



# Provincial Logging Sector Risk Assessment Workshop Results

A focused approach to improving workplace health and safety

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# Risk Assessment: Introduction

In 2013, the Ministry of Labour, Immigration, Training and Skills Development (Ministry/MLITSD) launched a project to put in place an **integrated risk assessment methodology** to:

- identify risks to worker health and safety, and work with employers and workers on reducing those risks
- provide more information to employers, workers and their representatives about risks at the **SECTOR** level

# Risk Assessment: Introduction

With support of the our highly valued member firms and the Ministry, WSN planned and facilitated the **Logging Sector Risk Assessment**.

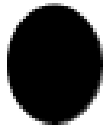
- ❑ **Harness collective wisdom across the sector in a tripartite process to focus the industry, health and safety associations (HSAs), and regulator on highest risks to health and safety**
- ❑ **Approach draws on industry, worker, HSA, and Ministry knowledge of risk and recognizes that **one-size approach does not fit all****
- ❑ **Approach draws on **empirical insights of risk management, operations research and decision science****

# Prevention

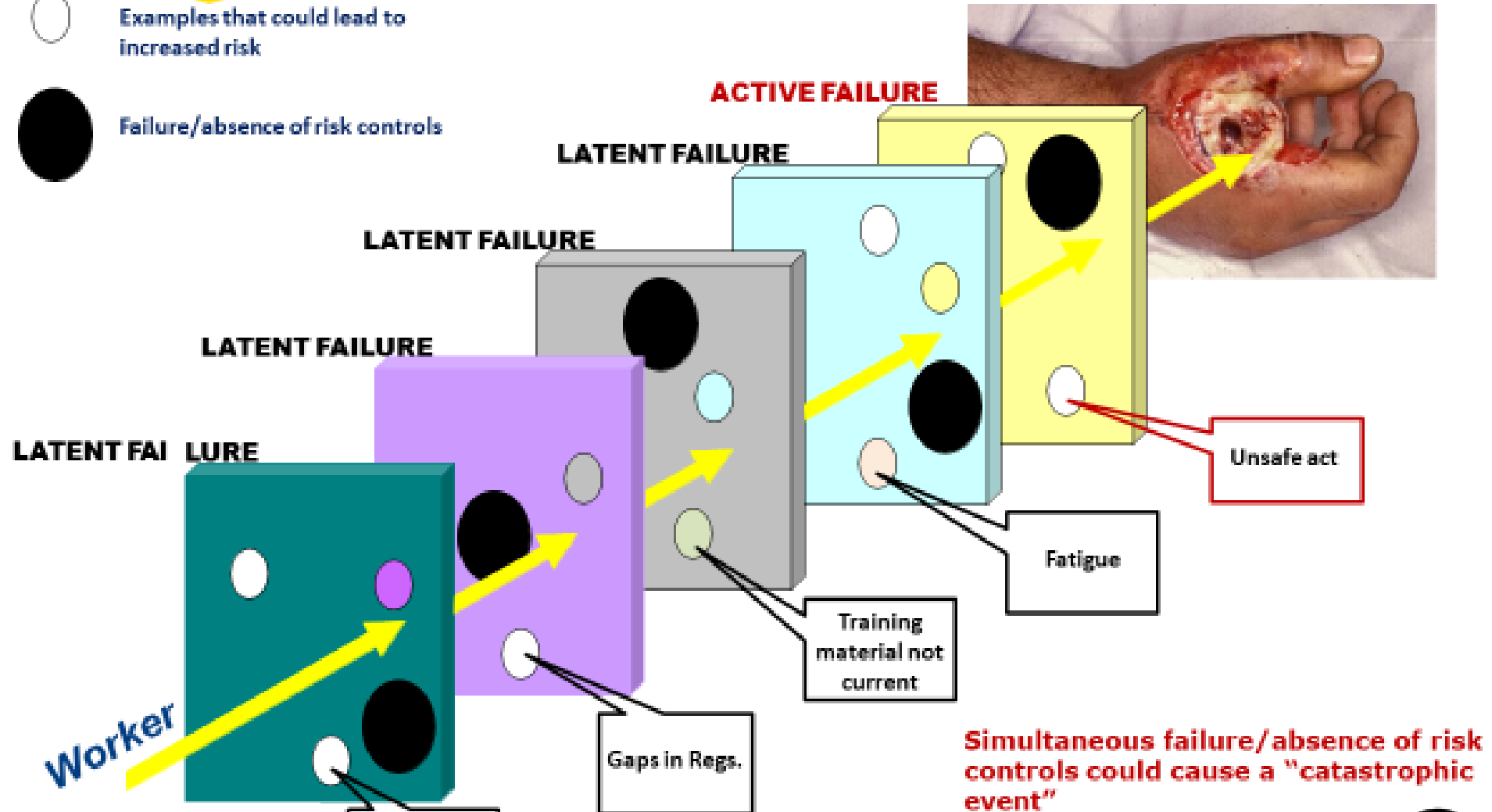
# The Swiss Cheese Model of Accident Causation



