

Administrative information

Name of IRCs: Civil Infrastructure IRC, Coal Mining IRC, Drilling IRC, Extractive IRC, Metalliferous Mining IRC ('Mining, Drilling and Civil Infrastructure IRCs')

Name of SSO: PwC's Skills for Australia

Name of Training Package: Resources and Infrastructure Industry (RII) Training Package

Name of Projects: 1H New and Emerging Technologies, 1L Contemporary and Emerging Blasting Methods

This Case for Change was agreed to by the Mining, Drilling, and Civil Infrastructure (MDCI) IRCs.



Tony Baulderstone Chair Civil Infrastructure IRC	Darryl Cooper Chair Coal Mining IRC	Tim Westcott Chair Drilling IRC	Mark Knowles Chair Metalliferous Mining IRC	Leanne Parker Chair Extractive IRC
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This Case for Change was established as a result of initial research and consultations outlined in Industry Skills Forecast and Proposed Schedule of Work (2017) for approval by the five Mining, Drilling and Civil Infrastructure IRCs and subsequent endorsement by the Australian Industry Skills Committee. The intention of this Case for Change is to provide reasonable justification for an update to the RII Training Package, in regards to *New and Emerging Technologies, and Contemporary and Emerging Blasting Methods 2017/18* projects.

The Case for Change

These projects are proposed in response to the following industry drivers for change:

Project	Industry Drivers
Project 1H: New and Emerging Technologies	<ol style="list-style-type: none"> The use of technology is the cornerstone of effective and efficient operational procedures in the MDCI industry. In order for the industry to keep up with the rapid growth and enhancement of existing technologies and practices, workers must receive training that is up to date. As current technologies evolve, new technologies also emerge. Employers need workers to acquire the specific skills and knowledge needed to make best use of these technologies. To ensure this, workers need nationally-consistent training in how to use these new technologies. Key recent technological advancements for which new training is required are listed below. <ol style="list-style-type: none"> The emergence of remote operating centres requires workers to be competent on all control room procedures. Current training only reflects the specific skills required in metalliferous mining, reinforcing the need for training product development across all industry sectors. The adoption of remotely operated vehicles in the MDCI industry involves the creation of new, specialised job roles in vehicle operations. Without the appropriate remotely operated vehicle training, an operator skill shortage will remain. Training for operating autonomous vehicles requires a national standard, in all MDCI sectors, or the industry will suffer from misalignment of and inconsistencies across operator skills. The use of drones presents great potential in mining, particularly in surveying, capturing data pre and post blast, and counting of stock piles, therefore workers require the skills necessary for data analysis and maintenance.
Project 1L: Contemporary and Emerging Blasting Methods	<ol style="list-style-type: none"> In recent years blasting techniques have become more sophisticated to achieve more efficient, safe and accurate outcomes. New methods in electronic blasting, use of drones, GPS tracking technology and data collection are all areas where upskilling is required within the industry. Environmental concerns that relate to blasting methods are becoming increasingly important as organisations endeavour to maintain sustainable long term operations. The benefits of environmentally-conscious blasting, including the control of fuel/dust production and mineral recovery are not currently addressed by the nationally-recognised training available to the industry. The ability to protect data and intellectual property from security breaches is an issue impacting industries worldwide. In the MDCI sector it has been highlighted that managing the security of data and IT systems for explosives is a crucial skill that needs to be addressed by the RII Training Package.

Case for Change – Resources and Infrastructure Industry (RII) Training Package
 Projects 1H, 1L – New and Emerging Technologies, Contemporary and Emerging Blasting Methods

The rationale for these projects, as established in the 2017 Mining, Drilling and Civil Infrastructure Industry Skills Forecast and Proposed Schedule of Work, is included in *Attachment C – Project Rationale to this Case for Change*.

