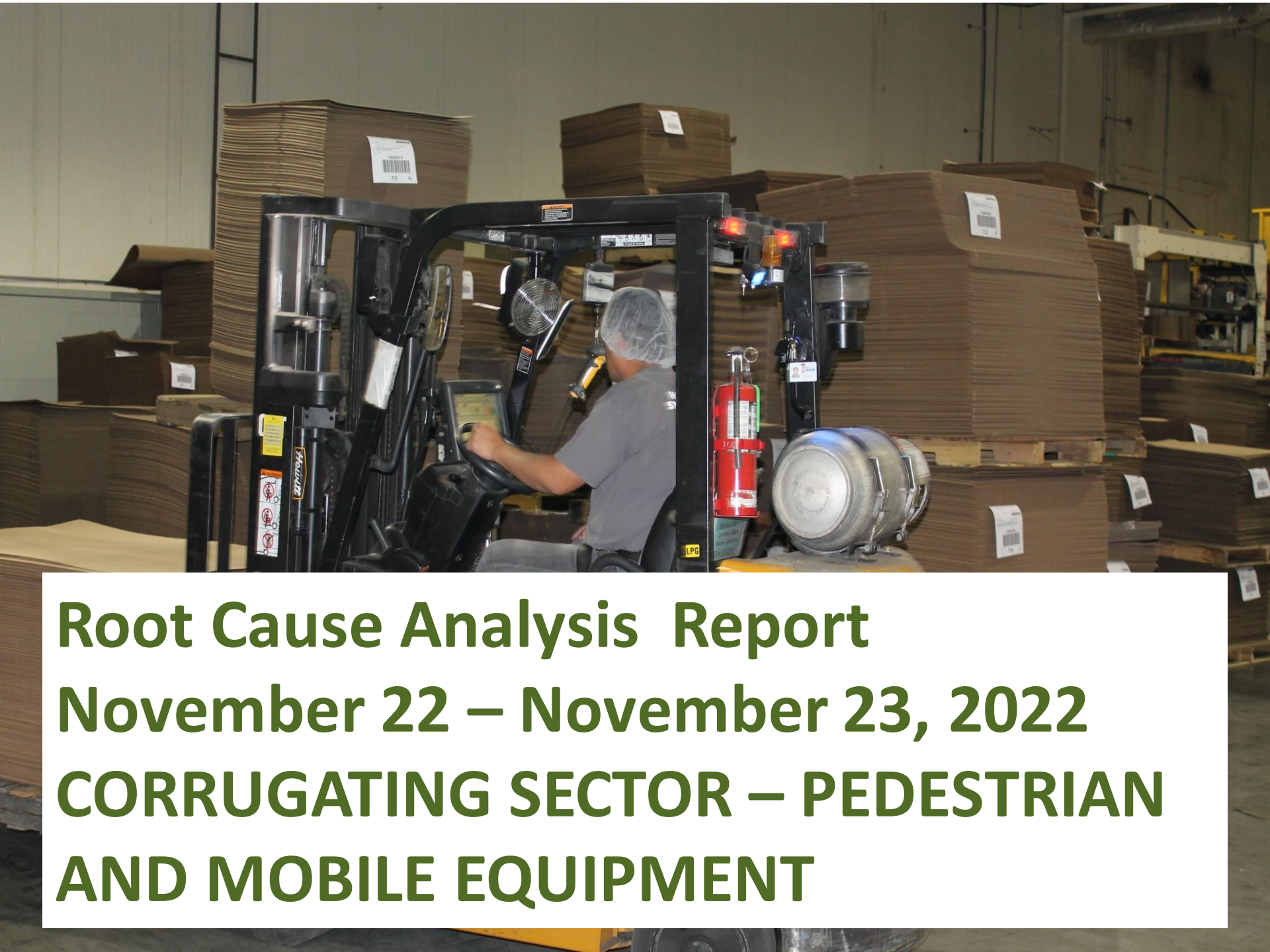
