



Workplace
Safety North



Mining webinar: Be prepared for upcoming MOL inspection blitz on ground control

July 23, 2019

1 888 730 7821 (Toll free Ontario)
workplacesafetynorth.ca



Welcome to the webinar

- The webinar will begin at **10:00 a.m. Eastern Time**
- For audio, please use headphones or ear buds.
- Please note the '**CHAT BOX**' to the right of the screen and feel free to type in your questions at any time during the presentation.
- Questions may be answered during the presentation, but most will be addressed at the end of the presentation.
- For your reference, this presentation will be emailed to attendees within one business day of the webinar.
- For assistance with the webinar, phone the WSN office at: **1-888-730-7821 ext. 0**

Webinar co-hosts

- **Philip Dirige** Senior Specialist, Ground Control
Workplace Safety North
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- **Jerry Wedzicha** Provincial Mining Specialist – Electrical/Mechanic
Ontario Ministry of Labour
Jerry.wedzicha@ontario.ca

Agenda

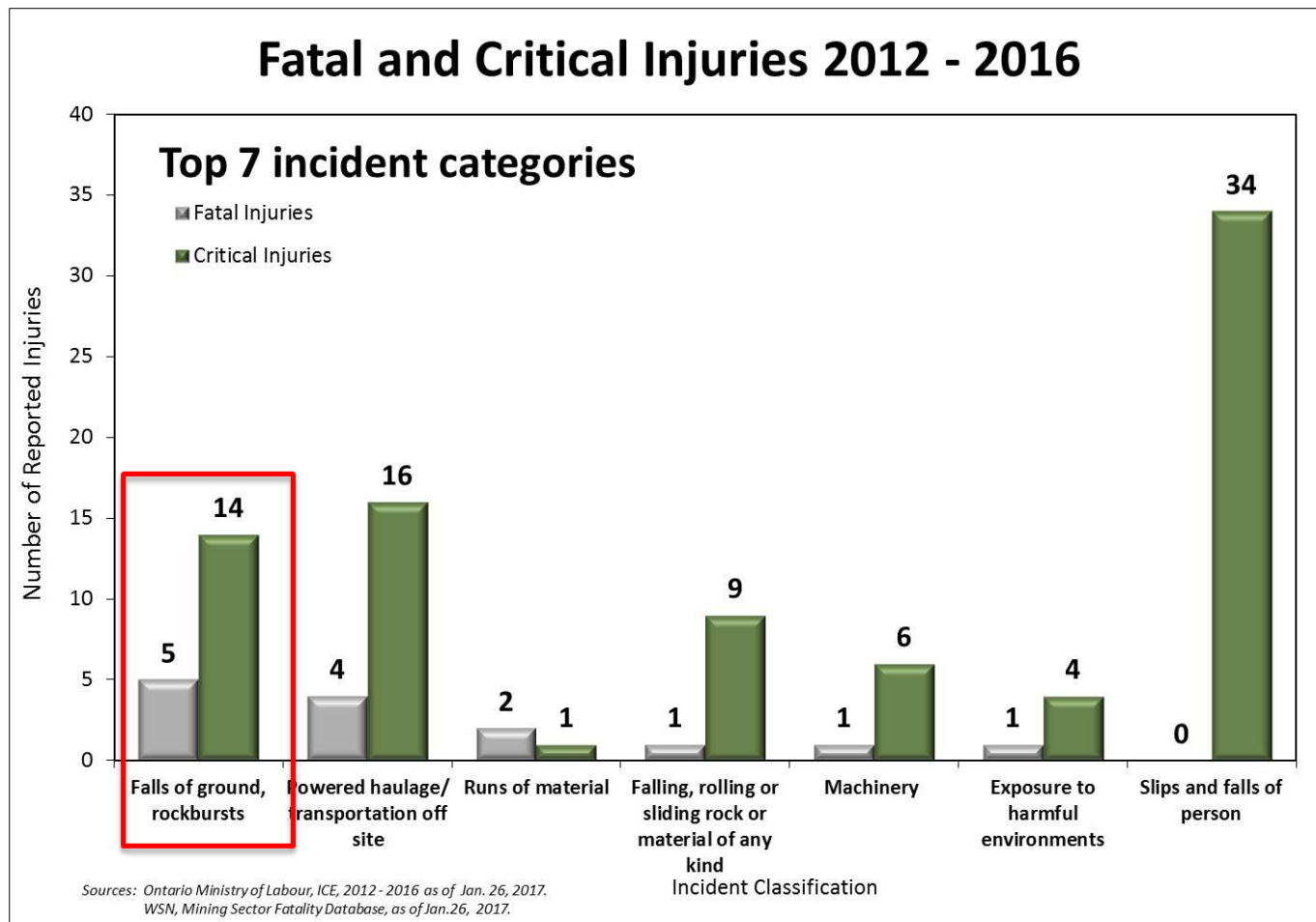
- Introduction and injury statistics
- Ground control hazards, categories and controls
- WSN information and resources
- What Ministry of Labour (MOL), Mining Health and Safety Inspectors will be looking for during the blitz
- Ontario requirements pertaining to ground control in the underground workplace in mines and mining plants (Occupational Health and Safety Act, Regulation 854)
- Q&A

MOL Inspection Blitz Overview

The Purpose of the Blitz:

- Raise awareness among workers and employers of health and safety issues involving ground control hazards including fall of ground and rockbursts in underground mines.
- Raise awareness of the importance of having a program for the protection of workers from ground control hazards, work practices and controls for fall of ground and rockburst hazards in underground mines.
- Promote awareness and compliance of mines and mining plants to regulatory requirements.
- Ensure workplace parties are complying with the Occupational Health and Safety Act and its regulations.

