters prescribed in Schedule 1, clause 1.

The WHS Mines Regulation also provides:

- (i) that the mine operator carry out a comprehensive risk assessment for the PMHMP for strata failure and document it (clause 23);
- (ii) that the PMHMP for strata failure include the preparation and distribution of support plans (in addition to the requirements under clause 52 concerning areas of unsupported ground or strata);
- (iii) that the mine operator manage risks to health and safety associated with mining induced seismic activity at the mine (where this is relevant) (clause 30);
- (iv) for performance standard and audit requirements for safety management systems (clauses 15 and 17) together with the specific requirement to review PMHMPs (clause 25); and
- (v) that the mine operator notify the NSW Resources Regulator of strata related incidents meeting the definition of dangerous incidents and high potential incidents (see clauses 179(a)(v), (viii), (xvi), (xvii), (d) and 128(a), (c), (d), (e), (f), (g) and (m)).

The NSW Resources Regulator has also issued a Code of Practice on "Strata control in underground coal mines" (January 2015). Such a code is admissible in proceedings

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concerning what is reasonably practicable (section 275, *Work Health and Safety Act 2011* (NSW)).

Further, the PCBU (which will include the mine operator) is required to manage risks associated with mining operations (clause 9, WHS Mines Regulation).

Glencore engages external experts in geotechnical issues to advise and assist it in undertaking the PMHMP risk assessment for strata failure. The undertaking of a risk assessment, and the development of a PMHMP and associated systems, their implementation as well as their monitoring and review, ensure that geotechnical risks are adequately identified and the risks arising from them eliminated or controlled.

These arrangements under the WHS Mines Act and Regulation, and the manner in which Glencore and other mine operators meet those obligations, is thorough and robust.

(b) Existing statutory functions

The WHS Mines Act and Regulation provide for prescribed statutory functions within underground coal mines (clause 136 and Schedule 1, Part 2, WHS Mines Regulation). Geotechnical matters come within the responsibility of a number of existing statutory functions, primarily the mining engineering manager, and also the mine surveyor, undermanagers and deputies.

In particular, the position of mining engineering manager prescribes that:

The statutory function of mining engineering manager is to develop, supervise, monitor and review the mining engineering standards and procedures forming part of mining operations at the mine. (Schedule 10, Part 2, clause 3, WHS Mines Regulation)¹

As acknowledged in the Paper (page 7), geotechnical issues are a sub-set of the function of the mining engineering manager function. There is appropriate statutory responsibility for geotechnical matters within this existing structure.

The Code of Practice sets out, by way of example, the responsibilities of statutory functions and other non-statutory positions within a coal mine operator's structure in respect of the development of a PMHMP for strata control (see Appendix B - Example of task allocations, pages 52-56). That division of responsibilities demonstrates the comprehensive manner in which geotechnical matters are already appropriately managed.

In addition, coal mine operators such as Glencore, have specialist internal geological and geotechnical resources who provide advice to underground coal mines, both based at the mine and in regional/head offices. External consultants are also engaged with particular expertise as required.

There is existing geotechnical capability which may be drawn on in managing mining engineering and geotechnical matters. The requirement to have an appointed statutory position would not change that resourcing, but would add unnecessary complexity to internal structures and functions.

¹ See NSW Resources Regulator - "Statutory function description - Mining engineering manager of underground coal mines" https://www.resourcesandgeoscience.nsw.gov.au/_data/assets/pdf_file/0004/298844/PLB17-653-Mining-engineering-manager-underground-coal-mines.pdf

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(c) Externally and internally sourced expertise

The development of a PMHMP, as well as meeting the obligations to assess and manage risks relating to strata control, requires the assessment of risks through a formalised risk assessment process and the development of measures to address risks identified.

Coal mine operators such as Glencore, utilise external consultants with expertise in particular geotechnical fields to both assist in the risk assessment process and also to provide geotechnical advice from time to time. The particular expertise required for each mine will vary, depending on the prevailing geological and geotechnical conditions.

A single geotechnical engineer is unlikely to have all necessary knowledge, skills and experience to advise on or deal with all geotechnical issues, such as subsidence, caving, modelling etc.

(d) Mine safety performance and incidents

As acknowledged in the Paper (page 9), fatalities due to strata failure in Australia are rare. At Appendix C of the Paper (pages 13 - 16), a number of incidents and investigations are set out. It is not clear how it is said that having a statutory geotechnical engineer would have prevented the incidents, or that a casual factor of the incidents was any lack of geotechnical engineering advice.

In respect of the most recent examples over the period from 2004, the following is observed:

(i) Dartbrook Mine (28 May 2004)

It is not apparent that there was any lack of geotechnical advice which caused the fatality at Dartbrook (see *Rodney Dale Morrison v Roche Mining Pty Ltd* [2007] NSWIRComm 276² (*Roche*); *Rodney Dale Morrison v Anglo Coal (Dartbrook Management) Pty Ltd* [2007] NSWIRComm 292 (*Dartbrook*)³).

The primary causes of the incident related to the bolting pattern adopted by the crew, and their training, instruction and supervision, in respect of manual roof bolting procedures (see *Roche* - [6(57)], [13], [23]; *Dartbrook* - [9(57)], [15], [19], [22]). Further, the worker fatally injured had entered an area of unsupported roof.

As noted at in the Paper (page 15), a geotechnical engineer being appointed would not have assisted in control of the risk.

(ii) Chain Valley Colliery (3 June 2011)

In respect of this incident in 2011 (see *Investigation report - Cause and circumstances of fatal injury to Peter Thomas Jones at Chain Valley Colliery on 3 June 2011*)⁴ the findings of the NSW Resources Regulator included the following:

Why the rib side in the incident area was not bolted was attributable to the Pillar Extraction Management Plan and supervision by statutory supervisory staff to identify and correct the non-conformance: ... (page 41).

² <https://www.caselaw.nsw.gov.au/decision/549f7db23004262463aa3bd3>

³ <https://www.caselaw.nsw.gov.au/decision/549f7d083004262463aa0c3e>

⁴ https://www.resourcesregulator.nsw.gov.au/_data/assets/pdf_file/0012/458985/0Published-report-Chain-Valley-fatality.pdf

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It is not apparent from those findings that there was a lack of on-site geotechnical engineering advice. Indeed, the report refers to external geotechnical advice having been sought in the review of roof and ribs support in the relevant area of the mine where the incident occurred (see pages ii, iii, 9, 26, 27 and 40).

It is accordingly not clear why it is noted in the Paper (page 16) that the appointment of geotechnical engineer would have assisted in managing the risk.

