



# **Pulp and Paper Webinar: New Research on Root Causes of Deficient Lockout of Machinery**

A focused approach to improving workplace health and safety

November 17, 2022

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



# Welcome to the webinar:

## New Research on Root Causes of Deficient Lockout of Machinery

- Thank you for joining us!
- We will be getting started at **1:30 pm ET**
- Please use the **Q&A** at the bottom of your screen for speaker questions and we will answer them at the end of the webinar.
- Please use the **chatbox** for commentary or technical questions.
- A link to the webinar recording, a copy of the presentation slides, and reference material will be emailed to registrants within a few days.

# Webinar hosts

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Program Training Specialist

Workplace Safety North

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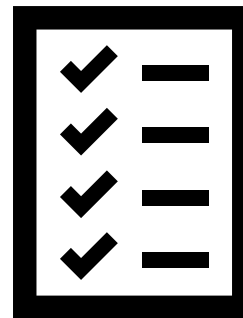
# Evidence Based Approach to Effectively Addressing Workplace Risk



**Risk Assessment**



**Root-Cause Analysis**



**Control Activities**

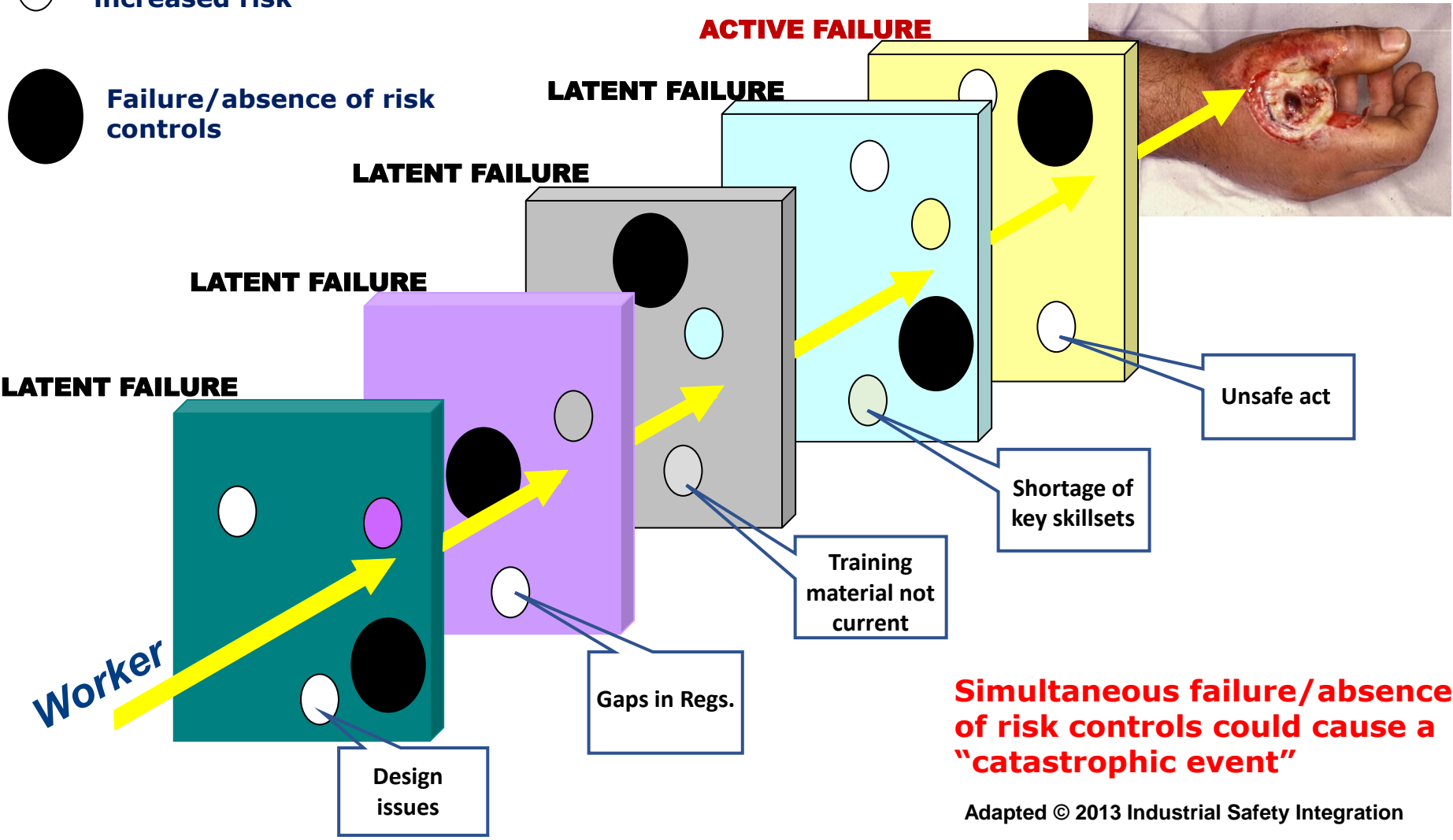


**Evaluation of Effectiveness**

# Risk Assessment Project

○ Examples that could lead to increased risk

● Failure/absence of risk controls



# Workshop: A Bipartite and Collective Process

- Workshop participants were peer-recognized industry/system experts
- Workshop process was open, transparent and collaborative
- Workshop was virtual because of Covid-19
- Ranking/prioritization of causal factors was done using Employer and Worker votes only (MLITSD and WSN did not vote)



