



COVID-19 Impacts on Mine Rescue Team Readiness, Mine Emergency Readiness and Preparedness

- William C. York-Feirn, Mine Safety Program Director, Colorado Division of Reclamation, Mining & Safety
- Dr. Jeffery H. Kravitz, PhD – President, JHK and Associates Consulting
- David Stalfort – Senior Director, ABS Group
- TRAM, Oct 14 – 15, 2020

The COVID-19 Pandemic -New Challenges, New Approaches

- COVID-19 precautions restrict normal training procedures
- Training in groups presents new challenges
- Mine Rescue training presents new challenges
 - Masks and social distancing for classroom activities
 - Disinfectants
 - Testing
- MERD training presents similar challenges

The COVID-19 Pandemic and New Challenges

- Mine Rescue Contests present new challenges
 - Benching safely
 - Running the contest
 - Handling simulated injured miners and victims safely
 - Judging safely
- MSHA is not relaxing annual regulatory requirements for training
 - 2 mine rescue contests per year for coal teams

Impacts

- Mine Emergency Risk, Readiness, and Preparedness is adversely affected
- Mine Rescue Team Readiness and Preparedness is adversely affected
- Need for new ways to train safely











VA Mine Rescue Contest July 27, 2020

- The VA Department of Mines, Minerals, and Energy and MSHA hosted the first mine rescue competition for underground teams in 2020.
- This was a significant accomplishment in a year where normally several mine rescue contests are held throughout the country.
- Many mine rescue contests around the country have been delayed or cancelled due to the COVID-19 pandemic.
- Three teams participated (minimum for MSHA standards)

VA Mine Rescue Contest

- This was a semi-virtual contest which minimized exposure to the coronavirus.
- Additional safety precautions included:
 - Social distancing
 - Personal protective equipment (PPE)
 - Disinfection of equipment
 - Judges evaluated maps and written test remotely
- Mine rescue teams worked two competition problems on the same day, thus achieving compliance for certification in 2020.

Post #5 Morgantown, WV Contest October 6-7, 2020

- Guards assigned for evaluating and restricting access to the contest area
 - Stop and screen everyone entering the contest area
 - Take temperatures – no one allowed with a temperature above 100.4 degrees F.
 - Deny access to anyone who is sick or has a fever, failing other screening questions.
- Social distancing – 6 feet
- Contest officials provided with PPE; teams provided their own.
- Isolation, written exams, and map scoring are the highest potential sources of exposure.

Post #5 Morgantown, WV Contest October 6-7, 2020

- No central isolation
- Teams arrive at a pre-determined time and leave 20 minutes after competing
- No inter-mingling of teams
- Spectators can only observe their respective teams.
- Selected members of teams take the written test. A picture is taken of the test, graded, and emailed to the team for review. Teams can protest by email.

Post #5 Morgantown, WV Contest October 6-7, 2020

- A picture of the briefing officer and team maps are taken or scanned and sent to a remote location for scoring.
- Scoring is done electronically.
- Contest officials email the score cards, maps, etc. to teams for review.
- Teams can have 60 minutes to review the materials and email protests.
- Bathrooms are available to everyone.
- The contest officials provide hand sanitizer, masks, and gloves for the two-day contest.
- Teams must wear surgical gloves and all others must wear gloves and masks.
- Other precautions are also practiced (disinfecting placards, etc.)

Post #5 Morgantown, WV Contest October 6-7, 2020

- No team meals provided
- No banquet
- No bench contest
- No first aid contest
- No pre-shift contest
- Trophies will be mailed to respective winners.

Rocky Mountain Mine Rescue Association Price Contest – September 14-17, 2020

- 2-day mine rescue competition only, no bench, no first aid, no pre-shift
- No designated isolation area - isolate in hotel rooms
- Guards secure contest area and restrict access
- Take temperatures & screen for symptoms for all competitors and officials
- Individual distancing 6 feet, no more than 10 persons on field at one time
- Contest officials provided PPE; teams required to bring own PPE
- Maps/written tests scanned and graded remotely
- No banquet - trophies will be mailed to winners
- No vendors area

Mine Emergency Risk, Readiness, and Preparedness

- ▶ Mine Emergency Risk must continually be evaluated and minimized
- ▶ Mine Emergency Readiness and Preparedness must similarly be continually evaluated and optimized.
- ▶ Mine Rescue Team Readiness must be evaluated and optimized.
- ▶ Responsible Person/Competent Person Readiness must be evaluated and optimized.

