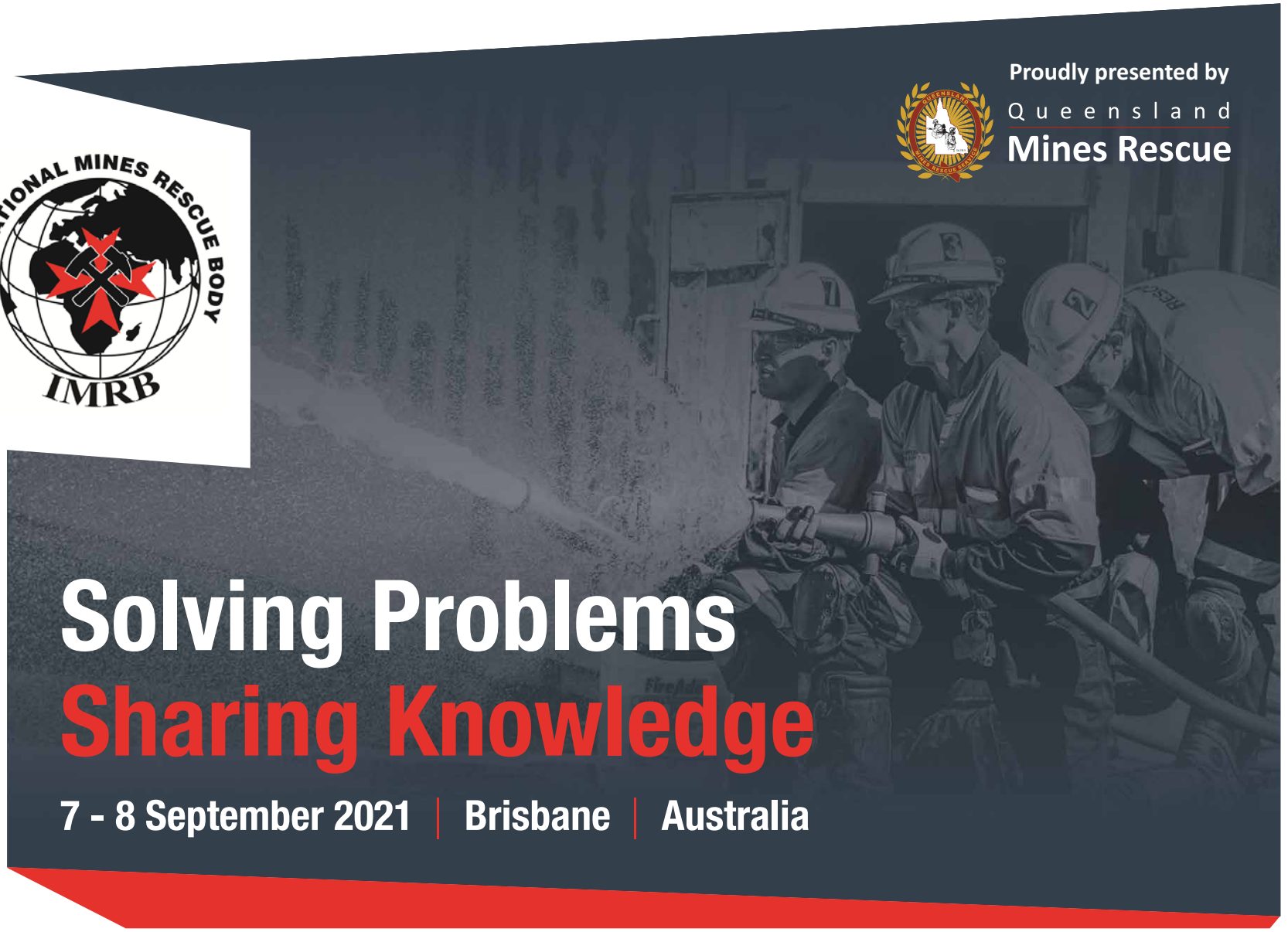
INTERNATIONAL MINES RESCUE BODY CONFERENCE 2021

Proudly presented by Queensland Mines Rescue



Solving Problems
Sharing Knowledge

7 - 8 September 2021 | Brisbane | Australia

Conference Handbook

#IMRB21 | www.imrb21.com

Contents

WELCOME

David Carey, CEO Queensland Mines Rescue Service

Dear Mines Rescuers

It is my pleasure to welcome the world of mines rescue to the 11th International Mines Rescue Body Conference, IMRB21, where we will celebrate 20 years of sharing knowledge and mateship since the first conference was held in Poland in 2001.

In 2019 QMRS accepted the role of host for this event. At that time, we all looked forward to sharing the sites and pleasures that Brisbane in September offers to visitors, and to sharing the developments in mines rescue occurring in Australia and around the world.

I wish to thank the commitment shown by the QMRS Board, as the opportunities for a physical conference diminished, for their encouragement as we explored virtual opportunities to sustain the critical sharing provided every 2 years by the International Conference.

This year will be the first virtual event for the IMRB and, with the help of the mines rescue community, we have compiled an entertaining and informative program delivered via an innovative platform. It will bring you as close to being present in the venue as can be achieved.

As we welcome the world to Brisbane, I hope you will enjoy the variety of presentations covering a range of topics and geographies. It is our greatest hope that we will all be able shortly to meet again in person, and build the friendships that are famous among mines rescue practitioners.

I look forward to saying g'day to as many of you as possible during the event and learning with you as we all share experiences of the craft in which we all share.

Yours in mines rescue

D Carey

David Carey
Chief Executive Officer
QUEENSLAND MINES RESCUE SERVICE

About the HOST

Queensland Mines Rescue Service

Queensland Mines Rescue
www.qmrs.com.au

The first mines rescue brigade was formed on the Ipswich coal fields (approximately 40km west of Brisbane) in 1909, with the first permanent mines rescue station being built there in 1923. As the mining industry expanded throughout the state, further brigades were formed with stations built at Collinsville, Blackwater, Moura, and Dysart.

The state was separated into three division – Southern, Central and Northern; each with a separate management committee responsible for providing a rescue capability to mines in its area.

Funding was provided on a one third share basis between the coal mining companies, the Department of Mines and the Queensland Workers Compensation Board (now Workcover Queensland).

In the 1989 the three division system was combined into the Queensland Mines Rescue Brigade with the intent of standardising mines rescue procedures and equipment.

In 1996 the government announced its intention to withdraw mines rescue funding and on January 1st, 1998, existing legislation was repealed and Queensland Mines Rescue Service Ltd was formed.

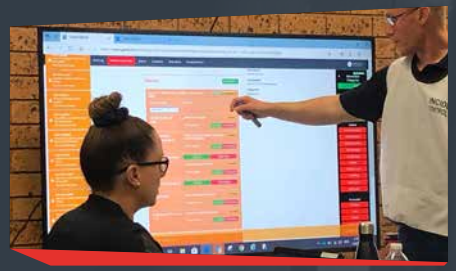
Deployment Capabilities

Inertisation (GAG) Unit

- The jet inertisation apparatus injects exhaust gas into a mine shaft to replace the oxygen content, below that required to support combustion

Mobile Shaft Rescue Systems

- This winder has a world first intrinsically safe directional Wi-Fi communications system for use in hazardous areas. It has interchangeable cage options and over 1,200m of rope on the drum for use in deep shafts.



Mine Event Management System (MEMS)

The MEMS training program provides you with the skills and knowledge to organise and manage a structured and efficient response to an emergency situation at a coal mine.

The MEMS course can be contextualised to focus on either underground or surface mining operations. It is delivered at QMRS facilities or onsite as required.

Training

Queensland Mines Rescue (QMRS) is proud to offer comprehensive and thorough training courses. Current courses include:

- Underground Coal Mine Emergency Response and Rescue Team Training Program
- Surface Coal Mine Emergency Response Team Training Program
- Underground Coal Mine Inertisation Team Operations Training Program
- Mine Emergency Preparedness and Response Systems
- Underground Coal Mine Control Room Operator Program

For the full list of courses please go to our website **www.qmrs.com.au**

The IMRB Board

The host would like to recognise and thanks the IMRB board members for their support in delivering the first virtual International Mines Rescue Body Conference

David Carey
Director

Mannas Fourie
Director

Ted Hanley
Director

Alex Gryska
Secretary/Treasurer

Delegates from 25 Countries

Speakers from 15 Countries

Simultaneous Translation into 4 Languages


SUNCORP
BRISBANE
What do I love about Brisbane?
Educating
Engaging
Encouraging

Welcome to BRISBANE

G’day, while we are disappointed not to share our beautiful part of the world with you this year, we still want to give you a little taste of what Brisbane has to offer.

The countdown to the Brisbane 2032 Games is on.

