

Risk Management Overview and Gap Assessment Tool

Mining sector

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Workplace Safety North

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About WSN

An independent not-for-profit, Workplace Safety North (WSN) is one of four sector-based health and safety associations in Ontario. Headquartered in northern Ontario, WSN administers the provincial mine rescue program and provides province-wide Ministry-approved workplace health and safety training and services for the mining and forest products industries.

With health and safety specialists and mine rescue officers located across the province, WSN and its legacy organizations have been helping make Ontario workplaces safer for more than 100 years. A leading provider of health and safety training and consulting, businesses call upon WSN for expert advice and information. For more information, visit workplacesafetynorth.ca. services and information stay relevant.

Mining Risk Assessment Overview: Legislation, Requirements, and Best Practices

Guidance for legislative requirements (Reg. 854) and Ministry Guidelines

Section Number	Legislation: What it Says (sub-section)	What is Legally Required	Ministry Guideline/Best Practices
5.1 (1)	(1) An 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.	<p>A written risk assessment that shows that hazards have been identified, the risk has been assessed and controls have been implemented to reduce that risk for your workplace. Think about the RACE process.</p> <p>It is important to note that different work sites may be considered different workplaces (with different hazards), so there should be a risk assessment for each.</p>	<p>Develop a program or programs that outline the hazard identification, risk assessment, and hazard control processes within the organization. The process(es) should include the following.</p> <ul style="list-style-type: none"> • Identify all the health and safety hazards, including potential hazards. • Take into consideration the nature of the workplace, the type of work, the conditions of work at the workplace and the conditions of work common at similar workplaces. • The determination of which hazards are to be risk-ranked should be decided jointly by the employer and the joint health and safety committee or health and safety representative, if any. • Assign a level of risk to each hazard and rank the hazards according to their level of risk. • Identify the priority (i.e., highest ranking hazards) for a root-cause analysis. • Compare the priority hazards for the mine or mining plant in question to those identified for the mining sector more broadly through the ministry's most recent risk ranking assessment.
5.1 (2)	(2) A risk assessment must take into consideration the nature of the workplace, the type of work, the conditions of work at that workplace and the conditions of work common at similar workplaces. O. Reg. 167/16, s. 3.	The risk assessment must consider all the different tasks at the workplace, the different conditions (ex. Weather, temperature, air quality, etc.) that workers are working under, and look at similar workplaces to identify other conditions the workers may face.	Employers should engage with the appropriate subject-matter experts when identifying and ranking hazards. When doing root-cause analysis of the risk of an undesirable event, employers should also consult with those people who have skill sets and experience that are needed to deal with the health and safety hazards for the event being analyzed. These subject-matter experts can be internal to the workplace (i.e., committee members or health and safety representatives, workers or supervisors, other workplaces with specific knowledge, experience and expertise) or external to the workplace (i.e. consultants or professionals) as may be appropriate in the circumstances.

Section Number	Legislation: What it Says (sub-section)	What is Legally Required	Ministry Guideline/Best Practices
5.1 (3) (4)	<p>(3) The results of an assessment must be provided, in writing, to the joint health and safety committee or the health and safety representative, if any. O. Reg. 167/16, s. 3.</p> <p>(4) If no joint health and safety committee or health and safety representative is required at the workplace, the results of an assessment must be communicated to workers at the workplace and provided, in writing, to any worker at the workplace who requests them. O. Reg. 167/16, s. 3.</p>	<p>The risk assessment must be provided to the JHSC. One way to ensure this is documented is to provide it for review at a JHSC Meeting and it can be included in the minutes.</p>	<p>The regulation requires that the employer provide the written results of the risk assessment to the joint health and safety committee or health and safety representative, if any. It is important to note that committee members or representatives can be involved in other stages of the process and that other workplace parties can also have roles within this process, either through direct participation or subsequent consultation endorsement.</p> <p>Employers of mines and mining plants should ensure that the right expertise is relied upon when conducting risk assessment and management.</p>
5.2 (1)	<p>(1) An employer shall, in consultation with the joint health and safety committee or the health and safety representative, if any, develop and maintain measures to eliminate, where practicable, or to control, where the elimination is impracticable, the hazards, and potential hazards, identified in a risk assessment conducted under subsection 5.1 (1). O. Reg. 167/16, s. 3.</p>	<p>When determining the controls for the hazards you have identified, consult with the JHSC and get their input.</p>	<p>Where the Occupational Health and Safety Act or its regulations require that an action be taken in consultation with another party, including but not limited to the committee or representative, the Ministry of Labour, Training and Skills Development expects that the employer will engage in a meaningful interaction (i.e., including but not limited to dialogue, discussion and providing all relevant information) with the committee or representative.</p> <p>There should be a genuine opportunity for the committee or representative to comment, and those comments should be received and considered in good faith. This includes taking into account any feedback and responses from the committee or representative before taking action (i.e. implementing a plan, or program) and responding to any recommendation arising out of the consultation.</p>