Ontario mining industry: Fatal and critical injuries



Ontario fatalities: Fall of ground and rockbursts 2000-2018

Year	Description
2000	Worker was struck by a rockfall caused by a rockburst that displaced 20 tons (gold mine).
2002	Worker was struck by loose while operating a scooptram in an open stope (gold mine).
2007	Worker was struck by a piece of rock while in a raise (mine contractor at gold mine).
2012	Employee was struck by displaced material from a development face (nickel mine).
	Employee was struck by a piece of rock while loading a development round (gold mine).
2014	Two workers were struck by shotcrete and rock, following a seismic event.
	Worker was outside of a loader he was operating when he was struck by a piece of broken ore (palladium mine)
2015 - 2018	No traumatic fatal injury associated with ground control

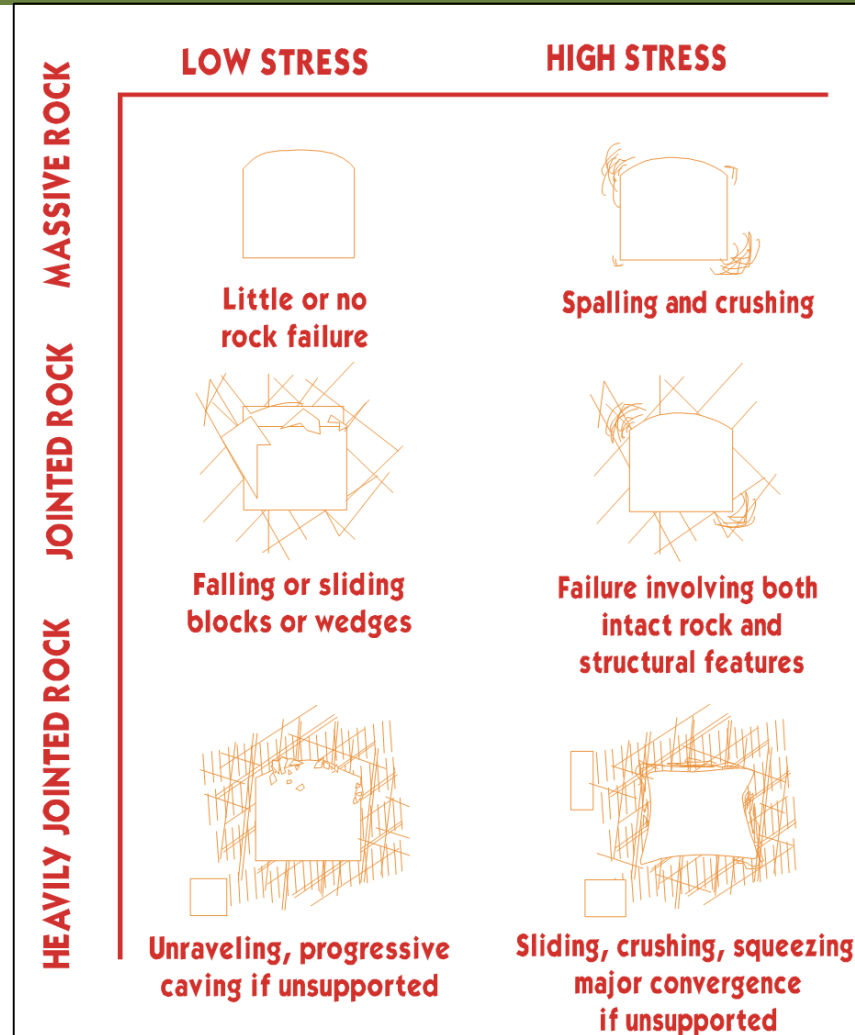
Note: There were 44 critically injuries associated to ground control that occurred in underground mines from 2000 - 2014.