# Revisiting 2019 Risk Assessment Results: Top 10 Risk Events

Risk Rank	Category	Event (Situation or Condition) that could result in injury or illness OR “What keeps you up at night?”	Risk
1	Lockout	Inadequate/Improper lockout of machine	
2	Occupational Illness	Exposure to dust	
3	Occupational Illness	Exposure to chemical agents (e.g. toxic chemicals, H2S gas, allergenic substances)	
4	Guarding	Exposure to unguarded moving and/or exposed parts on equipment during maintenance	
5	Working at Heights	Falls from height	
6	Maintenance	Structural integrity of building/ceiling falling	
7	Culture	Rushing to get the work done (taking shortcuts)	
8	Maintenance	Maintenance of process lines (i.e. leaks, caustic explosions, etc.)	
9	Guarding	Caught in/crushed by equipment during operations	
10	Environment	Workplace conditions	

# Subject Matter Experts

## Industry, Research, and System Partners Consulted

1	Domtar Management Representative*
2	Domtar Worker Representative*
3	Atlantic Packaging Management Representative*
4	Atlantic Packaging Worker Representative*
5	Rayonier Management Representative*
6	Rayonier Worker Representative*
7	Resolute Worker Representative*
8	Zeev Zaidman – Safe Engineering Representative

\* - Voting participants

9	Sujoy Dey	MLTSD (Prevention)
10	Chelsea Zhao	MLTSD (Prevention)
11	Shantelle Alcindor-Nichol	MLTSD (Prevention)
12	Jerry Traer	WSN/ Workshop Facilitator
13	Doug Brown	WSN/ Workshop Facilitator
14	Tom Welton	Workplace Safety North
15	Tiana Larocque	WSN/Virtual Session Support
16	Brandi Mathias	WSN/Virtual Session Support
17	Tricia Valentim	WSN/Virtual Session Support





## TOP 10 HEALTH AND SAFETY RISKS IN PULP, NEWSPRINT, AND SPECIALTY PAPER SECTOR

As identified by workers, supervisors, and employers in the Ontario pulp and paper industry through a risk assessment workshop facilitated by the Ministry of Labour, Training and Skills Development in partnership with Workplace Safety North.



1. Inadequate or improper lock out of machines.



2. Exposure to dust, especially paper dust.



3. Exposure to chemical agents (e.g. toxic chemicals, H<sub>2</sub>S gas, allergenic substances).



4. Exposure to unguarded moving and exposed parts on equipment during maintenance.



5. Falls from heights.



6. Structural Integrity of building.



7. Rushing to get the work done (taking shortcuts).



8. Leaks in process lines, caustic explosions, etc.



9. Caught in or crushed by equipment during operation.

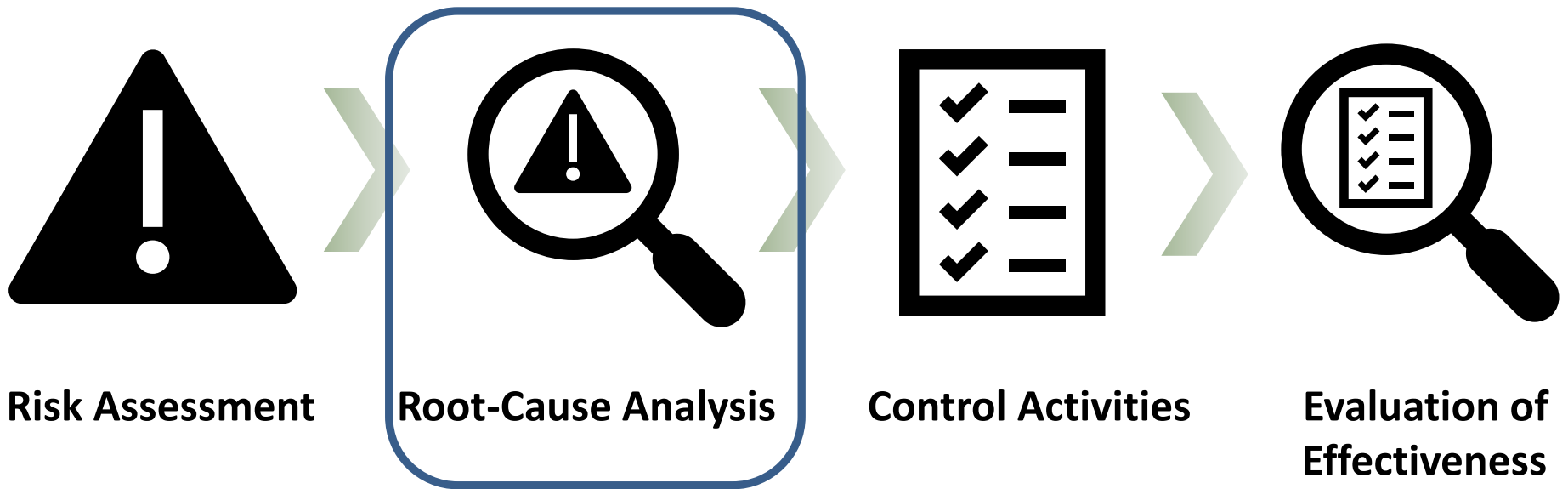


10. Workplace conditions in older buildings.

The internal responsibility system (IRS) is a system, within a workplace, where everyone shares responsibility for occupational health and safety that is appropriate to their role and function within the workplace. All workplace parties — including employers, managers, supervisors, and workers — need to do their part to raise awareness of risks, and follow and promote safety procedures to help make workplaces safer.