Section Number	Legislation: What it Says (sub-section)	What is Legally Required	Ministry Guideline/Best Practices
5.2 (2) (3)	<p>(2) The measures referred to in subsection (1) shall be put in writing and shall include each of the following, as applicable and reasonable in the circumstances:</p> <ol style="list-style-type: none"> 1. Substitution or reduction of a material, thing or process. 2. Engineering controls. 3. Work practices. 4. Industrial hygiene practices. 5. Administrative controls. 6. Personal protective equipment. <p>O. Reg. 167/16, s. 3.</p> <p>(3) Personal protective equipment shall only be used as a measure if the measures referred to in paragraphs 1 to 5 of subsection (2) are not obtainable, are impracticable or do not eliminate or fully control hazards and potential hazards. O. Reg. 167/16, s. 3.</p>	<p>When determining controls, ensure that controls are put in place following the hierarchy of controls. Eliminating the hazard should be the first consideration; however, this is often not feasible. The controls listed in section 5.2 (2) indicate other controls listed from most to least effective.</p> <p>Personal protective equipment must always be the last resort when determining controls and must only be used if the other types of controls are not possible or do not completely control the hazard.</p>	<p>The following are steps within a suggested framework that will assist workplace parties towards demonstrating compliance with their regulatory obligations regarding risk management:</p> <ul style="list-style-type: none"> • For each of the priority hazards, conduct a root-cause analysis through which the mitigating controls for each hazard will be clearly identified. • Manage each of the priority hazards through continuous monitoring (and refinement, if necessary) of its identified controls. <p>Many types of root-cause analyses are available. Examples of common root-cause analysis methods utilized in the Ontario mining sector are the:</p> <ul style="list-style-type: none"> • bow-tie analysis • failure mode and effects analysis • fault tree analysis • fish bone (i.e., the Ishikawa) analysis • pareto analysis <p>Once the necessary controls for a mine or mining plant have been formally identified for each priority health and safety hazard, the workplace should specify:</p> <ul style="list-style-type: none"> • how each control is to be managed and monitored; • the criteria that will be adopted for each control to determine when it is no longer effective and needs to be improved or replaced.

Section Number	Legislation: What it Says (sub-section)	What is Legally Required	Ministry Guideline/Best Practices
5.3 (1)	5.3 (1) The risk assessment required by section 5.1 must be reviewed as often as necessary and at least annually. O. Reg. 167/16, s. 3.	The risk assessment(s) developed to meet section 5.1 (1) must be reviewed at least once a year to ensure that new hazards or existing hazards that have changed, are addressed and effective controls are put in place.	The risk assessment must be reviewed as often as necessary and at least annually, as per subsection 5.3(1). This is to ensure that new hazards, or existing hazards that may have changed during the intervening period, are addressed, and that the controls that have been adopted to mitigate workplace risks continue to remain effective.
5.3 (2)	(2) When conducting the review, the employer shall ensure that, (a) new hazards or new potential hazards are assessed; (b) existing hazards or potential hazards that have changed are re-assessed; and (c) the measures required by section 5.2 continue to effectively protect the health and safety of workers. O. Reg. 167/16, s. 3.	When conducting the review required by section 5.3 (1), ensure that the following is considered: <ul style="list-style-type: none"> • Any new or potential hazards that have come up since the last review. • Any hazards that have changed since the last review. • The controls that have been identified in the risk assessment are still protecting workers as intended. 	Often, changes can occur to a workplace itself, or to the processes and work practices that are applied within it due to, for example, the introduction of new technology. These changes may result in new or modified hazards or they can affect existing controls. Periodic and regular reviews are important to ensure a workplace's risk assessment and management system continues to effectively mitigate workplace hazards and their associated risks.
5.3 (3)	(3) Subsections 5.1 (3) and (4) and section 5.2 apply with necessary modifications in respect of any new hazards and potential hazards and any existing hazards or potential hazards that have changed. O. Reg. 167/16, s. 3.	Provide the assessment to the JHSC, consult with the JHSC on the controls that are required, and ensure the hierarchy of controls is followed for any of the considerations as mentioned above.	