Ground Control Program



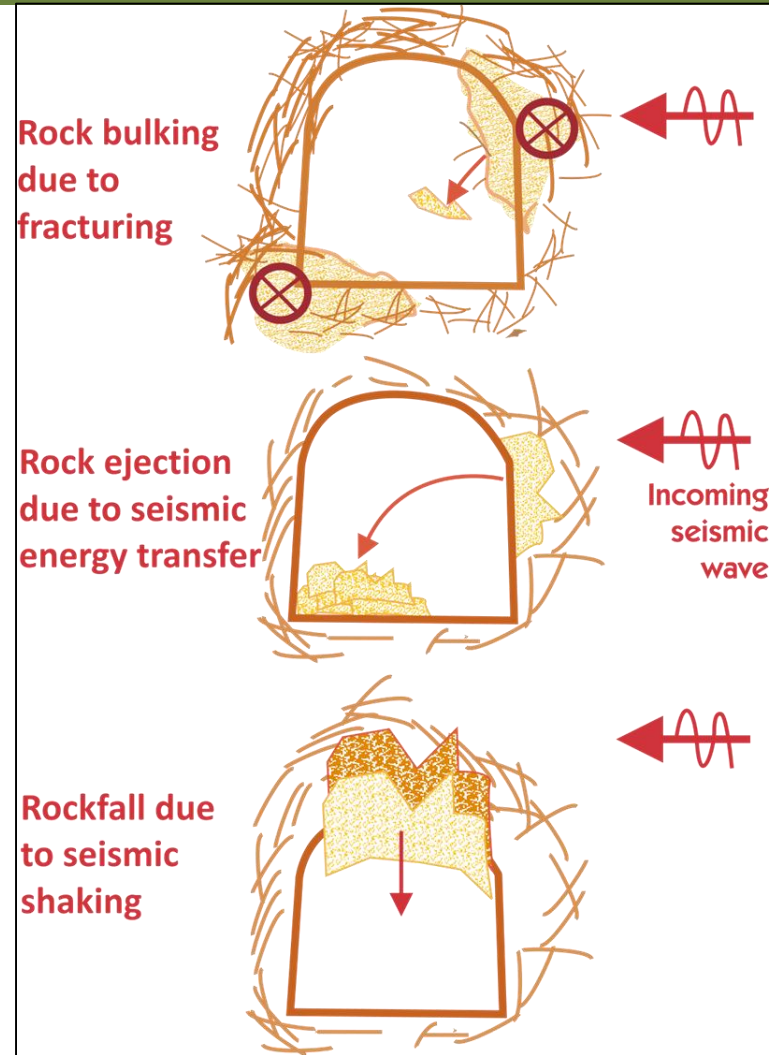
Workplace Ground Control Hazards

Fall of Ground - unplanned and uncontrolled falls, slips or toppling of ground or rockfalls that is gravity induced.



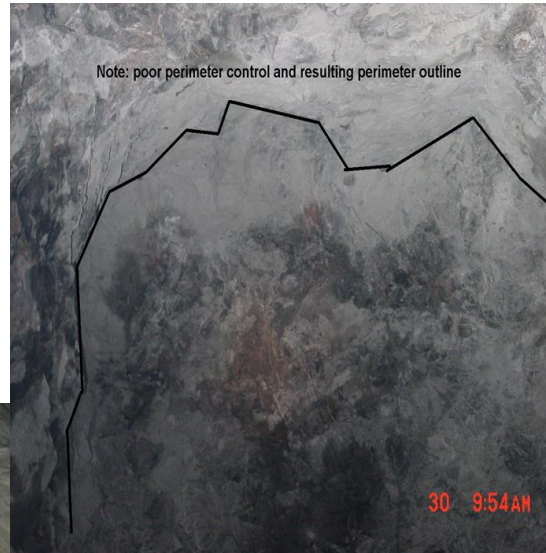
Workplace Ground Control Hazards (cont...)

Rockbursts - dynamic movement of rock causing damage to an excavation that occurs in a sudden or violent manner and is associated with a seismic event



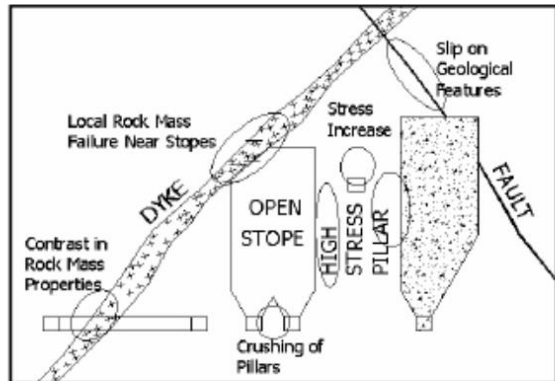
Ground control hazards and locations in underground mines

- Unsupported ground

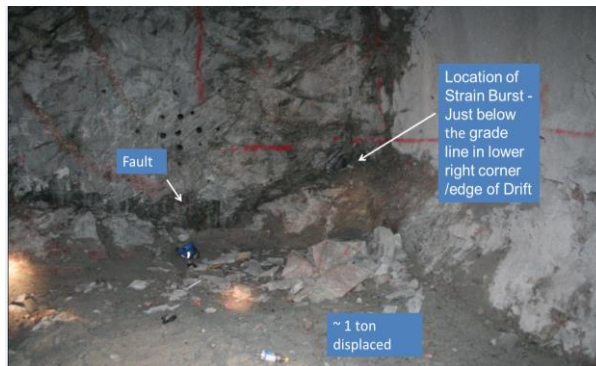


Ground control hazards and locations in underground mines (cont...)

- High stress that can cause rockburst and violent ejection of material from the back or walls of excavation



(Source: Marty Hudyma's course notes)