Project	Summary of Recommended Changes
Project 1H:	<p>Create 4 new units: to address skills gaps in remote operating centres, remote vehicle operations, autonomous vehicle operations and drone data analysis. There are currently no units held by mine workers to equip them with the necessary level or type of skills that industry demands when performing roles with new and emerging technologies, however, the industry demands such training to exist. By closing existing skill gaps, the MDCI Industry will benefit, with more competent workers performing job roles that leads to safer, higher quality levels of operational outcomes and more efficient applications of technology.</p> <p>The need for new training on drone data analysis is pending the outcomes of the Automation Cross Sector Project. If it becomes apparent that a new unit is to be created within the RII Training Package it will have a specialised focus on application to the MDCI industry due to niche requirements such as pre-blast surveying and geological field inspection.</p>
Project 1L:	<p>Update 24 existing units: to ensure that training is up to date from a technical lens, clearly explains legislative requirements and adequately aligns to the actual job roles of operators and managers on-site in blasting.</p> <p>Create 2 new units and potentially import 1 unit: to address the skills gap in the management and risk assessment of the security of explosives and environmental electronic blasting. This project will also consider the outcomes of the Automation Cross Sector Project and assess whether or not the proposed units for drone operations can be utilised within the RII Training Package and adapted to meet the needs of the MDCI sector, particularly in blasting.</p>

For the full list of training product changes, see *Attachment A – Training package components to change*.

Industry support for change

Industry views were captured via targeted stakeholder interviews. The method and scale of stakeholder consultation undertaken is outlined in *Attachment B – Stakeholder consultation method and scale*.

Project	Issues Identified by Stakeholders
Project 1H:	<ol style="list-style-type: none"> Digital skills and skills on how to operate in a digital environment are both areas lacking in the MDCI industry and RII training package, however are increasingly important to operator roles. Data that is gathered by multiple technology types (i.e. drones or remote operating centres) is often unused due to a lack of knowledge of how the data should be interpreted and then analysed. Due to many new technologies involving a digital method of operation, workers are not always aware of the hazards and risks involved when not being “on the ground.” The risks/hazards become easy to neglect and have caused great safety concerns since their introduction into the MDCI industry. Performing maintenance roles of new technologies involves programming and calibration skills. However, the specialised knowledge needed to perform these tasks is unknown to many workers. Safety issues and misaligned skilling outcomes have been emphasised as an issue. This stems from nationally diverse standards of automated vehicle training.
Project 1L:	<ol style="list-style-type: none"> Managing security and handling of explosives is a major safety concern and has not been an area of focus for many in the industry. There is a knowledge gap present in how to ensure data relating to explosives can be protected, as well as the implementation of risk assessment and management plans. Blasting is a highly technical operational procedure, however current workers within the industry are lacking technical knowledge relating to explosives, particularly product knowledge, properties of explosives, calculations of hole sizes and the relevant application skills. Workers are completing their qualifications with too little practical knowledge of what their role entails, creating a workforce that is not appropriately or adequately trained for their job and duties. There is currently a skill gap in the field of electronic blasting as the existing training has been identified as inadequate. Additionally there is a lack of knowledge relating to environmental concerns of controlling blast emissions and dust production as well as the mineral recovery benefits of electronic blasting.

Impact of Change

Throughout the Case for Change process we have sought to gather multiple perspectives on impacts of the proposed changes to training package. The below table provides a description of all expected impacts relative to stakeholders for Projects 1H and 1L given the proposed changes.

Stakeholder	Impact for Project 1H	Impact for Project 1L
Industry/ Employers	<ul style="list-style-type: none"> Employers will possess a more skilled workforce, with an understanding of key skills required to operate, maintain and process data for technologies, reducing the costs of retraining them in basic concepts. 	<ul style="list-style-type: none"> Employers will manage a more regulated and safe mine site, with explosives being secured appropriately. Employers will possess a more adequately skilled, practically able workforce with a better understanding of contemporary blasting methods.
Registered Training Organisations	<ul style="list-style-type: none"> RTOs will benefit from providing formally recognised training as opposed to the previous on the job training. 	<ul style="list-style-type: none"> RTOs will deliver training to blasting operators and technicians looking to increase their skill and knowledge base on the contemporary methods of blasting and new units offered. There could be a potential increase in enrolments and completion rates.
Learners	<ul style="list-style-type: none"> Learners will develop competency across multiple new technologies in the MDCI industry, thus strengthening their knowledge of the industry and positively affecting their career growth and development. 	<ul style="list-style-type: none"> Learners will be able to enhance their knowledge and skills in contemporary methods of blasting, such as electronic blasting and environmentally sound blasting. Learners will move into job roles with a more practical understanding of what is required of them, and with a greater knowledge of explosives security as well as technical product knowledge.
Regulators	<ul style="list-style-type: none"> Regulators will be part of the change process, hence will be involved and fully aware of the changes to be made to the units and their desired effect. 	