Brisbane is preparing to stand shoulder-to-shoulder with iconic Olympic cities – Los Angeles, Paris and London - following the announcement that Brisbane has successfully secured the world’s largest and most spectacular sporting event, the 2032 Olympic games.

Brisbane is ready to shine as a vibrant modern city on the world stage.

Tourists to Brisbane during the Olympics will be welcomed with open arms. There are myriad tourism drawcards, including inner-city adrenaline activities, Aboriginal & Torres Strait Islander art and cultural experiences, and mountain and water-based activities on offer, all extending the visitor spend throughout the wider Brisbane region.

Lifestyle is also key attribute. Known as one of the world’s most liveable cities, Brisbane’s year-round blue skies, sub-tropical climate, a thriving multi-cultural scene, and proximity to some of the State’s most beautiful natural landscapes, from the mountains to the Bay, draws interstate migration to the wider region.

We hope to see you soon,

VISIT Queensland

Our PROGRAM

Program is listed in Australian Eastern Standard Time Note: program is subject to change

Monday 6th September

22:30 - 00:30	Virtual Networking Event & Opening Ceremony

Tuesday 7th September

19:00 - 20:00	**Networking Session and Sponsor Displays Open**
20:00 - 20:05	Welcome
20:05 - 20:45	Pike River Mine Re-Entry Challenges & Risks – Our Journey **Dingy Pattinson,** ***Pike River Recovery Agency***
20:45 - 21:05	Accelerating Rescue through Drone Technology **Mike Campigotto,** ***Safesight Exploration Inc.***
21:05 - 21:25	Resys Hazardous Area Wireless Communication System for Mines Rescue **Robert Podolski,** ***2RHP***
21:25 - 21:45	Buddy Breathing Underground Oxygen Sharing Tactics **Dmytro Vakhnytski,** ***DEZEGA***
21:45 - 22:00	QMRS Shaft Recovery System with IS Communications **David Carey,** ***QMRS***
22:00 - 22:30	**Networking Session and Sponsor Displays Open**
22:30 - 22:50	COVID - 19 impacts on Mines Rescue Team Readiness and Mine Risk Assessments **Jeffery Kravitz,** ***JHK & Associates Consulting, LLC***
22:50 - 23:10	The functioning of the Central Mines Rescue Station during the Epidemic SARS-COV-19 **Andrzej Kleszcz,** ***Central Mines Rescue Station***
23:10 - 23:30	Effective Cleaning of Personal Protective Equipment (PPE) **Axel Bahr,** ***Draeger Safety***
23:30 - 23:50	Creation, Training and Strengthening - Emergency Response Team (ERT) **Erica Gallegos,** ***Metalkol ERG Africa***
23:50 - 00:10	Application of New Digital Technology for Promotion of Occupational Safety and Health in Coal Mining Industry of Russian Federation. Continuous Competency Management of Workers and Occupational Risks Assessment in the Workplace. **Alexey Voroshilov,** ***Kuzbass - COT LLC***
00:10 - 00:30	Mines Rescue in a Risk Managment Environment **Panel Discussion – David Carey, Gloria Catalina Gheorghe, Ted Hanley, Trevor Watts**
00:30 - 02:00	**Networking Session and Sponsor Displays Open**

Our PROGRAM

Program is listed in Australian Eastern Standard Time Note: program is subject to change

Wednesday 8th September		
19:00 - 20:00		**Networking Session and Sponsor Displays Open**
20:00 - 20:20		Rescue and Recovery After a Shaft Sinking Kibble Descended Uncontrollably Down a Sinking Shaft **Mannas Fourie,** ***Mines Rescue Services South Africa***
20:20 - 20:40		Managing Mine Emergencies, Software Developments **Ray Smith,** ***QMRS***
20:40 - 21:00		Mines Rescue Action Plan, Implemented Owing to Emergency Response Operations on Oil Mine No 3 “Yareganeft” of LLC “LUKOIL - Komi” **Nicolai Medvedev,** ***FSUE Mines Rescue Service (EMERCOM of Russia)***
21:00 - 21:20		Deadly Mining Emergencies in Colombia (2005-2020): Hierarchical Causation Model of 100 Events Investigated **Gloria Catalina Gheorghe,** ***National Mining Agency***
21:20 - 21:40		Development and Application of the Communication Device in Boreholes **Wen Hu,** ***University of Science & Technology***
21:40 - 22:00		Management of Spontaneous Combustion - Operational Experience **Owen Salisbury,** ***Whitehaven Coal Limited***
22:00 - 22:30		**Break - Foyer opens for delegates**
22:30 - 22:50		Paving the Way with Sticks & Stones **Kari Lentowicz,** ***Diamonds in the Rough Emergency Rescue Organization Inc.***
22:50 - 23:10		Autonomous Aerial Robots: Acquiring Data in Complex & Dangerous Environments **Raffi Jabrayan,** ***Exyn Technologies***
23:10 - 23:30		Developing a Contemporary Mines Rescue Response Model for the NSW Coal Industry **Alaster Wylie,** ***NSW Mines Rescue***
23:30 - 23:50		Trainings and Competitions of Mine Rescuers - Developments and Innovations **Vladimir Kravchenko,** ***Emergency Rescue Services Associations of the Republic of Kazakhstan***
23:50 - 00:10		Emergency Preparedness and Response in very remote locations **Norm Ladouceur,** ***Agnico Eagle Mines***
00:10 - 00:30		Open Pit Rescue & Recovery due to Highwall Failure **Mannas Fourie,** ***Mines Rescue Services South Africa***
00:30 - 00:50		Selection of the Number of Rescue Brigades Required for a Mine Using Multi-Criteria Decision Model **Sylvester Yenzanya Assistant Lecturer,** ***University of Mines and Technology***
00:50 - 01:05		Conference Closing
01:05 - 02:00		**Networking Session and Sponsor Displays Open**

INTERNATIONAL MINES RESCUE BODY CONFERENCE 2021

Hosted by Queensland Mines Rescue

DEZEGA®

LIFELONG SAFETY EXPERIENCE

NETWORKING

For the first time in its 20-year history, the biennial IMRB conference is going virtual!

But this doesn't mean we have lost the ability to come together, share, collaborate and learn. There will be dedicated networking opportunities with real time face-to-face interaction between all participants with a fully integrated video system. This is a chance to network with sponsors and colleagues from around the world.

The Welcome Reception is the first event in the program that provides this opportunity. Hear from our host and special guests on what to expect over the conference.

You will be treated to a traditional Welcome to Country from Brisbane-based tribe, Nunukal Yuggera.

Monday 6th September

22:30 - 00:30

Tuesday 7th September

19:00 - 20:00
22:00 - 22:30
00:30 - 02:00

Wednesday 8th September

19:00 - 20:00
22:00 - 22:30
00:45 - 02:00

The ONLINE Platform

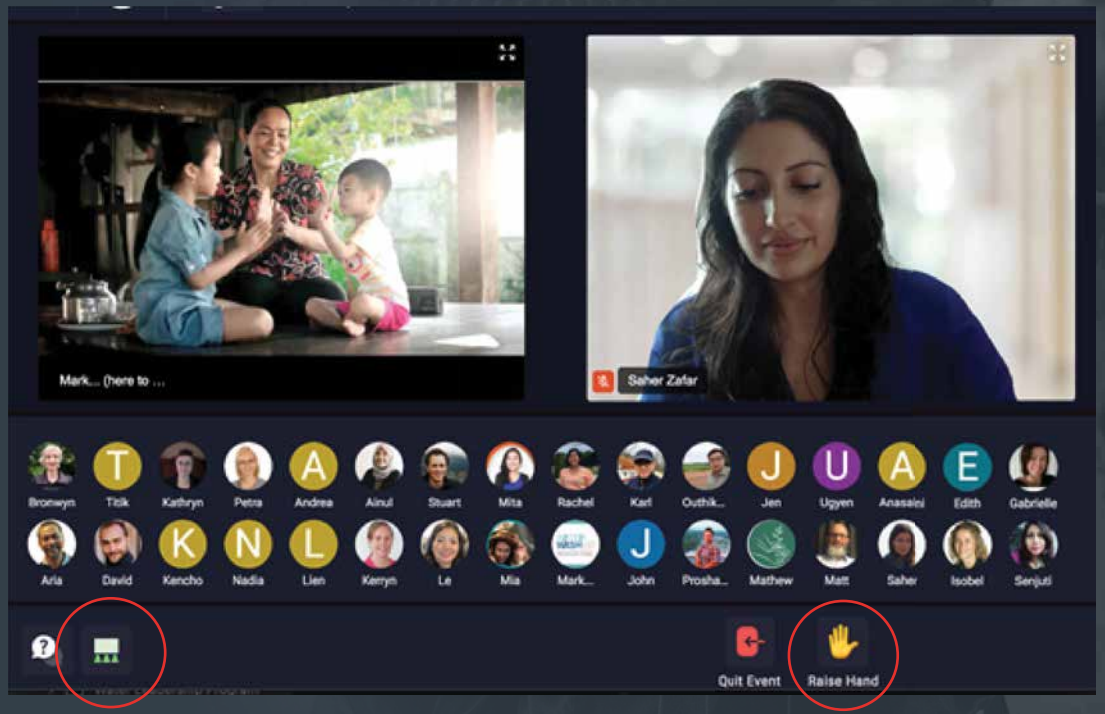
The virtual events platform allows delegates to access the platform through a basic web-based URL and allows the freedom to network about different tables and spaces as you would in a physical conference.

