COLLECTIVE COMMITMENT TO A SAFER INDUSTRY

2024 WOOD PELLET & BIOENERGY SAFETY SUMMIT

November 5, 2024 | Prince George, BC

WOOD PELLET ASSOCIATION OF CANADA

BC Forest Safety
Safety is good business

WORK SAFE BC

MEDIA SPONSOR CANADIAN BIOMASS

Wood Pellet & Bioenergy Safety Summit

WPAC SAFETY COMMITTEE PROJECTS: 2024 AND BEYOND

WOOD PELLET ASSOCIATION OF CANADA

Julie Griffiths
November 5, 2024

WPAC SAFETY COMMITTEE

- Established in 2014
- Initial focus on combustible dust.
- Expanded to all H&S matters, including lockout tagout, working at heights, confined spaces and process safety
- Progressive safety projects that reflect and respond to needs of sector
- Work closely with WorkSafeBC and BC Forest Safety Council

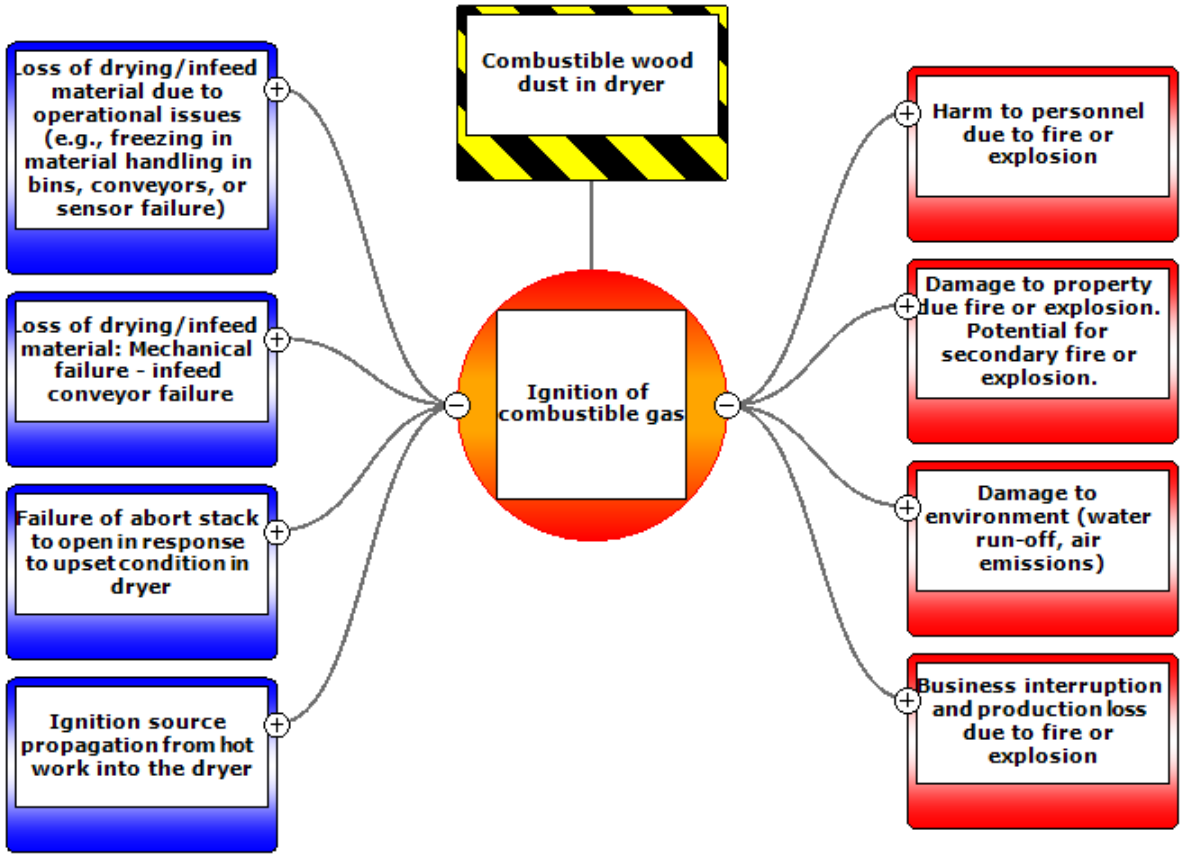
One-Stop Safety Resource

WPAC SAFETY COMMITTEE

- Connect with us at monthly 1-hr meeting
- Members are primarily from wood pellet and biofuel industry, UBC, WPAC, Forest Safety Council
- Meetings include:
  - Safety share
  - Scenario and discussion
  - Opportunity for industry discussions
  - Updates to ongoing projects & info sharing
  - Review of new industry requirements or government initiatives

PAST INITIATIVES

- CCM was 1st sustained PSM initiative
- Key outcomes:
  - Improved understanding of operational hazards and ensuring effectiveness of safeguards.
  - Bowtie analyses now developed for most plant processes.



Credit: Obex Risk, WPAC, BCFSC, Premium Pellet Ltd.

PAST INITIATIVES

- Inherently safer design (ISD)
- Belt dryer working group
- Deflagration isolation
- Combustible gas

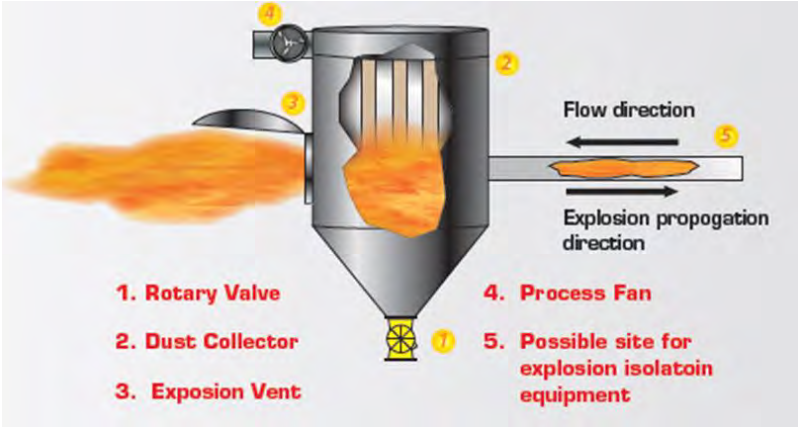
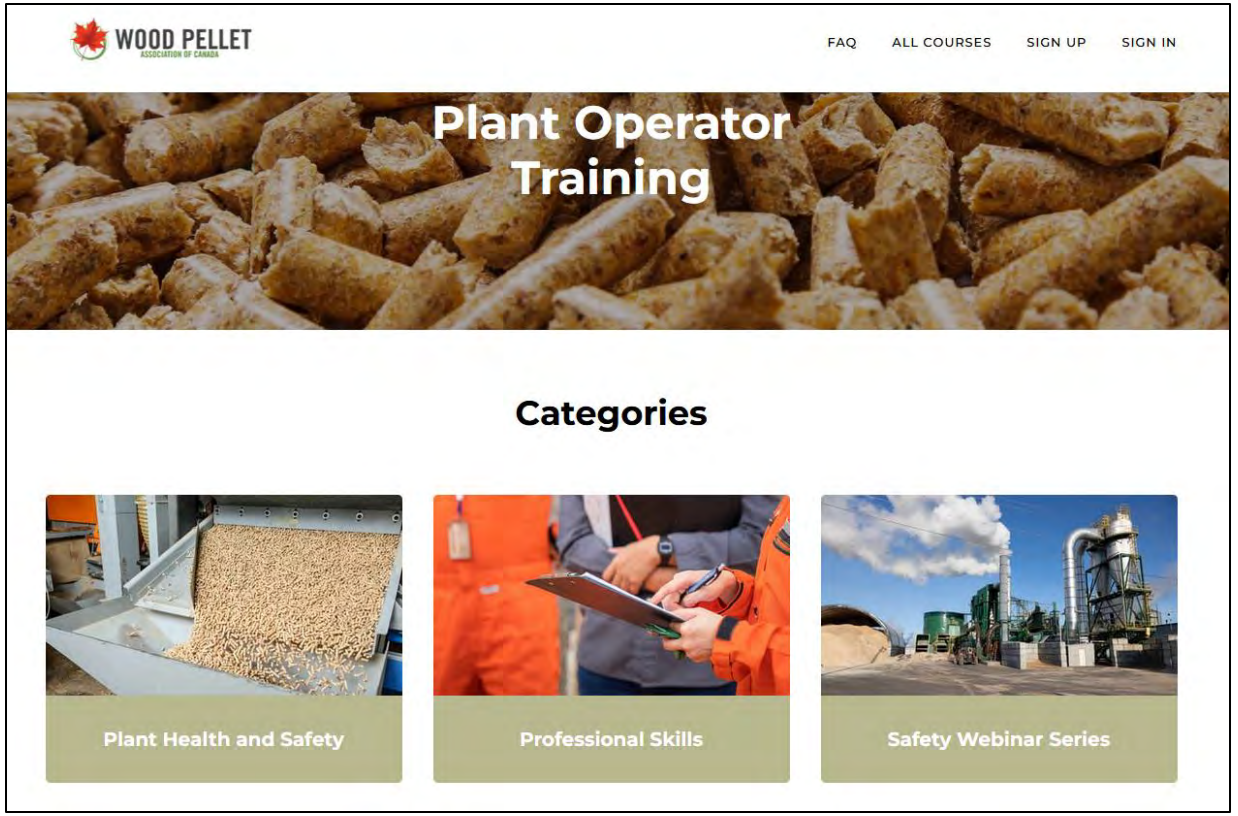