Implications of not implementing proposed changes

The base case (the ‘do nothing’) option must be considered as an alternative to the proposed changes in order to enable effective comparison between the two scenarios. No further reviews would be planned for the training products in scope of these projects in the base case scenario. The likely impacts of this option are outlined below:

Project	Current State Issues and Likely Impact(s) if not Addressed
Project 1H:	<ul style="list-style-type: none"> Current remote operating centre workers are not fully competent in all control room procedures <ul style="list-style-type: none"> Workers in remote operating centres will continue to not be able to adequately perform all of their duties in the control room. A large skill shortage exists in remote vehicles due to a lack of training available <ul style="list-style-type: none"> Workers will continue to operate remote vehicles without any formal training, which can lead to significant safety issues and operational inconsistencies. Current autonomous vehicle training does not have a national standard, but is instead taught on the job, without any nationally recognised regulations <ul style="list-style-type: none"> Employers continue to bear the cost of training employees and the standard of autonomous vehicle skills and maintenance operations remain inconsistent across the country. Current training for the use of drones does not teach the required skills for data analysis or maintenance <ul style="list-style-type: none"> Workers performing duties with drones will not possess any knowledge of how to process or analyse the gathered data. Furthermore, programming and maintenance procedures are not taught, so cannot be performed correctly.

Project 1L:	<ul style="list-style-type: none"> • Current training does not sufficiently teach the skills required for electronic blasting and related environmental issues <ul style="list-style-type: none"> ○ The impact of ignoring in depth training on electronic blasting and environmental concerns will not only be of detriment to environmental sustainability, but will also continue to produce inefficiencies in mineral recovery for organisations with less advanced technology. • Practically the operator roles within training do not align with industry job roles <ul style="list-style-type: none"> ○ Workers will enter job roles with an insufficient knowledge of what is expected of them in their practical roles, thus increasing the need for employers to carry out internal training on the job. • Technicalities exist in explosives and training is not sufficiently reflecting the required knowledge <ul style="list-style-type: none"> ○ A large disparity in technical knowledge between new and experienced workers will inevitably create a less efficient workforce, lacking the breadth of knowledge required to complete certain tasks. • Currently training does not exist to manage the security of explosives <ul style="list-style-type: none"> ○ With increasing security concerns and rapidly evolving technologies the MDCI sector may be prone to such breaches if workers are not adequately trained.
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Implementing the COAG Industry and Skills Council reforms for Training Packages

The table below outlines how the changes recommended in this Case for Change support the AISC reforms for Training Packages:

Reform	Evidence of this being addressed:
<i>1. Ensure obsolete and superfluous qualifications are removed from the system</i>	These projects will not include the development, review or deletion of any qualifications within the RII training package.
<i>2. Ensure that more information about industry’s expectations of training delivery is available to training providers to improve their delivery and to consumers to enable more informed course choices</i>	Training package components will be written so they align with industry expectations for training delivery, and will be released with an RII Companion Volume that provides additional information.
<i>3. Ensure that the training system better supports individuals to move easily from one related occupation to another</i>	The proposed new training package components for Project 1H will focus on receiving, processing and analysing data, whilst Project 1L will update the existing units with more technical explosives knowledge and environmental concerns within blasting. This will enable workers to carry these skills into multiple related occupations.
<i>4. Improve the efficiency of the training system by creating units that can be owned and used by multiple industry sectors</i>	Training package components have been developed so they are applicable across job roles and across industries wherever possible. For example, units were amended to ensure wording could be applied across the extractive, drilling, metalliferous mining, coal mining and/or civil infrastructure industries where applicable, to avoid creating duplicate units for each sub-sector as well as the use of cross sector units where possible.
<i>5. Foster greater recognition of skill sets</i>	Ongoing project work will consider options and assess industry demand for creation any skill sets within the RII Training Package in the future.