Upon entering the virtual venue, you will land in the foyer. Here you will be able to network with other mines rescue professionals and sponsors. Registered delegates will receive further information on how to best navigate the platform.

Once our official program begins you will be able to enter the plenary room and see the presentations live. There will be a live general chat box as well as the ability to send questions via Q & A box. All speakers have been asked to 'come to stage' to respond to questions at the conclusion of their presentation. Do you want to ask the speaker a question live? simply raise your hand and our technical team will invite you to stage to ask your question direct!

TIP: To expand your view please click on the three green triangles at the base of your page.

QMRS felt that it was important now more than ever to bring the Mines Rescue network together for the conference. The team have engaged a live translation service to provide a live simultaneous audio of the presentation into 4 languages: Polish, Russian, Spanish and French. Delegates will need to mute their virtual platform tab and open the audio translation on either a new tab or a mobile device. This service has allowed some speakers to present in their native language to be translated to English for all. A guide will be sent to all registered delegates. This is not available in the networking mode and delegates must write their questions for Q & A in English.



VENUE Map

You may be surprised by the possibilities and the similarities of functions between an in-person event and a virtual event.

Here are some key features to help you navigate the virtual venue!

Sign In

Key Networking Features

1. Tile View ***2.*** Camera On/Off ***3.*** Microphone On/Off
4. Chat Window ***5.*** Share screen ***6.*** Access Whiteboard

Access key networking features using the toolbox at the bottom of your screen

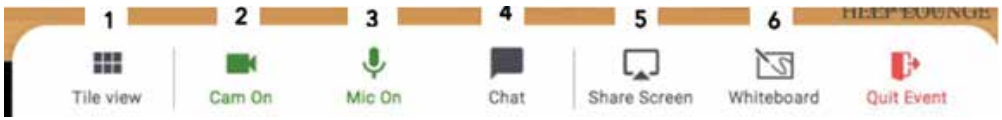
FLOORS: Change floors by clicking the numbers on the left hand side of the screen.

CHAT: You can message the whole room using the general chat. Alternatively chat amongst your table using the table chat. You can also private message colleagues by searching for their name in the chat box.

**You can only message delegates who are currently in the same room as you. If they are not in the room, they will receive the message when they return to the room.

Link

A link to the platform will be sent out to registered delegates prior to the conference date.
The platform is only open for the conference schedule.



Set Up Profile

Learn how to update your profile in the platform **here**.

DOs and DON'Ts of the Platform

Please USE the below web browsers

Chrome (Google)

Safari (Apple)

CONNECT using your **Windows** or **Mac computer** or **laptop**

NEED HELP once on the platform?
go to the **HELP DESK** or **SEARCH HELP** in the **CHAT BOX**.

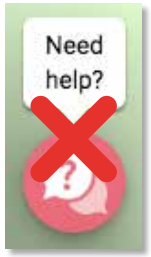
Do NOT use the below web browsers

Firefox

Internet Explorer

Do NOT use a portable device or mobile

DON'T USE the help box in the bottom right hand side
- this will direct you to an automated bot



TEST your video and microphone settings **HERE**

FIND SOLUTIONS to common technical issues **HERE**

Technical HELP?

Technicians will be available for the duration of the conference should you experience any technical difficulties. Event staff and technicians will all have **HERE TO HELP** at the end of their name to make it easy to find them.

Eg Danielle - HERE TO HELP

Please visit the main help desk in the foyer to chat to the team -

If you are having issues moving in the conference room, or changing tables, you may need to clear your cache settings. Please find tutorials linked for **Safari** and **Chrome**.

If you are joining from your organisations network, please ensure there is no firewall in place that is restricting your access.

You can contact your I.T department for assistance or use a personal network / wifi connection.

Please follow the Do's and Don't of the previous page for further tips.

It is prohibited to record presenters and table discussions during the conference.

SPONSORS

QRMS would like to sincerely thank our sponsors for their support to deliver the first virtual International Mines Rescue Body Conference.

Host

Queensland Mines Rescue

https://www.qmrs.com.au/

Gold Sponsors

DEZEGA is a world designer and manufacturer of breathing equipment with a closed circuit. We produce breathing apparatus on chemically bound and compressed oxygen. All equipment under **DEZEGA** brand is designed in collaboration with users for the user's needs. Over 500 thousand SCSRs and tens of thousands SCBAs are deployed daily worldwide. **www.dezega.com/en**

Dräger Safety Founded in Lübeck, Germany in 1889, Dräger develops and manufactures key components of an integrated safety concept - this begins with respiratory protection and gas detectors for everyday workplace safety and extends to self-contained self-rescuers and refuge shelters for emergency situations. **www.draeger.com** Contact **mining@draeger.com**

Silver Sponsors

NSW Mines Rescue plays a pivotal role in assisting industry to manage risk and operate safely. Backed by almost 100 years' experience providing emergency and incident response and specialist safety training to industry; we also offer integrated advisory and audit solutions to help identify, mitigate and remove high risk factors from your mining operations to improve the safety for your people, your assets and your business. **www.coalservices.com.au** Contact **scott.dennis@rescue.coalservices.com.au**

Media Partner

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FAQ'S

Can I share my registration?

Each registration is for one delegate. Sharing registrations is not permitted.

Can I transfer my registration to a colleague if I can no longer attend?

Yes. If you are registered for the conference and can no longer attend, you can transfer the registration to a colleague. To request a transfer please contact the events team at **info@imrb21.com** a minimum of fourteen (14) days prior to the conference.

Will recordings of the presentations be made available post event?

All conference presentations and recordings will be made available for conference attendees only via the **IMRB21 website post event** (subject to speaker approval of release).

It is prohibited to record presenters and table discussions during the conference.


SAFE COAL

KEYNOTE Speaker

Dinghy Pattinson

Chief Operating Officer, PIKE RIVER RECOVERY AGENCY | NEW ZEALAND

Tuesday 7th September 20:05 - 20:45

Keynote Address

Dinghy has over four decades of underground mining experience in New Zealand, consisting of 37 years in coal and 5 years in metalliferous. He was appointed Chief Operating Officer of the Pike River Recovery Agency in early 2018. In this role, Dinghy oversees the planning and operational elements of the Pike River re-entry work and has responsibility for ensuring activities at the mine comply with statutory health and safety requirements.

His numerous mining qualifications include Site Senior Executive and First Class Mine Managers certificates in coal and metalliferous, and a Post Graduate Diploma in Coal Mine Strata Control from the University of New South Wales.

In addition to his strong mining background, for the past 37 years, Dinghy has been actively involved with the NZ Mines Rescue Service in the roles of Brigadesman, Station Manager, and Board Member.

PIKE RIVER MINE. RE-ENTRY CHALLENGES AND RISKS - OUR JOURNEY

Presenter: Dinghy Pattinson

Authors: Dingy Pattinson[1]

[1]Pike River Recovery Agency

The Pike River Coal Mine explosion on the 19th November 2010 claimed the lives of 29 men. 31 were working underground at the time of the explosion, only 2 were able to escape.

The subsequent explosions resulted in the mine being sealed.

Prior to the 2017 general election, the families of the lost miners and the New Zealand public were promised that a Labour-elected government would support and fund a re-entry if it was deemed technically viable and safe to do so. After the election, on 31 January 2018, the Labour Party established the Pike River Recovery Agency Te Kāhui Whakamana Rua Tekau mā Iwa (the Agency) as a stand-alone government department.

The Agency's objectives are to conduct a manned recovery of the mine drift to:

- *Gather evidence to assist in ascertaining what occurred at Pike River Mine leading up to and on 19th November 2010. This will assist in preventing future mining tragedies, and also promote accountability for this mining tragedy; and*
- *Give the victims' loved ones' overdue closure and peace of mind; and*
- *If possible, recover any human remains.*

The Agency works in close partnership with the Family Reference Group (FRG) and their technical experts who together play a central role in the planning, decision making and implementation of the safe manned re-entry of the Pike River Mine drift.

The evidence gathering processes are directed by the NZ Police Investigation team who provide onsite oversight of all the forensic processes conducted. The Agency operates in a publicly transparent and open fashion with rigorous assessment of risks and control measures associated with the manned re-entry of the drift.