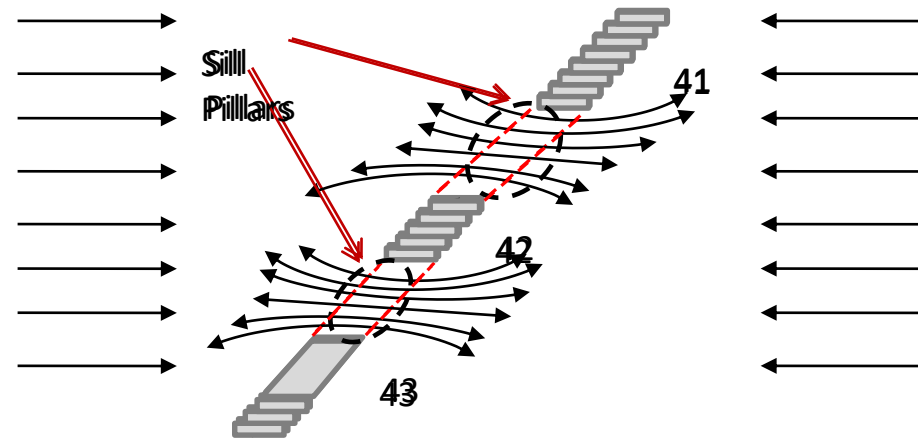
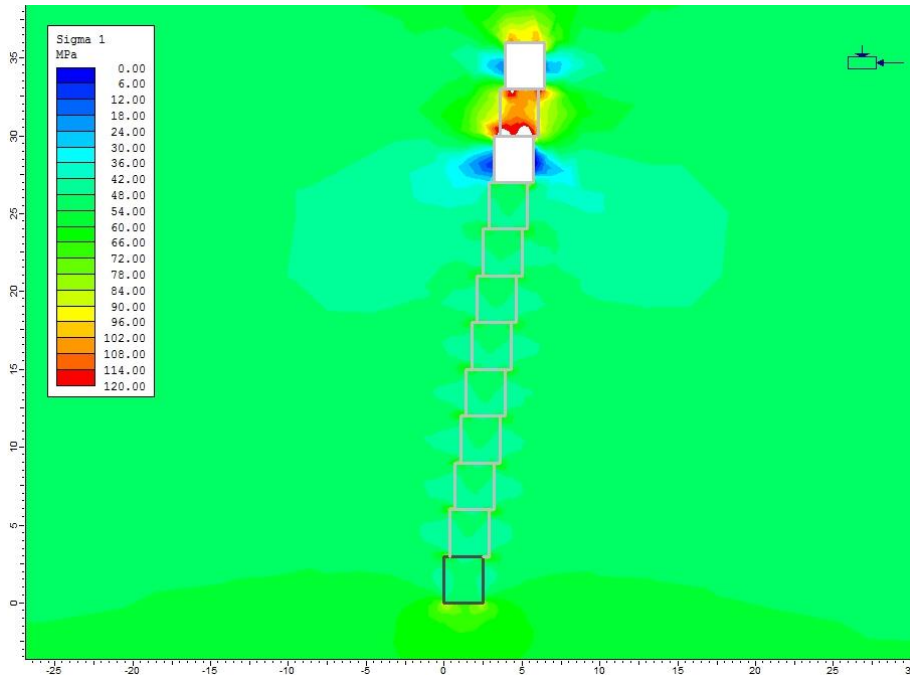
Ground controls hazards and locations in underground mines (cont...)

- Deteriorating or damaged ground support system



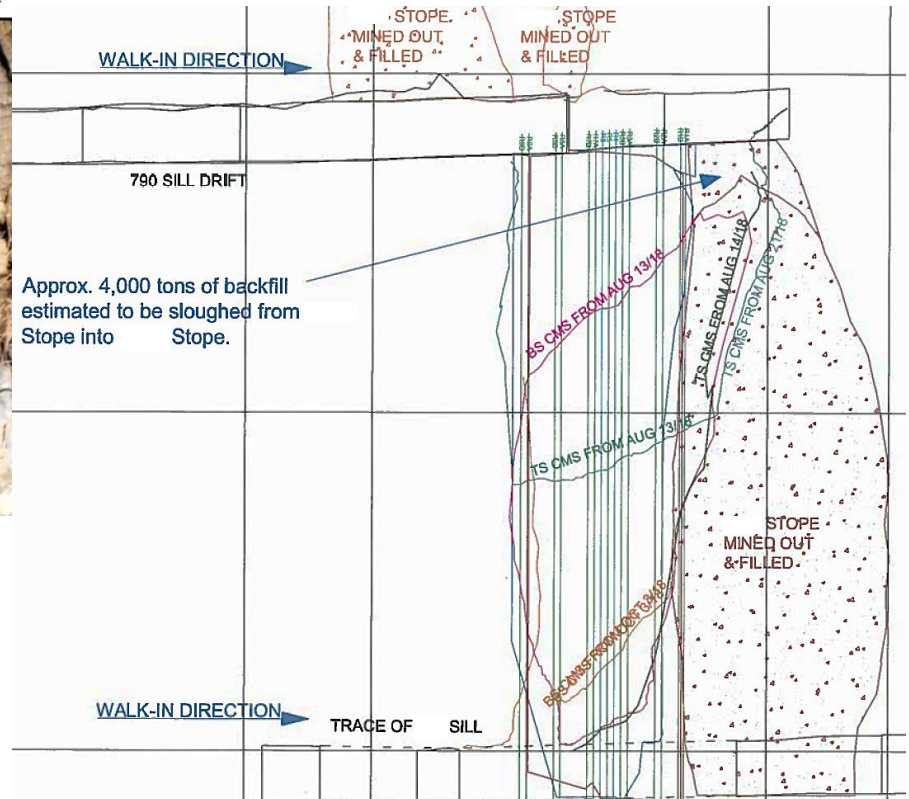
Ground control hazards and location in underground mines (cont...)

- Diminishing pillar effect



Ground control hazards and location in underground mines (cont...)

- Backfill failure



Regulatory Requirements

Sect. 5.1 - Risk Assessment of the Workplace

- Employer shall conduct a risk assessment of the workplace for the purpose of identifying, assessing and managing hazards, and potential hazards, that may expose a worker to injury or illness.

Sect. 5.2 - Measures to eliminate, where practicable, or to control

- Control measures, in writing and shall include each of the following, as applicable and reasonable in the circumstances: substitution or reduction of a material, thing or process; engineering controls.; work practices; administrative controls; personal protective equipment.

Sect. 5.3 - Risk assessment review

- The risk assessment must be reviewed as often as necessary and at least annually.

Regulatory Requirements (cont...)

Sect. 6 - Mine Design

- Consists of drawings, plans, specifications or procedures. It must be prepared under the direction of a competent person and be based upon sound geotechnical engineering practices. It must describe geology; excavation geometry; previous ground problems; mining methods; ground control support.
- Measures used to assess potential ground instability (instrumentation, computer modeling, etc.) must be described.
- The mine design must be updated annually and also before any alteration is made to the mine that may significantly affect the ground stability of the mine.
- A copy of the program must be available for review by an MOL inspector and by the JHSC.