Appendix A – Schedule of review of training products

Project 1H: New and Emerging Technologies

Training Package Code	Training Package Name	IRC Name	Review status (Set options)	Number of existing qualifications to be reviewed as part of the project	Number of new qualifications to be created	Number of existing skill sets to be reviewed as part of the project	Number of new skill sets to be created	Number of existing NATIVE units to be reviewed as part of the project	Number of new NATIVE units to be created	Total number of NATIVE training products that are likely to attract development work costs
RII	Resources and Infrastructure Industry	Civil Infrastructure IRC Coal Mining IRC Drilling IRC Extractive IRC Metalliferous Mining IRC	Progress to Project	0	0	0	0	0	4	The following UoCs will be created as part of the project and could potentially be housed within the Certificate II in Underground Coal Mining, Certificate III in Civil Construction, Certificate III in Underground Metalliferous Mining, Certificate III in Drilling Operations or Certificate IV in Surface Extraction Operations at a minimum: <ul style="list-style-type: none"> • RIIXXXXXX – Perform duties in remote operating centres • RIIXXXXXX – Perform remote vehicle operations • RIIXXXXXX – Perform autonomous vehicle operations • RIIXXXXXX – Analyse data from drone operations

Project 1L: Contemporary and Emerging Blasting Methods

Training Package Code	Training Package Name	IRC Name	Review status (Set options)	Number of existing qualifications to be reviewed as part of the project	Number of new qualifications to be created	Number of existing skill sets to be reviewed as part of the project	Number of new skill sets to be created	Number of existing NATIVE units to be reviewed as part of the project	Number of new NATIVE units to be created	Total number of NATIVE training products that are likely to attract development work costs
RII	Resources and Infrastructure Industry	Civil Infrastructure IRC Coal Mining IRC Drilling IRC Extractive IRC Metalliferous Mining IRC	Progress to Project	0	0	0	0	24	2	<p>The following UoCs will be created as part of the project and at minimum will be included in the Certificate III in Underground Metalliferous Mining:</p> <ul style="list-style-type: none"> RIIXXXXXXX – Manage the security of explosives RIIXXXXXXX – Conduct environmentally sound blasting <p>The following UoC will be imported from Project 1H, once created:</p> <ul style="list-style-type: none"> RIIXXXXXXX – Analyse data from drone operations <p>The following UoCs will be reviewed with intent to amend as part of the project and are linked to the Certificate II, III and IV in Underground Metalliferous Mining, Certificate III in Drilling Operations, Certificate III in Underground Coal Operations, Certificate III and IV in Surface Extraction Operations, Certificate IV in Metalliferous Mining Operations Certificate IV in Surface Coal Mining, Diploma of Surface Operations Management, Diploma of Underground Metalliferous Mining Management, Advanced Diploma of Metalliferous Mining:</p> <ul style="list-style-type: none"> RIIBLA602D – Establish and maintain a blasting system RIIBLA401D – Manage blasting operations RIIBLA402D – Monitor and control the effects of blasting on the environment RIIBLA205D – Store, handle and transport explosives RIIBLA204D – Store, handle and transport explosives in underground coal mines RIIBLA201D – Support shotfiring operations RIIBLA202E – Support underground shotfiring operations RIIBLA307D – Conduct a blast survey RIIBLA306D – Conduct accretion firing RIIBLA308D – Conduct electronic blasting operations RIIBLA203D – Conduct mobile mixing of explosives RIIBLA305D – Conduct secondary blasting RIIBLA302D – Conduct shotfiring operations in underground coal mines RIIBLA301D – Conduct surface shotfiring operations RIIBLA303D – Conduct underground development shotfiring RIIBLA304D – Conduct underground production shotfiring RIIBLA601E – Design blasts RIIBHD305D – Conduct down-hole hammer drilling RIIBHD303D – Conduct long hole drilling RIIBHD301D – Conduct surface blast hole drilling operations RIIBHD302D – Conduct underground

Appendix B – Subject matter experts consulted in the development of this Case for Change

Methods and scale of consultation

The consultation approach for the Case for Change is designed to build on research and consultations undertaken in development of the Industry Skills Forecast and Proposed Schedule of Work. For the Case for Change we have relied on subject matter expertise gained from structured interviews with IRC members and industry representatives to whom we were referred, in addition to those who expressed interest in our projects via our website form. Experts who were consulted via one-on-one phone interviews during the development of these cases for change are listed in the table below.

‘Industry’ opinions in the Case for Change refer to views raised and validated in consultations outlined above. It is acknowledged that additional consultation will be conducted in future project work to confirm that these opinions are largely agreed upon by a broader group of stakeholders and to determine specific changes required in the Training Package.

All MDCI IRCs have had the opportunity to review and comment on this Case for Change prior to submission, as the units so far specified will affect all sub-sectors directly or indirectly. This Case for Change was also provided to STAs for review during April 2018. QLD, WA, NT and NSW provided their support, while ACT, SA and TAS did not submit a response. VIC provided feedback which was actioned and/or responded to accordingly. We are unaware of any STA that objects to the Case for Change being submitted to the AISC.