This presentation covers

- *Introduction*
- *Background*
- *Key relationships*
- *Founding principles*
- *Planning*

SPEAKERS

Axel Bahr
Marketing Manager – Segment Mining, DRAEGER SAFETY | GERMANY

Axel Bahr has been with Dräger since 1990 and has more than 30 years of experience in the area of Business Engineering, which he studied in Hamburg and Wilhelmshaven. He held different positions within Dräger and has been dealing closely with Mines Rescue as global product manager for closed circuit breathing apparatus since 2005.

His main focus as Marketing Manager Mining now is to understand and support mines rescue with suitable solutions.

Tuesday 7th September 23:10 - 23:30

EFFECTIVE CLEANING OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Presenter: Axel Bahr

Authors: Simon Vogt[1], Axel Bahr[1]

[1]Draeger Safety

The cleaning of protective equipment after use has always been a requirement in order to not only maintain a working condition but also to fulfill hygiene requirements when PPE is shared.

Due to the COVID-19 pandemic, the awareness and uncertainty among wearers surrounding these topics has increased. The need for disinfection as an additional measure to lower the potential risk of transmission of the virus must be reconsidered.

In this presentation, Dräger, a global manufacturer of safety technology, will provide insight into the differences between cleaning and disinfection and how these steps have an impact on different phases of a product's life cycle from development to certification and approval as well as maintenance throughout the lifetime. Different factors will be reviewed that can assist organizations in their definition of service procedures. This will be done following the "Sinner's Circle" of chemistry, mechanical action, temperature, and time. Considering these elements and dependent on the application and objective, a high degree of safety can be achieved while keeping the complexity on a manageable level.

Mike Campigotto
Chief Executive Officer, SAFESIGHT EXPLORATION INC | CANADA

Mike Campigotto is the President and a founding member of SafeSight Exploration. A Graduate of the University of Waterloo's Math and Computer Science program, Mike has had an extensive career in technology transformation. Over his 35 years in the digital industry Mike has participated in and championed the digital transformation of e-Government and e-Health around the globe.

The past 3 years have been focused on innovation within the mining sector in support of the Digital Transformation.

Tuesday 7th September 20:45 - 21:05

ACCELERATING RESCUE THROUGH DRONE TECHNOLOGY

Presenter: Mike Campigotto

Authors: Mike Campigotto[1], David Poulin[2]

[1]Safesight Exploration Inc.
[2]Newmont Canada

GPS denied drone technology can be adapted to support the Mine Rescue and Emergency Response events.

SafeSight Technologies and Newmont Canada have collaborated to develop and apply a Mine Rescue drone platform for use on surface or underground.

This operational technology transforms the reach and range of rescue in the mining sector.

David Carey
Chief Executive Officer, QUEENSLAND MINES RESCUE SERVICE | AUSTRALIA

A mining engineer with 40 years of experience in underground and open cut coal mining, David has held roles in general management, mine planning and mine management in both Australia and Indonesia. David has spent 5 years with the New South Wales government as a Coal Mines Inspector, Senior Inspector and Area Manager leading the Extractive Industries Safety Advisory Committee.

Since 2004, David has been with Queensland Mines Rescue Services Ltd, and now serves as CEO, directing the company in providing leading edge emergency services to the coal industry.

Tuesday 7th September 21:45 - 22:00

QMRS SHAFT RECOVERY SYSTEM WITH IS COMMUNICATIONS

Presenter: David Carey

Authors: David Carey[1]

[1]Queensland Mines Rescue Services

In 1994 Queensland suffered a major mining disaster when 11 miners died following a coal spontaneous combustion, initiated gas explosion at an underground bord & pillar coal mine. Following an extensive coronial investigation, 25 recommendations were made to improve mine safety aimed at both preventing mine emergencies and the capabilities of the state to respond to future events. After more than 20 years one of the last outstanding recommendations to be completed is "Aided rescue using shafts and/or large diameter boreholes should be considered for inclusion in mines' Aided Rescue Management Plans where viable."

The ability to recover coal mine workers unable to escape via conventional means, through shaft accesses or utilising purpose drilled recovery boreholes, whilst available in several countries, is not yet available in Queensland.

In 2013 QMRS commenced a project to gain industry support to implement such a recovery system. A working group sought information about such systems, particularly from our South African mines rescue friends. Following various workshops and sourcing specifications regarding existing shaft entries into both coal and metal mines throughout Australia, design parameters for such a system were developed.

Following several attempts to gain the necessary commitments to allow this project to progress, in 2019 the CEO of Anglo-American Coal Australia committed to fund the development of a winding system by QMRS.

This presentation details the outcome of the last 2 years work in completing the Shaft Recovery System and the integrated safety systems included into the design that allow the unit to be deployed within a risk managed environment.

Erica Araceli Gallegos Arias
ERT Superintendent, METALKOL ERG AFRICA | PERU

Erica A. Gallegos Arias brings the passion of Peru into her role as leader of a mines rescue team, consultant, and international emergency response competition judge. Like most emergency responders, the people she works with have become like a global family; bonded together through shared experiences and mutual admiration. However, Erica's choice to pursue emergency response in mines was met with institutionalised challenges.

Tuesday 7th September 23:30 - 23:50

CREATION, TRAINING AND STRENGTHENING – EMERGENCY RESPONSE TEAM

Presenter: Erica Araceli Gallegos Arias

Authors: Erica Araceli Gallegos Arias[1]

[1]Metalkol ERG Africa

Mannas Fourie

Chief Executive Officer,
MINES RESCUE SERVICES | SOUTH AFRICA

JAW Fourie (Mannas), is the Chief Executive Officer at Mines Rescue Services in South Africa. Mannas worked himself through the ranks to Mining Executive and joined Mines Rescue Services as CEO, in 2017. Having 27 years Mining Operations experience, he successfully managed several difficult and challenging Gold Mines with various mining methodologies in South Africa. During his mining career, he was an active Mines Rescue Team Member and served as Captain of the Rescue Team. This platform gave him extensive exposure to several underground fires and mine rescue and recovery incidents. Mannas is also a Board Member to the International Mines Rescue Body and with his mining experience, emergency response training and his passion for people, he aims progressively through great leadership to make an important contribution to the Mining Industry.

Wednesday 8th September 20:00 - 20:20

RESCUE AND RECOVERY AFTER A SHAFT SINKING KIBBLE DESCENDED UNCONTROLLABLY DOWN A SINKING SHAFT

Presenter: Mannas Fourie

Authors: Mannas Fourie[1]

[1]Mines Rescue Services South Africa

Mining in relation to Emergency Preparedness and Response should be looked at in a holistic approach, as mining operations have a vast footprint and various kinds of emergencies that can arise at any given moment at any place of work. One sometimes tends to emphasize focus on the working front due to the level of risk exposure and its inherent dangers. This may lead to neglecting the importance of access ways and means of transportation as they are deemed low risk areas based on the number of incidents occurring within. The question now arises, whether Rescue Teams have the knowledge and the relevant Emergency Rescue and Recovery Equipment available should an unplanned incident occur anywhere in the mine.This presentation will give an overview of a very complexed mine shaft accident where a sinking kibble descended uncontrollably down a vertical shaft, sharing the knowledge gained during this emergency. Learnings from this accident can be applied during both shaft sinking phases, current active operations as well as shafts with ageing infrastructures. Mines Rescue Services shall explain some of the specialized rescue equipment used and the challenges that were overcome during this unwanted incident.

Wednesday 8th September 00:10 - 00:30

OPEN PIT RESCUE & RECOVERY DUE TO HIGHWALL FAILURE

The exploitation of valuable Minerals has allowed us as Miners to design various methodologies of extractions from the earth. With these methodologies come many challenges together with its associated risks, and all Miners know that should they find themselves in grave danger, Mines Rescue Services would be there to answer the call. Mines Rescuers need to be adaptable and skilled in all these methodologies to ensure that they can tend to unwanted and uncalled incidents which may occur at any point of time. Such knowledge and skill, often applied in combination, enable Rescuers to minimize the loss of life and incurred risks, not only to mine employees but also to mining infrastructure ensuring a safe working environment and business continuity. This presentation would serve as platform to share the learnings and knowledge gained and emphasize the importance of having an Emergency Preparedness and Response service that can cater for various incidents requiring the response of Rescuers. Although some might consider Open Pit mining emergencies easier to deal with than underground operations, I can assert that these incidents pose unique challenges. We invite you to enrich your knowledge and be prepared when a similar incident may occur within your area of responsibility or share with me your thoughts on how we could have improved the rescue and recovery conducted during this operation.