(iii) Austar Coal Mine (15 April 2014)

In respect of the incident at Austar Coal Mine in 2014, the report of two experts (see *Extract of Consultants' Report (Galvin and Hebblewhite)- Double fatality at Austar Coal Mine on 15 April 2014*)⁵ concludes:

There is no doubt that the mechanics of what causes a pressure burst, and what are the contributing factors, is extremely complex. There remains a considerable amount of research effort to be applied in the future to this complex and dynamic rock failure behaviour – in all its different manifestations. ...

It is not possible on the evidence available to categorically state the cause(s) of the pressure burst on 15 April 2014, nor to state the factors and their contributory roles, with a high degree of certainty or quantification. (page 35)

It is not possible to provide a definitive cause for the Austar Coal Mine pressure burst. (page 36)

It is not apparent that there was a lack of geotechnical advice which caused the fatalities, given experts reviewing the incident remained unable to identify its cause. It is accordingly not clear why the Paper (page 16) states that an appointed geotechnical engineer would have assisted in dealing with the risk.

(e) Differences for geotechnical needs across mines

There will be a need for a broader range of geotechnical engineering expertise to adequately deal with geotechnical matters at any particular underground coal mine. This will require more than one geotechnical engineer. As acknowledged in the Paper (page 9):

- (i) having a single person be responsible, statutorily, for geotechnical issues is both unlikely to lead to different perspectives being sought, and a collaborative approach being adopted for the management of geotechnical risks;
- (ii) nor is on-site expertise likely to be regularly exposed to different conditions resulting in such personnel having an appropriate breadth of relevant expertise and experience.

There is an inherent degree of uncertainty in most geotechnical situations and the uncertainty increases as the complexity increases. Accordingly, being reliant on a single geotechnical engineer could lead to inadequate consideration of geotechnical issues.

Within Glencore's operations, mine site based geotechnical specialists are primarily engaged in straightforward design, mapping and monitoring. More complex and crucial

⁵ https://www.resourcesregulator.nsw.gov.au/_data/assets/pdf_file/0010/684424/extract-of-consultants-report-austar.pdf

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tasks are overseen by an off-site and senior geotechnical specialist. Glencore also engages external experts for a further level of review and consideration of geotechnical issues.

2.2 Question - If the function is warranted, what qualifications and experience are appropriate?

If a new Geotechnical Engineering statutory function is adopted, the proposed qualifications and experience prescribed in the Paper are overly stringent, and likely to result in a shortage of geotechnical engineering capability in underground coal mines in NSW.

This is for the following reasons:

- (i) It is unclear whether a “four-year degree in geotechnical engineering”, which would provide geotechnical engineering training specific to underground coal mining, is actually offered by Australian universities.
- (ii) There is no proposed recognition of any foreign qualification or experience.
- (iii) If qualifications are a pre-requisite for appointment as a statutory geotechnical engineer then a significant number of very experienced engineers will be unlikely to meet those qualification requirements despite their significant expertise and experience.
- (iv) It is not clear how “adequate and proper experience” would be either defined or assessed.

(b) Qualifications

Any qualifications for a geotechnical engineer, if they are to be adopted (see page 6, Paper), should be set out in competency standards established by the Mining and Petroleum Competence Board and not prescribed in the WHS Mines Act or Regulation. Such qualifications and experience should be subject to further consideration and development through workshops with industry, as occurred with the current competency standards for other statutory functions.

Alternatively, the setting of such qualifications should be left to appropriate professional bodies such as Australasian Institute of Mining and Metallurgy (AUSIMM) and/or the Association of Professional Engineers Australia.

The proposed qualifications place a greater emphasis on tertiary academic qualifications and insufficient emphasis on experience and non-academic training (for example, the South African Chamber of Mines Rock Mechanics Certificate, which would also provide appropriate skills and training).

As noted above, it is unclear whether a “four-year degree in geotechnical engineering”, which would provide geotechnical engineering training specific to underground coal mining, is actually offered by Australian universities.⁶ Such a prescription may also be problematic for persons with overseas qualifications, given European undergraduate programs are often three years.

In respect of the alternate proposed qualifications of “geology, geophysics or mining engineering with a one-year postgraduate qualification in geomechanics or geotechnical

⁶ It is noted that “geotechnical engineering” may be offered as a specific course, or a major (for example, the University of Queensland - Bachelors of Engineering (Hons) (Mining & Geotechnical Engineering), and is also offered in postgraduate Masters (see for example, UNSW - Master of Mine Geotechnical Engineering, and University of Sydney - Master of Engineering Science in Geotechnical Engineering and Engineering Geology).

GLENCORE

engineering”, qualifications in geology and geophysics degrees, and also contemporary mining engineering degrees, may not have sufficient content on the engineering properties of steel to provide sufficient skills in the support design responsibilities of a geotechnical engineer.

(c) **Description of geotechnical engineering role**

The description of the function of a geotechnical engineer (page 5, Paper) is unfortunately inaccurate and incomplete.

The reference to slope stability is irrelevant to underground coal mines. Further, the description does not include any reference to the skills and knowledge required to design underground support systems (typically roof bolts, cable bolts, resins, grouts and various standing support systems) which is an essential part of the role.

The role of geotechnical engineer (page 6 and Appendix A, Paper) includes a reference to “gas burst” and “outbursts and rock bursts/bumps”. It is submitted that this should not be a feature of a geotechnical engineering role. It is not commonplace in practice, and it is suggested that it ought not be prescribed in any such role. The control of gas outbursts is by gas management (ie. draining gas from the seam) which is outside the knowledge base and skill set of the majority of geotechnical engineers. It is noted that coal burst science in Australia, while developing, is at an early stage.

Further, caving mechanics are a subset of longwall geomechanics and should also not be included in the role.

2.3 **Question - If the function is warranted should it be a key statutory function?**

If there was a statutory requirement to appoint a geotechnical engineer, and this position was a “key statutory function” under clause 135 of the WHS Mines Regulation, then this may lead to operational difficulties where the position could not be filled.

Glencore considers that it is unlikely that there would be sufficient persons with the proposed prescribed qualifications and experience for each underground coal mine in NSW to be able to appoint a geotechnical engineer to such a position.



Darren Nicholls
Director Underground Operations
Glencore Coal Assets Australia

8. Professors Ismet Canbulat and Bruce Hebblewhite – individual submission

From: Ismet Canbulat
To: [RRD SE Resources Regulator Feedback Mailbox](#)
Cc: [Bruce Hebblewhite](#)
Subject: Discussion Paper - Proposed New Statutory Function: Geotechnical Engineer – Underground Coal Mines
Date: Saturday, 19 October 2019 4:12:45 PM

Dear Sir/ Madam,

RE: Discussion Paper - Proposed New Statutory Function: Geotechnical Engineer – Underground Coal Mines

The discussion paper indicates that the deadline for submission is on 19 October 2019; despite the website indicating that submissions are closed. We hope you consider our submission outlined below.