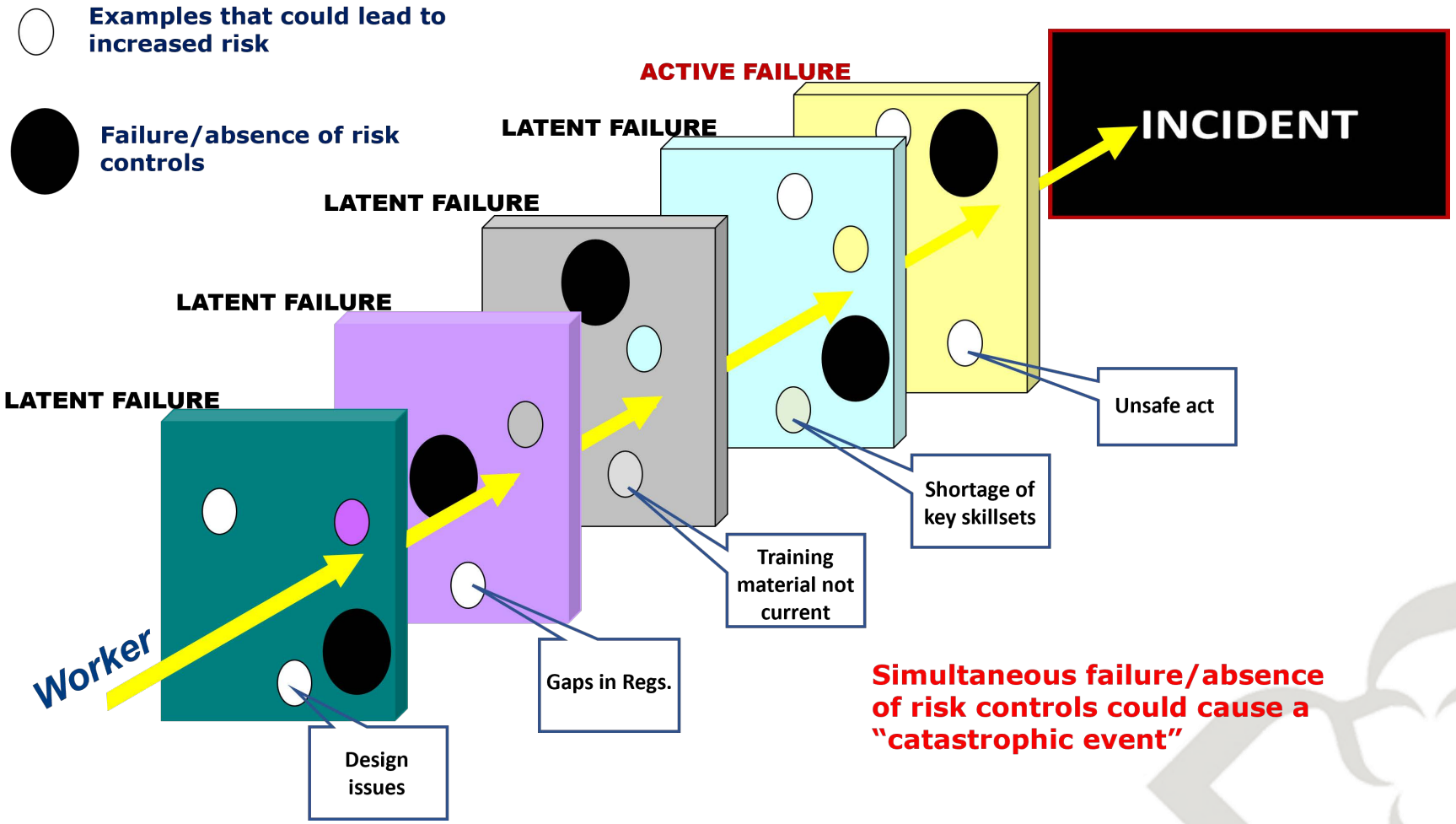