Approach

The consultation approach for the new Case for Change built upon on research and consultations undertaken in development of the Industry Skills Forecast and Proposed Schedule of Work. Consultations were targeted and include views from industry, peak bodies, training organisations, employers and those currently employed within the profession. These experts were consulted via one on one telephone interviews. Experts who were consulted during the development of this Case for Change include:

Project 1H: New and Emerging Technologies

Individual	Organisation	State	Stakeholder Type
Aaron Gray	Rio Tinto	WA	Industry
Cherie Holland	TSI Innovations	QLD	Industry / RTO
Peter Holland	TSI Innovations	QLD	Industry / RTO
Chris Kroehn	TAFE Queensland	QLD	RTO
Donna Playford	TAFE Queensland	QLD	RTO
Kaz Harris-Brown	TAFE Queensland	QLD	RTO
Garry Hargreaves	TAFE Queensland	QLD	RTO
Joanne Williamson	Dalrymple Bay Coal Terminal (DBCT)	QLD	Industry
Justin Murray	Curragh Mine	QLD	Industry
Ross Kelly	William Adams Institute of Training (Caterpillar)	VIC	Industry / RTO
Sandra Gillanders	Hy-performance Fluid Power	QLD	Industry
Sarah Boucaut	METSigned	VIC	Peak body
Teresa Signorello	Holmesglen Institute	VIC	RTO
Tony Mapp	MyneSight Pty Ltd	QLD	RTO
Stuart Maxwell	Construction, Forestry, Maritime, Mining and Energy Union (CFMMEU)	NSW	Employee Association
Scott Layton	BHP	QLD	Industry

Project 1L: Contemporary and Emerging Blasting Methods

Individual	Organisation	State	Stakeholder Type
Antony Shaw	Yancoal Australia	NSW	Industry
Graham Terrey	Mine Resilience	NSW	RTO
Paul Sear	Glencore	QLD	Industry
Bob Gildare	Explosives Training Centre	WA	RTO
Brett McTeare	Orica	NSW	Industry
Randy Biddle	Dyno Nobel	QLD	Industry
Shannon Mayfield	Dyno Nobel	QLD	Industry
Tapan Goswami	Orica	NSW	Industry

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Individual	Organisation	State	Stakeholder Type
Mihai Leonte	NSW Resources Regulator	NSW	Regulator
Robert Jay	NSW Resources Regulator	NSW	Regulator
Brad Holberton	Rio Tinto	WA	Industry
Hayden Isaac	Department of Natural Resources and Mines and Energy (DNRME)	QLD	Regulator
Mark Hayward	Department of Natural Resources and Mines and Energy (DNRME)	QLD	Regulator
Chris Aitchison	Alkane Resources Limited	NSW	Industry
Robert Nitz	Gelncore	QLD	Industry
Dr Marc Elmoultie	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	QLD	Government

Appendix C - Project rationales

Project 1H and 1L

To further understand the reasoning behind instigating this Case for Change we have prepared a rationale to support the scope, content and timing of these projects. This rationale is derived from the Industry Skills Forecast and Proposed Schedule of Work which was submitted to the AISC in 2017. Table 1 represents a summary of the rationale for these projects.

Table 1: Rationale for Project 1H and 1L

Item Code	Year	Title	Rationale
1H	2017-18	New and Emerging Technologies	The rationale of this project works on the basis that there are currently no units to be held by mine workers to equip them with the necessary level or type of skills that industry demands when performing roles with new and emerging technologies, however, the industry demands such training to exist. The skills gap of mine workers in the MDCI sector particular exists in the areas of remote operating centres, remotely operated vehicles, autonomous vehicles and the use of drones. Through the creation of units of competency, which appropriately support the learning of such new skills, the skill gap can be catered for.
1L	2017-18	Contemporary and Emerging Blasting Methods	The rationale of this project works on the basis that blasting techniques have become more sophisticated to achieve more efficient, safe, accurate and environmentally sound outcomes and enhanced skills are now required of shotfirers and blast designers. The areas where skill demands are increasing include: electronic blasting, environmental blasting, and managing security of explosives. Through the creation of units of competency, which appropriately support the learning of such new skills, the skill gap can be catered for.