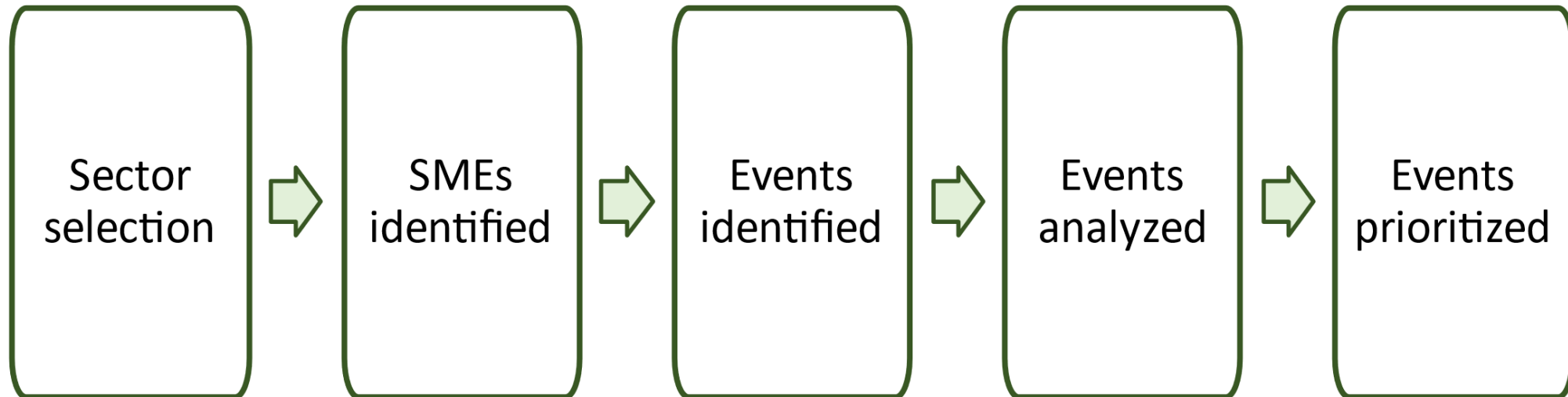
Examples that could lead to increased risk



Failure/absence of risk controls



# Workshop: A tripartite and collective process



# Workshop: A Tripartite and Collective Process

## **Workshop process was open, transparent, and collaborative:**

- Ensured any perspective or viewpoint was heard
- Each response received was respected and not freely edited
- Final list shared with workshop participants before the workshop
- Final workshop results reviewed/validated by industry participants

## **Finding acceptable solutions that all members can support:**

- Only industry experts ranked the risks, not government or WSN
- Process was NOT about consensus, although the results demonstrate a significant degree of convergence



# Risk Assessment Workshop: Attendees

SUBJECT MATTER EXPERTS		
#	Name	Company/Representative
1	Scotia Biloski	Metis Nations of Ontario
2	Michael Leckner	Steel Workers Union
3	Eric Carroll	Steel Workers Union
4	Jason Lacko	Steel Workers Union
5	Craig Ward	Robertson Logging
6	Pierre Tremblay	Steel Workers Union
7	Ron Vautour	Interfor
8	Michelle Briska	Interfor
9	Pierre Brouzes	Columbia Forest Products
10	Beverly Graham	Ricci Trucking
11	Kaitlin Laveille	Interfor