For more information, please contact your WSN Health and Safety Specialist or visit [workplacesafetynorth.ca](http://workplacesafetynorth.ca)

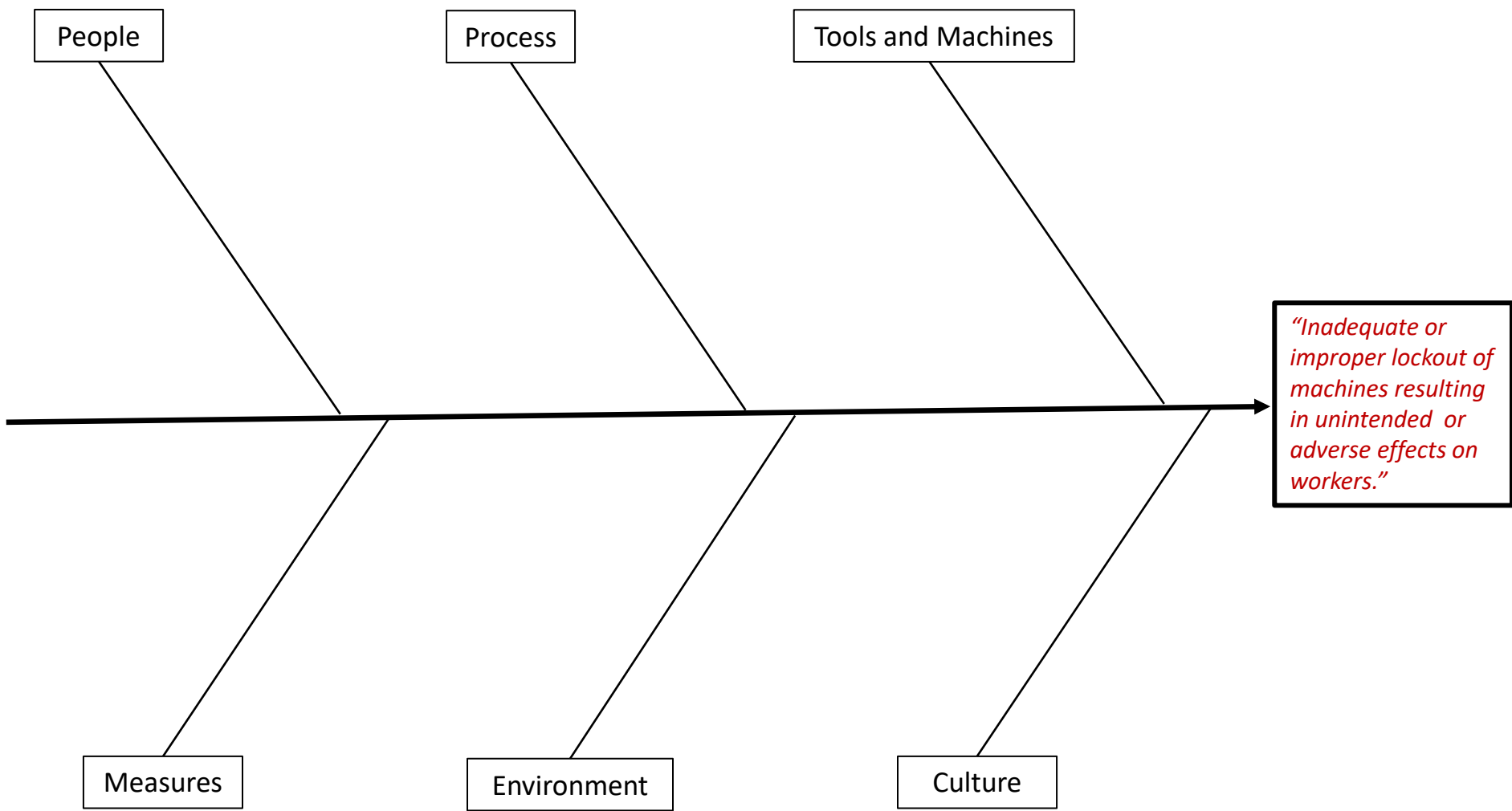
# Evidence Based Approach to Effectively Addressing Workplace Risk