This submission is provided jointly by Prof Ismet Canbulat, (Professor, Head of School and Chair of Rock Mechanics) and Prof Bruce Hebblewhite (Chair of Mining Engineering) at UNSW Sydney in their private capacity, and does not necessarily reflect the views of UNSW.

Below is a summary of the three questions raised by the discussion paper:

1. Is a new statutory function for geotechnical engineering warranted? Yes, there is merit in this statutory role. However, we do not believe it should be justified on the basis of current skill sets out there. Therefore, time is required for the industry to train more geotechnical engineers before the full implementation of the proposed statutory role.
2. If the function is warranted, what qualifications and experience are appropriate?
 - a. 4 years of a relevant engineering degree (e.g., Geotechnical, Mining, Civil etc); at least 3 years of relevant experience in the industry; and registration with a relevant professional organistaion (AusIMM, BPEQ, Engineers Australia etc) to ensure that the continuing professional development is achieved.
 - b. Other tertiary qualifications - at least one year of full-time equivalent post-graduate degree; 3 years of relevant industry experience; and registration with a relevant professional organistaion (AusIMM, BPEQ, Engineers Australia etc) to ensure that the continuing professional development is achieved.
3. If the function is warranted should it be a key statutory function? In the discussion paper what constitutes a key function is unclear and potentially misleading. If it is to proceed, we believe it should be on same basis as a Ventilation Officer.

We also provide the following comments to support our above responses:

- Although the discussion paper refers to a number of relatively recent fatalities, it should bear in mind that there has been a significant reduction in fall of ground related fatalities in NSW over the years. This reduction has not been achieved by statutory geotechnical engineers, but with the combined efforts of industry and academia as well as the government by continuously enhancing the knowledge of the fundamentals of geotechnical engineering and introducing new legislation.
- We felt that the statement by the CFMEU on Page 2 that mines are not receiving sound advice on geotechnical issues because of a lack of a statutory position should be challenged. There are many competent experts providing such advice, which is sound and robust. Despite some exceptions, the industry as a whole should not be stereotyped in this way.
- P5 – geotechnical engineers fulfil many other functions at a mine site. In broader terms these include, but are not limited to, rock mass stability, operational and mine design, and management/administration. In addition (whilst not disagreeing with the points made), there is a glaring omission – design.
- P5 – “assess risks” should not be listed here. Geotechnical hazards may be identified by the geotechnical engineers, but assessment of the risks must involve a range of people, not just the geotechnical engineers.
- Qualifications – Engineering usually refers to a specific formal tertiary degree. However, many geotechnical engineers which operate in the coal mining industry don’t have a formal engineering qualifications but instead hold geology, geophysics, or other science degrees. We feel that if a person holds a formal engineering degree it is appropriate to call them a geotechnical engineer. Otherwise, it is more appropriate to call their role a “Strata Control Officer” (or equivalent).

PUBLIC SUBMISSIONS

Proposed new statutory function:
Geotechnical engineer – underground coal mines

Further comments on qualifications – option 2 should include civil engineers, not just mining engineers; and the postgraduate qualification should be stated to be a “recognised” or “endorsed” postgraduate qualification, which is one year full-time equivalent – not just one year. We also question the entry point of a qualified and experienced hard rock geotechnical engineers – we feel that a person with hard rock underground geotechnical engineering experience should not need to wait until they have 3 years underground coal mining experience to qualify for this role.

- Furthermore, there are a number of competent, highly qualified geotechnical engineering consultants in the industry, who may not have been worked in underground coal mines for three years; will they still be able to provide technical advice to the mines?
- P6 – Principal hazard list should include coal bursts (listed separately like outbursts, not lumped in with strata failure); and probably also windblasts.
- Key function – by this discussion, we believe it should not be a key function. This role should be considered equivalent to a Ventilation Officer. Also, consideration should be given to the use of external consultants – can they be appointed to the statutory position for a mine? This needs to be explicitly stated.

Should you require any further information please do not hesitate to contact myself or Prof Bruce Hebblewhite, who is copied in.

Regards,
Ismet

Ismet Canbulat, FIEAust, FAusIMM, RPEQ
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CRICOS Provider Code 00098G

9. NSW Minerals Council



NSW MINERALS COUNCIL
PO Box H367
Australia Square, NSW 1215
T 02 9274 1400
nswmining.com.au
ABN: 42 002 500 316

NSW Department of Planning Industry and Environment
NSW Resources Regulator – Regulation Development Unit
PO Box 344 Hunter Regional Mail Centre 2310 NSW

By email: rr.feedback@planning.nsw.gov.au

18 October 2018

Discussion Paper - Proposed New Statutory Function: Geotechnical Engineer - Underground Coal Mines

Dear Resources Regulator

The NSW Minerals Council (NSWMC) appreciates the opportunity to provide comment on the *Discussion Paper - Proposed New Statutory Function: Geotechnical Engineer - Underground Coal Mines* (Discussion Paper). The industry acknowledges the importance of those holding statutory function certificates of competence having the right knowledge, experience and qualifications in order to fulfill their roles effectively. Safety is the number one priority of the mining industry.

The Discussion Paper notes that the CFMMEU Mining and Energy Division believes operators of underground coal mines are not receiving sound and robust advice on geotechnical issues because of an absence of a statutory function with responsibility for this area of mining engineering.

Activities undertaken in the area of geotechnical engineering already fall under the responsibility of the mining engineering manager. There is no logical basis to infer that the presence of a geotechnical engineer statutory function would result in any change or improvement. Nor is there any basis for inferring that there are inadequacies in the present framework that prevent the adequate management of geotechnical risks.

A new statutory function of Geotechnical Engineers - Underground Coal Mines is neither necessary nor warranted.

Please find below NSWMC's feedback on the proposed new statutory function.



NSW MINERALS COUNCIL
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Geotechnical issues are the responsibility of mining engineering manager

As noted in the Discussion Paper, the activities undertaken by the role of geotechnical engineer at mines all fall under the responsibility of the mining engineering manager. Schedule 10, Part 2(3) of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* (NSW) provides:

The statutory function of mining engineering manager is to develop, supervise, monitor and review the mining engineering standards and procedures forming part of mining operations at the mine.

As acknowledged in the Discussion Paper, the mining engineering manager is responsible for strata control and draws on information from several specialist professionals to undertake this role. The operator of an underground mine is in the best position to determine the resourcing it requires for geotechnical engineers.

In Appendix C of the Discussion Paper there is a table entitled *Nine major investigations relating to ground and strata management since 1998*. The last column asks "Would Geotechnical Officer Statutory Function Assist in Control" - the conclusions of "Yes" are premature and unsubstantiated. There is no evidence to indicate that the presence of a Geotechnical Officer statutory function would have improved the outcome.