**Worker Representation**

**Employer Representation**

OTHER NON-VOTING WORKSHOP PARTICIPANTS		
#	Name	Company/Representative
1	Konor Poulin	Workplace Safety North: Facilitator
2	Adrienne Allam	Workplace Safety North: Facilitator
3	Penny Ratuszniak	WSN Health and Safety Specialist
4	Richard Hutchinson	MLITSD: Provincial Specialist
5	Tom Welton	Workplace Safety North: Tech Support
6	Sabrina Missere	WSN Health & Safety Specialist
7	Stephanie Boucher	WSN Health & Safety Specialist
8	Tiana Larocque	Workplace Safety North: Tech Support
9	Tricia Valentim	Workplace Safety North: Tech Support
10	Gilles Boisvert	WSN Health and Safety Specialist

*MLITSD: Ministry of Labour, Immigration, Training and Skills Development*





# Risk Assessment Workshop: Event Categories

1. Age
2. Contact with Material or Equipment
3. Culture
4. Driving Hazards
5. Emergency Preparedness
6. Environment
7. Equipment Maintenance
8. Exposure, Chemical Hazards
9. Fatigue
10. Lockout
11. New/Young Workers
12. Psychosocial Hazards
13. Slip, Trip And Fall
14. Work Practices

# Risk Assessment: Prioritize risks

- The purpose of this stage is to assess the level of risk and establish risk priorities
- **Risk**, which is the **average Likelihood (L)** multiplied by the **average Consequence (C)** for each event, then is categorized with respective risk ratings using the **Risk Matrix (Heat Map)**

<b>LIKELIHOOD</b>	Almost Certain (5)	5	10	15	20	25
	Very Likely (4)	4	8	12	16	20
	Likely (3)	3	6	9	12	15
	Unlikely (2)	2	4	6	8	10
	Rare (1)	1	2	3	4	5
		Low (1)	Minor (2)	Moderate (3)	Major (4)	Extreme (5)
		<b>CONSEQUENCE</b>				

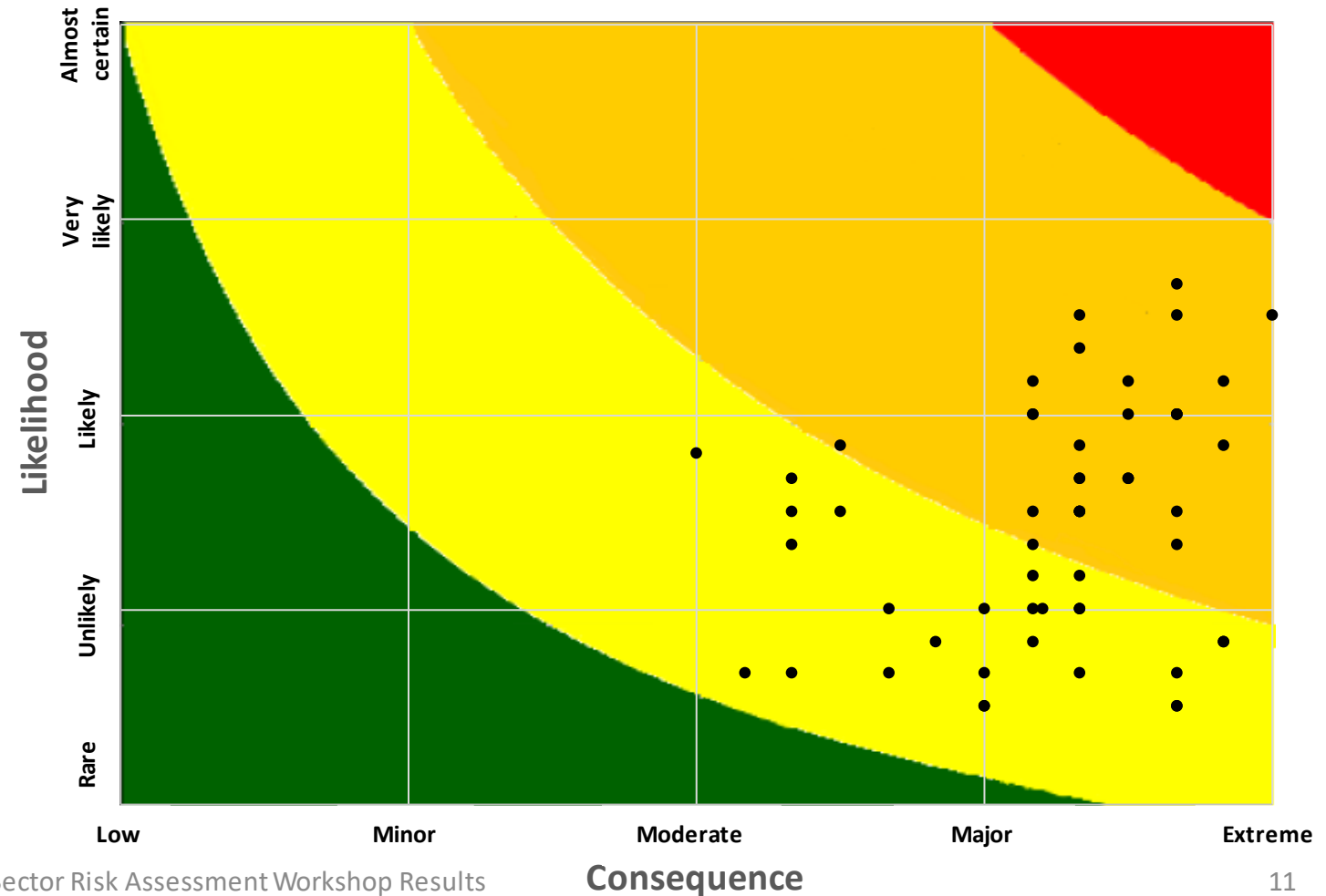
Risk Matrix Result	Risk Rating
20 to 25	Critical
12 to 16	High
5 to 10	Moderate
1 to 4	Low