Background

- ▶ Holistic Gap Analysis, MSHA 2012
- ▶ ABS Contract to Develop Risk, Preparedness, and Readiness Tools
- ▶ Literature Review
- ▶ Industry Development Workshops Implemented
- ▶ Assessment Models Developed for Underground Coal Mines

Industry Experience



Assessments conducted for Underground Coal Mines



Demand for other assessment models



Surface Coal Models developed using Industry workshops



Conducted Surface Assessment



Underground and Surface models developed for M/NM using Industry workshops

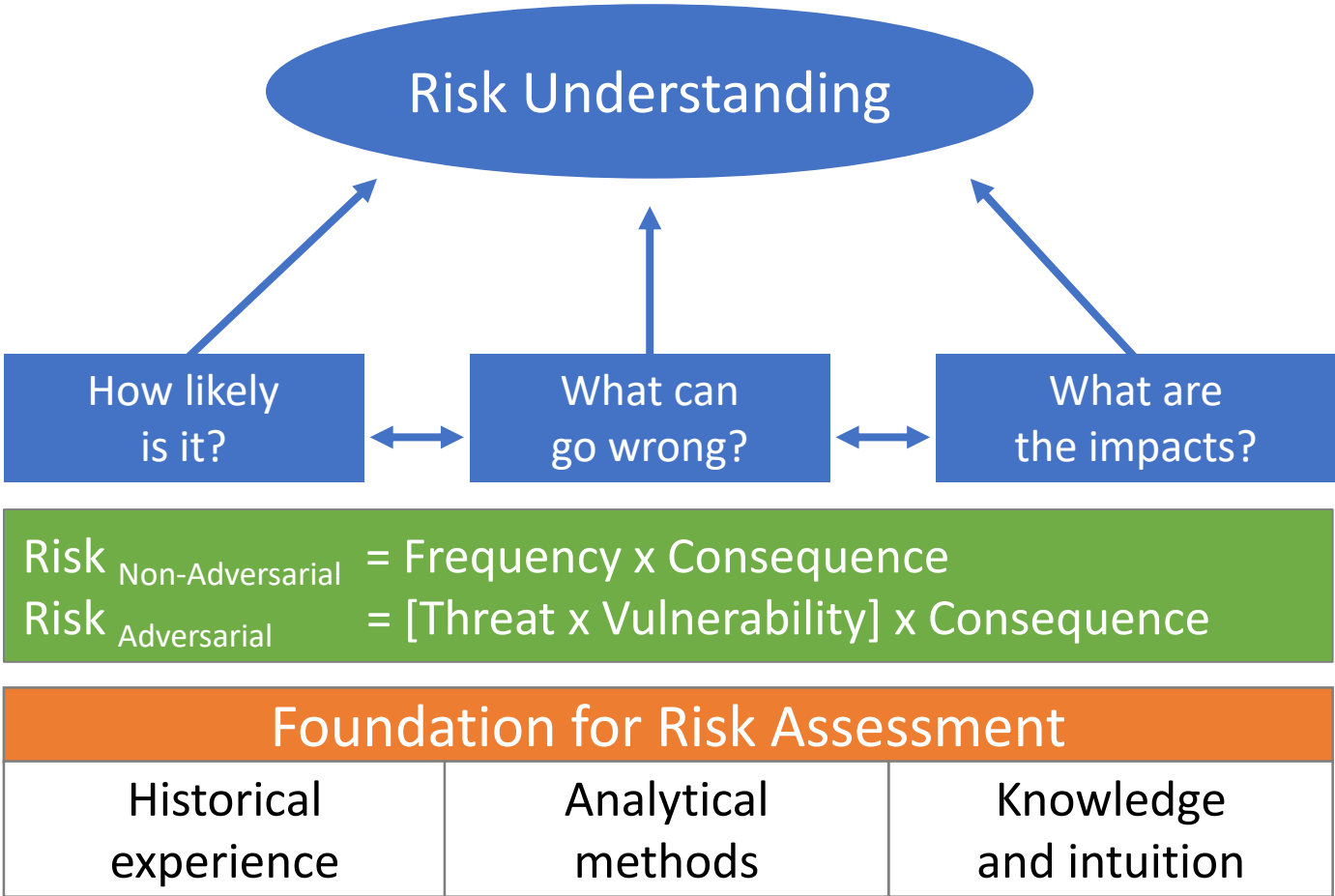


Underground M/NM assessments conducted

GOALS

- ▶ Identify the risks associated with your mine and methods to prevent major mine emergencies,
- ▶ Assess the preparedness of your mine to respond to a major mine emergency,
- ▶ Assess the readiness of your rescue teams, and
- ▶ Assess the readiness of responsible persons to execute your emergency plan.

