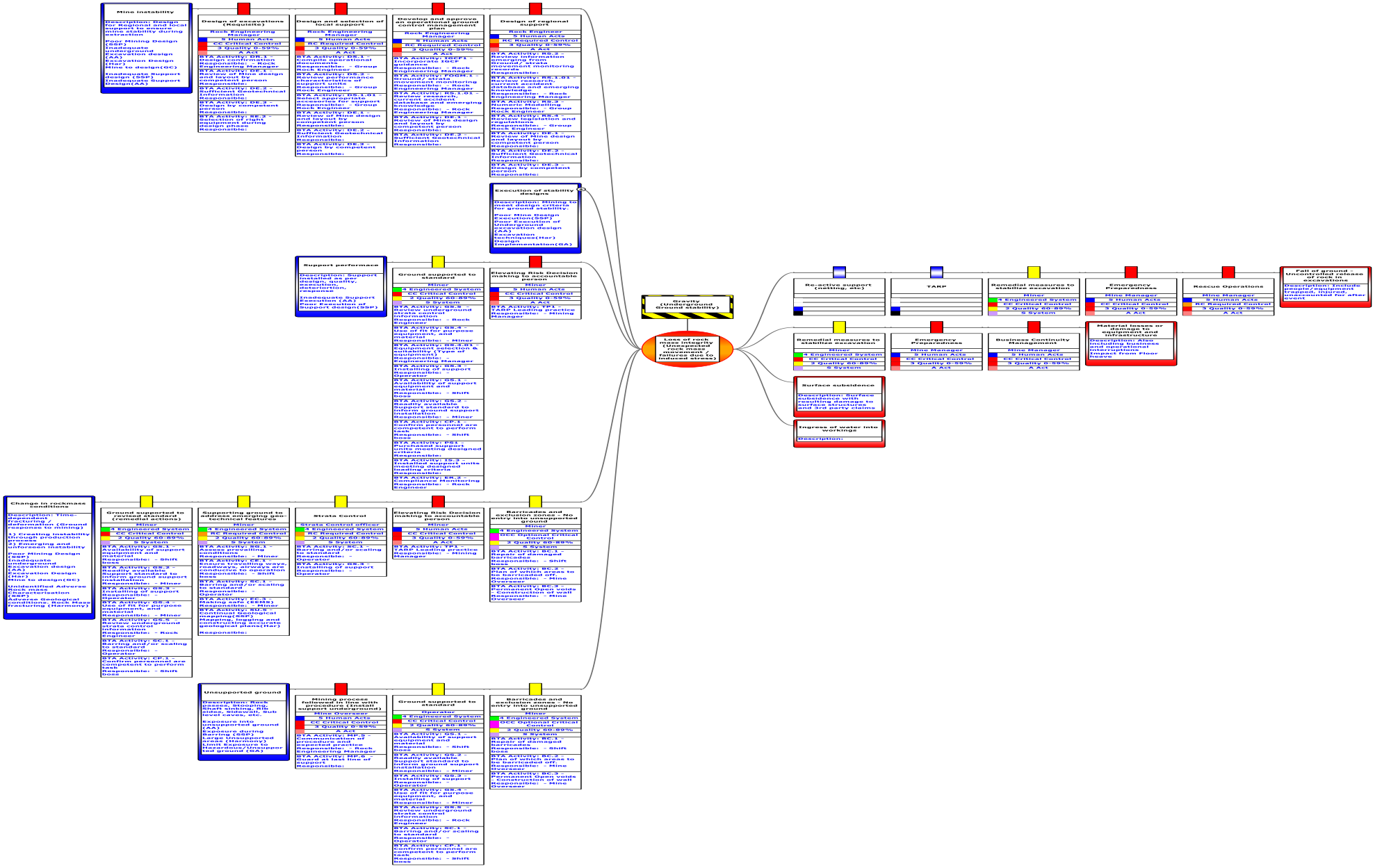
Mine instability
Description: Design for Regional and local support to maintain mine stability during extraction
Poor Mining Design (SSR)
Inadequate Underground Excavation design (AA)
Inadequate Support Design(AA)
Design of excavations (Requisite)
Rock Engineering Manager
5 Human Acts
CC Critical Control
3 Quality 0-59%
A Act
RTA Activity: DR-1 - Design confirmation
Responsible: - Rock Engineering Manager
RTA Activity: DR-1 - Review of Mine design by competent person
Responsible:
RTA Activity: DE-2 - Sufficient Geotechnical Information
Responsible:
RTA Activity: DE-3 - Design by competent person
Responsible:
RTA Activity: DE-4 - Selection of right equipment during excavation
Responsible:
Design and selection of local support
Rock Engineering Manager
5 Human Acts
RC Required Control
3 Quality 0-59%
A Act
RTA Activity: DE-1 - Compile operational requirements
Responsible: - Group Rock Engineer
RTA Activity: DE-2 - Understand rock characteristics of support units
Responsible: - Group Rock Engineer
RTA Activity: DE-1.01 - Select appropriate support or support system
Responsible: - Group Rock Engineer
RTA Activity: DE-1 - Review design and layout by competent person
Responsible: - Group Rock Engineer
RTA Activity: DE-2 - Sufficient Geotechnical Information
Responsible:
RTA Activity: DE-3 - Design by competent person
Responsible:
Develop and approve an operational ground control management plan
Rock Engineering Manager
5 Human Acts
RC Required Control
3 Quality 0-59%
A Act
RTA Activity: FOOP-1 - Incorporate GCCP guidance
Responsible: - Rock Engineering Manager
RTA Activity: FOOM-1 - Ground / strata monitoring
Responsible: - Rock Engineering Manager
RTA Activity: RS-1.01 - Review current accident database and emerging knowledge
Responsible: - Rock Engineering Manager
RTA Activity: DE-1 - Review design and layout by competent person
Responsible: - Rock Engineering Manager
RTA Activity: DE-2 - Sufficient Geotechnical Information
Responsible:
Design of regional support
Rock Engineer
5 Human Acts
RC Required Control
3 Quality 0-59%
A Act
RTA Activity: RS-2 - Review legislation and regulations
Responsible: - Group Rock Engineer
RTA Activity: RS-1.01 - Review research, current accident database and emerging knowledge
Responsible: - Rock Engineering Manager
RTA Activity: RS-2 - Review legislation and regulations
Responsible: - Group Rock Engineer
RTA Activity: DE-1 - Review design and layout by competent person
Responsible:
RTA Activity: DE-2 - Sufficient Geotechnical Information
Responsible:
RTA Activity: DE-3 - Design by competent person
Responsible:
Execution of stability designs
Description: Mining to meet design criteria for ground stability.
Poor Mine Design (SSR)
Poor Execution of Underground Excavation design (AA)
Excavation techniques(Haz)
Poor Implementation(GA)
Support performance
Description: Support installed as per design capability, prevent deterioration.
Inadequate Support Design (AA)
Poor Execution of Support design(SSP)
Ground supported to standard
Miner
4 Engineered System