# Logging Sector Risk Assessment: Heat Map

Risk Rating
Critical
High
Moderate
Low

Likelihood	Description
[1] Rare	Very low probability for unwanted event to occur in the next year [or less than 5% of occurrence]
[2] Unlikely	Low probability for unwanted event to occur in the next year [or between 5%-20% chance of occurrence]
[3] Likely	It is possible for unwanted event to occur in the next year [or between 20%-50% chance of occurrence]
[4] Very likely	High probability for unwanted event to occur in the next year [or between 50%-90% chance of occurrence]
[5] Almost certain	Unwanted event is almost certain to happen in the next year [or 90% or greater chance of occurrence]

Consequence	Description
[1] Low	No injury or illness [or negligible impact/importance]
[2] Minor	First aid treatment (no lost time) [or minor impact/importance]
[3] Moderate	Temporary disability (lost time): Injury/illness [or moderate impact/importance]
[4] Major	Serious event/critical injury or critical illness [or major impact/importance]
[5] Extreme	Fatality or permanent disability [or extreme impact/importance]



# Logging Sector Risk Assessment: Top 10 of 39 Identified Events

Rank	Category	Event (Situation/Condition) that could result in Injury or Illness OR <b>What could keep you up at night?</b>	Risk
1	Driving hazards	Highway travels	14.58
2	Contact with materials/equipment	Conventional harvesting (contact with overhead debris)	14.18
3	Driving hazards	Driving during work activities (incl. haul drivers)	13.50
4	Driving hazards	Focus/Distracted while driving to and from work sites (not including hauling)	13.15
5	Lockout	Inadequate/improper lockout while working on energized equipment	12.79
6	Fatigue	Fatigue-induced accidents	12.57
7	Psychosocial hazards	Impairment causing injury	12.56
8	Psychosocial hazards	Behaviour (complacency, shortcuts, attitude, perception of risk)	12.25
9	Contact with materials/equipment	Caught in or struck by equipment	11.90
10	Culture	Lack of company/internal enforcement (incl. contractors)	11.60