Photo Credit: CV Technology

Pellet.org/safety

PAST INITIATIVES

- Developed by operations for operations.
- Free state-of-the-art online learning platform with 17 modules for operators and supervisors.
- Webinar and factsheet to onboard new learners.



wpaclearning.com

2024 WORK PLAN INITIATIVES

Rotary Drum Dryer Safety

Symposium

↓

Working Group

↓

Safer SOPs & Recommendations

↓

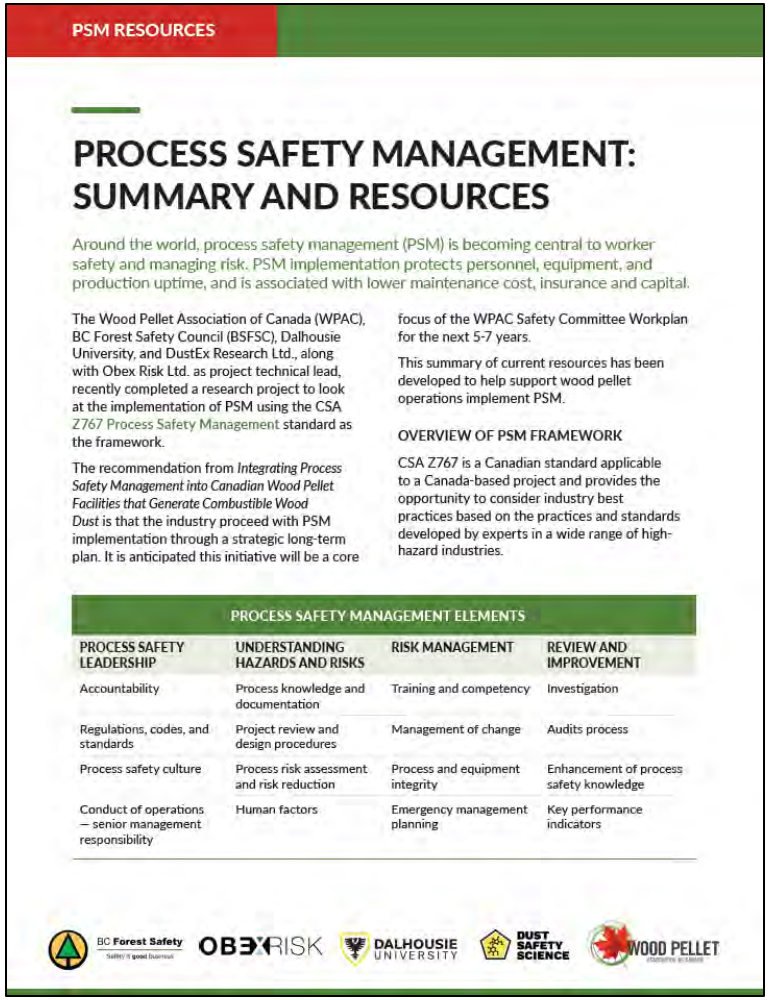
Share learnings

2024 WORK PLAN INITIATIVES

Process Safety Management

OUR COMMITMENT

Implementation of process safety management (PSM) may vary in both detail and time in different facilities. However, in recognition of the essential role PSM principles and approaches play in the management, sustainability, and safety of our industry, we commit to working to integrate an effective PSM system for the prevention of incidents.



PSM RESOURCES

PROCESS SAFETY MANAGEMENT: SUMMARY AND RESOURCES

Around the world, process safety management (PSM) is becoming central to worker safety and managing risk. PSM implementation protects personnel, equipment, and production uptime, and is associated with lower maintenance cost, insurance and capital.

The Wood Pellet Association of Canada (WPAC), BC Forest Safety Council (BSFSC), Dalhousie University, and DustEx Research Ltd., along with Obex Risk Ltd. as project technical lead, recently completed a research project to look at the implementation of PSM using the CSA Z767 Process Safety Management standard as the framework.

The recommendation from *Integrating Process Safety Management into Canadian Wood Pellet Facilities that Generate Combustible Wood Dust* is that the industry proceed with PSM implementation through a strategic long-term plan. It is anticipated this initiative will be a core focus of the WPAC Safety Committee Workplan for the next 5-7 years.

This summary of current resources has been developed to help support wood pellet operations implement PSM.

OVERVIEW OF PSM FRAMEWORK

CSA Z767 is a Canadian standard applicable to a Canada-based project and provides the opportunity to consider industry best practices based on the practices and standards developed by experts in a wide range of high-hazard industries.

PROCESS SAFETY MANAGEMENT ELEMENTS

PROCESS SAFETY LEADERSHIP	UNDERSTANDING HAZARDS AND RISKS	RISK MANAGEMENT	REVIEW AND IMPROVEMENT
Accountability	Process knowledge and documentation	Training and competency	Investigation
Regulations, codes, and standards	Project review and design procedures	Management of change	Audits process
Process safety culture	Process risk assessment and risk reduction	Process and equipment integrity	Enhancement of process safety knowledge
Conduct of operations — senior management responsibility	Human factors	Emergency management planning	Key performance indicators

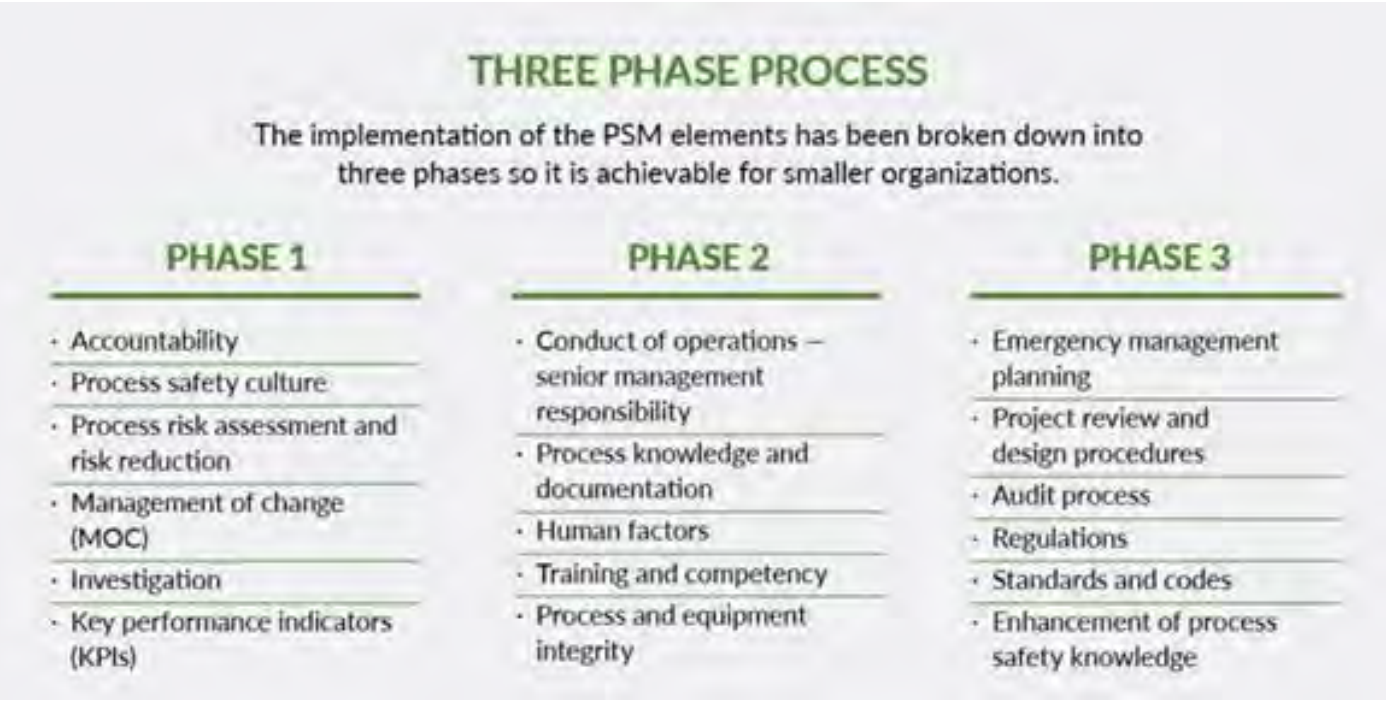
BC Forest Safety · OBEX RISK · DALHOUSIE UNIVERSITY · DUST SAFETY SCIENCE · WOOD PELLET