The industry receives sound advice from geotechnical engineers, both in house and externally, which feeds into the information used by the mining engineering manager for matters such as:

- design and development of principal hazard management plans (PHMPs) and their implementation such as strata control, spontaneous combustion and outburst
- important developments including ventilation systems, shafts, pillars and road ways, and
- roof and rib support.

Peer review of high risk geotechnical issues is common practice

It is common practice for a peer review to be undertaken on geotechnical issues in order to obtain multiple perspectives and gain a broader understanding of the risks involved.

Different expert perspectives provide valuable input on different geotechnical situations to supplement on-site geotechnical expertise.



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Increased regulatory burden should not be implemented without reason

In the absence of a compelling reason to impose it, further regulatory burden should not be introduced. A comprehensive regulatory framework exists that addresses geotechnical hazards present in the mining industry.

There is no evidence that operators of underground coal mines are not receiving sound and robust advice on geotechnical issues because of an absence of a statutory function with responsibility for this area of mining engineering. Mine operators engage appropriate geotechnical engineers either through direct employment or through consultants.

The NSWMC strongly recommends against a new statutory function of Geotechnical Engineers - Underground Coal Mines. It is neither necessary nor warranted.

Should you require further information or wish to discuss, please contact James Barben, Policy Director at the NSWMC, on 0409 526 374 or email jbarben@nswmining.com.au.

Yours sincerely

A handwritten signature in black ink, appearing to read "James Barben".

James Barben
DIRECTOR POLICY

10. Mine Managers’ Association of Australia

Name	Ray Robinson
Email	admin@minemanagers.com.au
Street address	11a Puna Road, Wangi Wangi. NSW 2267
Postal address (if different)	PO Box 1116, Toronto. NSW 2283
Are you an individual representing an organisation	Yes
If you are representing an organisation, please name it	Mine Managers’ Association of Australia Incorporated
<p>Privacy – please tick if appropriate</p> <p><input checked="" type="checkbox"/> I consent to my submission being published in full</p> <p><input type="checkbox"/> I consent to my submission being published excluding personal information</p> <p><input type="checkbox"/> I do not want my submission published on the NSW Resources Regulator website</p>	
<p>DO YOU HAVE ANY COMMENTS ON THE QUESTIONS BELOW? <i>(Please outline the reasons to support your views)</i></p>	
Is a new statutory function for geotechnical engineering warranted?	<p>No</p> <p>A mine’s MHMP and PCHP adequately address the need for well designed, peer reviewed, properly installed and monitored support of underground mining systems.</p> <p>See Comments section for elaboration.</p>
If the function is warranted, what qualifications and experience are appropriate?	<p>N/A</p> <p>See Comments section for elaboration.</p>

<p>If the function is warranted should it be a key statutory function?</p>	<p>No</p>
<p>Do you have any comments of a general nature?</p>	<p>Yes</p> <p>Our submission represents the views of the Mine Managers’ Association of Australia regarding the proposal to introduce a statutory function of geotechnical engineer in underground coal mines. Members of our Association were invited to contribute to our response and while there was considerable interest, none were in favour of the proposal.</p> <p>The Mine Managers’ Association of Australia has existed in various forms since 1942 and now represents members in most states of the Commonwealth and New Zealand. Our membership has continued to grow and whilst mainly directed to practicing mine managers, also includes a diverse range of senior management in the mining industry; from chairmen and directors of companies, mines inspectors, academics, consultants and senior technical managers. To our knowledge all practising “<i>managers of mining engineering</i>” in NSW are members of the Association.</p> <p>The objects of the Association are;</p> <ul style="list-style-type: none"> • To advance the interests and raise the status of members, • to maintain member’s competencies and continue their professional development, • to improve health and safety in the workplace, • to provide support to members in employment related issues, and • to contribute to sustainable mine development and industry growth. <p>To elaborate on the questions in the discussion paper we submit the following:</p> <p>The principal activity is mining. Responsibility for strata control and control of other hazards is directed to a suitably qualified Mining</p>

	<p>Engineering Manager or Technical Services Manager by the Operator following the process specified in the legislation. That is the best approach.</p> <p>The responsible person draws on advice from specialist professionals as required. Advice related to ground control may include geotechnical and geological input, ground modelling, exploration data, rock properties, support alternatives and specifications, experience in similar conditions, mining systems and research. It is a multi-disciplined approach.</p> <p>Hazards associated with mining activities include roadway support, gas, inundation, stress, spontaneous combustion, water and dust, etc and controls are often inter-related. Risks often cannot be managed in isolation. This is recognised in legislation</p> <p>I refer to a quotation from <i>Galvin J Critical role of risk management in ground engineering and opportunities for improvement. Int J Mining Sci Technol (2017)</i></p> <p style="padding-left: 40px;">“...ground engineering should be practised within a risk management framework that aims to prevent unwanted outcomes and to mitigate their consequences to an acceptable level. To be successful this process requires knowledge of fundamental scientific and engineering principles relevant to ground behaviour, knowledge of mining systems, practices and hazards, and an understanding of risk management principles, supported by appropriate experience and skill.”</p> <p>The appointment of a statutory geotechnical engineer does not guarantee prevention of ground support failures. Failures have taken place in cases where geotechnical advice has been provided.</p> <p>Geotechnical input is most often employed in the early formulation of ground control systems, in setting TARPS and monitoring convergence devices. Other important elements of the plan include the hazard identification and risk management process with involvement of employees and daily on-site monitoring of structure, lithology and roadway behaviour by Mining Supervisors and</p>
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	<p>Equipment Operators. It is a system approach with many facets, all critical to success.</p> <p>Allowing the Geotechnical Engineering function to be carried out between degree qualified as well as operationally experienced members of sites' teams fosters a consultative approach to support design and the practical engagement of the workers responsible for its installation and monitoring</p> <p>Splitting responsibilities with the Mining Engineering Manager and a Geotechnical Engineer is problematic and fraught with risk.</p> <p>It is over-regulation in an already complex legislative framework. It is accepted that there is an important role for geotechnical expertise in mining operations. Mine Operators are already using in-house and/or external geotechnical engineers in conjunction with other advice.</p> <p>The geotechnical specialists used by industry have extensive knowledge and experience, service multiple sites, have international networks and often work in tunnelling, hard-rock and construction and bring a much broader knowledge base to play</p> <p>The suggestion that a generalist mine site Geotechnical Engineer can perform all the functions set out in the Appendix is not supported.</p> <p>The section <i>What is a geotechnical engineer?</i> largely relates to soil mechanics and surface activity and has limited relevance to underground coal operation.</p> <p>Elsewhere the discussion paper suggests involvement in coal burst, outburst and inrush. Those topics and other knowledge are deficient in the suggested qualifications and experience.</p> <p>The inclusion of a list of fatalities in the discussion paper, without a robust analysis of the causes, is of little or no value and tends to be misleading.</p> <p>There is an inference that a statutory official may have altered the outcome (although not stated) and the list is silent on whether</p>
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	<p>geotechnical advice was provided.</p> <ul style="list-style-type: none">• Was geotechnical advice provided in each case?• What was the nature of the advice?• Was the principal failure mode related to method of work, equipment or people? <p>It is stated in the foreword that: “The CFMMEU Mining and Energy division believes that operators of underground mines are not receiving sound and robust advice on geotechnical issues because of the absence of a statutory function with responsibility for this area of mining engineering”.</p> <p>We believe the CFMMEU’s concerns should have been first addressed by the Resources Regulator (Chief Inspector and the Inspectorate) to assess whether it is an issue of compliance or legislation deficiency. Normal process would be for the Regulator to make this proposal after such a review.</p> <p>Thank you for the opportunity to comment on the proposal.</p>
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11. Name redacted – individual submission