WSN Risk Management Gap Assessment Tool: Reg. 854 and MLITSD Risk Assessment Guidelines


The Risk Management process (or program) is a documented and planned sequence and combination of activities designed to establish standardization, develop employee knowledge, skills and abilities to ensure consistent outcomes. The Risk Management process includes:

- Step 1: Identification of hazards** (hazards can be identified through various means which could include workplace inspections, pre-operational checks, hazard reports, investigation results etc.)
- Step 2: Assessment of relative risk** (a risk rating typically considering likelihood and consequence is determined as a means to assess risk to help prioritize hazard control efforts)
- Step 3: Control of hazards** (controls must be put in place to help reduce overall risk, typically done by reducing the likelihood of exposure and/or the degree of harm)
- Step 4: Control effectiveness assessment** (controls need to be assessed to ensure the risk is reduced as a result of the hazard control, if the control is not effective, it needs to be replaced)

Key Terms

OFI = Opportunity for Improvement	ID = Identification	MG = Ministry Guideline
NA = Not Applicable	RA = Risk Assessment	RM = Risk Management
	TRPH = Top-Ranking/Priority Hazards/Risk Events	

NOTE: When there is a number in the 'applicable requirement' column, this is a LEGAL REQUIREMENT under O. Reg. 854, Mines and Mining Plants; these are also highlighted in light grey. When the requirement is under the Ministry Guideline, the letters MG are noted. Where applicable, some examples and/or guidance on how the requirement 'could be' met is provided.

 Section 1: Hazard Identification							
	Assessment Criteria	Applicable Requirement	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
1	A Hazard identification process has been established.	5.1(1)	Field Level Risk Assessment (FLRA), Project Level Risk Assessment (PLRA), Risk Registry etc.				
2	All workplace parties contribute to the Hazard identification process(es) which reflects the Scope of the organization including nature of the workplace, type of work and conditions of work.	5.1(1)	The Hazard Identification process outlines the requirements of which management and worker are parties required to participate and through which methods.				
3	A process is established to identify new hazards in existing circumstances/processes.	5.3(2)(a)(b)	Field Level Risk Assessments, 'tailgate talks' focused on hazards of the day, hazard assessment, workplace inspections, pre task inspections, supervisor inspections etc.				
4	A frequency for applying the Hazard identification processes(es) has been established.	5.1(1)	Example: FLRA = daily, PLRA = weekly, Supervisor inspection = daily, JHSC inspections = monthly, Risk Registry review = annually, etc.				

	Assessment Criteria	Applicable Requirement	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
5	Hazards are identified for all routine work/tasks.	5.1(2)	Record of Hazard Identification for routine work.				
6	Hazards are identified for non-routine work/tasks.	5.1(2)	Record of Hazard Identification for non-routine work.				
7	Hazards are identified for all work areas/departments considering all work conditions.	5.1(2)	Record of Hazard Identification for various departments and work areas.				
8	The Hazard identification process considers internal sources of information.	MG	Sources of injury from incident reporting, hazard reporting, inspection reports, internal stats etc.				
9	Hazards identified at the workplace are compared to the Sector Risk Assessment to ensure the sector hazards have been considered (Referring to the requirement to take into consideration the conditions of work at similar workplaces).	5.1(2)	The Sector risk assessment results must be considered when identifying hazards. https://www.workplacesafetynorth.ca/industries/mining				
10	Workplace hazards have been identified as a result of fatalities at the mine or mining plant or similar mines or mining plants.	MG	Incidents in like workplaces are to be considered in the Hazard ID process. (Mining Health and Safety Stats from WSIB)				
11	The Hazard Identification process includes: Environmental hazards	MG	Examples include but are not limited to: • condition of work environment including temperature (both too hot and cold) • noise (acoustical energy) • dust				
12	The Hazard Identification process includes: Potential Energy & Gravity	MG	Examples include but are not limited to: • falling objects (fall of ground) • falls of people • work done at heights (WAH) • floor & other surfaces (slips, trips & falls) • falls of unsecured objects/equipment				