Gloria Catalina Gheorghe

Mines Safety and Rescue Manager, NATIONAL MINING AGENCY | COLOMBIA

Gloria is an expert in mining safety, crisis management and mining rescue. She completed her undergraduate studies at the National University of Colombia and completed her Postgraduate Masters in Occupation and Environmental Health, specialising in Occupational Safety and Health Management. Gloria has 14 years' experience in the energy mining sector, with both public and private companies. Since 2012, Gloria has been serving as the Mines Safety and Rescue Manager at the National Mining Agency. Here, she has been coordinating the National Mines Rescue System and leading the implementation of the National Mines Safety Policy. During her time in the energy mining industry, Gloria has attained many skills and qualifications including those in the prevention of methane and coal dust explosions, incident command systems, pre-hospital life support training, mine rescue instructing and is an expert in mining accident investigation.

Wednesday 8th September 21:00 - 21:20

DEADLY MINING EMERGENCIES IN COLOMBIA (2005-2020): HIERARCHICAL CAUSATION MODEL OF 100 EVENTS INVESTIGATED

Presenter: Gloria Catalina Gheorghe

Authors: Gloria Catalina Gheorghe[1]

[1]National Mining Agency

Introduction: *1,653 people died and 2,590 were injured as a result of the 1,473 mining emergencies occurred in Colombia between 2005 and 2020. Emergencies due to geomechanical failures are the most frequent - 509 emergencies and 465 deaths - and explosions are the most catastrophic event, as 149 workers died in only five explosions. Explosions and geomechanical failures account for 52.8% of the deaths occurred.*

Objective: *To build a hierarchical model of causation for fatal mining emergencies in Colombia, based on 100 investigations of mining emergencies conducted by the Mining Authority. Materials and Methods: A hierarchical model of causation of fatal mining events in Colombia was built using the ISM - Interpretive Structural Modeling. 31 out of 183 risk factors identified were selected - accounting for 60.6% of the total frequencies (1,460).*

Results: *A hierarchical, 8-level model was obtained. The sequence of risk factors in the tree shows how incorrect decisions and unfavorable environmental conditions are influenced by the set of Rules of the game of the Occupational Health and Safety Management System. Neither are risks inherent to us, nor is human error the cause in which an investigation must conclude - contrariwise, this is the very beginning of it.*

Conclusion: *Injuries and deaths in mining can be prevented. Reading the hierarchical model in a positive sense, it was found that if hazards and risks are identified and evaluated, ventilation and maintenance plans are implemented, risks of critical tasks are managed, and workers are continuously trained on the basis of the Occupational Health and Safety Management System and the leadership and responsibility of the mining employer, so too will mine workers acquire skills in their work, with an adequate perception of risks, the performance of adequate procedures and the establishment of proper supervision systems. Only thus will avoid injuries and deaths.*

Wen Hu

Xi'an University of Science and Technology, SCHOOL OF SAFETY, SCIENCE AND ENGINEERING | CHINA

Wen Hu is a professor at Xi'an University of Science and Technology, a Doctoral Supervisor, Director of the Science and Technology Department and discipline leader of Safety Science and Engineering.

Wen Hu is also the Director of national mine rescue (Xi'an) research centre, and mainly engages in the teaching and scientific research of coal fire disaster prevention and mine emergency rescue. He presided over the research and development of technologies and equipment such as mine borehole life information detector and unmanned intelligent detection aircraft in roadway disaster area, which has played an important role in many rescue operations.

Wednesday 8th September 21:20 - 21:40

DEVELOPMENT AND APPLICATION OF THE COMMUNICATION DEVICE IN BOREHOLES

Presenter: Wen Hu

Authors: D. Zhang[1], W. Hu[1], Z. Xuezhao[1], W. Jianbin1, G. Jun[1]

[1]Xi'an University of Science and Technology

Once mine accidents occur, the communication between the ground and underground areas will be cut off, leading to the inaccessibility for the mine rescuers to enter the underground mine. In this case, boreholes can be drilled to help search and connect the trapped miners. Therefore, a set of wireless-wired combined communication devices used in mines were invented.

The applications of this device in the emergency rescues of Pingyi gypsum mine accident and Hushan gold mine accident suggested that the device has advantages of fast networking, quick action and stable information transmission. It can help the rescuers access the accident site as close as possible and find the trapped survivors. Moreover, the device is beneficial in monitoring the physical and mental states of the trapped miners, diagnosing the status of the boreholes and detecting the environmental parameters of the underground roadways.

The information provided by the communication device is vital for solving the last-mile problem in human life detection.

Raffi Jabrayan

Vice President, Business Development & Commerical Sales, EXYN TECHNOLOGIES | CANADA

Raffi Jabrayan is the Vice President, Commercial Sales and Business Development for Exyn Technologies. He oversees the expansion of the business internationally in the mining sector, as well as penetration into other industries. A large part of his role at Exyn is to help miners leverage the data produced by Exyn's autonomous aerial robots to streamline underground inspections, enhance operational efficiency and reduce risk.

Raffi has managed digital and technology innovation projects for mining companies and was intimately involved with operationalizing new technologies at Dundee Precious Metals. Raffi oversaw the scouting, due diligence, implementation and post integration assessment of Dundee's digital and technology projects.

Raffi is a seasoned mining professional with practical experience at both the plant and corporate level in various capacities, and has completed the Digital Business Strategy Program at MIT Sloan as well as Driving Strategic Impact from Columbia Business School.

Wednesday 8th September 22:50 - 23:10

AUTONOMOUS AERIAL ROBOTS

Presenter: Raffi Jabrayan

Authors: Raffi Jabrayan[1]

[1]Exyn Technologies

When a mine rescue team enters a search & rescue environment, they are walking into the unknown. That's exactly how every ExynAero autonomous flight platform starts its mission. With complete autonomy onboard, the ExynAero can safely navigate and map any complex, dangerous environment without ever putting the operator in harm's way. Autonomous flight enables our robots to relentlessly explore dark, dangerous, GPS-denied environments well beyond the operator's line of sight while still capturing rich, real-time data sets for increased situational awareness. During this presentation, Raffi Jabrayan -- Vice President, Commercial Sales & Business Development — will explain the advantages of our autonomous aerial robots in search and rescue operations, their ease of use for rescue personnel, and the speed of our post-processing pipeline for high-fidelity data analysis. ExynAI transforms each S&R team into a 3D modeling powerhouse churning out fresh maps ~15 minutes after capture. (*real-time data when comms available)*

Andrzej Kleszcz

Vice-President for Technical Affairs, CENTRAL MINES RESCUE STATION | POLAND

He graduated from the Faculty of Mining at the University of Silesia, specializing in mine design and construction. He started his professional career in Przedsiębiorstwo Robót Górniczych in Mysłowice, moving up the career ladder from an intern to a department foreman. The next years of professional work were related to work in mining supervision authorities. His duties included supervision over the rescue services of the entrepreneur and entities professionally engaged in mining rescue. He took part in many rescue operations, participated in the work of committees appointed by the President of the State Mining Authority to investigate the causes and circumstances of hazardous events. He is a co-author of the ordinance in the matter of mine rescue, co-organizer of the International Competition of Rescue Teams in Poland, which took place in 2004 and 2016. From 2014 to 2016, he was the deputy director of the department of underground and opencast mining at the State Mining Authority. In June 2016, he assumed the position of a Member of the Management Board - Vice-President for Technical Affairs at the Central Mining Rescue Station S.A.

Tuesday 7th September 22:50 - 23:10

THE FUNCTIONING OF THE CENTRAL MINES RESCUE STATION DURING THE EPIDEMIC SARS – COVID 19

Presenter: Andrzej Kleszcz

Authors: Piotr Buchwald[1], Andrzej Kleszcz[1]

[1]Central Mines Rescue Station

The Central Mines Rescue Station is a professional rescue unit, which protects all underground coal mines, salt mines, touristic mines and underground tunnels. There are four categories of the activity of the Central Mines Rescue Station.

- *intervention - offering assistance to miners due to accidents and dangerous occurrences*
- *prevention - protection against occurrence of hazardous situations*
- *training - conducting of the specialized training*
- *specialised medical examination for the mining rescuers*
- *scientific activity - activities related to innovativeness and cooperation with science sector in order to introduce new technology and to improve safety in mining.*

Because of epidemic COVID -19 we have made decision to suspend activities connected with: training, and medical examinations for rescue miners. Moreover we have suspended: business trip and business meeting in our company.

In order not to lower safety standards of the rescue mining service after many analysis, thanks to action taken we have decided reopen trainings and medical examinations.

We have developed the new training system - blended learning and the new medical examinations methodology. During epidemic COVID -19 rescue mining service was working without lowering safety standards.