Regulatory Requirements (cont...)

Sect. 11 - Training

- Hard rock and soft rock underground mines: *Common Core for Basic Skills; Specialty Modules; Common Core for First Line Supervisor*

Sect. 19 - Boundary Pillar

- A pillar 60 m thick must be established between adjoining underground mining properties.
- Before the pillar is mined, drawings, plans, specifications, mining methods and procedures must be approved by a professional engineer in accordance with good engineering practice.
- Pillar dimensions and mining methods and procedures must provide ground support to control ground problems and must withstand the inrush of water or materials across the party boundary.

Regulatory Requirements (cont...)

Sect. 21 - Notice of unusual occurrence

- Rockburst > 5 tonnes
- Groundfall > 50 tonnes
- Other occurrences causing damage to equipment or injury to workers.

Sect. 61 - Stockpiles of unconsolidated material

- A stockpile must be inspected for hazardous conditions regularly by a competent person and made safe before a worker is allowed to work close to or on top of the stockpile.
- Bulk or packaged material shall be piled or stacked in a manner to prevent accidental movement or collapse.
- When a tunnel is used under a stockpile for the purpose of reclaiming material, at least two exits must be provided from the tunnel.

Regulatory Requirements (cont...)

Sect. 63 - Workplace inspections

- The supervisor must examine during each work shift all areas where drilling and blasting is taking place.
- The supervisor must examine at least once each work week all areas other than where drilling and blasting is taking place.



Regulatory Requirements (cont...)

Sect. 64 - Record of dangerous conditions

- The supervisor must describe the condition and corrective measures in a logbook.
- The supervisor of the following shift must countersign the logbook and alert workers.



Regulatory Requirements (cont...)

Sect. 65 - Program for communication of ground control information

- In an underground mine, a written program for the timely communication of ground control information must be developed in consultation with the JHSC.
- The program must describe:
 - *The means and procedures for communication; the kind of information to be communicated; the actions to be taken by supervisors and workers with respect to information that is communicated to them.*
- Elements includes:
 - *Training; Meetings (Safety, JHSC, Crew, Production); Driving layouts; Rehabilitation plans; Ground inspection reports; Safety system; Ground occurrence reports; Internal reports; Logbooks (Shifter's, Captain's, Geology, ground control, Computer log); Bulletin board; Seismic Visualizer; Reporting sequence for unusual ground conditions.*

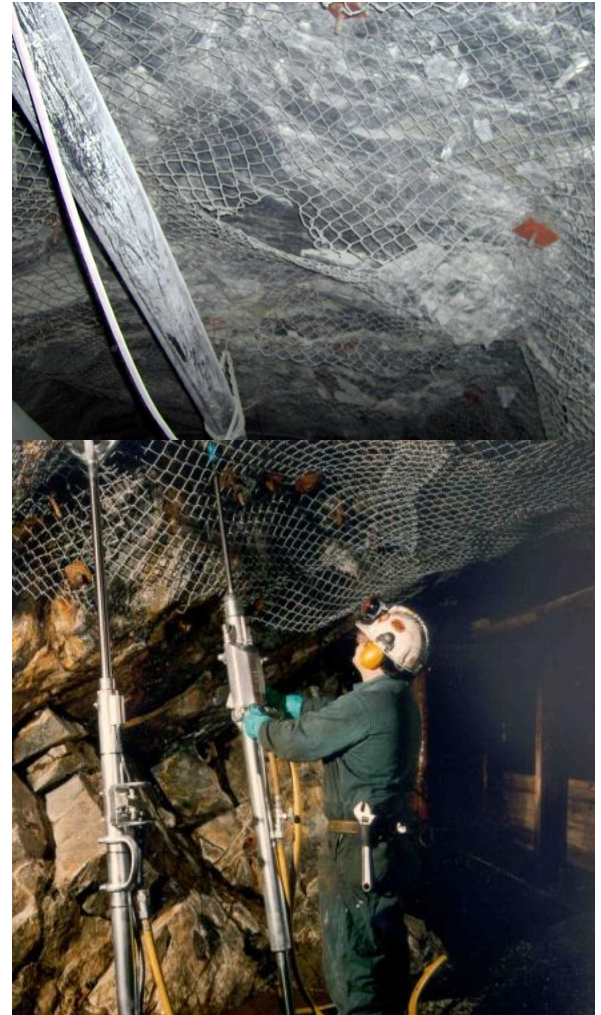
Regulatory Requirements (cont...)

Sect. 66 - Ground conditions

- Before work begins in an underground mine, ground conditions must be examined for hazards and made safe.

Sect. 67 - Procedures for ground control

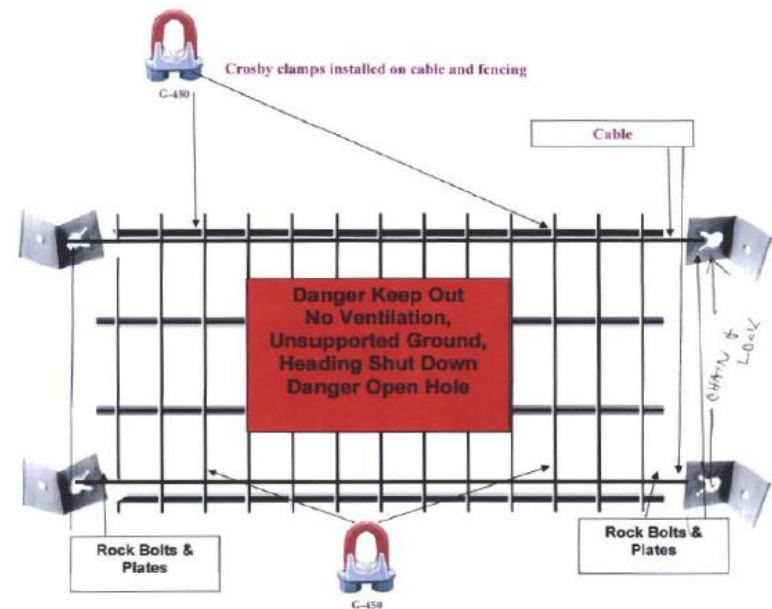
- Written procedures must be prepared for activities relating to the installation of ground support and activities that require a worker to be exposed to unsupported ground.