Name	Personal information redacted
Email	
Street address	
Postal address (if different)	
Are you an individual representing an organisation	INDIVIDUAL
If you are representing an organisation, please name it	NO
<p>Privacy – please tick if appropriate</p> <p><input type="checkbox"/> I consent to my submission being published in full</p> <p><input checked="" type="checkbox"/> I consent to my submission being published excluding personal information</p> <p><input type="checkbox"/> I do not want my submission published on the NSW Resources Regulator website</p>	
<p>DO YOU HAVE ANY COMMENTS ON THE QUESTIONS BELOW? <i>(Please outline the reasons to support your views)</i></p>	
Is a new statutory function for geotechnical engineering warranted?	Yes, underground geotechnical is classed as a principal hazard. Although statutory mine managers have done a geotechnical module not all are experienced in geomechanics and not all rely on a geotechnical engineer for educated advice.
If the function is warranted, what qualifications and experience are appropriate?	A discussion around competencies of people doing mine and support designs, controlling hazards and building management plans. UNSW offers a grad dip in strata control but there is no recognised requirement. At the very least a post graduate course similar if not the same as offered at UNSW and/or an engineering degree in mining or civil and/or at least 5 years experience should be considered.

PUBLIC SUBMISSIONS

Proposed new statutory function:
Geotechnical engineer – underground coal mines

If the function is warranted should it be a key statutory function?	Yes. As stated above we are dealing with a principal hazard.
Do you have any comments of a general nature?	No.

12. Emeritus Professor Jim Galvin – individual submission

Name	Em Prof Jim Galvin
Email	J.Galvin@Galvin.net.au
Street address	28/2 Cerretti Crescent Manly NSW 2095
Postal address (if different)	PO Box 1228 Manly NSW 1655
Are you an individual representing an organisation	No
If you are representing an organisation, please name it	
<p>Privacy – please tick if appropriate</p> <p><input checked="" type="checkbox"/> I consent to my submission being published in full</p> <p><input type="checkbox"/> I consent to my submission being published excluding personal information</p> <p><input type="checkbox"/> I do not want my submission published on the NSW Resources Regulator website</p>	
<p>DO YOU HAVE ANY COMMENTS ON THE QUESTIONS BELOW? <i>(Please outline the reasons to support your views)</i></p>	
Is a new statutory function for geotechnical engineering warranted?	No – reasons noted in response to Question 3

<p>If the function is warranted, what qualifications and experience are appropriate?</p>	<p>Not necessarily. There are alternative options – see discussion in response to Question 3.</p>
<p>If the function is warranted should it be a key statutory function?</p>	<p>No – see following submission</p> <p>1.0 Summary Credentials</p> <p>This submission is based on almost 45 years of international experience in mining engineering, geotechnical engineering and coal mine supervision and management (Attachment 1). This includes involvement in developing formal programs in geotechnical engineering for practitioners in South Africa (1982) and Australia (1995-97), designing, supervising and/or managing underground mines in very challenging ground conditions, headship of mining engineering at the University of New South Wales, authoring a peer reviewed textbook on geotechnical engineering in underground coal mining, and investigating and/or giving evidence in legal proceedings on behalf of both industry and the regulator in relation to eight of the nine major investigations noted in the discussion paper.</p> <p>2.0 Characteristics of Geotechnical Engineering</p> <p>Geotechnical engineering is characterised by pervasive uncertainty. This uncertainty is due to many factors, including that the geological materials are usually not uniform in composition, contain natural defects, have different properties in different directions, have properties that vary with the size and volume of the rock and over time, and there are gaps in the knowledge base and equations that describe how these factors, individually and collectively, influence mine design and stability. These types of characteristics distinguish geotechnical engineering from other technical areas in coal mining such as electrical engineering, mechanical engineering and mine ventilation where the properties of materials one is working with are usually well know and behaviour obeys reasonably precise mathematical equations.</p>

3.0 Designating Competencies in Geotechnical Engineering

Because rock behaviour is governed by a wide range of factors, many of which are imprecisely known, the practice of geotechnical engineering relies on a range of disciplines, with distinctions between the various professional competencies and roles being somewhat clouded and ambiguous.

Geotechnical engineering is a core component of degrees in mining engineering and civil engineering. It has been offered as a standalone degree in engineering on rare occasions. Many practitioners are not engineers but may hold postgraduate qualifications in geotechnical engineering, usually building on graduate degrees in other aspects of earth science. However, some do not possess any specific qualification in geotechnical engineering.

Designating competencies for geotechnical engineers has been attempted in the past in the UK, Europe and North America but, to date, there is no universal agreement on these (see Galvin, 2016). This is primarily because although geotechnical engineering is embedded civil and mining engineering, is not a distinct, standalone discipline. It inputs into a range of other disciplines and, conversely, requires the input of a range of other disciplines. These aspects are illustrated in **Error! Reference source not found.** and **Error! Reference source not found.**

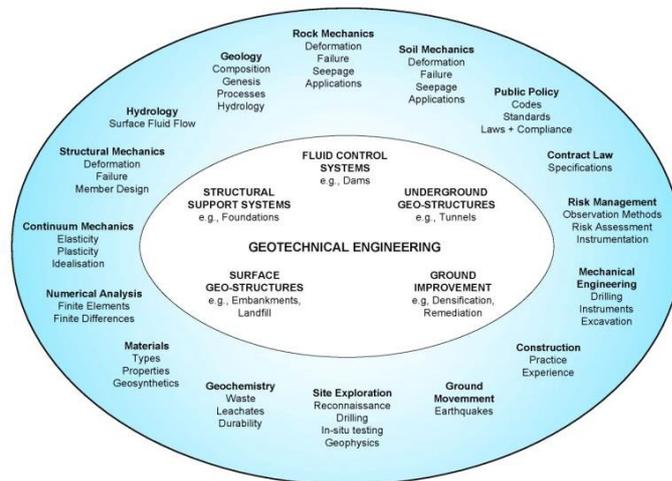


Figure 1: Model developed by Morgenstern (2000) which illustrates the wide variety of professionals