	Assessment Criteria	Applicable Requirement	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
13	The Hazard Identification process includes: Kinetic Energy	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • sharp objects • penetrating objects • flying objects • puncture & stabbing • linear & rotational from impulse 				
14	The Hazard Identification process includes: Mechanical Energy & Machinery Hazards (Machine and Equipment)	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • moving equipment (mobile equipment/driving) • machinery/equipment that can cut crush or catch people • pinch points • machinery/equipment which ejects flying objects • caught between, struck by, struck against 				
15	The Hazard Identification process includes: Pneumatic/Pressure	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • energy of compression & fluids • injection from pressurized fluid, air, or other sources. 				
16	The Hazard Identification process includes: Electrical	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • unsafe electrical equipment (e.g. overload circuits, worn or damaged cords) • exposed wiring • numerous double adaptors & piggy back connectors • aerial conductors overhead 				
17	The Hazard Identification process includes: Hazardous Substances & Chemicals	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • gases (asphyxiate properties) • flammable materials • fire & explosion • oxidizing agents & organic peroxides • poisonous or infectious substances • toxic substances (skin contact, absorption, inhalation, ingestion) • corrosives 				
18	The Hazard Identification process includes: Radiation & Ionizing Energy	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • sunlight • X-rays • lasers • nuclear, particulate & RF radiation • bright light • light flashes (e.g. welding) • ultra violet, arc flashes, micro waves 				

	Assessment Criteria	Applicable Requirement	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
19	The Hazard Identification process includes: Biological & Microbiological	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • biological matter (e.g. human or animal waste, blood, body fluids & organs) • handling of humans or animals (micro-organisms, viruses, parasites, bacteria etc.) 				
20	The Hazard Identification process includes: Psychosocial Hazards/ People/ Human Factors	MG	Examples include but are not limited to: <ul style="list-style-type: none"> • Psychological/Mental Health • Job design (including shift work) • Workplace violence and harassment • Workload • Job demand • Span of control • Hours of work • Leadership and culture • Capabilities of work • Fit for duty 				
21	A process is established to identify new hazards in new processes (Management of Change requirements).	5(3)	New processes, equipment, or significant changes that require a new way of conducting tasks require a process that will identify and control any new hazards that arise due to these changes. Referred to as Management of Change, will use a Risk Assessment to determine the hazards and controls for these changes. The Ministry provides guidance for Management of Change requirements: https://www.ontario.ca/page/management-change-mines-and-mining-plants				
22	A process is established to identify new hazards when there is a change in processes (Management of Change requirements).	5(3)					



Section 2: Risk Assessment

	Assessment Criteria	O.REG 854	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
23	A process to rate the level of risk associated with workplace hazards has been established.	MG					
24	Relevant workplace parties participate in the assessment of risk.	MG	Representatives of relevant management and workers are required for the risk assessment to be most effective.				
25	The process considers the likelihood of a worker being injured for each hazard/risk event identified.	MG	'Likelihood' is commonly understood to be the measurement of how often an event might occur.				
26	The process considers consequence (or severity) of the injury caused by each hazard/risk event identified.	MG	'Consequence' is the outcome of an event expressed quantitatively in terms of a loss, injury disadvantage or lost opportunity. If the risk event occurred, how bad would it be? (ex. minor injury up to multiple fatalities)				
27	The process includes a means to quantify or qualify various degrees of risk.	MG	Risk matrix, risk calculator, etc., which utilize the likelihood and consequence results by specific hazard/risk event.				
28	The process defines prioritized risk rating categories.	MG	An example of risk rating would be: Critical, High, Moderate, Low.				
29	Acceptable/unacceptable levels of risk have been determine.	MG	The employer has determined the level of risk that is unacceptable and must be controlled prior to performing work based on their pre-determined risk categories. For example using the scale above, anything with a risk of "Critical" would fall into the unacceptable level to proceed.				
30	A level of risk has been assigned to each identified hazard/risk event.	MG					
31	Hazards are ranked based on the level of risk determined, and top-ranking/priority hazards are identified.	MG					
32	Top-ranking/priority hazards undergo a Root Cause Analysis.	MG	Ex: hazards in the highest risk bracket to identify the root causes and potential control (relative top 5 rated hazards should be considered to be top hazards). Bow-Tie Analysis, Failure Mode and Effects Analysis, Fault Tree Analysis, Fish Bone Analysis, Pareto Analysis etc.				