CC Critical Control
3 Quality 60-89%
S System
RTA Activity: GS-3 - Availability of support material
Responsible: - Miner
RTA Activity: GS-4 - Use of fit for purpose equipment
Responsible: - Miner
RTA Activity: GS-5 - Safety - underground strata control
Responsible: - Miner
RTA Activity: GS-6 - Review underground strata control
Responsible: - Rock Engineer
RTA Activity: EC-1 - Barring and/or scaling
Responsible: -
RTA Activity: CP-1 - Confirm personnel are competent to perform task
Responsible: - Shift boss
Elevating Risk Decision making to accountable person
Miner
5 Human Acts
CC Critical Control
3 Quality 0-59%
A Act
RTA Activity: TP1 - Follow mining practice
Responsible: - Mining Manager
Gravity (Underground Ground stability)
Loss of rock mass integrity (Unexpected rock mass movement / failures due to induced stresses)
Re-active support (netting, etc)
TARP
Remedial measures to stabilize excavation
Miner
4 Engineered System
EC Critical Control
2 Quality 60-89%
S System
Emergency Preparedness
Mine Manager
5 Human Acts
EC Critical Control
3 Quality 0-59%
A Act
Rescue Operations
Mine Manager
5 Human Acts
RC Required Control
3 Quality 0-59%
A Act
Fall of ground - Uncontrolled release of rock in excavation
Description: Include people/equipment damage and consequential loss after event
Remedial measures to stabilize excavation
Miner
4 Engineered System
EC Critical Control
2 Quality 60-89%
S System
Emergency Preparedness
Mine Manager
5 Human Acts
EC Critical Control
3 Quality 0-59%
A Act
Business Continuity Management
Mine Manager
5 Human Acts
EC Critical Control
3 Quality 0-59%
A Act
Material losses or damage to equipment and infrastructure
Description: Including business and operational interruption Impact from Floor heave
Surface subsidence
Description: Surface subsidence resulting damage to surface structures and 3rd party claims
Ingress of water into workings
Description:
Change in rockmass conditions
Description: Time-dependent fracturing / weakening (Ground response to mining)
1) Creating instability through production activities
2) Encountering and unforseen instability
Poor Mining Design (SSR)
Inadequate Underground Excavation design (AA)
Excavation Design (Haz)
Mine to design(GC)
Unidentified Adverse Rock mass characterisation (SSR)
Adverse Geological conditions encountered (fracturing (Harmony))
Ground supported to standard (Remedial actions)
Miner
4 Engineered System
CC Critical Control
3 Quality 60-89%
S System
RTA Activity: GS-3 - Availability of support material
Responsible: - Shift boss
RTA Activity: GS-4 - Use of fit for purpose equipment
Responsible: - Miner
RTA Activity: GS-5 - Safety - underground strata control
Responsible: - Rock Engineer
RTA Activity: EC-1 - Barring and/or scaling to standard
Responsible: - Operator
RTA Activity: CP-1 - Confirm personnel are competent to perform task
Responsible: - Shift boss
Supporting ground to standard (Technical feature)
Miner
4 Engineered System
RC Required Control
3 Quality 60-89%
S System
RTA Activity: GS-3 - Assess prevailing conditions