2024 WORK PLAN INITIATIVES

Process Safety Management

(via IAW2 Research Project & Industry Commitment)

Steering Committee
↓
Develop Implementation Guideline
↓
Self-Assessment Worksheets
↓
Key Performance Indicators/Metrics
↓
Gap Analysis Worksheets
↓
Develop/Support implementation of Phase 1



THREE PHASE PROCESS

The implementation of the PSM elements has been broken down into three phases so it is achievable for smaller organizations.

PHASE 1

- Accountability
- Process safety culture
- Process risk assessment and risk reduction
- Management of change (MOC)
- Investigation
- Key performance indicators (KPIs)

PHASE 2

- Conduct of operations — senior management responsibility
- Process knowledge and documentation
- Human factors
- Training and competency
- Process and equipment integrity

PHASE 3

- Emergency management planning
- Project review and design procedures
- Audit process
- Regulations
- Standards and codes
- Enhancement of process safety knowledge

ONGOING SAFETY INITIATIVES

Mobile Equipment Bowtie

New WorkSafeBC Combustible Dust Regulation

- Assess compliance and ID gaps to reach compliance

2024 Wood Pellet & Bioenergy Summit

Semi-Annual meetings with WSBC

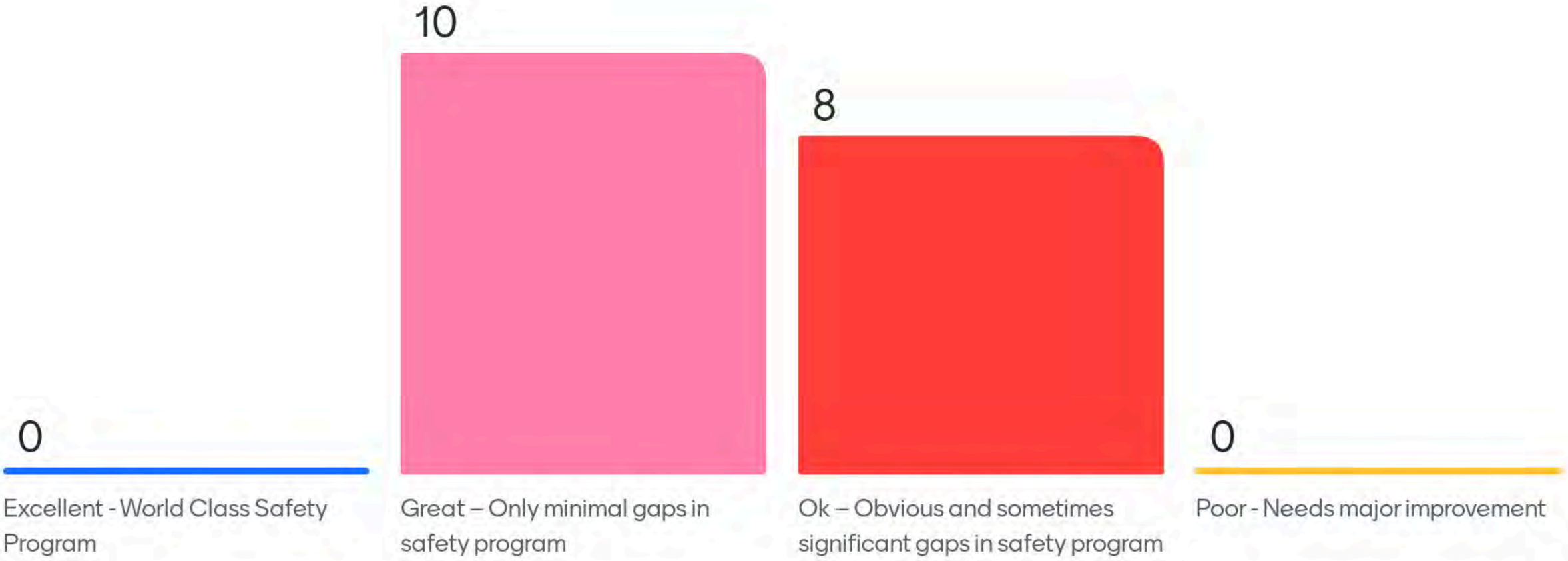
Safety Hero

WPAC SAFETY COMMITTEE COMMITMENT

- Safer industry
- Greater cooperation across industry
- Improved reputation with public and regulators

pellet.org/safety

How would you rate your plant for safety? If you don't work at a plant, from your experience, how would you rate our sector?



6 18

What areas does your company or our sector in general need to work on to improve this rating?

PSM

Dust cleanup

PSM buy in

Process safety

Time and money

Inherently safer by design - including the right people

Fugitive Dust management from process

Management of change

1

17

What areas does your company or our sector in general need to work on to improve this rating?

Consistent execution of principles.

Risk assessment, implement control measures, investment of resources

Behaviour based initiatives

Fully implement PSM and OHS management system

Engineering sign-off

Support for mental health and MSIs

Awareness, enployee integration, sharing across sectors

Communication, buy in from all employees

What areas does your company or our sector in general need to work on to improve this rating?

Behaviour

PSM

MOC

Participation

Empowering boots on the ground to share

Mental health

1

17

Are there other safety initiatives or topics that you would like to see the WPAC Safety Committee focus on?

Between batch furnace cleaning

Mental health

Mental Health

Psychological health and safety

BBS

Benchmarking

Preventive maintenance

Doing great at what we have committed to

Are there other safety initiatives or topics that you would like to see the WPAC Safety Committee focus on?

Psychological injury from. Shift work.

Preventative maintenance as a prevention tool

Mental health

incident investigation

Psycological Health

Worker engagement


WOOD PELLET
ASSOCIATION OF CANADA

Wood Pellet & Bioenergy Safety Summit

WPAC'S COMMITMENT TO PROCESS SAFETY MANAGEMENT (PSM)

WOOD PELLET ASSOCIATION OF CANADA

Fahimeh Yazdan Panah / Julie Griffiths
Tuesday, November 05, 2024

AGENDA

- Process Safety Management (PSM)
- PSM Implementation Foundation – Research Findings
- PSM Implementation Strategy
- Project Roadmap
- Introduction: *Self-Assessment Worksheets* and *Guideline*

Photo Credit: WPAC, Premium Pellet Ltd.

PROCESS SAFETY MANAGEMENT (PSM)

- Focused on preventing catastrophic events that are typically low frequency but high impact. Often, these are the kinds of events that are reported in the media and receive negative public attention.
- Application of management principles and systems to the identification, understanding and control of process hazards to prevent process-related injuries and incidents.
- Needed to manage combustible dust hazards.
- Mainstream: best practice used by broad range of sectors including oil and gas, food product manufacturing, chemical production and transportation, and mining.