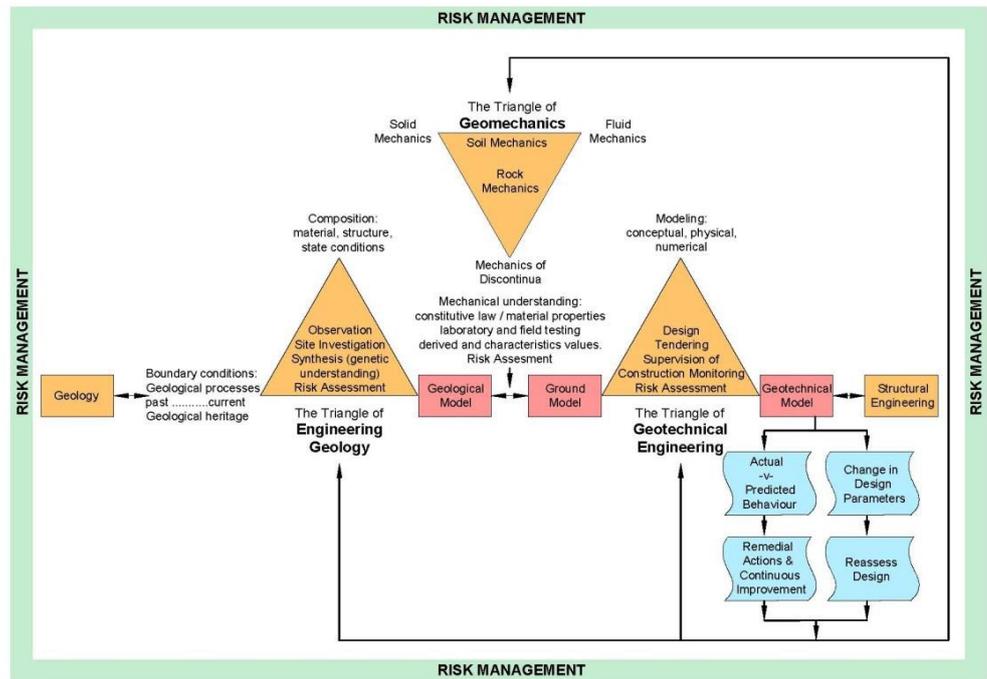


Figure 2: A ground engineering process model, showing multidisciplinary and interdisciplinary interactions embedded within a risk management framework (based on Bock et al., (2004) and extended by Galvin (2016) to include risk management).

Error! Reference source not found. evolved out of a proposal for geotechnical engineering to be represented by a single learned society in the UK. **Error! Reference source not found.** is based on a model of the role and interaction of the various disciplines involved in earth sciences that was developed by the 2003 Joint European Working Group of the three principal global societies associated with earth sciences. These are 1) The International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE); 2) The International Society for Rock Mechanics (ISRM); and 3) The International Association for Engineering Geology and the Environment (IAEG). The existence of the three learned societies, in itself, illustrates the multidisciplinary nature of geotechnical and geomechanical engineering.

Nevertheless, there is a history of competencies having been developed for the practice of ground (or strata) control in underground coal mining. The South African Chamber of Mines developed a syllabus and examination system in the early 1980s for the award of basic and advanced certificates of competency in rock engineering in coal mining. This qualification is a requirement for persons who have ultimate accountability for ground control

at a mine site. Following the Moura No 2 disaster in Australia in 1994, National Competencies were developed for ‘Mining Method and Strata Management’ as part of the Black Coal Competency Standards. These subsequently formed the basis for the Graduate Diploma in Mining Geotechnical Engineering (Coal Mine Strata Control) and the Master of Mining Geotechnical Engineering (Coal Mine Strata Control) that are still offered by the School of Mining Engineering at the University of New South Wales.

4.0 Managing Geotechnical Risk

Pervasive uncertainty dictates that the diligent practice of geotechnical engineering should be based on a risk management approach. **Error! Reference source not found.** and **Error! Reference source not found.** illustrate the positive impact that the shift to risk based management since the early 1980s has had on workplace health and safety in NSW coal mines in general and specifically in relation to ground control.

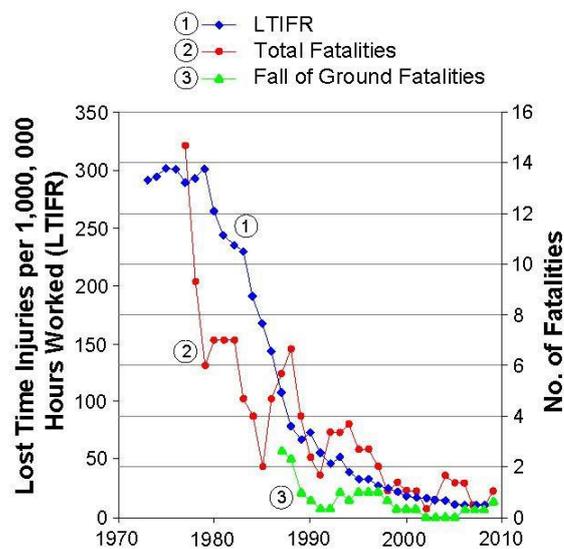


Figure 3: Trends in safety performance measures for the NSW coal mining sector, expressed as three year rolling averages (plots by Galvin (2016) based on data compiled by the Joint Coal Board and by Coal Services Pty Limited).

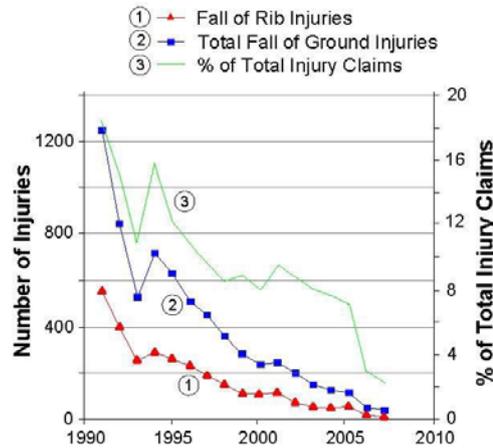


Figure 4: Trends in injuries due to all types of falls of ground and to falls of rib only, expressed as a percentage of the total number of injuries in the NSW coal sector (plots by Galvin (2016) based on data compiled by the Joint Coal Board and by Coal Services Pty Limited).