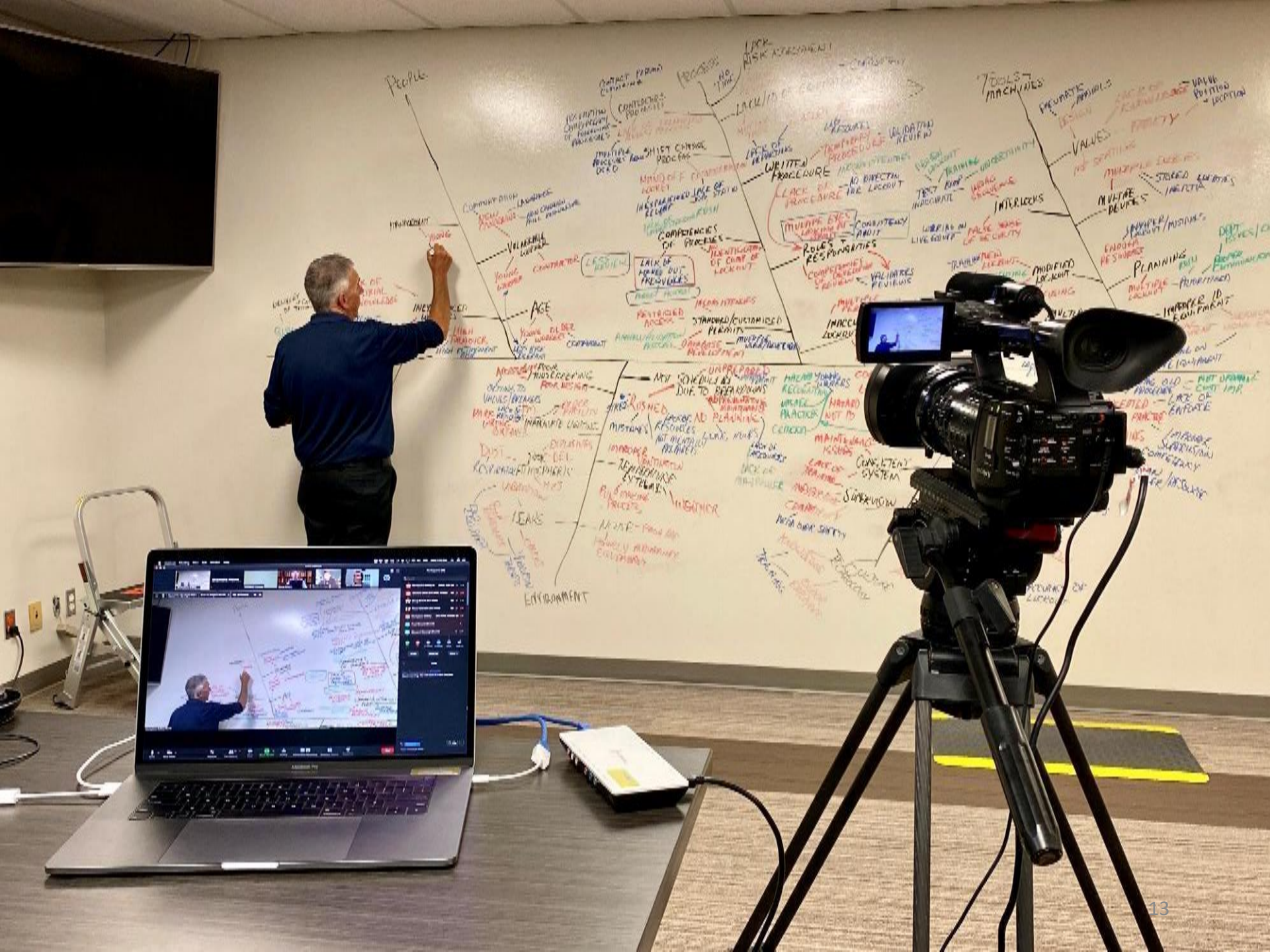
# Root Cause Analysis: Risk Statement

Based on the results of the Pulp and Paper Risk Assessment, the following risk statement was selected by the Workplace Safety North Advisory Committee for Forestry, Paper, Printing & Converting for Root-Cause Analysis using the “**Fishbone**” approach:

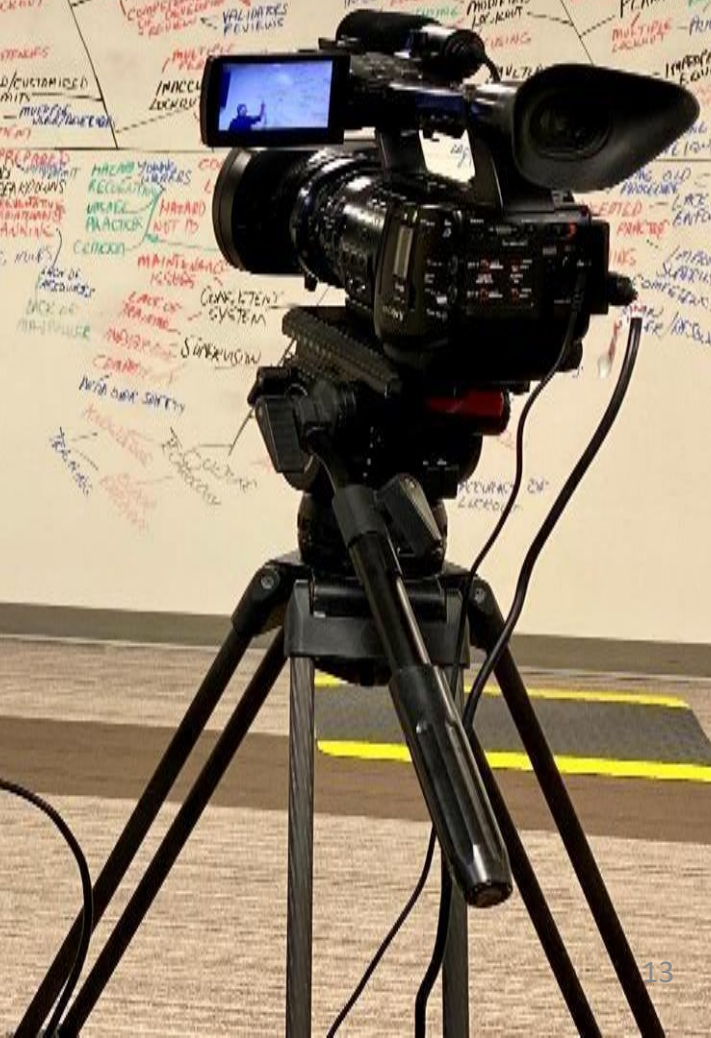
*“Inadequate or improper lockout of machines resulting in unintended or adverse effects on workers.”*