PROCESS SAFETY VERSUS PERSONAL SAFETY (ADAPTED FROM CSB, 2016)

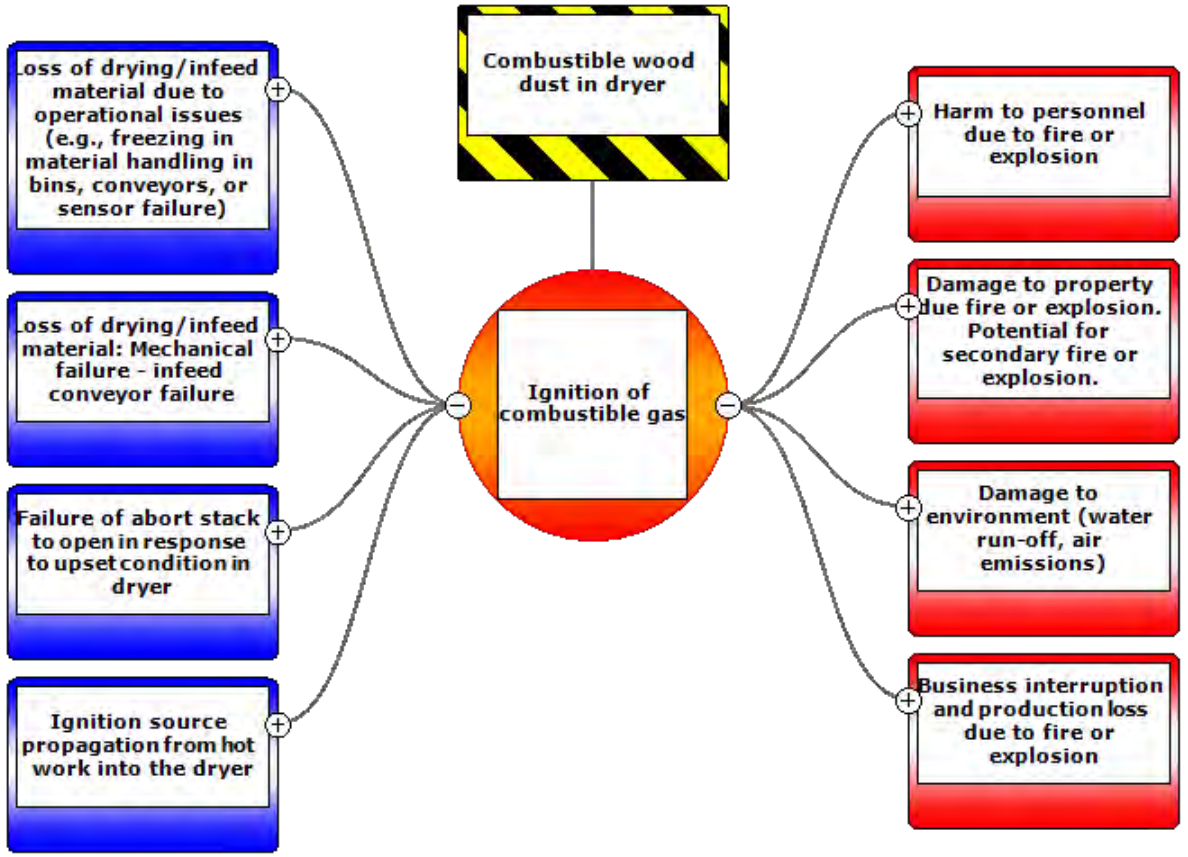
	Process Safety	Personal Safety
Scope	Complex technical systems	Individual workers and injuries
Prevention	Management systems for design, mechanical integrity, hazard evaluation, management of change	Procedures, training, personal protective equipment (PPE)
Risk	Events with potential for catastrophic outcomes (injuries, fatalities, environmental, property, business interruption)	Slips, trips and falls, musculoskeletal injuries (MSI), electrocution, struck-by mobile equipment
Primary actors	Executives, engineers, managers, operations personnel	Frontline workers, supervisors, managers
Examples of leading and lagging safety indicators	Material releases, inspection frequency, PSM action closures, maintenance backlog	Recordable injury rate, days away from work, refresher training

PSM PROVIDES NUMEROUS BUSINESS BENEFITS

- Prevents catastrophic loss
- Increases productivity by using a disciplined process
- Proven to reduce costs
- Enhances relationships and protects reputation
- Reduces downtime
- Contributes to sustainable growth
- Protects affordable access to insurance

PROCESS SAFETY AND CRITICAL CONTROL MANAGEMENT (CCM)

- Critical control management (CCM) project completed as part of WorkSafeBC Process Safety Initiative
- Helped industry understand:
  - Most significant process safety risks
  - Controls in place to manage these risks
  - Operational practices to ensure reliability
- Completed through collective commitment
- Aligned with PSM



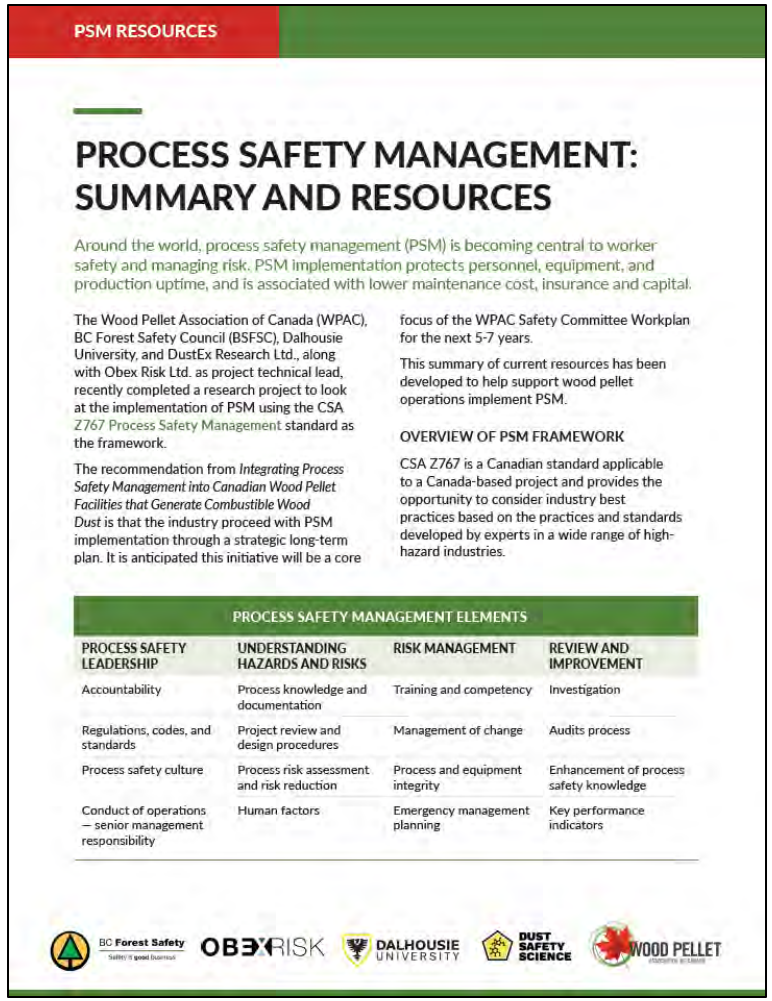
Credit: Obex Risk, WPAC

IMPLEMENTATION FOUNDATION: PSM RESEARCH PROJECT

- "*Integrating Process Safety Management into Canadian Wood Pellet Facilities that Generate Combustible Wood Dust*"
- Project Objective: Enhance process safety in operations by developing PSM integration tool that serves as foundation for industry-led implementation
- Project Outcomes: PSM best practices, implementation tools and strategy based on CSA Z767 *Process Safety Management* standard

[Full Project Report]

[Project Summary]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Conduct of operations — senior management responsibility	Human factors	Emergency management planning	Key performance indicators

This project was funded by WorkSafeBC under an Innovation at Work grant. The views, findings, opinions, and conclusions expressed herein do not represent the views of WorkSafeBC.