Root Cause Analysis Report
November 22 – November 23, 2022
CORRUGATING SECTOR – PEDESTRIAN AND MOBILE EQUIPMENT

Table of Contents


Examples that could lead to increased risk
Failure/absence of risk controls
ACTIVE FAILURE
LATENT FAILURE
LATENT FAILURE
LATENT FAILURE
LATENT FAILURE
INCIDENT
Unsafe act
Shortage of key skillsets
Training material not current
Gaps in Regs.
Design issues
Worker
Simultaneous failure/absence of risk controls could cause a "catastrophic event"

Revisiting 2022 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/Tagout	Inadequate lockout/tagout resulting in injury	
2	Struck by equipment	Pedestrians struck by mobile equipment	
3	Ergonomics	Ergonomics – injuries to employees	
4	Guarding	Inadequate guarding (equipment that's older with outdate guarding)	
5	Struck by equipment	Improper pedestrian/mobile equipment interaction	
6	Improper storage	Paper roll & inventory storage (wood pallets, finished goods)	
7	Struck by equipment	Caught in/struck by stationary equipment (leading to falls and crush)	
8	Training	Contractor program training and inadequate compliance	
9	Lockout/Tagout	Incomplete due to design constraints (equipment and process issues	
10	Occupational Illness	Occupational illness (repetitive strain injury)	

Root Cause Analysis: Risk Statement

Based on the results of the Corrugating Sector Risk Assessment, the following risk statement was selected by the sector subject matter experts for Root-Cause Analysis using the **"Fishbone"** approach:

"Ineffective control measures between pedestrians and mobile equipment can result in pedestrian injuries."

Note: The number one issue (lockout/tagout) was not used as this was the number one issue for the pulp and paper sector and the results/controls from that process will be utilized by the corrugating sector as well.

Workshop: A Bipartite and Collective Process

- Workshop participants were peer-recognized industry/system experts
- Workshop process was open, transparent and collaborative
- Workshop was virtual for the most part
- Ranking/prioritization of causal factors was done using Employer and Worker votes only (WSN personnel did not vote)

Subject Matter Experts

Industry, Research and System Partners Consulted

Companies Represented	
1	Atlantic Packaging Brampton*
2	Cascades CP Vaughan*
3	Moore Packaging Barrie
4	Atlantic Packaging Corporate
5	Cascades CP Guelph
6	Atlantic Packaging Midwest

9	Jerry Traer	WSN/ Workshop Facilitator
10	Tom Welton	Workplace Safety North
11	Tiana Larocque	WSN/Virtual Session Support
12	Brandi Mathias	WSN/Virtual Session Support
13	Tricia Valentim	WSN/Virtual Session Support

***Management and worker representatives from these locations**

Top 10 Primary Causal Factors

1. Lack of awareness and reaction to workplace hazard cues (e.g. backup alarms, proximity lighting around lift truck, ineffective enforcement of lift truck speed)
2. Lack of traffic management plans
3. Lack of training
4. Lack of enforcement of policies
5. No commitment to put measures in place to mitigate
6. Lack of safety processes
7. Poor work environment (lack of rules/lack of enforcement with high-visibility vests)
8. Lack of/Ineffective policies
9. Improper use of mobile equipment
10. Not learning from incident reports (lack of awareness to take these incidents more seriously)

List of Solutions/Controls for the Top 10 Primary Root Causes

Notes

- Scope of this exercise does not include assessment of listed controls
- This list provides information on specific controls and/or activities that support a control
- Control performance should be specified, observable, measurable and auditable

1. Lack of awareness and reaction to workplace hazard cues (e.g. backup alarms, proximity lighting around lift truck, ineffective enforcement of lift truck speed) (People)

- Training: pre-job risk assessment
  - Ensure this is conducted across the entire work area
  - Utilize as an awareness tool
  - Focus on how to control the hazards; focus on addressing issues in the physical workplace
- Identification of work zones
- Auditing and observation of work area by competent supervisory staff
- Ensuring that proper warning systems are in place (e.g.: blue lights on vehicles, stop signs, mirrors)
- Follow-up post-incident to determine whether cause is lack of attention
- Examination on why there is a lack of attention
  - Root cause analyses: focus on contributors/reasons for lack of attention
- Complete separation of workers from mobile equipment
  - Designated walkways
  - Made explicit in traffic management plan
- Frequent inspection; risk assessment