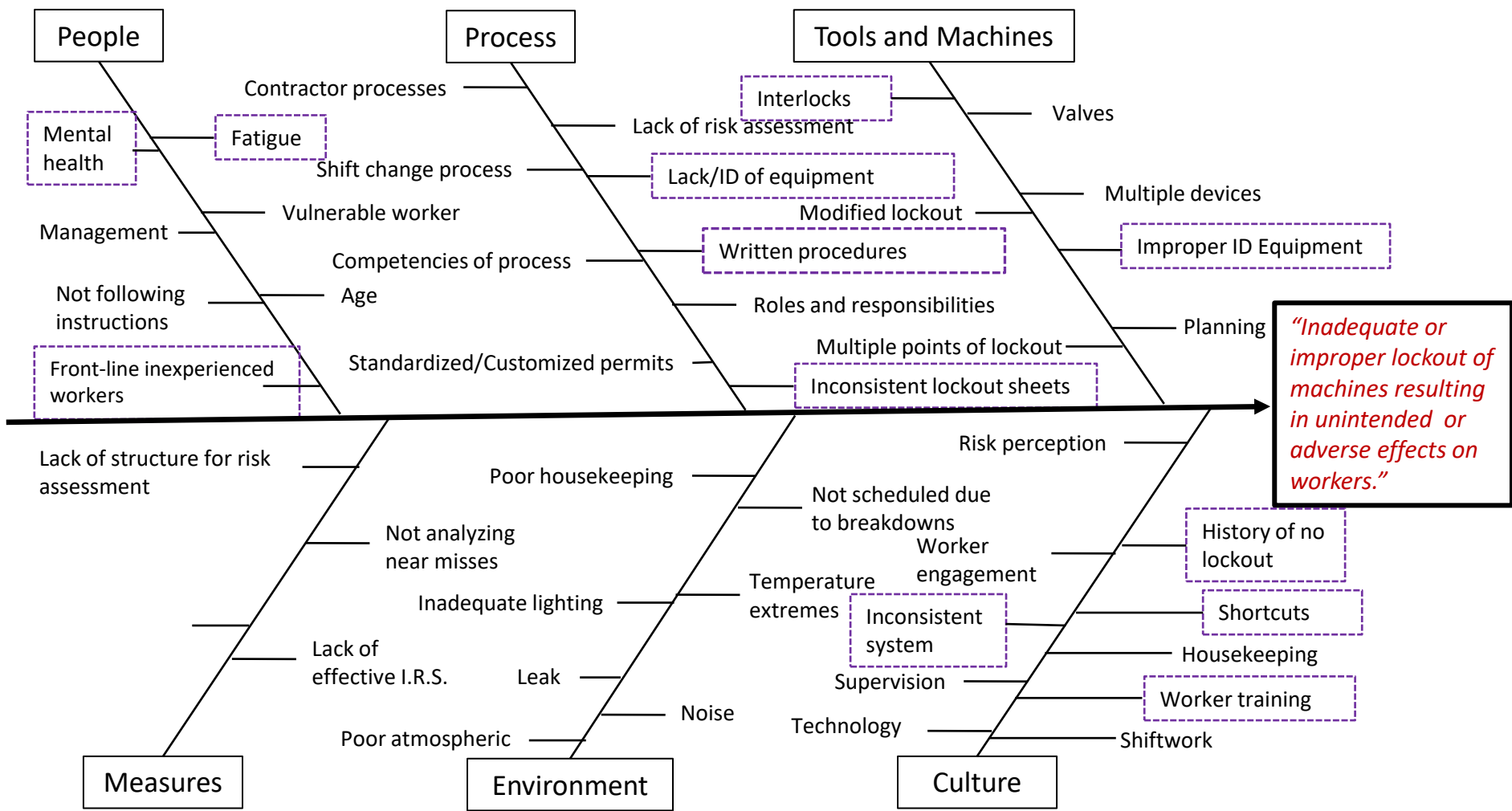






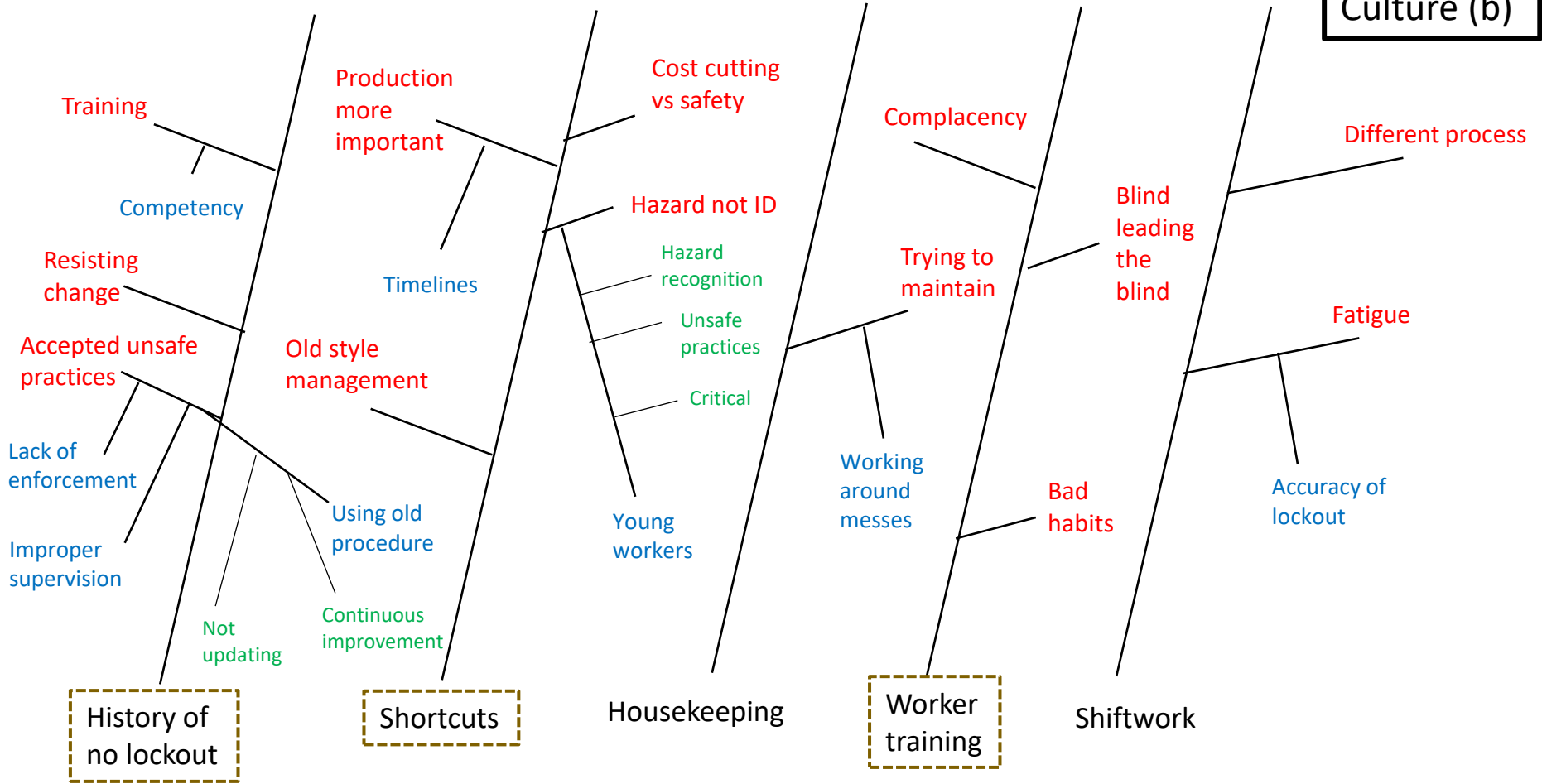
Management  
People  
Process  
Tools/Machines  
Values  
Competencies  
Leak  
Environment





 Top 10 Primary Root-Cause

**Culture (b)**



- Top 10 Primary Root-Cause
- Primary Root-Cause
- Second Level Root-Cause
- Third Level Root-Cause
- Fourth Level Root-Cause

#	Category	Primary Root-Cause	Voter 1	Voter 2	Voter 3	Voter 4	Voter 5	Voter 6	Voter 7	Average
1	Culture	Worker Training/Front Line Inexperienced Worker	5	5	5	5	4	5	5	4.86
2	Tools/Machines, Process	Improper/Lack of Identification of Equipment	5	5	4	5	5	5	4	4.71
3	Process	Written Procedure	5	4	5	5	5	5	4	4.71
4	Process	Inaccurate Lockout Sheet	4	4	5	5	5	5	4	4.57
5	Culture	Shortcuts/Inconsistent Lockout	4	5	5	5	4	4	5	4.57
6	People	Fatigue	4	5	5	4	4	4	5	4.43
7	People	Mental Health	3	4	4	5	4	5	5	4.29
8	People	Vulnerable Workers	5	4	4	5	4	3	5	4.29
9	Culture	History of No Lockout	4	5	3	5	4	5	4	4.29
10	Tools/Machines	Interlocks	4	5	4	4	4	5	4	4.29