Vladimir Kravchenko

Chairman, EMERGENCY RESCUE SERVICES ASSOCIATIONS OF THE REPUBLIC OF KAZAKHSTAN | KAZAKHSTAN

Vladimir has more than 45 years' experience in the mines rescue services in the Republic of Kazakhstan. Graduating from Polytechnic Institute in Kazakhstan in 1985, Vladimir repeatedly managed the liquidation of the consequences of complex technogenic accidents in various regions of the Republic of Kazakhstan.

Vladimir has been instrumental in getting Kazakhstan recognised in the IMRB. In 2013, he initiated the entry of the Republic of Kazakhstan and in 2019 once again initiated the entry of the State Fire and Mine Rescue Service of the Ministry of Emergency Situations of the Republic of Kazakhstan into the IMRB.

In 2021, Mr Kravchenko became the Chairman of the Association of Emergency Rescue Services of the Republic of Kazakhstan and at present is focusing on the the coordination and effective interaction of all mine rescue services in the Republic of Kazakhstan.

Wednesday 8th September 23:30 - 23:50

TRAININGS AND COMPETITIONS OF MINE RESCUERS - DEVELOPMENTS AND INNOVATIONS

Presenter: Vladimir Kravchenko

Authors: Vladimir Kravchenko[1]

[1]Emergency Rescue Services Association of the Republic of Kazakhstan

Mining rescue services in the Republic of Kazakhstan carry out rescue services for subsoil users' facilities in the mining and coal industry and since 2019 are private. Most of the mine rescue services use unified types of instruments, apparatus, equipment, and other outfit, have similar methods of training to act in extreme situations.

Competitions are held once a year at the site of the largest division of the mine rescue service (in Karaganda city), where representatives and teams of mine rescue services and formations of the Republic of Kazakhstan are invited, who are interested in. Surface mine rescue range has been used as an innovation, that has no analogues in Kazakhstan. The range is a sequential set of various structures on the earth's surface (modules of horizontal and vertical mine workings of different cross-sections, various types of rock support, smoke chamber, main water supply and air duct, various mining equipment, mechanisms, etc.), which allows simulate all kinds of situations that can occur during the elimination of an accident in underground mine workings.

The presence of a high-altitude observation deck above the range allows observers to take photo and video recording actions of mine rescuers.

The range is used both for regular training throughout the year, and during the competition at the final stage of which - is the relay, the most spectacular and emotional event, that attracts many spectators to the competition.

Jeffery Kravitz

President, JHK & ASSOCIATES CONSULTING LLC | UNITED STATES OF AMERICA

Dr. Kravitz is the President of JHK & Associates Consulting, LLC. He holds an MBA and Ph.D. from the University of Pittsburgh and a BSEE degree from the Illinois Institute of Technology. He is a registered Professional Engineer (PE) in Pennsylvania. Dr. Kravitz has received many awards and accolades and is a member of several mining related Boards of Directors. He is the President of the Holmes Mine Rescue Association.

Dr. Kravitz worked at the Mine Safety and Health Administration for over 43 years. He served as the Chief, Mine Emergency Operations, and the Chief, Scientific Development for MSHA. He was responsible for seeking out and developing new technology for mine emergency operations and led MSHA's mine emergency operations and respiratory protection programs. He has been involved in over 80 mine emergency responses in the United States and Internationally.

Tuesday 7th September 22:30 - 22:50

COVID-19 IMPACTS ON MINES RESCUE TEAM READINESS AND MINE RISK ASSESSMENT

Presenter: Jeffery Kravitz

Authors: J Kravitz[1], W. C. York-Feirn[2], D. Stalfort[3]

[1]JHK & Associates Consulting LLC
[2]Colorado Division of Reclamation, Mining, and Safety
[3]ABS Group

The readiness of mines rescue teams is vital to effectively respond to a major mine emergency. The COVID-10 pandemic has impacted team readiness due to the reduction in mine rescue training and contests. Multiple team MERD exercises in realistic environments have not been possible, and readiness assessments using easy-to-use comprehensive tools are difficult to achieve. Virtual mine rescue team assessments are conducted at mining operations that depend upon mine rescue teams through a Zoom meeting platform. Results of these abbreviated assessments and more comprehensive tools are presented.

People often ask: "Why Do We Need To Do a Risk Assessment?" Organizations and their management are often lulled into a false sense of security due to complacency, and a feeling that "Everything is Going Great" and ask "what could possibly go wrong here?"

This presentation will illustrate where some things have gone terribly wrong at some mines, leading to several major mine disasters in the past. Risk Assessments for major mine emergencies could have helped mitigate potentially dangerous situations. Preparedness and readiness assessments are necessary to assure proper responses can be made in the event of an emergency. These assessments pinpoint individual mine risk and readiness deficiencies for mine emergencies and help mine management prioritize the gaps and devise action plans to quickly address them.

Norm Ladouceur

Corporate Manager of Health, Safety & Security, AGNICO EAGLE MINES | CANADA

Norm has been in the Mining and Mine Rescue – Emergency response industry for over 37 years with experience in underground, open pit, mill-process plants and surface infrastructure. During this time, Mr Ladouceur has worked in Ontario, Manitoba, British Columbia, the territory of Nunavut and Nevada.

Norm has competed in several Mine Rescue competitions as well as been a judge at numerous events on the district, regional and world stages.

Wednesday 8th September 23:50 – 00:10

EMERGENCY PREPAREDNESS AND RESPONSE IN VERY REMOTE LOCATIONS

Presenter: Norm Ladouceur

Authors: Norm Ladouceur[1]

[1]Agnico Eagle Mines

This presentation will cover types of emergencies, emergency response, mutual aid, manufacturers, and effectiveness. The purpose of the presentation is to provide a solution for a successful and effective emergency response program for remote mining sites.

Today, mining occurs in extreme remote areas of the world. In areas accessible by sea or air only. To effectively deal with all types of emergencies, mines must ensure that they are ready. They must be prepared for all surface and underground type emergencies.

The objective is to give you guidance and ensure that you have an "emergency response plan" that can effectively deal with potential emergencies that could occur at site while doing business in very remote locations.

We address this by ensuring that our emergency responders are ready by giving them full training, ensuring there is an appropriate number of responders, that they are physically fit, and have access to well-maintained equipment.

The best way to do this - is to ensure that a risk assessment is done, involve key stakeholders to make sure that all areas of the mining operation are covered and to focus on all areas of the operations and not just the most obvious.

Kari Lentowicz

MANAGING DIRECTOR, DIAMONDS IN THE ROUGH EMERGENCY RESCUE ORGANISATION | CANADA

Kari Lentowicz hails from Northern Saskatchewan, Canada. In 2014, Kari became the Saskatchewan's first female Mine Rescue Instructor after several years of participating in mine rescue. She has participated as a competitor in nine competitions and a volunteer casualty and judge in several more. With her passion for emergency response, Kari went on to complete her Master of Arts in Disaster and Emergency Management sparking further interest in the area of inclusion within workplaces. In 2018, Kari and fellow colleagues formed Diamonds in the Rough Emergency Rescue Organization (DITR) dedicated to increasing awareness around diversity, equality, and inclusion. DITR participated in the 2018 International Mines Rescue Competition becoming the first all-women's team to compete in the event. They finished 5th in the underground event and 15th overall. Kari's drive to complete this project set a world stage to increase the culture of inclusion in the mine rescue community.

Wednesday 8th September 22:30 - 22:50

PAVING THE WAY WITH STICKS AND STONES

Presenter: Kari Lentowicz

Authors: Kari Lentowicz[1]

[1]Diamonds in the Rough Emergency Rescue Organisation Inc.

Women make 75% of the buying decisions for the household. So, it makes sense that they want to step out of the "traditional" employment options and step into the quite lucrative, engaging, and fulfilling field of mining. However, women in mining have not had an easy entry and acceptance into the industry and even more so in mine rescue.

A largely male-dominated field, the perceptions placed on the industry's emergency response roles sets the foundation for many of the limitations placed on women who wish to enter the field. Mining, however, is no longer made of 300+ lb. men grunting at a rock face as they swing a pickaxe. Mining is highly technical and embraces new technology every day. This technology requires physical strength sure, but it doesn't require the strength that many feel women just don't have. In fact, women can physically fulfill all the emergency response roles that men do in the industry and they do it well. They work smarter not harder and create an environment where people are free to be innovative to face emergency situations safely and effectively.

While some women are being encouraged by many to enter this field, there are many barriers they still face. Some challenges are blatant and quite obvious to many, however there are still many micro-aggressions that women face on a daily basis both within the mine rescue field and externally. Bringing all these challenges to the forefront is critical in beginning to understand how to overcome the barriers that still exist.

We need an industry that embraces what women can offer. We can't do it alone and we need to rely on our male counterparts to be our allies in breaking those glass ceilings. Let's knock down those barriers together.