Regulatory Requirements (cont...)

Sect. 68 - Isolation of hazardous areas

- An area under repair or where there is a hazard to a worker must be closed by barricades, fencing or others suitable means. Warning signs must be posted indicating that the area is under repair or indicating the nature of the danger or hazard.



Screen will be secured to the wall with chain through the rabbit ears & padlocked in place.

Regulatory Requirements (cont...)

Sect. 69 - Illumination

- Illumination provided to workers must be adequate to visually assess ground conditions.
- Cap lamps must provide a peak illuminance of at least 1500 lux at 1.2 meters from the light source.
- A program for cap lamp maintenance must be developed and records of cap lamp maintenance must be kept.
- High-intensity lights must be provided to workers if required to assess ground conditions at a distance greater than the effective range of a cap lamp.



Regulatory Requirements (cont...)

Sect. 72 - Record of fall of ground and rockburst

- A written record of all falls of ground and rockbursts must be maintained.

Sect. 73 - Quality control of ground support

- A quality control program must be developed to ensure that ground support specified in mine design must be well installed and remain effective while in use.
- A record of tests conducted must be maintained.
- If requested, the employer must provide a copy of the program and records of the tests to the JHSC.



Information and Resources

WSN – Recommendations for Mine Design required under Sect. 6

<http://www.workplacesafetynorth.ca/resources/wsn-ground-control-committee-recommendations-mine-design>

Free download

WSN – Unusual Occurrence Report for Ground fall/Rockburst

<http://www.workplacesafetynorth.ca/resources/unusual-occurrence-report-groundfall-and-rockburst>

Free download



WSN Ground Control Committee recommendations

Mine design required under Sect. 6 of Ontario Regulation 854 (Mines and Mining Plants)

2008



UNUSUAL OCCURRENCE REPORT FOR GROUND FALL/ROCKBURST (UNDERGROUND MINE)

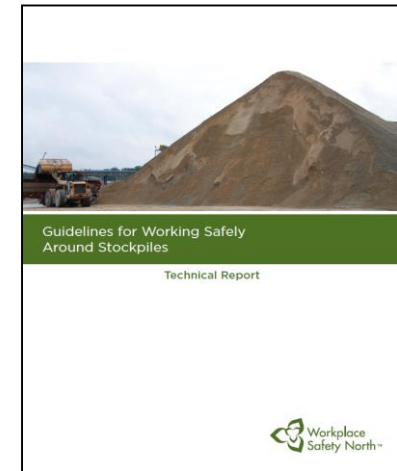
THIS REPORT IS FOR: <input type="checkbox"/> FALL OF GROUND <input type="checkbox"/> ROCKBURST	
GENERAL	
Company Incident Code: <input type="checkbox"/> Internal Report <input type="checkbox"/> Reportable Incident (Sec. 21 of Ontario Regulations for Mines and Mining Plants)	
Company: <input type="checkbox"/> Mine	Address: <input type="checkbox"/>
Date: <input type="checkbox"/>	Time of Occurrence: <input type="checkbox"/> a.m. / <input type="checkbox"/> p.m. <input type="checkbox"/> Unknown
General description of occurrence: <input type="checkbox"/>	
WORKERS	
At time of Incident Workers were: <input type="checkbox"/> U.G. <input type="checkbox"/> Surface <input type="checkbox"/> No one Working <input type="checkbox"/> Unknown	
Were workers in Immediate Area: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> To Within What Distance of the Incident were Workers Present: <input type="checkbox"/> B <input type="checkbox"/> M	
Workers Normally Required in Area: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Was access to the area restricted? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Were there any injuries: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Nature of Injuries: <input type="checkbox"/>	
DESCRIPTION OF OCCURRENCE	
Location: <input type="checkbox"/> Single Location <input type="checkbox"/> Multiple Locations	
Damage Sustained to: <input type="checkbox"/> Excavation <input type="checkbox"/> Ground Support <input type="checkbox"/> Equipment <input type="checkbox"/> Unknown <input type="checkbox"/> Depth Below Surface: <input type="checkbox"/> B <input type="checkbox"/> M	
Area is in: <input type="checkbox"/> E/W Rock <input type="checkbox"/> E/W Rock <input type="checkbox"/> Ore <input type="checkbox"/> This Area is: <input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Abandoned	
Incident Occurred in: <input type="checkbox"/> Rake <input type="checkbox"/> Drift/SC <input type="checkbox"/> Shaft <input type="checkbox"/> ore waste pass <input type="checkbox"/> Pillar <input type="checkbox"/> Slope <input type="checkbox"/> Other: <input type="checkbox"/>	
Opening Dimensions: Height: <input type="checkbox"/> Width: <input type="checkbox"/> Length: <input type="checkbox"/> Span: <input type="checkbox"/> B <input type="checkbox"/> M	
Mining Method: <input type="checkbox"/> None <input type="checkbox"/> VEM <input type="checkbox"/> Blasting <input type="checkbox"/> Cut & Fill <input type="checkbox"/> Post Pillar Cut & Fill <input type="checkbox"/> Sublevel Caving <input type="checkbox"/> Shearage <input type="checkbox"/> Shear and Shovel <input type="checkbox"/> Types Return <input type="checkbox"/> Undercut & Fill <input type="checkbox"/> Other: <input type="checkbox"/>	
If Pillar Sustained Damage: Type: <input type="checkbox"/> R/B <input type="checkbox"/> Post <input type="checkbox"/> Sill <input type="checkbox"/> Crown <input type="checkbox"/> Other: <input type="checkbox"/>	
Dimensions: Height: <input type="checkbox"/> Width: <input type="checkbox"/> Length: <input type="checkbox"/> B <input type="checkbox"/> M	
Ore Recovery in Immediate Area: <input type="checkbox"/> None <input type="checkbox"/> Primary Recovery <input type="checkbox"/> Pillar or Secondary Recovery	
Material Displaced From: <input type="checkbox"/> Face <input type="checkbox"/> Back <input type="checkbox"/> Wall <input type="checkbox"/> Floor <input type="checkbox"/> Bore <input type="checkbox"/> Unknown <input type="checkbox"/> Other: <input type="checkbox"/>	
Total Material Displaced: <input type="checkbox"/> Unknown <input type="checkbox"/> Amount: <input type="checkbox"/> tonnes Maximum depth of failure: <input type="checkbox"/> B <input type="checkbox"/> M	
Comments: <input type="checkbox"/>	
Rock types: <input type="checkbox"/>	
Displaced Material: <input type="checkbox"/> Wedge <input type="checkbox"/> Tabular <input type="checkbox"/> Block <input type="checkbox"/> Angular <input type="checkbox"/> Thin Slabbing <input type="checkbox"/> Unknown	