Nevertheless, as evident by the nine major investigations tabulated in the discussion paper in relation to ground and strata management since 1998, there is still some way to go to eliminate serious incidents related to loss of ground control in the workplace.

While I do not fully concur with the assessment in the discussion paper of the influence of a geotechnical statutory function in assisting to control these incidents, I agree that it could have played a beneficial role in preventing some of them.

However, I do not believe that the creation of this statutory role is required or will deliver the anticipated benefits. I am of this view for a number of reasons, two of which follow. Firstly, geotechnical design underpinned a number of the incidents listed in the discussion paper and the incidents were preventable if this design had been implemented effectively by adherence to standard working procedures and operating discipline. Secondly, a number of the incidents were already overseen from a geotechnical perspective by persons with significant underground mining experience and reputable and contemporary qualifications in geotechnical engineering.

5.0 Going Forward

Based on my academic and practical experience in mining engineering, geotechnical engineering, mine management and risk management, it is my opinion that the creation of a new statutory function of Geotechnical Engineer – Underground Coal Mines is unwarranted, will prove overly onus to administer, and could give rise to a number of unintended negative consequences. One of these negative consequences relates to unduly confining the competencies specified for practicing geotechnical engineering, with the potential to create the expectation that a person is competent in all aspects of geotechnical engineering relating to underground coal mining. It is unreasonable, or else foolish, to consider that someone could be competent in all aspects of such a diverse and multidisciplinary field. A second potential unintended negative consequence relates to discouraging or impeding access to the range of specialists and consultants from across many disciplines who currently contribute to managing the risks associated with geotechnical engineering.

An alternative and contemporary approach that would cater for the multidisciplinary and cross-disciplinary nature of geotechnical engineering would be to simply require persons who influence the practice of geotechnical engineering in underground coal mines to have registered or chartered engineering status with a nominated profession organisation, such as Engineers Australia, the Association of Professional Engineers Australia, the Australasian Institute of Mining and Metallurgy or the state scheme currently under consideration by the New South Wales government.

These schemes offer the benefit of confirming a person’s qualifications in their nominated area of engineering practice, of requiring them to maintain their competencies up-to-date and committing them to a code of ethics in their engineering practice. This concept complements and is consistent with the purpose and construct of mine safety and health management systems, and with accountabilities already attached to the statutory function of Manager of Mining Engineering in developing, supervising, monitoring and reviewing mining engineering standards and procedures, of which geotechnical engineering is a subset. It caters for the varying size and needs of mine sites and to geotechnical hazards and design changing over time at mine sites.

6.0 References

Bock, H., Broch, E., Chartres, R., Gambin, M., Maertens, J., Maertens, L., . . . Stille, H. (2004). *Engineering Geology for Infrastructure Planning in Europe: A European Perspective* (Vol. 104): Springer-Verlag.

Galvin, J. M. (2016). *Ground Engineering: Principles and Practices for Underground Coal Mining*. Switzerland: Springer.

Morgenstern, N. R. (2000). *Common Ground*. Paper presented at the Int. Conf. on Geotechnical and Geological Engineering, Melbourne.

Attachment 1 – Summary CV**Emeritus Professor Jim Galvin**

BSc, BE, PhD

FTSE, FIEAust CPEng, FAusIMM CPMIn

Jim Galvin has professional qualifications in science, engineering and mine management and extensive international experience in mining and geotechnical engineering, risk management, expert opinion and independent review and advisory roles. He has led major industry and university geotechnical research groups in South Africa and Australia, complemented with practical mining experience from miner through to mine manager. In 1991, Jim was appointed Professor of Mining Engineering at the University of New South Wales and soon thereafter as Head of School. He was appointed as an Emeritus Professor in 2006, when he went into private practice. Jim has served on and chaired a range of government and industry appointed independent expert review panels, commissions of inquiry and advisory committees, concerned primarily with mining approvals and managing risk presented by mining. He is the author of an international acclaimed textbook on ground engineering in underground coal mining published by Springer and a Fellow of a number of professional societies including the Australian Academy of Technological Sciences and Engineering.

ACADEMIC QUALIFICATIONS AND AWARDS

- B.Sc. (Mathematics), University of Sydney, 1973
- B.E. (Hons I), Mining Engineering, University of Sydney, 1975
- Ph.D. Mining Engineering (Rock Mechanics), University of the Witwatersrand,

	<p>1981</p> <ul style="list-style-type: none">• Churchill Fellow – 1988• ACARP Research Excellence Award – 2015 – in recognition of publication of textbook entitled Ground Engineering: Principles and Practices in Underground Coal Mining• Merv Harris Award for Contributions to the Australian Mining Industry – 2016• Australasian Institute of Mining & Metallurgy President’s Award – 2018 – in recognition of contributions to improving safety in the Australian mining industry <p>PROFESSIONAL QUALIFICATIONS</p> <ul style="list-style-type: none">• <i>Fellow</i> – Australian Academy of Technological Sciences and Engineering• <i>Fellow and CPEng</i>- Institution of Engineers Australia. Mem. No. 1157157• <i>Fellow and CPMIn</i>- Australasian Institute of Mining and Metallurgy. Mem. No. 101903• <i>Registered Profession Engineer Queensland</i>. Reg No: 18443.• Practicing Certificate - Manager of Mining Engineering. NSW - Current• Certificate of Competency – Mine Manager. NSW. 12/11/85. No.6702• Certificate of Competency - Mine Undermanager. NSW. 4/12/84. No.2273• Certificate of Competency - Colliery Deputy. NSW. 6/12/84 No.2316• Certificate of Competency - Mines Rescue. NSW. 1984. <p>PROFESSIONAL ASSOCIATIONS AND SOCIETIES</p> <ul style="list-style-type: none">• <i>Member</i> - Mine Managers Association of Australia• <i>Member</i> - Mine Subsidence Technological Society• <i>Member</i> - International Society of Rock Mechanics• <i>Member</i> - Australian Geomechanics Society• <i>Member</i> – Australian Mining History Association• <i>Member</i> - Australian Association for Engineering in Education
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EMPLOYMENT HISTORY SUMMARY

1976 - 1982	Mining Operations Laboratory Chamber of Mines of South Africa Progressed to Head, Coal Strata Control Section
1928 – 1992 9/82 - 3/85 4/85 - 8/86 8/86 - 1/88 1/88 - 10/88 10/88 -	Newcom Collieries Pty Limited NSW, Australia Technical Assistant, Myuna Colliery Undermanager, Myuna Colliery Technical Services Manager Relief Mine Manager at Myuna and Cooranbong Collieries. Deputy Mine
12/92 – 3/06	Professor of Mining Engineering University of New South Wales
3/06	Appointed Emeritus Professor University of New South Wales
1998 - Present	Managing Director Galvin and Associates Pty Limited A consultancy providing services in areas related to: <ul style="list-style-type: none"> • mining engineering, geotechnical engineering and risk management with specialist expertise in workplace health and safety, incident investigation and analysis, mine management, mine design and stability, subsurface and surface subsidence and associated environmental impacts; • expert opinion in international legal jurisdictions;