PSM FRAMEWORK (CSA Z767)

Process Safety Management Elements			
Process safety leadership	Understanding hazards and risks	Risk management	Review and improvement
Accountability	Process knowledge and documentation	Training and competency	Investigation
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Credit: CSA (2017)

RESEARCH OUTCOMES AND FINDINGS

- *We are further ahead than we think*: Each PSM element in CSA Z767 was present in operations in varying degrees of formalization and completeness.
- To formalize elements and close gaps, PSM gap analysis tools, industry best practices, informative factsheets, and an implementation strategy were developed.
- High-priority PSM elements were identified, and a phased approach (with site-specific flexibility) to implementation was developed to make the process easier for industry.

Phase 1

- Accountability
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Phase 2

- Conduct of operations
- Process knowledge and documentation
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Phase 3

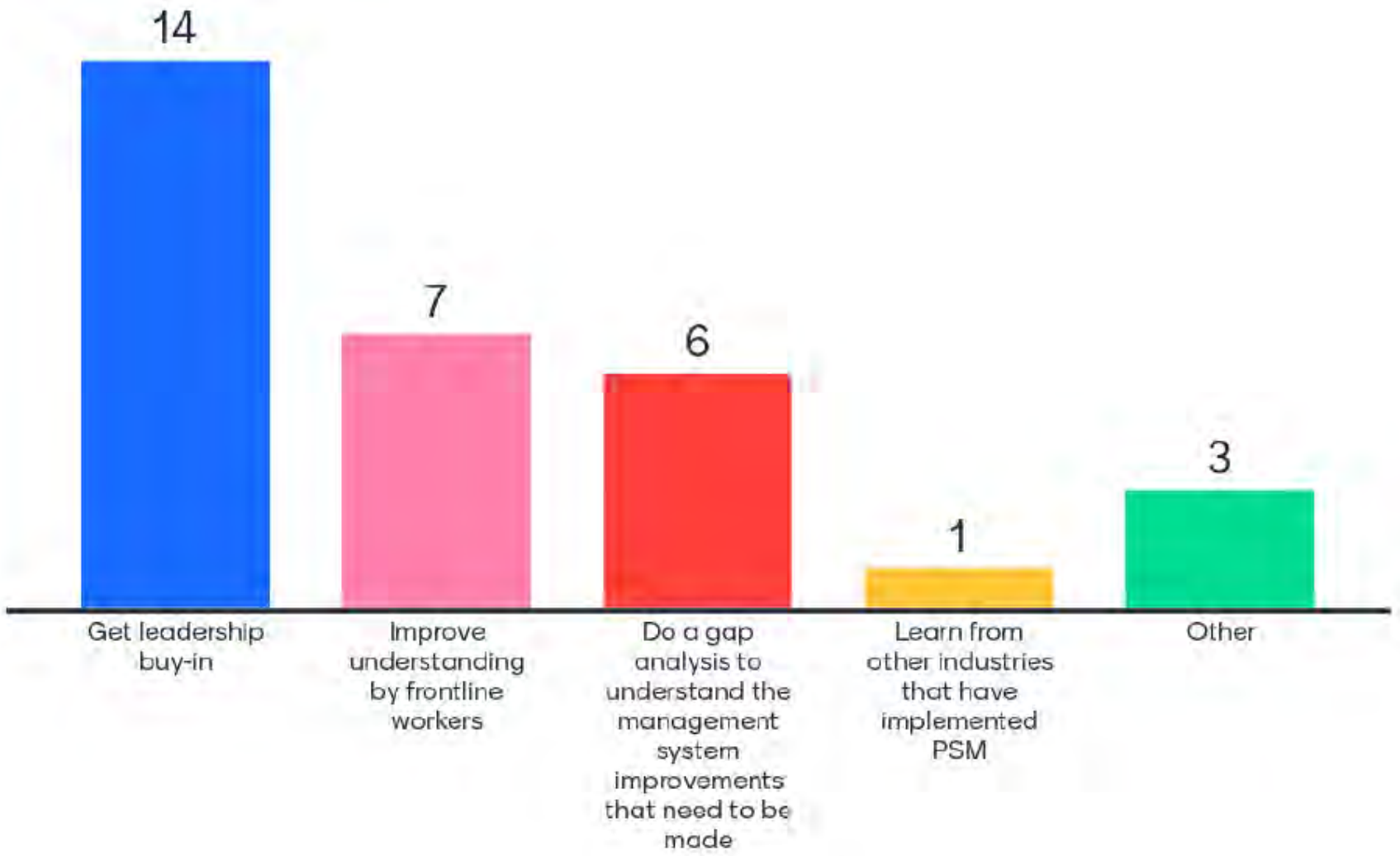
- Emergency management planning
- Project review and design procedures
- Audit process
- Regulations
- Standards and codes
- Enhancement of process safety knowledge

PLANT FEEDBACK

- Nov. 15th Safety Summit in Prince George, BC
- Attended by approximately 50 participants
- When participants were asked why they wanted to attend, the vast majority responded: "*To learn more about process safety*"

PLANT FEEDBACK

"What do we need to do to keep up with process safety?"



PROCESS SAFETY MANAGEMENT (PSM) IMPLEMENTATION

Objective:

Develop resources and provide guidance to help WPAC members integrate PSM (based on the CSA Z767 process safety management standard) into their organizations.

Deliverables:

Documentation (examples of policies, programs, and procedures), online resources, and workshops to help companies implement PSM.

PSM IMPLEMENTATION
WHAT HAVE WE DONE SO FAR?

1. Established commitment statement and sign-off
2. Communicated commitment publicly and to the regulator
3. Formed a PSM steering committee
4. Reviewed and adopted CSA Z767
5. Formalized workplan
6. Evaluate present status (Gap analysis)

COMMITMENT STATEMENT

The Wood Pellet Association of Canada and its members place the highest priority on workers' safety and health and does so by committing to continuous improvement and exploring and advancing effective and practical safety initiatives and achievable outcomes.

Around the world, process safety management (PSM) is an important tool in improving worker safety and managing risk. We recognize that PSM is moving forward in Canada through the Canadian Standards Association's CSA Z767 PSM standard.

COMMITMENT STATEMENT

WPAC members are committed to adopting and integrating the standard over the next five to seven years to:

1. **Create safer work environments:** implementing systems that prevent injuries, avoid major losses and environmental damage.
2. **Establish a Canadian Wood Pellet Approach:** understanding, testing and implementing the CSA Z767 PSM standard to ensure it is both practical and achievable, and reflects the unique needs of Canada's wood pellet sector and local, provincial and national laws and regulations.
3. **Advance Process Safety Management:** creating a project management team which is guided by a steering committee that meets regularly to provide input and review key information, monitor progress, and ensure accountability.
4. **Enhance reputation:** improving workplace safety is the foundation of WPAC's commitment to safety and positions our sector as responsible employers and good corporate citizens.
5. **Improve Business Flexibility**: investing in safer workplaces reduces downtime and maintenance costs, boosts productivity, increases shareholder value and protects affordable access to insurance.
6. **Demonstrate Leadership Excellence:** embracing and communicating PSM at all levels to reinforce safety culture and demonstrate our commitment to walking the talk when it comes to safety.

WPAC members have earned a reputation for exploring, identifying and embracing opportunities to improve safety. We share our learnings across our membership, our sector both domestically and internationally, and with other manufacturing sectors.

PSM STEERING COMMITTEE

Mission:

Serve as multidisciplinary team to provide input on project deliverables and resources, and insights to help with decision-making.