Low Frequency / High Consequence Events



The Four Assessment Models

Risk Assessment

Preparedness Assessment

Mine Rescue Team
Readiness

Responsible/Competent
Person Readiness

Broad Mining Industry Participation



HARRISON WESTERN



Assessment Criteria



Meeting the Factors



Not meeting the factors, making progress



Not meeting the factors
top priority for management

The Assessment Process

Step 1:
Review
Criteria
and Factors

- Questions to Frame Your Thoughts

Step 2:
Assign a
Score

- Green
- Yellow
- Red

Step 3:
Explain the
Score

- Document why you could not score "Green"

Step 4:
Develop
Action Plan

- Document what you plan to do to move towards "Green"

Group Dynamics- A Different Environment

- In an inspection environment.....
- *Everyone hopes that the inspector doesn't find problems*
- In an assessment environment.....
- *Everyone is looking for unaddressed problems to highlight and correct*



Facilitated Group Dynamics

- Aid the group dynamics process
- Record scoring and comments.
- Aid in developing action plans



Summary Results - Mine 4

Overall Summary Assessment					
RISK LEVEL = 1; THE MINE DOES NOT MEET THE STANDARD					
MODEL 1: RISK ASSESSMENT		MODEL 2: EMER PREPAREDNESS		MODEL 3: MINE RESCUE TEAMS	
Risk Criteria	Rating	Risk Criteria	Rating	Risk Criteria	Rating
SECTION A – BASE RISK		SECTION A - PEOPLE		SECTION A – PEOPLE	
A. Design and Planning		A. Local Coordination		A. Competencies	
B. Equip, Maintenance/Reliability		B. Knowledge		B. Training Drills And Exercises	
C. Upkeep of Infrastructure		C. Training and Exercises		C. Leadership/Organization	
D. Documentation/Records		SECTION B – EQUIPMENT		SECTION B – EQUIPMENT	
E. Material/Parts/Equipment		D. Communications		D. Rescue Team Equipment	
F. Hazardous Material		E. Firefighting		E. Mine Infrastructure Equipment	
G. Procedures		F. Facilities		F. Contracted Team Resources	
H. Workplace Conditions		G. Mine Equipment		SECTION C – PROCESS	
I. Training/Personnel Qualifications		H. Rescue Equipment		G. Communications	
J. Supervision		I. Outside Suppliers		H. Emergency Procedures	
K. Communication		SECTION C – PLANNING		I. Equipment Procedures	
L. Personnel Performance		J. Planning			
SECTION B – ACTIVITY RISK		MODEL 4: RESPONSIBLE PERSONS			
M. Equipment/Infrastructure		SECTION A – PEOPLE		SECTION C – PROCESS	
N. Personnel		A. Competencies		G. Communication	
O. Mining Conditions		B. Training		H. Emergency Procedures	N/A
P. Mining Location	N/A	C. Knowledge			
SECTION C – SAFETY CULTURE		SECTION B – EQUIPMENT			
Q. Safety Culture		D. Equipment			
		E. Infrastructure			

Comments from Participants

- It is definitely a **huge value** to our industry
- **Made us think** about things that have been taken for granted
- **Helped us develop a good action item list** of best practices to lead continuous improvement in risk mitigation and preparedness
- Produced **new understanding and insights** about our preparedness to further reduce risk
- We were able to **engage our team on substance with each other.**
I will **share this process with our sister mines** as well as our competitors locally

Comparative Results - Risk Assessment

Date	5/6/2014	4/1/2015	6/24/2014	3/10/2015	10/1/2014	2/24/2015	9/1/2015	4/5/2016	11/11/2015	10/6/2015
MINE SAFETY RISK ASSESSMENT	Mine 1a	Mine 1b	Mine 2	Mine 3	Mine 4	Mine 5	Mine 6a	Mine 6b	Mine 7	Mine 8
A. Design and Planning	Green	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Green	Yellow
B. Equipment Maintenance and Reliability	Green	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Green
C. Mine Infrastructure	Green	Green	Yellow	Green	Yellow	Green	Yellow	Green	Green	Yellow
D. Documentation and Records	Green	Green	Yellow	Green	Yellow	Green	Yellow	Yellow	Green	Yellow
E. Material/Parts/Equipment	Green	Yellow	Yellow	Green	Yellow	Green	Red	Yellow	Green	Green
F. Hazard/Defect Identification and Analysis	Green	Green	Yellow	Green	Yellow	Yellow	Yellow	Green	Green	Yellow
G. Procedures	Green	Yellow	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Yellow
H. Workplace Conditions/Human Factors	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Green	Green	Green
I. Training/Personnel Qualification	Yellow	Green	Yellow	Green	Red	Yellow	Yellow	Green	Green	Yellow
J. Supervision	Green	Green	Yellow	Green	Yellow	Green	Yellow	Green	Green	Green
K. Verbal and Informal Written Communication	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Green	Green	Yellow
L. Personal Performance	Green	Green	Yellow	Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow
M. Equipment/Infrastructure	Green	N/A	Green	Green	Green	Green	Green	Green	Green	Green
N. Personnel	Green	Green	Yellow	Green	Yellow	N/A	Yellow	N/A	Yellow	Yellow
O. Mining Conditions	Green	Green	Green	Green	Green	Yellow	N/A	Green	Green	Green
P. Mining Location	Green	Green	N/A	Green	Green	N/A	N/A	N/A	Yellow	N/A
Q. Safety Culture	Green	Green	Green	Green	Green	Green	Yellow	Green	Yellow	Green