# Worker verses Workshop Results Top 10 Comparison

#	Category	Event (Situation/Condition) that could result in Injury or Illness OR <b>What could keep you up at night?</b>	RISK
1	Driving hazards	Highway travels	15.33
2	Driving hazards	Driving during work activities (incl. haul drivers)	14.67
3	Driving hazards	Focus/Distracted while driving to and from work sites (not including hauling)	14.06
4	Contact with materials/equipment	Conventional harvesting (contact with overhead debris)	14.00
5	Psychosocial hazards	Impairment causing injury	13.44
6	Lockout	Inadequate/improper lockout while working on energized equipment	13.42
7	Psychosocial hazards	Behaviour (complacency, shortcuts, attitude, perception of risk)	12.83
8	Fatigue	Fatigue-induced accidents	12.83
9	Culture	Lack of government enforcement	12.78
10	New/young workers	Incident involving new/young workers	12.22

Rank	Category	Event (Situation/Condition) that could result in Injury or Illness OR <b>What could keep you up at night?</b>	Risk
1	Driving hazards	Highway travels	14.58
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9	Contact with materials/equipment	Caught in or struck by equipment	11.90
10	Culture	Lack of company/internal enforcement (incl. contractors)	11.60

Worker results

Workshop results

# Employer verses Workshop Results Top 10 Comparison

#	Category	Event (Situation/Condition) that could result in Injury or Illness OR <b>What could keep you up at night?</b>	Rank	Category	Event (Situation/Condition) that could result in Injury or Illness OR <b>What could keep you up at night?</b>
1	Contact with materials/equipment	Caught in or struck by equipment	1	Driving hazards	Highway travels
2	Contact with materials/equipment	Conventional harvesting (contact with overhead debris)	2	Contact with materials/equipment	Conventional harvesting (contact with overhead debris)
3	Driving hazards	Highway travels	3	Driving hazards	Driving during work activities (incl. haul drivers)
4	Fatigue	Fatigue-induced accidents	4	Driving hazards	Focus/Distracted while driving to and from work sites (not including hauling)
5	Work practices	Hoisting heavy parts	5	Lockout	Inadequate/improper lockout while working on energized equipment
6	Driving hazards	Driving during work activities (incl. haul drivers)	6	Fatigue	Fatigue-induced accidents
7	Driving hazards	Focus/Distracted while driving to and from work sites (not including hauling)	7	Psychosocial hazards	Impairment causing injury
8	Lockout	Inadequate/improper lockout while working on energized equipment	8	Psychosocial hazards	Behaviour (complacency, shortcuts, attitude, perception of risk)
9	Psychosocial hazards	Behaviour (complacency, shortcuts, attitude, perception of risk)	9	Contact with materials/equipment	Caught in or struck by equipment
10	Culture	Lack of company/internal enforcement (incl. contractors)	10	Culture	Lack of company/internal enforcement (incl. contractors)

Employer results

Workshop results

# Rank, Category, Event: Logging Sector Risk Assessment

1. Driving – Highway travels
2. Contact with materials/equipment – Conventional harvesting (contact with overhead debris)
3. Driving hazards – Driving during work activities (incl. haul drivers)
4. Driving hazards – Focus/Distracted while driving to and from work sites (not including hauling)
5. Lockout – Inadequate/improper lockout while working on energized equipment
6. Fatigue – Fatigue-induced accidents
7. Psychosocial hazards – Impairment causing injury
8. Psychosocial hazards – Behaviour (complacency, shortcuts, attitude, perception of risk)
9. Contact with materials/equipment – Caught in or struck by equipment
10. Culture – Lack of company/internal enforcement (incl. contractors)
11. Work practices – MSD injury
12. New/young workers – Incident involving new/young workers
13. Psychosocial hazards – Workplace injury due to poor mental health or mental illness

# Rank, Category, Event: Logging Sector Risk Assessment (cont'd)

14. Culture – Lack of government enforcement
15. Driving hazards AND WORK PRACTICES – Public interference/Private Lands
16. Work practices – Improper PPE use
17. Culture – Limited focus on legislated standards for logging in Ontario, resulting in injury
18. Emergency preparedness – Inability to perform an emergency evacuation in the case of injury, resulting in increased severity
19. Slips/trips/falls – Working at heights, fall of 10'
20. Driving hazards – Inadequate/improper load security
21. Contact with materials/equipment – Exposure to moving and exposed machinery and parts
22. Slips/trips/falls – Slips, trips and fall at same level (dismounting, fall at same level, fall to lower level and falls <10')
23. Work practices – Improper/incomplete training
24. Work practices – Hoisting heavy parts
25. Equipment – Poorly maintained equipment in general