Members:

- Co-chairs
- Industry representatives
- WPAC and BCFSC representatives
- Communications support
- PSM implementation project technical lead

CSA Z767 PROCESS SAFETY MANAGEMENT STANDARD

Process Safety Management Elements			
Process safety leadership	Understanding hazards and risks	Risk management	Review and improvement
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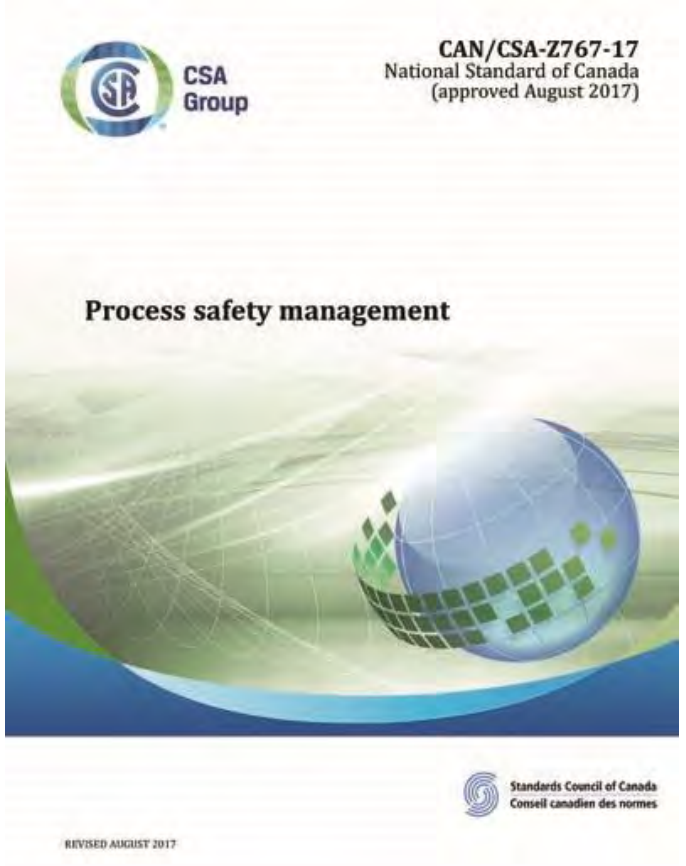
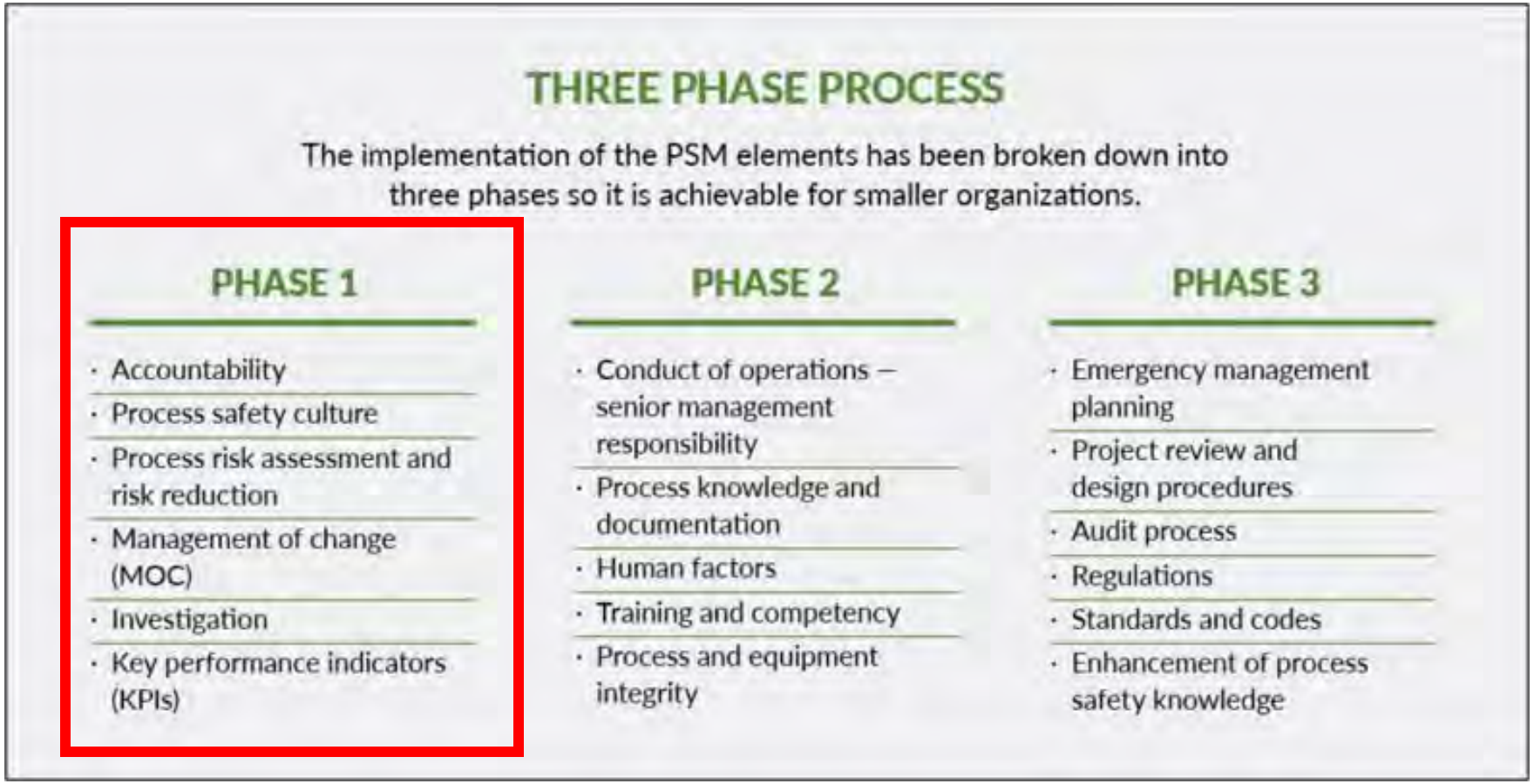
Credit: CSA (2017)



PSM ELEMENT PHASES: PHASE 1



IMPLEMENTATION STRATEGY

Communicate and evaluate research outcomes; provide recommendations and gain consensus from stakeholders on the next actions.

Establish PSM Steering Committee, who will provide input on workplans, timelines and material and process development.

Develop process to provide ongoing support across the industry.

Develop implementation guide, workplan and milestones.

Develop self-assessment worksheets for each of the PSM elements.

Develop additional resources with input from operations based on their needs.

Complete qualitative gap analysis against CSA Z767 standard using the self-assessment sheets.

Develop action plans and other tools and resources to address identified areas for improvement.

Create library of PSM policies and procedures for operations to refer to and adapt accordingly.

Develop PSM implementation, site-specific and industry benchmarking process safety KPIs to monitor and report out on progress.

Develop additional guidance and resources to support operations for determining the effectiveness of PSM element implementation, as part of the Plan-Do-Check-Act cycle.

PROJECT ROADMAP

PSM implementation plan 2024-2025 (short-term)

Objective:	**Deliverables:**	**Metrics/KPIs:**	**Team:**
Provide resources and guidance to help WPAC members integrate PSM into their organizations.	Updated policies, programs, and procedures aligned with the CSA Z767 process safety management standard.		**Co-chair:** Fahimeh Yazdan Panah (WPAC), Industry Jeff Johnston, Drax **WPAC:** Fahimeh Yazdan Panah / Gordon Murray **BCFSC:** Bill Laturnus **Industry Representatives:** Jason Stockall (Drax), Frank Wall (Premium Pellet), Julie Griffiths (Shaw Renewables), Philippe Landry (Grand River), Amanda Fee (WestPine) **Technical Lead:** TBD **Communications Support:** Jennifer Raworth