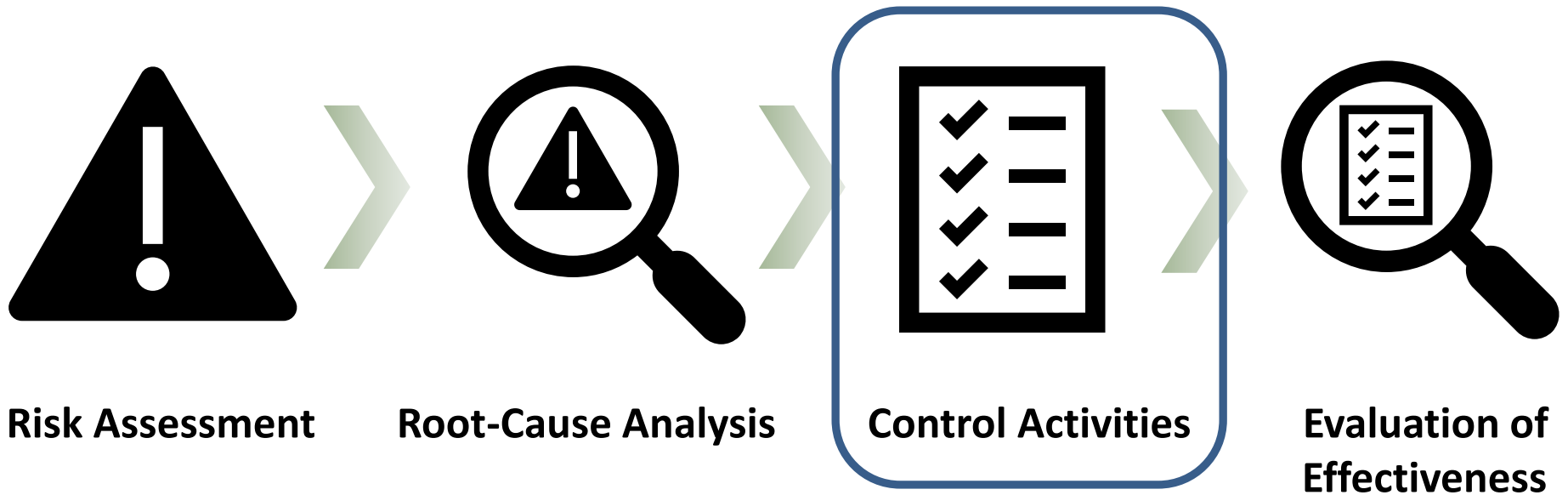


# Top 10 Primary Causal Factors

1. Worker Training/Front Line Inexperienced Workers\*
2. Improper Lockout/Lack of Identification of Equipment\*
3. Written Procedures
4. Inaccurate Lockout Sheet
5. Shortcuts/Inconsistent Lockout\*
6. Fatigue
7. Mental Stress
8. Vulnerable Workers
9. History of No Lockout
10. Interlocks

\* Causal Factors in these cases have two factors that were grouped together into one based on similarities

# Evidence Based Approach to Effectively Addressing Workplace Risk



# 1. Worker Training (Culture) and Front-Line Inexperienced Workers (People)

- a) Competent Trainer
- b) Proper evaluation that training is understood
- c) Effective training program – blended training with classroom and field work
- d) Ensure adequate timelines are developed to minimize rushed training
- e) Annual review
- f) Observation by lead hand – a ‘show-me’ audit – have several different scenarios on what/how to lock-out
- g) Set of standardized corporate guidelines for lock-out training
- h) Training tailored to the type of equipment in the specific plant – based on examples from that plant – Site specific training program – energy types, steam, etc.
- i) Department orientation on lockout process
- j) Explore engineered solutions and artificial intelligence (AI solutions)
- k) Develop a retention program for employees
- l) Better knowledge transfer from experienced employees for new hires – mentorship, shadowing, induction
- m) Formal evaluation of new workers before they are put in positions
- n) Legislative module training for the pulp and paper sector
- o) Having a dedicated trainer for new hires

## 2. Improper Lockout (Tools/Machines)/Lack of Identification of Equipment (Process)

- a) Proper identification of equipment
- b) Yearly audits per facility of the durable tags to make sure there are tags and that they are legible
- c) Maintenance machine files need to be kept up to date
- d) Lockout procedures need to be properly written for each piece of equipment
- e) Logbook that has a map of all the different equipment in the facility for direction and inventory purposes
- f) Standardization of the tagging system so all the tags have the same shape and colour to identify easier
- g) Contents of the piping identified by a colour code– line labelling
- h) Adequate resources i.e. Competent Lock-out Coordinators or role of supervisor or front-line worker job descriptions
- i) Explore engineered solutions and artificial intelligence (AI solutions)

### 3. Written Procedures (Process)

- a) Develop corporate lock-out policy
- b) Annual review of your corporate lock-out policy
- c) Develop site specific work instructions outlining roles and responsibilities and methods of lock-out
- d) Validating of temporary procedures by competent workers -minimum of two
- e) Review process of procedures when there is a process change or incident
- f) Explore engineered solutions and artificial intelligence (AI solutions)

## 4. Inaccurate Lockout Sheets (Process)

- a) Validation is required by competent person(s) in the field
- b) Develop job specific lock-out sheets (outlining roles and responsibilities and methods of lock-out)
- c) Explore engineered solutions and artificial intelligence (AI solutions)

## 5. Shortcuts (Culture)/Inconsistent Lockout (Culture)

- a) Consistently enforcing the lockout policy by all levels
- b) Consistent communication from upper management that safety always goes before production
- c) Awareness workshop for upper management for when they are on the floor, to how to verbally communicate that it is for support only
- d) Set of standardized corporate guidelines for lock-out training
- e) Training tailored to the type of equipment in the specific plant – based on examples from that plant – Site specific training program – energy types, steam, etc.
- f) Department orientation on lockout process
- g) Sustaining consistent lockout through supervisor intervention

## 6. Fatigue (People)

- a) Ensure proper scheduling and manpower to minimize doing lockouts on overtime shifts
- b) Hire more people
- c) Education and training on recognizing the symptoms of fatigue – bring in more manpower if necessary
- d) Education and training for competent supervisors to recognize the symptoms of fatigue
- e) Taking regular breaks to cool down, regroup



# 7. Mental Health (People)

- a) Develop a policy for substance use
- b) Computer based training for all employees for mental health training
- c) Specific training for supervisors on recognizing and dealing with impairment
- d) Basic awareness training to all in the workplace (including how to recognize impairment)
- e) Inventory of safety-sensitive job tasks
- f) Training for management / supervisor to communicate (leadership program) effectively
- g) Mental Health First Aid training for everyone, specifically supervisors as well as union executives, JHSC, and shop stewards
- h) Establish an employee assistance program
- i) Education and training on recognizing the symptoms of fatigue
- j) Establish an employee wellness program – encouraging fitness, healthy diet, lifestyle balance, self-awareness training