# Rank, Category, Event: Logging Sector Risk Assessment (cont'd)

26. Psychosocial hazards – Multitasking/shift scheduling
27. Work practices – Working alone
28. Contact with materials/equipment – Equipment tip/rollovers
29. Environment – Working at night
30. Age – Aging workforce
31. Contact with materials/equipment – Contact with equipment (burns, frostbite, pressurized hydraulic fluid, abrasions, punctures, lacerations)
32. Environment – Wildfires
33. Exposures – Inadequately-maintained/isolated work in camp trailers
34. Contact with materials/equipment – Contact with overhead debris during mechanical harvesting that could cause injury to a worker
35. Exposures – Exposure to machine/chainsaw (diesel) emissions, and chemicals under pressure
36. Environment – Health hazard concern (e.g. bear attacks on the rise)

## Appendix A: Workshop Process Details

1. A sector is identified and defined for risk assessment
2. Subject matter experts (SMEs) from the selected sector are identified
3. Each of the selected SMEs list (identify) the situations or conditions (events) that could lead to injury or illness with appropriate evidence for each event (pre-workshop)
4. The lists are collected and amalgamated into one list (pre-workshop)
5. The amalgamated list is sent to each SME for review (pre-workshop)
6. A workshop is scheduled for the analysis and prioritization of each identified event on the amalgamated (final) list
7. For each identified event on the list, SMEs contribute toward a robust discussion, generating deeper objective understanding and allowing for all perspectives to be heard (comments are NOT attributed)
8. After each discussion for each identified event, each SME “votes” (based on identified criteria/scale) to lock in a value judgement on **likelihood of the event occurring** and **severity of the consequence if the event was to occur**
9. Electronic voting tools are used to make voting easy and anonymous; results on each event are instantaneous
10. Project manager takes results to create a risk profile/heat map for the sector
11. Results validation includes “smell test” by industry SMEs before releasing final results

# Appendix B: Risk Assessment Processes/Standards

1. Bayesian Analysis
2. Bow-tie analysis
3. Brainstorming (e.g. what-if)
4. Business impact analysis
5. Cause and effect analysis
6. Checklists
7. Computer Hazard and Operability Studies (CHAZOP)
8. Consequence Analysis (also called Cause-Consequence Analysis)
9. Likelihood/Consequence matrix
10. Construction Hazard Assessment and Implication Review (CHAIR)
11. Decision tree
12. Delphi technique
13. Energy Barrier Analysis (or Energy Trace Barrier Analysis)
14. Environmental risk assessment
15. Event tree analysis
16. Failure Mode and Effect Analysis (FMEA)
17. Failure mode, effect and criticality analysis
18. Fault Tree Analysis
19. Fishbone (Ishikawa) Analysis
20. Hazard analysis and critical control points
21. Hazard and Operability studies (HAZOP)
22. Human reliability analysis
23. Job Safety Analysis (JSA)
24. Level of Protection Analysis (LOPA)
25. Markov analysis
26. Monte Carlo
27. Preliminary Hazard Analysis (PHA)
28. Reliability centered maintenance
29. Scenario analysis
30. Sneak circuit analysis
31. Structured/semi-structured interviews
32. SWIFT (i.e. structured what-if)
33. Systemic Cause Analysis Technique (SCAT)
34. Human Error Analysis (HEA)
35. Workplace Risk Assessment and Control (WRAC)

## Risk Management Standards:

1. Risk Management Principles and Guidelines (ISO 31000:2009)
2. Risk Assessment Techniques (ISO/IEC 31010:2009)
3. OH&S Hazard Identification and Elimination and Risk Assessment and Control (CSA Z1002)
4. Process Safety Management (CSA Z767-17)
5. Enterprise Risk Management (COSO 2004)

**\* Not an exhaustive list**

## Appendix C: Contacts

For additional information or questions, please contact:

### **Konor Poulin**

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