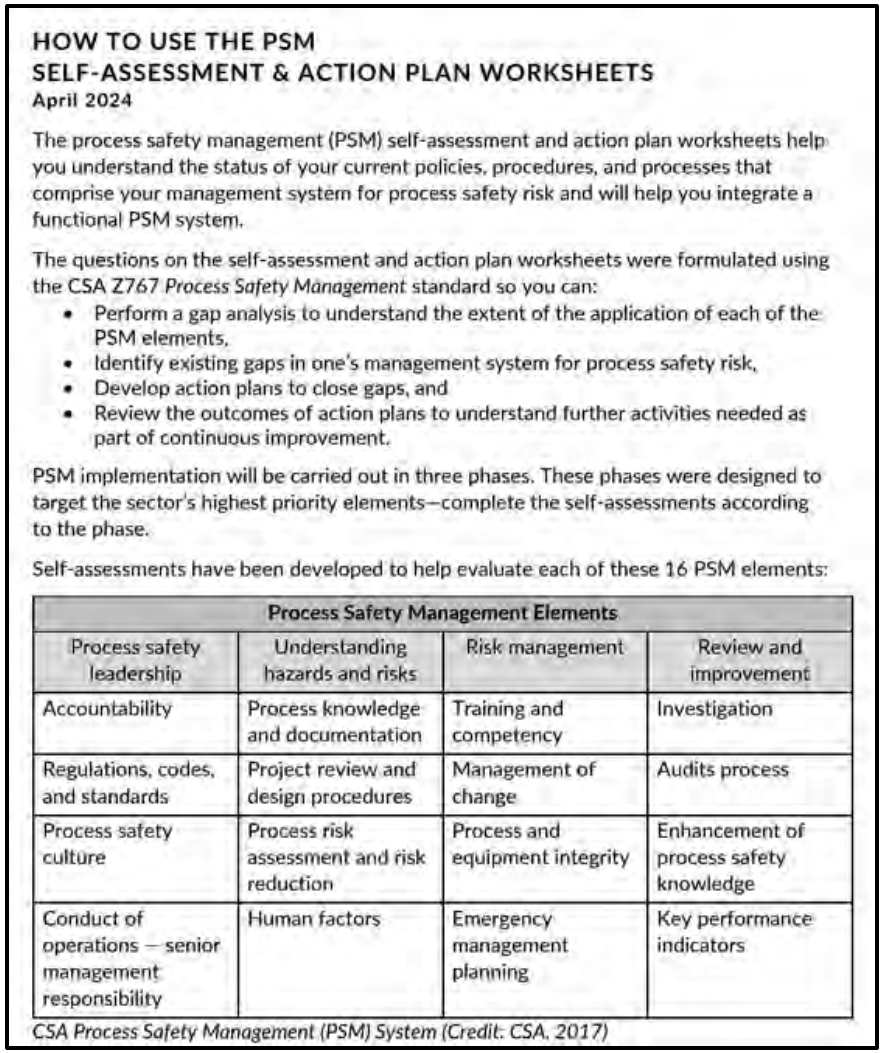
Timeline

Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sept 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25
Key meetings											
		Project kick-off					Understanding PSM workshop				
Key milestones											
Group activities											
					Develop commitment statement, charter, guidelines, self assessment worksheets		Review/ comment	Finalize guidelines, self assessment worksheets		Approve	Website page built out
					Workshop prep		Understanding PSM workshop				

Project team | WPAC members | Steering Committee

SELF-ASSESSMENT WORKSHEETS

- These resources have been developed and you will go over them in the next session, and we'll ask for feedback.



HOW TO USE THE PSM SELF-ASSESSMENT & ACTION PLAN WORKSHEETS
April 2024

The process safety management (PSM) self-assessment and action plan worksheets help you understand the status of your current policies, procedures, and processes that comprise your management system for process safety risk and will help you integrate a functional PSM system.

The questions on the self-assessment and action plan worksheets were formulated using the CSA Z767 *Process Safety Management* standard so you can:

- Perform a gap analysis to understand the extent of the application of each of the PSM elements,
- Identify existing gaps in one's management system for process safety risk,
- Develop action plans to close gaps, and
- Review the outcomes of action plans to understand further activities needed as part of continuous improvement.

PSM implementation will be carried out in three phases. These phases were designed to target the sector's highest priority elements—complete the self-assessments according to the phase.

Self-assessments have been developed to help evaluate each of these 16 PSM elements:

Process Safety Management Elements			
Process safety leadership	Understanding hazards and risks	Risk management	Review and improvement
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CSA Process Safety Management (PSM) System (Credit: CSA, 2017)

PSM INTEGRATION TOOL: SELF-ASSESSMENT & ACTION PLAN ELEMENT: ACCOUNTABILITY
April 2024

Accountability focusses on senior management accountability for the PSM system goals, considering process safety risks throughout the facility lifecycle.

Accountability Self-Assessment & Action Plan

When completing the Self-Assessment & Action Plan below:

- If you identify a gap in any of the questions, develop an action plan.
- When choosing due dates for the action plans, consider the following to determine priority:
  - The anticipated effort required to close the gap and make improvements,
  - The benefits expected from taking action and implementing change, and
  - The urgency (e.g., perceived risk) of the improvements needing to be made.

Visit Accountability on pellet.org for:

- Self-Assessment & Action Plan Worksheets
- Improvement Tools & Resources
- Process Safety Leadership Principles and Intervention Tool

Key Resources

- PSM Implementation: How to Use the Self-Assessment Worksheets
- Process Safety Management on pellet.org
- CSA Z767 *Process safety management* standard

Materials are being updated all the time - come back to pellet.org often.

Suggested Activities

- Establish a formal corporate process safety policy. Create a statement that outlines your organization's process safety philosophy.
- Develop a process for senior management to get feedback from all employees about the process safety policy during implementation; solicit feedback and discuss the policy during plant visits or safety/fire prevention meetings.
- Provide process safety training and instruction to workers. Develop training programs and materials.
- Commit sufficient resources to enable the continuous improvement of process safety.

Suggested Deliverables

How familiar are you with Process Safety Management (PSM) principles?

What do you think is the biggest challenge in implementing PSM in the wood pellet industry?

Doing it

Management buy in

Time

Resources and framework

Leadership Buy-in

Resources and time.

Buy in

Leadership understanding and buy-in

What do you think is the biggest challenge in implementing PSM in the wood pellet industry?

Resources

Resources

Resource commitment

Senior management commitment

Awareness

Management/corporate commitment to the actual activities

By in

Finnances

17

What do you think is the biggest challenge in implementing PSM in the wood pellet industry?

Gaining momentum

Aligning with processes already in place

Rigour

17

What words come to mind when you think of 'Process Safety Management? (This could be one of those word could ones)

Prevention

Structure

Helpful

Safety

Engineering

Robustness

Evolution

Control

16

What words come to mind when you think of 'Process Safety Management? (This could be one of those word could ones)

Control

Verification

Hidden risks

Framework

Organization

Inherently stable

Risk Reduction

Investment

What words come to mind when you think of 'Process Safety Management? (This could be one of those word could ones)

Engineered controls

Mindset

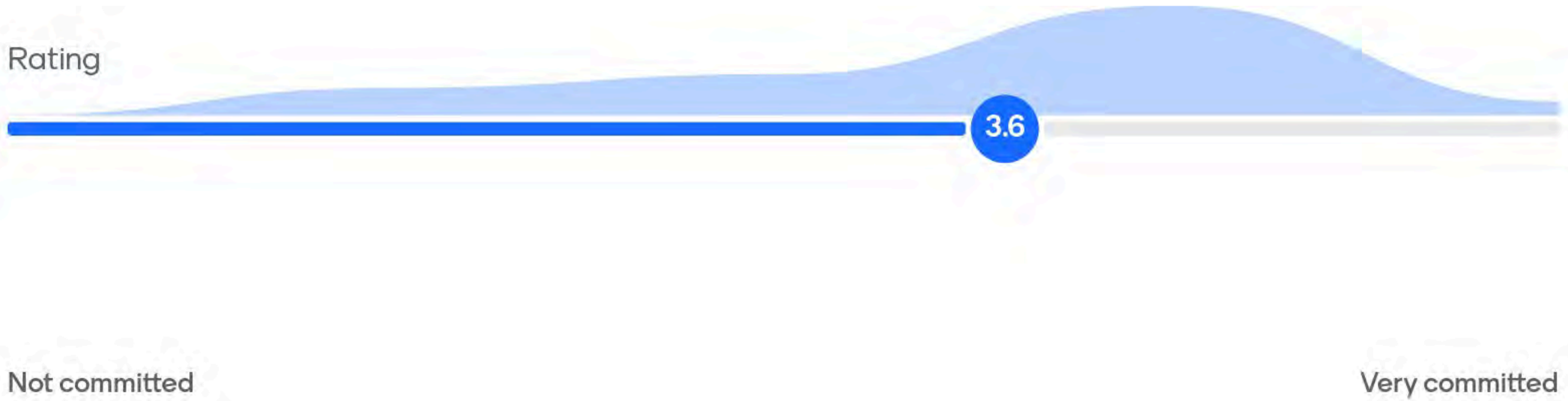
Foresight

mitigation

Analyssis

16

How committed do you feel your organization is to achieving PSM goals?