Nicolai Medvedev

General Manager, FSUE MINES RESCUE SERVICES (EMERCOM OF RUSSIA) | RUSSIA

Nicolai Medvedev is the General Manager of FSUE Mines Rescue Service (EMERCOM of Russia). The FSUE Mines Rescue Service is the biggest enterprise in Russia, consisting of 14 big mine rescue units (including more than 370 mine rescue team members), responsible for the rescue in mining.

Nicolai Medvedev has 30-years of mine rescue and underground coal mining experience in Russia. He started his mine rescue career in Vorkuta, one of the most famous coal mining cities, situated in the Extreme North territory of Russia. He has participated in emergency response operations in coal mining facilities as a briefing officer and currently has the responsibility of overseeing accident prevention activities in mining facilities. Nicolai Medvedev is ready to share experience and knowledge.

Wednesday 8th September 20:40 - 21:00

MINES RESCUE ACTION PLAN, IMPLEMENTED OWING TO EMERGENCY RESPONSE OPERATIONS ON OIL MINE NO 3 "Yareganeft" OF LLC "LUKOIL – KOMI

Presenter: Nicolai Medvedev

Authors: Nicolai Medvedev[1]

[1]Emergency Rescue Services Association of the Republic of Kazakhstan

At this facility, the oil extraction is realized by the unique thermoshaft method based on steam assisted gravity drainage.

On the first of November 2020 the fire occurred in the oil mine No 3 "Yareganeft" at depth of 157 meters (about 515 ft). At the moment of emergency, there were 82 miners in the mine, 2 of them died. More than 90 people and 15 special vehicles were involved in emergency response operations.

Initially, the basic firefighting equipment was used, and then hose line was joined to the firefighting irrigation pipe for water application, but the efforts did not lead to the accident elimination because of permanently occurring gas dynamic manifestations, which characterize the oil mine. In the next place, aiming the prevention of fire spreading in mine workings, water shield barriers were installed on accident zone limits. Due to the aggravation of gas situation, permanently occurring gas dynamic manifestations and for the safety protection of mine rescue operations, the accident zone was isolated and flooded. The total volume of water was 200000 cubic meters. During emergency response operations, additionally nitrogen was ducted in the isolated zone from the surface. For that reason, 2 boreholes 600 meters (1968 ft.) long were drilled.

At the end of January, the emergency response operations on oil mine No 3 "Yareganeft" were completed. Within 3 months of the emergency response operations, the mine rescuers carried the gas control in the mine workings of accident zone, including mine air sampling.

Robert Podolski

2RHP | POLAND

Robert Podolski is a veteran in mining and mining rescue areas. He has been an active member of the International Mining Rescue Cooperation, since Louisville 1999, Nevada 2000 (IMRC) and Kokotek, Poland 2001 (IMRB). He was also a coach for the Polish Copper Mining Rescue Team "White Eagles" from 2000 – 2008.

Robert has a strong background in Polish copper and Lower Silesia coal mines as well as in Polish Mining Authority Administration. He has also supervised rescue operations as a State Authority in all types of mining. His last position was as Director of Regional Mining Office in ...and once endangered "participant" in real underground fire operation. Last position - Director of Regional Mining Office in Wroclaw.

Mr Podolski is a member of SITG (Polish: Society of Engineers and Technics of Mining) as well as author and co-author of numerous technical papers.

Tuesday 7th September 21:05 - 21:25

RESYS; HAZARDOUS AREA WIRELESS COMMUNICATION SYSTEM FOR MINES RESCUE

Presenter: Robert Podolski

Authors: Robert Podolski[1], Joanna Plachetka[1]

[1]2RHP

ReSys, is an independent wireless communication system fully compatible with any local solution (wires, optical). It is our answer to mining catastrophes like Sago Mine 2006 or Polish Krupinski Mine 2011.

ReSys main elements are: personal communicators, repeaters, Fresh Air Base managing unit - the commander tool, fiber optic converters and software. System covers communication between rescuers, rescue teams and commander of rescue operation. It's supported by software apps.

Presentation shows samples of possible network topology based on repeaters installed during rescue team penetration route, forming rescue network nods, dependent on different mine's structure. ReSys was used in rescue training works in Poland (coal, copper), and tested in situ in RSA and Australia mines. ReSys is a handy solution supported by features that make system unique: it's handsfree system - radio transmission is automatically activated by Voice Activity Detection Algorithm. It is full duplex and even allows conference call communication. At default configuration all users within the same team can hear each other. Repeaters, retransmit received IP packets. Distance between repeaters depends on radio propagation conditions. Because of underground obstacles (sealings, pillars), or very confine spaces of drifts/shafts it differs from 50 to 150 m, sometimes to 400 m. Practically we need 15 repeaters to cover 2 km route. Repeaters are equipped with media converter that allows connecting to fibre optic lines. ReSys allows live stream tracking of rescuers positions and their life functions. Large number of repeaters does not impact on network bandwidth.

Raymond Smith

OPERATIONS MANAGER, QMRS | AUSTRALIA

Raymond has over 20 years experience in mines rescue. His qualifications include Advanced Diploma in Risk Management, Advanced Diploma in Emergency Management, ERZC/Deputy Qualification Class 3 ticket, Diploma in Underground Mining and Diploma in Business Management. Currently undertaking study towards completion of an MBA.

Recent experiences as the Lead Manager with the Re-entry into North Goonyella Coalmine in 2019, Cook Colliery (Oxidation Event) and Crinum Coalmine (Reconnaissance to reopen the mine) in 2020.
Course facilitator in 2017 MEMS training program, educating UG Coal Mines personnel in Incident Management Training, the scope was then expanded into training personnel in Surface Coal Mines and Surface & Underground Metals Mines.

In 2018 QMRS advanced the MRAS software from Microsoft Access to MEMS – SQL platform, providing a more functional software to QMRS stakeholders.

Wednesday 8th September 20:20 - 20:40

MANAGING MINE EMERGENCIES, SOFTWARE DEVELOPMENTS

Presenter: Ray Smith

Authors: Ray Smith[1]

[1]Queensland Mines Rescue Services

It has long been recognised that knowledge of the conditions existing in a mine after an incident is essential in deciding whether or not to deploy Mines Rescue teams as part of the incident recovery process. Applying this knowledge in a structured manner to the assessment and the acceptability of the risks likely to be faced by those teams during rescue activities before authorising their deployment is an onerous task incumbent upon the person controlling the incident response.

How MEMS is Used

An Information Management Software, MEMS, is used to support the decision making process to deploy rescue resources in accordance with the operational guidelines.

MEMS assists decision makers to make considered decisions; it does not make decisions for you. When fully set up, it allows the information that already exists within a mine's Safety Management System that is relevant to the incident to be accessed and considered rapidly within the pressured environment of an emergency. Secondly, the incident specific questions contained within MEMS focuses the management team on gathering and assessing information relevant to the incident as it progresses.

At any time during the event, the management team can generate reports to assess what information is currently known and what still needs to be gathered. They can generate a running log of the status of the incident and can provide situation update emails to selected people from within the program.

MEMS provides a process to formally consider the adequacy of the information available upon which decisions have to be made, to formally consider and acknowledge the explosibility hazards of the environments within or adjacent to which a mines rescue team will need to work and to acknowledge and formally authorise the entry of teams into or for teams to remain within a mine either during or post an incident occurring, once an acceptable level of risk is achieved.

Owen Salisbury
Technical Services Manager, WHITEHAVEN COAL LIMITED | AUSTRALIA

Owen has worked as a Technical Services Manager for the last 17 years at multiple mines from Queensland and New South Wales. Since December 2012, he has been based at Narrabri Mine in New South Wales.

Prior to his work as a Technical Services Manager, Owen worked as a Safety and Training Manager in New South Wales and Queensland and gained operational experience in New South Wales coal mines.

Mr Salisbury holds a Bachelor of Engineering (Mining) with honours from the University of New South Wales, a Graduate Diploma in Safety Science from the University of New South Wales, Ventilation Officer Qualification, 2nd and 3rd Class Certificates of Competency in both New South Wales and Queensland.

Wednesday 8th September 21:40 - 22:00

MANAGEMENT OF SPONTANEOUS COMBUSTION – OPERATIONAL EXPERIENCE

Presenter: Owen Salisbury

Authors: Owen Salisbury[1]

[1]Whitehaven Coal Limited

The following spontaneous combustion event occurred in May 2020 and was successfully dealt with over the next 4 months. Due to numerous responses and actions done well, the impact was limited. In May 2020 products of accelerated coal oxidation were detected behind a seal at the rear of the LW109 goaf during routine sampling. At this time, O2 was present along MG seals at greater than 15%.

It was determined that the oxidation was in the pillar on the MG corner.