2. Lack of traffic management plan (Process)

- Complete elimination of possible interaction between equipment and pedestrians
- Lane demarcation; barriers/handrails
- Prohibition of pedestrian entry into traffic laneways
- Establishment of clear processes (in events where interaction between equipment and pedestrians must take place)
  - Pedestrian safety zone policy; traffic management plan
  - Ensure everyone knows and understands this plan
  - Formulate plan according to risk/gap assessment
    - On equipment, on layout; use to define routes, determine whether PPE will assist; ensure lighting and infrastructure is appropriate
    - Base plan on best practices
    - Examine existing processes; traffic flow (frequency of movement to specific areas that create higher risk)
- Training: ensure workers know and understand the plan through appropriate education
- Regulation of traffic speed
  - Development of in-house requirements
  - Consider recommending baseline speed limits to MLITSD for potential addition into legislation
    - Are there numbers that indicate the need for this type of legislation that could be shared?
      - Include near-miss data (events with no substantial damage to person/property but that could have been worse)

3. Lack of training (People)

- Having clearly defined training objectives and how to measure the effectiveness
- Standardized pedestrian training and best practices
- In-house assessment around training and how it is delivered – example like WAH and how audited with quality and consistency of what is being delivered, look at TTT programs including training and auditing components
- Documentation of the in-house training on the job – what are the clear expectations around competency and ensuring that employee receives that training in the workplace

4. Lack of enforcement of policies (Process)

- Increased external pressure – MOL inspector roles and what they are doing and what questions being asked, what are their expectation around enforcement around polices etc. (help minimize the minimal standards)
- Increased internal pressure - Both management and workers are aware of expectations and what the consequences are so no surprises – including consultation
- JHSC and getting them involved – write and review policy, management support understanding risk and monitor effectiveness (through inspections and making recommendations)
- Training important of the supervisors as to why it is being done – as well as the rest of the management team to support it
- Budget constraints pressures impact on enforcement
- Making sure that disciplinary and HR processes can facilitate proper enforcement

5. No commitment to put measures in place to mitigate (Culture)

- Make the priority to eliminate the risk of pedestrian and equipment interaction
- Clear guidelines/policies/procedures on processes on reducing risk
- Management commitment on recommendations from JHSC – action them by management
- Supervisor and worker engagement in the measures to help mitigate

6. Lack of safety processes (Environment)

- Include work planning, risk assessments, engagement in workplace, management commitment
- Having a defined policy or program, training program
- Accident incident investigation – focus on material handling and root cause
- Training on what they don't know and what they should have – you don't know what you don't know – safety awareness training for ALL people in the workplace
- Benchmarking, auditing, observation coaching, looking at overall effectiveness
- Constant reminders, using signage in strategic locations, changing on regular basis to help with focused reminders

7. Poor environment (including lack of rules/lack of enforcement of high visibility vests (Environment)

- Workplace inspections being done on the right basis so you can see housekeeping issues – recommend controls and follow up
- Physical parts: floors, lighting, PPE etc.
- Environment on how people treat each other – respect, interaction, culture so people aren't hesitant to report, so people are engaged,
- Good recognition program - Look at things that people are doing right, not just what is being done incorrect – how workers being treated at workplace – worker to worker, worker to management
- Having realistic expectations of workers and management in the work environment – too much pressure can cause resentment
- Create environment for workers to succeed so they don't take risky chances
- Control of the equipment and who has access/control of it – only qualified people are allowed to operate; does it have the necessary technology it needs

8. Lack of/Ineffective policies (Measures)

- Reviewing the accident investigations to ensure policies are effective (after an incident as well)
- Make sure up to date for Ministry
- Policy reviewed annually – if there is an incident look to see if policy had been reviewed and if any changes should be included and/or added
- Share information and ideas with industry to see what is working for them
- Communication issues with language barriers – coming up with ideas and ensuring worker understanding
- Benchmarking with policies around mobile equipment