## 8. Vulnerable Workers – Young and New Canadians (People)

- a) Incorporate skills-based training and government assistance through module training for vulnerable workers
- b) Educational awareness training on work culture differences
- c) Communicating that it is okay to speak up if you have concerns. (all workers to speak up when they see situations that may impact vulnerable workers)
- d) Create engagement sessions where open discussion occurs
- e) Tolerance training for all, including management
- f) Identify in your workplace what type of vulnerable workers you have – mentorship programs

## 9. History of No Lockout (Culture)

- a) Consistently enforcing the lockout policy
- b) Ensuring the lockouts are in place for the ones that did not have any
- c) Refresher training/review on lockout procedures and incidents
- d) Better communication and sharing of information in the sector
- e) Complete an analysis of why people do not lockout and create an engineering control to solve the issue
- f) Engineering controls to control the hazard energy within the CSA standards

# 10. Interlocks (Tools and Machines)

- a) Safety interlocking systems need to be designed or reviewed by a professional engineer
- b) Conduct a risk assessment and health and safety review to list the tasks that the interlock is designed to protect
- c) Education training for the operator, supervisor, and maintenance personnel on the differences between the functions of interlocks, lockout, and emergency stop, and for specific equipment which have interlocks

# Top 10 root causes of deficient lockout in Ontario pulp and paper operations

## Inadequate or Improper lockout of machines is top health and safety risk

As identified by workers, supervisors, and employers in the Ontario pulp, newsprint, and specialty paper sector through a Ministry of Labour, Training and Skills Development (MLTSD)-facilitated risk assessment and root-cause analysis workshops in partnership with Workplace Safety North.



**1. Lack of worker training and experience**



**6. Fatigue** – shiftwork, lack of staff, workload, long hours



**2. Improper lockout, lack of identification of equipment** - working on wrong or live equipment



**7. Mental health** – stress, fatigue, substance use, anxiety



**3. Lack of written procedure**



**8. Vulnerable workers** - new Canadians, young workers



**4. Inaccurate lockout sheets outlining roles and responsibilities**



**9. History of no lockout** - poor safety culture



**5. Inconsistent lockout, taking shortcuts**



**10. Interlocks** – wrong sequence, live equipment

The internal responsibility system (IRS) is a system where everyone shares responsibility for occupational health and safety that is appropriate to their role and function within the workplace. All workplace parties – including employers, managers, supervisors, and workers – need to do their part to raise awareness of risks, and follow and promote safety procedures to help make workplaces safer.

For a detailed list of critical controls you can put in place, read the technical paper: Root cause analysis report of deficient lockout of machines in Ontario pulp and paper operations.

**For more information, please contact your WSN Health and Safety Specialist or visit [workplacesafetynorth.ca](http://workplacesafetynorth.ca)**

# Lockout/Tagout – Provincial Initiative

This initiative will assist various sectors supported by Workplace Safety North (WSN) in recognizing the:

- current shortcomings with existing lockout training programs
- lack of on-site training consistency
- culture shifts required to ensure the desired elimination of lockout-related incidents

This initiative will leverage the evidence-based approach through industry partnerships and rollouts of a lockout program effectiveness template, awareness sessions, and training and consulting programs.

# Next Steps

- Improve client understanding of lockout-related on-site gaps using assessment tool
- Enhance competency of on-site trainers by providing a Train the Trainer program addressing risk-related content, as well as information on principles of adult learning and instructional technique
- Improved client lockout program engagement, application, and improved workplace culture
- Subject matter expertise will allow for improved resources and guidance to enhance WSN's support of its clients

# How does your Lockout Program measure up?



Workplace Safety North (WSN) conducted a provincial sector-based risk assessment exercise that looked at, **“What keeps you up at night?”**

The number one risk identified in the exercise was “Inadequate or improper lockout of machines resulting in unintended or adverse effects on workers”.

When looking at some of the causal factors of this, we find things like the following:

- Improper/lack of identifying of equipment – wrong equipment/live equipment, lack of reporting
- Interlocks – false sense of security/live equipment
- Inconsistent lockout – lack of training/maintenance
- Worker training – new workers trained by inexperienced instructors
- Shortcuts – cost cutting versus safety, production more important
- History of no lockout – accepted unsafe practices, resisting change
- Inaccurate lockout sheets – wrong information, not up to date
- Written procedures – lack of procedures and only temporary in some cases
- Vulnerable workers – young and/or new workers
- Fatigue/mental health – stress, shiftwork and overworked, unlimited allowed overtime
- Front-line inexperienced workers – high turnover, lack of industrial knowledge, lack of proper training

To put measures in place to mitigate these risks, Workplace Safety North is developing the following:

An assessment tool that will create significant impact on:

- Improving awareness towards key lockout program gaps
- Improved client lockout programs
- Improving the culture of the organization when dealing with lockout

A train the trainer program that focuses on:

- Improving trainers understanding of the principles of adult learning
- Improving on-site trainer competencies
- Improving the experience of workers attending hands on training.

Workplace Safety North is looking for clients that want to assess their lockout program to determine if gaps are present and how to close those gaps to prevent injuries and illnesses, those things that “keep you up at night”.





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

## Questions?

### Contact Workplace Safety North

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