Comparative Results - Emergency Preparedness

Date	5/6/2014	4/1/2015	6/24/2014	3/109/15	10/1/2014	2/24/2015	9/1/2015	4/5/2016	11/11/2015	10/6/2015
MINE EMERGENCY PREPAREDNESS	Mine 1a	Mine 1b	Mine 2	Mine 3	Mine 4	Mine 5	Mine 6a	Mine 6b	Mine 7	Mine 8
A. Local Coordination	Red	Red	Green	Yellow	Yellow	Red	Yellow	Green	Yellow	Yellow
B. Knowledge	Yellow	Yellow	Green	Yellow	Yellow	Red	Yellow	Green	Yellow	Yellow
C. Training and Exercises	Red	Yellow	Green	Yellow	Yellow	Red	Yellow	Green	Yellow	Yellow
D. Communications	Yellow	Green	Green	Green	Yellow	Green	Yellow	Green	Green	Green
E. Firefighting	Red	Yellow	Red	Green	Green	Yellow	Red	Green	Green	Yellow
F. Facilities	Yellow	Yellow	Green	Green	Yellow	Red	Yellow	Green	Green	Green
G. Mine Equipment	Yellow	Green	Green	Green	Yellow	Red	Yellow	Yellow	Yellow	Green
H. Rescue Equipment	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
I. Outside Suppliers	Red	Yellow	Green	Green	Yellow	Yellow	Red	Green	Green	Green
J. Planning	Red	Yellow	Green	Green	Green	Red	Green	Green	Green	Yellow

Comparative Results - Responsible Persons

Date	5/6/2014	4/1/2015	6/24/2014	3/109/15	10/1/2014	2/24/2015	9/1/2015	4/5/2016	11/11/2015	10/6/2015
RESPONSIBLE PERSON READINESS	Mine 1a	Mine 1b	Mine 2	Mine 3	Mine 4	Mine 5	Mine 6a	Mine 6b	Mine 7	Mine 8
A. Competencies	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow	Yellow	Yellow
B. Training, Drills and Exercises	Yellow	Yellow	Yellow	Green	Green	Red	Yellow	Green	Yellow	Yellow
C. Knowledge and Information	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Yellow
D. Emergency Response Plans	Yellow	Green	Green	Green	Green	Yellow	Yellow	Green	Yellow	Green
E. Responsible Person(s) Equipment	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
F. Communications Procedures	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green
G. Emergency Procedures	Yellow	Green	Green	Yellow	Green	Yellow	Green	Green	Green	Green

Action Plans

Category	Rating	Explanation	Action Plan	Lead Person
<p>C.1. Housekeeping: Score the mine on its housekeeping programs and implementation and implementation.</p> <p>+ Questions to Help Frame Your Thoughts: Does the mine have a minewide housekeeping schedule? Is the housekeeping schedule adequate to maintain proper working conditions in the entire mine? Is the location of combustible and flammable appropriate? Are travelways and escapeways designed and maintained appropriately?</p>	3	Can always improve on housekeeping. Got away from section and panel audits - need to revive them. When they move the LW the clutter gets pretty intense.	Revive section and panel audits quarterly	Smith, John

Reassessment 6 Months Later

- Reassessment of one mine six months later:
- Base Risk

MINE SAFETY RISK ASSESSMENT	Mine 6a	Mine 6b
A. Design and Planning	Yellow	Yellow
B. Equipment Maintenance and Reliability	Red	Green
C. Mine Infrastructure	Green	Green
D. Documentation and Records	Yellow	Yellow
E. Material/Parts/Equipment	Yellow	Yellow
F. Hazard/Defect Identification and Analysis	Yellow	Green
G. Procedures	Yellow	Green
H. Workplace Conditions/Human Factors	Green	Green
I. Training/Personnel Qualification	Yellow	Green
J. Supervision	Yellow	Green
K. Verbal and Informal Written Communication	Green	Green
L. Personal Performance	Red	Yellow
M. Equipment/Infrastructure	N/A	Green
N. Personnel	Green	N/A
O. Mining Conditions	Green	Green
P. Mining Location	N/A	N/A
Q. Safety Culture	Yellow	Green