The following actions were taken

- *Activated MRS Mineshield*
- *Built N2 chamber*
- *QMRS UG foam unit to site injected N2 foam at the source which was very successful*
- *Situation improved for few days then reversed oxidation creates a new airflow path.*
- *Utilised Mines Rescue team to enter N2 chamber to repair monitoring system - foam observed from strata cracks*
- *Installed carbofill plug outbye*
- *Rocsil plug at MG corner*
- *Flyash plug into chamber created.*

The process from detection, rapid and significant responses meant that the mine kept operating, it limited the extent of the event and put permanent solutions in place.

Dmytro Vakhnytskyi
Head of Technical Marketing, DEZEGA | UKRAINE

Dmytro is an expert in the field of self-contained breathing apparatus with compressed oxygen (SCBA CO) and trains people in the use of his breathing apparatus and auxiliary equipment. He was a judge of the International Mine Rescue Competition IMRC-2018 and a speaker at the International Mine Rescue Conference IMRB-2019.

Since March 2020, Dmytro is the head of the Technical Marketing Unit at DEZEGA where he is responsible for the company's product matrix, product certification, building business processes, developing new and upgrading existing products. Prior to his current position, Dmytro was the Lead Engineer of the Marketing Department where he was responsible for RPE on the compressed oxygen.

Tuesday 7th September 21:25 - 21:45

BUDDY BREATHING UNDERGROUND OXYGEN SHARING TACTICS

Presenter: Dmytro Vakhnytskyi

Authors: Dmytro Vakhnytskyi[1]

[1]DEZEGA

DEZEGA represents studies and reports of testing the oxygen sharing system, explaining the principle of work, and extra application for addition to base functionality, including feeding oxygen resuscitators, evacuation victims using escape hood, remote short-term activities in ultra-confined space, etc. using Breathing Apparatus P-70 with integrated oxygen sharing system.

Buddy breathing is a rescue technique borrowed from scuba diving and firefighting to use in underground "out of gas" emergencies when two rescuers share one oxygen source. Running out of breathing gas most commonly happens as a result of poor gas management or unexpected situations, and always is an emergency that should be taken when conducting a risk assessment.

The oxygen sharing system in DEZEGA BA's, called "Buddy-Breathing", allows intercepting oxygen from an external source or from another breathing apparatus, without stopping using your own oxygen from the cylinder, or even not to close the cylinder valve. Original idea, methods of implementation, tactics, pros, and cons - all this and even more, we are pleased to share with you during the presentation.

Alexey Voroshilov

Deputy Director for Research, KUZBASS – COT LLC | RUSSIA

Alexey leads and coordinates the work on the practical use of the Probability of Harm Risk methodology for quantitative assessment of injury risks. With the direct participation of Alexei Voroshilov, the software for the injury risk assessment programme, its theoretical and factual substantiation, is being developed. The main specifics of the assessment of risks of injuries due to personal incompetent actions of an employee, is that it is numerical and gives the employer a forecasted number of injured workers in the enterprise at the end of the calendar year.

In 2012 he defended his PhD thesis in the field of fire and industrial safety (mining), the topic of his PhD thesis was “Investigation of regularities of influence of moisture on the process of self-heating of coal”.

Tuesday 7th September 23:50 - 00:105

APPLICATION OF NEW DIGITAL TECHNOLOGY FOR PROMOTION OF OCCUPATIONAL SAFETY AND HEALTH IN COAL MINING INDUSTRY OF RUSSIAN FEDERATION. CONTINUOUS COMPETENCY MANAGMENET OF WORKERS AND OCCUPATIONS RISKS ASSESSMENT AT WORKPLACES

Presenter: Alexey Voroshilov

Authors: A. Voroshilov[1], G. Sedelnikov[1], S. Voroshilov[1]

[1]Kuzbass-COT LLC

During the period of 2018 - 2020 the social partners (government, employers, and employees’ associations) of the Russian Federation made a global review of the situation in the field of occupation safety and health (OSH) in different branches of industry. They had determined that the most critical situation with fatal injuries and professional diseases arose in coal mining, construction, and agricultural sectors of Russia.

In this connection, the NACOT and main OSH Centre working in Kemerovo, Kuzbass(the main coalfield of Russian Federation) - Kuzbass-COT- had developed the new digital technology, new methodology and principles in occupational risk assessment and OSH training of miners and rescue teams. The report contains the global findings of researchers and practical application of developed technology, and it is supplemented with two video films which gives some conclusions about what was developed and what was applied in coal mines of Russia and how these methodology and practical methods made contribution in occupational injuries lowering and the occupational risks assessment at workplaces in coal mines.

Alaster Wylie

State Operations Manager, NSW MINES RESCUE | AUSTRALIA

With 16 years’ experience in underground coal mining gained from a diverse range of operational, management and project roles, Alaster’s experience has embedded a thorough understanding and practical application of Workplace Health and Safety legislation and Mines Safety Management Systems. Prior to joining NSW Mines Rescue in 2019 he was the Operations Manager for South32 Dendrobium Mine, preceded by senior roles in longwall operations.

He is also part of the Regional Emergency Management Committee, a forum which is responsible for emergency management in regional government areas. Alaster is a member of the Mine Managers Association of Australia, is the Chair of the Mines Rescue Working Group and has been a mines rescue brigade member for 12 years.

Alaster’s qualifications include a Mining Engineering Managers Certificate of Competency, Advanced Diploma in Underground Coal Mine Management and SAI Global Lead Auditor qualifications. He is currently completing an Executive Master of Business Administration.

Wednesday 8th September 21:40 - 22:00

DEVELOPING A CONTEMPORARY MINES RESCUE RESPONSE MODEL FOR THE NSW COAL INDUSTRY

Presenter: Alaster Wylie

Authors: Alaster Wylie[1]

[1]NSW Mines Rescue

On Saturday 1 September 1923, 21 miners lost their lives in the Bellbird coal mine disaster. This incident followed several earlier mining disasters between 1887 and 1921 which killed a total of 293 people in NSW. It was the impetus for the creation of the Mines Rescue Act of 1925 and the establishment of the NSW Mines Rescue service whose fundamental role was, and remains, to provide an emergency response capability and industry safety training. Fortunately, today’s mining operations are centred on safe work practices with robust controls in place to manage occupational hazards. The number of major incidents requiring the assistance of NSW Mines Rescue and brigade personnel is limited which is a credit to the safety culture of the industry.

Today, NSW coal mining maintains one of the highest safety records in the world. NSW Mines Rescue plays a critical role by assisting workers and employers to manage risk and operate safely through the provision of specialist industry training and consultancy. Notwithstanding the development and progress in recent decades regarding safety standards and training, it is critical that we remain vigilant in maintaining a response model that is relevant to today’s mining environment.

This presentation will describe how NSW Mines Rescue is working with industry stakeholders to enhance the NSW mines rescue model which will provide a first response skill set to brigade members whilst maintaining the long duration search and rescue capability.

Sylvester Yenzanya

Assistant Lecturer, University of Mines and Technology | GHANA

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Wednesday 8th September 00:30 – 00:50

SELECTION OF THE NUMBER OF RESCUE BRIGADES REQUIRED FOR A MINE USING MULTI-CRITERIA DECISION MODEL

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The number of underground personnel has been used as the sole criterion for determining the number of rescue brigades required in most mines around the world. Because there are no standard criteria for selecting the needed number of rescue brigades for a mine, it varies from country to country. As a result, regardless of the number of personnel, the number of rescue brigades varies between mines. While the criterion has proven beneficial in mine rescue management for more than a century, it ignores any risk linked with mining operations. Over time, it has been clear that the number of rescue brigades is influenced by a variety of factors other than the number of underground employees alone. Because other elements such as the nature of the mine, the mining technique, and available process plants and other surface facilities must be considered, the criterion does not justify whether the number of rescue brigades placed in the mine is sufficient. There is a gap since the existing criteria do not incorporate other mine variables. To close this gap, this study aims to establish the required number of rescue brigades by conducting a risk analysis of the entire mining operation.

The goals of this study was to: identify factors that impact the number of mine rescue brigades; rank factors that influence the number of brigades using multi-criteria decision making tools like Analytical Hierarchy Process (AHP) and Fuzzy-AHP; and compare and contrast factors that influence the number of brigades. Make recommendations after developing a model to determine the number of rescue brigades required by a mine. Focus group, questionnaire administration, and interview with Subject Matter Experts, risk assessment utilising risk score elements were among the methodologies and processes used. A model was formulated in the AHP framework. From the study, the following factors and their respective weights determine the number of mine rescue teams in a mine: Safety Culture (0.225); Employees per Shift (0.194); Resourcefulness of the Rescue Team (0.177); Number of Active Mines within the Mine and other Facilities, such as a process plant (0.146); Level of Mechanisation of the Mine (0.097); Mining Depth (0.082); and Nearness and Responsiveness of Sister Rescue Teams (0.079).

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