	Assessment Criteria	O.REG 854	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
33	A comparison of rating priority hazards/risk events relative to those identified as priorities in the latest Sector Risk Assessment (MLITSD) has been completed.	MG	Demonstrate the comparison took place. Access sector risk assessment here: https://www.workplacesafetynorth.ca/industries/mining				
34	Discrepancies in priority hazards/risk events (if any) have been investigated, reassessed and understood.	MG					
35	The written results of the Risk Assessment are provided to the joint health and safety committee or the health and safety representative. Where no JHSC/rep is required, the results are communicated in writing to any worker who requests the information.	5.1(3)(4)	Record of communication of Risk Assessment to JHSC/rep/worker.				
36	The risk assessment is reviewed at least annually.	5.3(1)	To ensure hazard ratings are still current, ongoing controls have been effective, post Incident etc. It is important that relevant representatives from both management and worker parties are involved in this review to be most effective.				
37	The review addresses the following: - New or new potential hazards are assessed. - Existing or existing potential hazards that have changed are re-assessed. - The controls that have been implemented for existing hazards are still effective.	5.3 (2)	This process works with the change management process when new or changes in processes, equipment, etc. have resulted in new or changing hazards.				
38	The JHSC is provided with the results of the review.	5.3 (3)					



Section 3: Hazard Control and Control Effectiveness

	Assessment Criteria	O.REG 854	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
39	A Workplace Hazard Control program has been established.	5.2	The program should support of the results of the risk assessment. These can include various procedures, training etc.				
40	Roles and responsibilities have been established for management and monitoring of the TRPH controls.	MG					
41	Roles and Responsibilities for TRPH control improvement and/or replacement are established.	MG					
42	Hazard controls consider the hierarchy of controls/effectiveness.	5.2(2)	elimination, substitution or reduction engineering controls work practices industrial hygiene practices administrative controls personal protective equipment				
43	The most effective controls are applied to control hazards.	5.2	Demonstrate most effective controls are applied.				
44	Personal protective equipment is only used when more effective means are not practical or do not fully eliminate or control hazards or potential hazard.	5.2(3)					
45	The employer can demonstrate consultation with the JHSC/rep (or worker where no JHSC/rep is required) in the development of measures to control hazards.	5.2(1)	Demonstrate consultation in the determination and establishment of controls.				
46	The employer can demonstrate consultation with the JHSC/rep (or worker where no JHSC/rep is required) in the maintenance of measures to control hazards.	5.2(1)	Demonstrate consultation in the ongoing verification an assurance of controls.				

	Assessment Criteria	O.REG 854	Example/Guidance	YES	OFI	NA	Findings/Comments (How can this be proven? Is follow up required?)
47	Controls are assessed to ensure they do not create unintentional/additional hazards.	MG					
48	For all Top-ranking/Priority Hazards/Risk Events (TRPH), controls are established based on the root cause analysis.	MG					
49	Controls for TRPH have been clearly identified.	MG					
50	Continuous monitoring methods have been established for TRPH.	MG					
51	The employer has specified the criteria that will be adopted for each TRPH control to determine when it is no longer effective and needs to be improved or replaced.	MG					
52	The employer has specified the criteria that will be adopted for each control to determine when it is no longer effective and needs to be improved or replaced.	MG					



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