Selective Roles Related to Workplace Health and Safety:

- *Investigator* appointed under Work Health and Safety Act 2011 into fatal accident in September 2015 at Ridgeway Copper/Gold Mine, NSW, Australia
- Undertake, on behalf of NSW Government Mine Safety Investigation Unit, an investigation into the double fatality accident at Austar Coal Mine in April 2014.
- *Independent Advisor* – to the Health, Safety and Environment Committee of the Board of Solid Energy New Zealand (a New Zealand government enterprise). 2009 -present
- *Statutory Member and Chair* – Technical Review Board, established in 2009 to advise the Victorian Government on the risks presented to public safety, environment and security of power supply by quarries and mines. 17/8/09 – 2017

PUBLIC SUBMISSIONS

Proposed new statutory function:
Geotechnical engineer – underground coal mines

	<ul style="list-style-type: none">• Assist the Coroner into the inquest into fatal mine accident at Blackwood Mine. Tasmanian Government. 2010.• <i>Independent Advisor (Safety)</i> – Health, Safety, Environment and Community Sub-committee (Sustainability Committee) of the Board of BHP Billiton. 2005 – 2009• Review of the Health and Safety Management System of Solid Energy New Zealand, 2007.• Member – Investigation Team into fatality accident at Cannington Mine, December 2006.• Member – Investigation Team into fatality accident at Cannington Mine, December 2006.• Investigation into fatal fall of ground in chrome mining operations of Xstrata Alloys, South Africa. 2005.
Do you have any comments of a general nature?	No – covered in response to Question 3

13. Collieries' Staff and Officials Association

**SUBMISSION ON A PROPOSAL TO INTRODUCE
A NEW GEO-TECHNICAL ENGINEER STATUTORY FUNCTION**

SUBMISSION MADE TO: NSW Resources Regulator
on behalf of the
Mining and Petroleum Competence Board

NSW Resources Regulator

516 High Street
Maitland NSW 2320

By Email: rr.feedback@planning.nsw.gov.au

AUTHOR: Catherine Bolger

Collieries' Staff and Officials Association

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Proposed new statutory function:
Geotechnical engineer – underground coal mines

Introduction

The Association of Professional Engineers, Scientists and Managers, Australia – Collieries Staff Division (also known as the Collieries' Staff and Officials Association (CSOA) welcomes the opportunity to provide a submission to the NSW Resources Regulator on a proposal to introduce a new statutory function of geotechnical engineer for underground coal mines.

The CSOA has broadly consulted with our members who are involved in Geotechnical functions at mines across NSW. We have surveyed members, audited their qualifications and have based our submissions on those consultations, audits and survey results.

In summary Staff support the creation of a new statutory function of Geotechnical Engineer. Staff do not however, believe it is warranted for the role to be a "key" statutory position. There is not clear support for the qualifications and experience proposed in the discussion paper, perhaps in part because there is a lack of clarity about the proposed one year qualification in geomechanics or geotechnical engineering, and its equivalence to other one year qualifications such as the University of NSW one year diploma of coal mine strata control.

In response to the questions set out in the discussion paper on behalf of the Mining and Petroleum Competence Board, the CSOA provides the following:

1. Is a new statutory function for geotechnical engineering warranted?

There is broad support amongst Staff involved in Geotechnical functions for the creation of a new statutory function of Geotechnical Engineer. Staff felt that the elevation of the role to a statutory position may help ease the tension between production demands and geotechnical recommendations. These tensions were evidenced by respondents replies:

"Yes. this legislative change would obligate other roles, particularly those already assigned a statutory function, a duty to more fully consider and include geotechnical recommendations provided by the geotechnical engineer and in doing so bring with it a higher level of respect."

"At current the profession is pushed around and blamed for poor production but the instant something goes wrong, it is the first group to be blamed for geotechnical instability or strata failures."

2. If the function is warranted, what qualifications and experience are appropriate?

The CSOA did an audit of the qualifications currently held by Staff who do geotechnical work and are in the main employed by a coal mining operator.

Less than 10% hold a 4-year degree in geotechnical engineering. The vast bulk of Staff who are undertaking Geotechnical work currently hold a degree in geology, geophysics or mining engineering, supplemented by post graduate qualifications including the University of NSW Strata Control diploma.

Currently within some Coal Mining operators, there is a shared Geotechnical lead resource provided by one Staff member with a Geotechnical Engineering degree, who internally consults across multiple mines. Where there is not an internal Staff member with a Geotechnical Engineering degree, that lead resource is provided by a contracting firm, once again consulting across multiple mines.

In the time provided for consultation we were unable to provide a definitive answer on what qualifications are appropriate, because more work needs to be done on possible post graduate qualifications that would be deemed equivalent to the proposed post graduate qualifications identified in the discussion paper of geomechanics or geotechnical engineering. For example, would the postgraduate qualification in coal mine strata control be deemed equivalent?

The CSOA understands that until recently a standalone 4-year Geotechnical Engineering degree was not taught. Mostly geotechnical engineering was taught as part of another engineering degree, or as a Master of Engineering Science in Geotechnical Engineering and Engineering Geology at UNSW for example.

Should the Board decide to proceed with the proposal to create a new statutory function of geotechnical engineer, before the proposal is finalised more work needs to be done on potential transitional arrangements and recognition of prior learning. This is particularly important given the findings of our audit, namely that less than 10% currently hold a 4-year degree in geotechnical engineering and our comments that many Staff with the proposed qualifications are not currently employed as a standalone resource at some mines (instead spread over the mine operators various mines).

3. If the function is warranted should it be a key statutory function?

There was unanimous support that the geotechnical engineer function should not be a key statutory function. It was felt that the key function should remain with the Mining Engineering Manager, who has the appropriate oversight and responsibility for the whole of mine functions.

The CSOA thanks the NSW Resources Regulator on behalf of the Mining and petroleum Competence Board for taking the time to read and consider our submission. If, however there are any further questions the NSW Resources Regulator may have in relation to the CSOA's

PUBLIC SUBMISSIONS

Proposed new statutory function:
Geotechnical engineer – underground coal mines

position on the proposal to introduce a new statutory function of geotechnical engineer for underground coal mines, please contact Ms Samantha Williams, Legal Officer or Ms Catherine Bolger, Director.

Catherine Bolger
Director
Collieries' Staff and Officials Association

31 October 2019