Reassessment 6 Months Later

- Reassessment of one mine six months later:
- Emergency Preparedness

Date	5/6/2014	4/1/2015
MINE EMERGENCY PREPAREDNESS	Mine 1a	Mine 1b
A. Local Coordination	Red	Red
B. Knowledge	Yellow	Yellow
C. Training and Exercises	Red	Yellow
D. Communications	Yellow	Green
E. Firefighting	Red	Yellow
F. Facilities	Yellow	Yellow
G. Mine Equipment	Yellow	Green
H. Rescue Equipment	Green	Green
I. Outside Suppliers	Red	Yellow
J. Planning	Red	Yellow

Selected Best Practices

- Implementation process for innovative changes is informal - approved and completed quickly
- Workforce completes risk assessment cards every day - WRACs - Workplace Risk Assessment and Control evaluations - target low probability/high consequence events
- Monitoring systems over and above requirements - lower alarm levels than required
- Installing proximity detection on all CMs, scoops and trammers
- Level of team training and equipment readiness exceeds industry standards
- Acquiring latest wireless communication and tracking system for emergencies
- Strong succession planning for company employees

Assessments Conducted

- ▶ Total 17
 - Underground Coal - 11 assessments
 - Underground MNM - 4 assessments
 - ▶ Salt
 - ▶ Limestone
 - ▶ Trona
 - ▶ Nickel / Copper
 - Surface Coal - 2 assessments completed

New Assessment Methods

- ▶ Implementing Risk, Preparedness, and Readiness Assessments Remotely/Use of online virtual assessments.
 - ▶ Video Conference assessments
 - ▶ Minimize exposure to COVID-19
 - ▶ Groups can be in different locations

Quick Look Assessment

- ▶ Development of an on-line readiness assessment survey
- ▶ Deploy to mine rescue team member within a company or across the industry
- ▶ Quick look will contain a subset of the mine rescue team readiness criteria from the original assessment tool
- ▶ Provide immediate results to mine operators, safety officers, mine rescue team captains
- ▶ Identify needs to deeper assessment, development of action plan
- ▶ Gauge the impact of COVID-19 on mine rescue team readiness
- ▶ Develop Best practices to:
 - ▶ Train safely during COVID-19 threat
 - ▶ Utilize computer-based virtual reality training
 - ▶ Encourage innovation for training





Complete Mine Emergency Risk, Readiness and Preparedness Assessments

- Work with Mine Trainer or Safety Director
 - Provides Train-the-Trainer training
- Select groups (Supervisors, Safety Department, Mine Rescue Teams, Responsible Persons/Competent Persons) work with Trainer and Consulting Team.
- Consulting Team works with Trainer and groups over video platform.
- Video interface is projected on large screen in conference room/training room.
- Consulting Team provides facilitation, note taking, consolidation of action items, and feedback to groups.

Thank You!

I've reviewed the recent Risk Assessment and Readiness evaluation and shared it with our US Executive team. I want to thank you and your team for the effort and dedication in bringing this tool all the way from concept to product and emphasize the value to us as a corporation.

First, for the people who are intimately involved with planning and operation on the most fundamental level, it is critical to have a broad, thorough and objective measuring stick to assess risk readiness, identify gaps and develop action plans to either maintain or improve performance. Second, those who are not deeply entrenched in daily operations need to be able to rely on an appraisal such as this to help set short-term and long-term strategic operations goals. Finally, for those of us in a position of responsibility in a complex organization, this type of tool provides an objective audit to assure senior executives, board members and owners that systems are in place to evaluate risk and readiness.

Trent Peterson, Vice President
GCC Energy, LLC

2017

To schedule an assessment:

William C. York-Feirn, CMSP

Colorado Division of Reclamation,
Mining and Safety
1313 Sherman St., Rm 215
Denver, CO 80203
United States
(303) 866-3567, x 8151
bill.york-feirn@state.co.us

Jeff Kravitz, PhD, PE

JHK & Associates Consulting
412-596-6849
jeffkrav@msn.com

David C. Stalfort, PMP

ABS Group
1525 Wilson Blvd, Suite 625
Arlington, VA 22209
United States
(703) 351-3727
dstalfort@abs-group.com