Responsible: - Miner
RTA Activity: GS-1 - Identify in what ways, routines or areas are conducive to operation
Responsible: - Shift boss
RTA Activity: EC-1 - Barring and/or scaling
Responsible: -
RTA Activity: EC-2 - Installing or support
Responsible: -
RTA Activity: GS-3 - Use of fit for purpose equipment, and consumables
Responsible: - Miner
RTA Activity: GS-5 - Safety - underground strata control
Responsible: - Rock Engineer
RTA Activity: SU-2 - Collecting Geological Information
Mapping, logging and sampling (Implementation)
Responsible:
Strata Control
Strata Control officer
4 Engineered System
RC Required Control
3 Quality 60-89%
S System
RTA Activity: EC-1 - Barring and/or scaling
Responsible: -
Operator
RTA Activity: EC-2 - Installing of support
Responsible: -
Operator
Elevating Risk Decision making to accountable person
Miner
5 Human Acts
CC Critical Control
3 Quality 0-59%
A Act
RTA Activity: TP1 - Follow mining practice
Responsible: - Mining Manager
Barricades and exclusion zones - No entry into unsupported ground
Miner
4 Engineered System
OCC Optional Critical Control
3 Quality 60-89%
S System
RTA Activity: BC-1 - Repair of damaged barricades
Responsible: - Shift boss
RTA Activity: BC-2 - Plan of which areas to be barricaded off
Responsible: - Mine Overseer
RTA Activity: BC-3 - Permanent Open Voids - Construction of wall
Responsible: - Mine Overseer
Unsupported ground
Description: Rock bursts, Stooping, Open pit walls, Dump slope, Sidewall, Sub level caves, etc.
Exposure into unsupported ground
Exposure during Barring down
Exposure to supported areas (Harmony)
Limit Exposure to unsupported ground (SSR)
End ground (GA)
Mining process followed in line with procedure (Install support as required)
Operator
5 Human Acts
CC Critical Control
3 Quality 0-59%
A Act
RTA Activity: MP-3 - Follow mining of procedure and expected practise
Responsible: - Rock Engineering Manager
RTA Activity: MP-5 - Support as per last line of support
Responsible:
Ground supported to standard
Operator
4 Engineered System
CC Critical Control
3 Quality 60-89%
S System
RTA Activity: GS-3 - Availability of support material and consumables
Responsible: - Shift boss
RTA Activity: GS-2 - Support standard to inform ground support installation
Responsible: - Miner
RTA Activity: GS-3 - Installing of support
Operator
RTA Activity: GS-4 - Use of fit for purpose equipment and material
Responsible: - Miner
RTA Activity: GS-5 - Review underground strata control
Responsible: - Rock Engineer
RTA Activity: EC-1 - Barring and/or scaling
Responsible: -
Operator
RTA Activity: CP-1 - Confirm personnel are competent to perform task
Responsible: - Shift boss
Barricades and exclusion zones - No entry into unsupported ground
Miner
4 Engineered System
OCC Optional Critical Control
3 Quality 60-89%
S System
RTA Activity: BC-1 - Repair of damaged barricades
Responsible: - Shift boss
RTA Activity: BC-2 - Plan of which areas to be barricaded off
Responsible: - Mine Overseer
RTA Activity: BC-3 - Permanent Open Voids - Construction of wall
Responsible: - Mine Overseer