Information and Resources

WSN Technical Report – Working Safely Around Stockpiles

<http://www.workplacesafetynorth.ca/resources/guidelines-working-safely-around-stockpiles>

Free download



WSN – Recommendations for Quality Control Program

<http://www.workplacesafetynorth.ca/resources/quality-control-program-ground-control-wsn-suggested-template>

Free download

Suggested Template for Quality Control Program for Ground Support

Item#	Description	Department Responsible	Monitoring Schedule, Communication and Record Keeping	Acceptance Criteria	Remedial Measures required if acceptance criteria not met
A. Procurement Specifications					
1. Specifications for ground support products and accessories	All ground support products and accessories must meet relevant ASTM/CSA standards.	Ground Control and Purchasing Department	Ground Control Department conducts an annual review of specifications for ground support products and accessories. The Purchasing Department requests manufacturer's certification to ensure that ground support products and accessories are manufactured and tested in accordance with the relevant ASTM/CSA standards.	Specifications for ground support products and accessories must meet relevant ASTM/CSA standards. Ground support products and accessories delivered to the site must meet relevant ASTM/CSA standards.	Changes, revisions or additions reviewed and approved by the Ground Control Department. If necessary, seek alternate suppliers.
2. Supplier Certification	All suppliers of ground support products and accessories should hold ISO 9001:2008 certification.	Purchasing Department	Annual audit by Purchasing Department.	Suppliers should current ISO 9001:2008 certification.	If suppliers do not hold current ISO 9001:2008 certification, consideration should be given to identifying another supplier who holds current ISO 9001:2008 certification.

Information and Resources

Best Practices for Assessing Ground Control Hazards in the Workplace

<https://www.workplacesafetynorth.ca/resources/best-practices-assessing-ground-control-hazards-workplace>

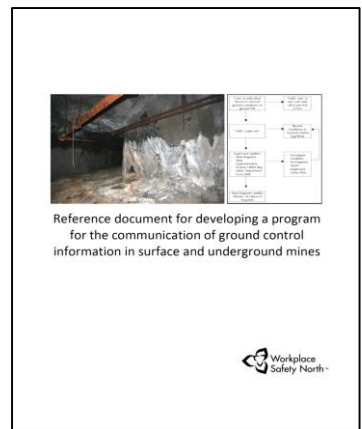
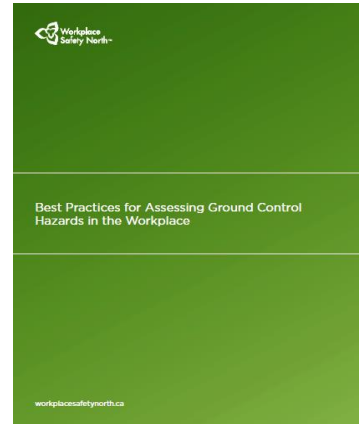
Free download

Reference document for developing a program for the communication of ground control information in surface and underground mines

Final draft is completed and will soon be available on WSN's website for free download

MOL Ground Control Guideline

https://www.labour.gov.on.ca/english/hs/sawo/pubs/fs_groundcontrol.php



Ground Control Blitz (Initiative)



Webinar July 23, 2019

MOL Mining Program

Overview

- Safe At Work Ontario
- Ground Control Blitz (Initiative)
- Why Is The MOL Doing A Ground Control Blitz
- Hazards
- What to Expect During an Inspection
- Pertinent Sections of Regulation 854
- MOL Contact Centre
- Resources

Safe At Work Ontario

- The goal of Ontario's *Occupational Health and Safety Act* (OHSA) is to keep workers safe and healthy. The OHSA sets out the health and safety requirements for workplaces across Ontario.
- Safe At Work Ontario is the Ministry of Labour's compliance strategy that helps promote safe and healthy workplace practices.