9. Improper use of equipment (Tools and machines)

- Ensure regular maintenance and preventative maintenance being done – part of risk assessment – make sure being updated – follow up on regular maintenance to make sure equipment not being misused
- Mobile equipment inventory and what task each equipment is used for – weight capacities, right equipment for the job,
- Training so people aware of limitations and capacities of equipment and the weight of items being picked up
- Proper tools for proper job, awareness for maintenance, rental units,
- Risk assessment of potential of pedestrians interacting with equipment with the job being done

10. Not learning from incident reports (Lack of awareness to take these incidents seriously)(Measures)

- Record keeping - previous years incidences
- Looking at trends that are happening, using stats
- Centralized software system to help analyze trends
- More training on incident investigation
- Sharing internal safety alerts with each other, processes, and outcomes of investigations
- Increased sharing within the sector itself – without fear and without repercussions when sharing externally from outside forces
- Use for safety talks - internal and external, make sure communicated so employees can understand how it could affect them
- Highlighting seriousness of incidences – JHSC monthly talks which include mobile equipment, sharing videos and information on what available from an incident

Next Steps

What should we focus on immediately

- Based on a scan of controls identified for the Top 10 primary causal factors, it would be beneficial, as a start, to focus right away on the following common systemic weaknesses
  - Development of a traffic management gap analysis to recommend a best practice approach to controlling the hazard of pedestrian and mobile equipment interaction within the corrugating sector

Next Steps

What should we focus on immediately

- Development of a training course focusing on the following topics
  - Responsibility and accountability of setting up a traffic management system/process
  - Enforcement of the traffic management system/process
    - Auditing of work areas by supervisory staff
    - Inspections of work areas by JHSC Members
  - Control options
    - Work zones (identifying areas where interaction is limited)
    - Proper warning systems (blue lights, mirrors, stop signs, designated walkways and driving areas)
- Increase among workplace parties a heighten awareness of pedestrian and mobile equipment interaction

Appendix A

Risk Assessment Methods/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 (or 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 Error Analysis (HEA)
23. Human reliability analysis
24. Job Safety Analysis (JSA)
25. Level of Protection Analysis (LOPA)
26. Markov analysis
27. Monte Carlo Analysis
28. Preliminary Hazard Analysis (PHA)
29. Reliability centered maintenance
30. Scenario analysis
31. Sneak circuit analysis
32. Structured/semi-structured interviews
33. SWIFT (i.e. structured what-if)
34. Systemic Cause Analysis Technique (SCAT)
35. Workplace Risk Assessment and Control (WRAC)

Risk Management Standards:

1. Risk Management Principles and Guidelines (ISO 31000:2018)
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)
6. Global Minerals Industry Risk Management (GMIRM)
7. International Council on Mining & Metals (ICMM)

Appendix B
Workshop Contacts

- For additional information or questions, please contact:

Tom Welton, CRSP
Director, Prevention Services and Education
Workplace Safety North
tomwelton@workplacesafetynorth.ca

Jerry Traer, CRSP, CHSC
Program Training Specialist
Workplace Safety North
jerrytraer@workplacesafetynorth.ca

Appendix C

Poster: Top 10 Health and Safety Risks in Ontario Corrugating Sector

Top 10 health and safety risks in corrugating sector

Inadequate lockout-tagout is top health and safety risk

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

1. **Inadequate lockout-tagout resulting in injury**
2. **Pedestrian struck by mobile equipment**
3. **Ergonomics - injuries to workers**
4. **Inadequate guarding** (older equipment with outdated guarding)
5. **Improper pedestrian and mobile equipment interaction**
6. **Improper storage of paper roll and inventory** (wood pallets, finished goods)
7. **Caught in or struck by stationary equipment** (leading to falls and crush)
8. **Contractor program training and inadequate compliance**
9. **Incomplete lockout and tagout due to design constraints** (equipment and process issues)
10. **Occupational illness** (repetitive strain injury)

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 more information, please contact your WSN Health and Safety Specialist or visit workplacesafetynorth.ca

Workplace Safety North

1-888-730-7821 Toll-free Ontario
705-474-7233
workplacesafetynorth.ca

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