Ground Control Initiative

What:

- From July 15 to September 27, 2019, the Ministry of Labour with Workplace Safety North will conduct an initiative focusing on ground control in underground mines across Ontario.
- **Phase 1 Education, Outreach and Awareness:** the first phase will focus on educating workplace parties on their responsibilities regarding addressing ground control hazards inherent to underground mining.
- **Phase 2 Inspections Blitz:** during phase two, inspectors will conduct proactive workplace inspections to review compliance with the OHSA and mining regulations.

When:

- **Phase 1 Education, Outreach and Awareness:** July 15 to September 27, 2019
- Compliance assistance and awareness campaign with Workplace Safety North
- **Phase 2 Inspections Blitz:** August 6 to September 27, 2019
- Ministry of Labour Focused inspections campaign.

Why Is The MOL Doing A Ground Control Blitz

Focus: Review ground control plan (unsupported underground openings, ground support quality control and ground instability record keeping), mine design, communication program, procedures for installation of ground support, quality control program.

Why Is The MOL Doing A Ground Control Blitz

Rationale: Ground instability has been one of the biggest causes of fatalities in underground mines in Ontario. Since 2000, 10 workers have died and nearly 50 workers have been critically injured in underground mines in Ontario as a result of falls.

Workers face health and safety risks from hazards that can lead to the collapse of excavated rock, or stockpiled material found in underground and surface mines. These hazards can result in serious injuries, and even death, to workers. Ground control has been ranked as a high risk hazard and feedback from stakeholders and Workplace Safety North requires this blitz.

Hazards

Hazards involving ground control mainly involve:

- Struck by falling, sliding or toppling rock
- Rockburst and violent ejection of material from an excavation's back or walls
- Diminished boundary pillars
- Ground support:
 - Unsupported
 - Deterioration of existing support
- Backfill material failure in stopes

What to Expect During an Inspection

- During a proactive inspection, inspectors will enforce the OHSA based on the facts at the time of the inspection.
- An inspector has the right to enter and be granted access to all areas of the workplace.
- When a ministry occupational health and safety inspector arrives at your workplace, they will introduce themselves, explain the reason for the visit and ask to have a worker and management representative accompany them during the inspection.
- The Inspector may conduct an administrative review and a physical inspection of the workplace.

What to Expect During an Inspection

- If an inspector finds a contravention under the OHSA, the inspector will explain the contravention and may refer the workplace to an HSA for compliance assistance.
 - An order may also be issued and the employer must comply.
- Inspectors issue stop work orders where an immediate threat to worker health and safety has been observed.
- A field visit report outlining the details of the visit including orders issued, will be provided to the employer.

Pertinent Sections of Regulation 854

<u>Section Number</u>	<u>Topic</u>	<u>What Ministry of Labour Mining Health and Safety Inspectors will be Looking for</u>
6	Mine Design	<ul style="list-style-type: none"> ▪ <i>That the mine design is up-to-date.</i> ▪ <i>Who prepared the mine design.</i> ▪ <i>That the mine design has been made available to the mine joint health and safety committee for review.</i>
6.1	Unsupported Underground Openings	<ul style="list-style-type: none"> ▪ <i>That written reports have been prepared by a professional engineer confirming worker safety for new excavations where no ground support is to be installed.</i>
19	Boundary Pillars	<ul style="list-style-type: none"> ▪ <i>That where boundary pillars exist and have or will be mined, the mining procedures for extracting these pillars have been checked by a professional engineer.</i>
65	Communication Program	<ul style="list-style-type: none"> ▪ <i>That a formal program for communicating ground control information between supervisors and workers has been developed, and that it has been prepared in consultation with the joint health and safety committee.</i> ▪ <i>Examples of how the program is being applied.</i>
67	Procedures for Ground Control	<ul style="list-style-type: none"> ▪ <i>That formal procedures for installing ground support have been developed and they have been prepared in consultation with the joint health and safety committee.</i> ▪ <i>Confirmation that these procedures are being properly followed.</i>

Pertinent Sections of Regulation 854

<u>Section Number</u>	<u>Topic</u>	<u>What Ministry of Labour Mining Health and Safety Inspectors will be Looking for</u>
72	Rockburst Record	<ul style="list-style-type: none"> ▪ <i>That the mine record of all occurrences of rockbursts and uncontrolled falls of ground at the mine is up-to-date and complete.</i> ▪ <i>Who maintains and updates the record.</i> ▪ <i>Evidence that all entries in the record that are reportable under Section 21 5) (e) and (f) have in fact been reported to the Ministry of Labour.</i>
73	Ground Support Quality Control	<ul style="list-style-type: none"> ▪ <i>That a ground support quality control program that covers all of the types of ground support that are in use at the mine has been developed.</i> ▪ <i>Evidence that the ground support quality control program is being implemented as required.</i> ▪ <i>The ground support quality control program test records for review.</i> ▪ <i>That the ground support quality control program and the program test records have been made available to the mine joint health and safety committee.</i>

MOL Contact Centre

1-877-202-0008

- Call between 8:30 a.m. to 5 p.m. Monday to Friday for general inquiries about workplace health and safety.
- Call any time to report critical injuries, fatalities or work refusals.
- **Always call 911** in an emergency.

Resources

- [Regulations for Mines and Mining Plants](#), E-Laws
- [Ground Control Guideline](#), MOL's guideline
- [Workplace Safety North WSN](#), Resources

Thank you

Thank you for attending today's webinar and helping make workplaces safer.

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