What is one word that describes your feeling toward the WPAC's PSM roadmap?

28 responses

Which phase of PSM implementation do you think will be the hardest to adopt?


WOOD PELLET
ASSOCIATION OF CANADA

BC Forest Safety

Process Safety Management Implementation

Bill Laturnus

Photo: WPAC

WOOD PELLET ASSOCIATION OF CANADA
Responsible, Renewable Clean Energy

PSM

Integrating Process Safety Management into Canadian Wood Pellet Facilities that Generate Combustible Wood Dust

Obex Risk Ltd.
Dalhousie University
Dust Safety Science
Wood Pellet Association of Canada (WPAC)
British Columbia Forest Safety Council (BCFSC)
Project Report

Type of Document
Final Report

Project Name
Integrating Process Safety Management into Canadian Wood Pellet Facilities that Generate Combustible Wood Dust

Prepared By:
Kayleigh Rayner Brown, MASc, P.Eng.

Reviewed By:
P. Amyotte
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B. Laturnus
G. Murray
F. Yazdanpanah

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Date Submitted
June 28, 2023

UNRESTRICTED

PSM Implementation: Research Outcomes and Next Steps

View presentation: PSM Implementation: Research Outcomes and Next Steps

CSA Z767 Process Safety Management

Standard Used as the Framework for PSM

Process Safety Management Elements

PROCESS SAFETY MANAGEMENT ELEMENTS			
PROCESS SAFETY LEADERSHIP	**UNDERSTANDING HAZARDS AND RISKS**	**RISK MANAGEMENT**	**REVIEW AND IMPROVEMENT**
Accountability	Process knowledge and documentation	Training and competency	Investigation
Regulations, codes, and standards	Project review and design procedures	Management of change	Audits process
Process safety culture	Process risk assessment and risk reduction	Process and equipment integrity	Enhancement of process safety knowledge
Conduct of operations — senior management responsibility	Human factors	Emergency management planning	Key performance indicators

WPAC PSM Implementation Strategy

PSM Implementation Strategy: Three Phases

PSM Implementation Steps

1. Development of Phase 1 Self Assessments (Completed)
2. Establishment of PSM Steering Committee (Completed)
3. Operations use self-assessments to identified gaps in the various PSM Elements
4. Support operations with resources to close identified gaps from self-assessments
5. Create Library of PSM policies/procedures
6. Develop Self-Assessment for Phase 2 & Phase 3 assessments (currently working out the logistics)

Phase 1: Process Safety Management Implementation

Complete management system self-assessments based on CSA Z767 process safety management standard.

Breakout Activity:

- Accountability
- Safety Culture
- Process Risk Assessment and Risk Reduction
- Incident Investigation
- Management of Change
- Key Performance Indicators

PSM Implementation Breakouts

Key Questions to Answer:

- Has the self-assessment worksheet aided in identifying gaps in current policies/procedures?
- What's missing from the assessment?
- What additional resources need to be identified to close the gaps?

Thank you for your participation

Contact information
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Wood Pellet & Bioenergy Safety Summit

DRUM DRYER HAZARDS AND OPPORTUNITIES FOR IMPROVEMENT

WOOD PELLET ASSOCIATION OF CANADA

Tuesday, November 05, 2024
Wood Pellet & Bioenergy Safety Summit

OUTLINE

- Background
- Critical Control Management Project – 2020
- Rotary Drum Dryer Initiative - 2024
- Hazards and threats to drum dryer safety
- Incidents, severity and frequency
- Lessons learned
- Closing remarks

Photo Credit: WPAC, Premium Pellet Ltd.

CRITICAL CONTROL MANAGEMENT-2020

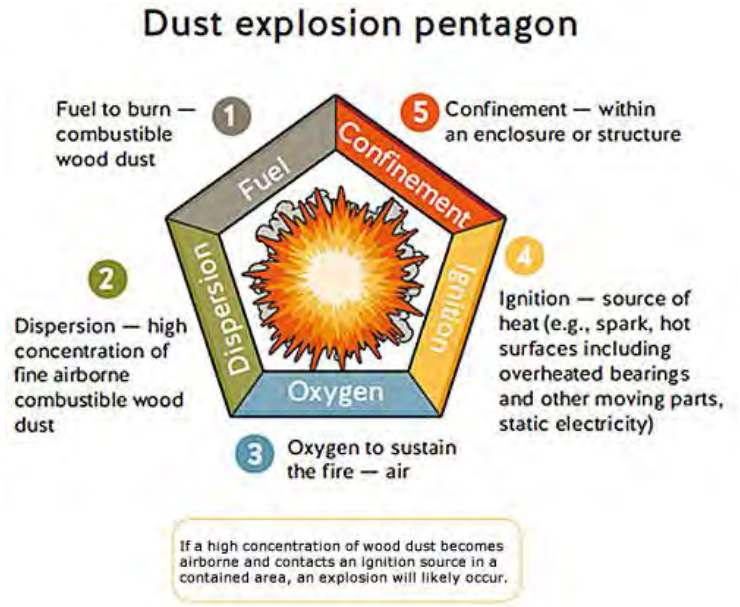
- Systematically assessed hazards associated with drum dryers
- Identified critical controls to prevent ignition of combustible dust
- Helped identify areas for improvement and define roles and responsibilities

ROTARY DRUM DRYER INITIATIVE - 2024

- Understanding the Root Causes
- Optimizing Dryer Operation and Reducing Risk- Drax
- Continuous Improvement, status and outlook- Shaw Renewables
- Applying Bow Tie Analysis to Drum Dryers – Premium Pellet

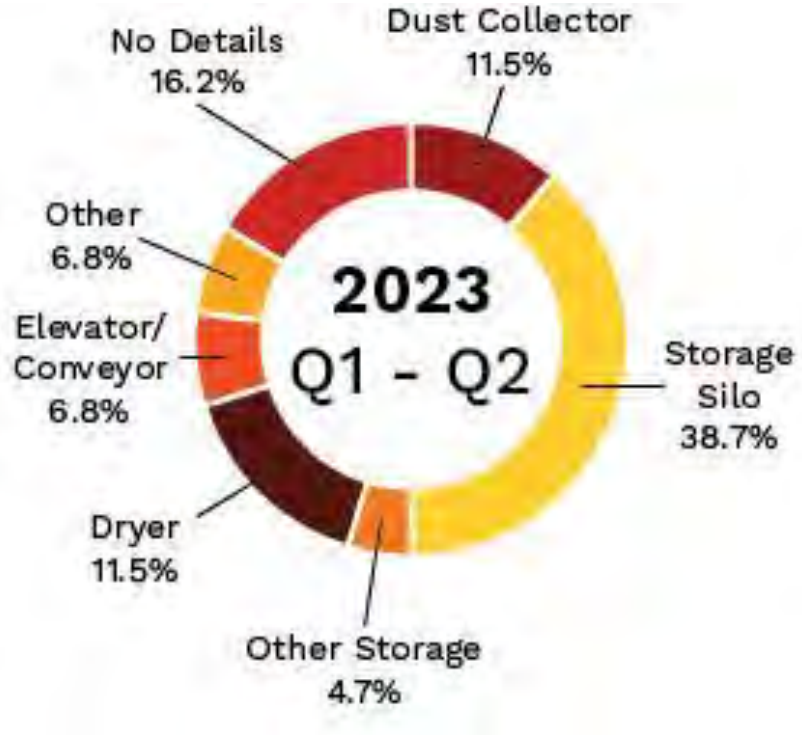
DRUM DRYER HAZARDS

- Drum dryers used in manufacturing pharmaceutical, wood, food products
- Combustible wood dust presents risk of fires and explosions, as well as the formation of combustible gas (syn gas)
- Fires and explosion can occur due to ignition from:
  - Mechanical failure, electrical failure, hot work, propagation from interconnected equipment, incorrect start-up and shutdown procedures
- Consequences:
  - Propagation to interconnected equipment, harm to people, damage to equipment and business disruption

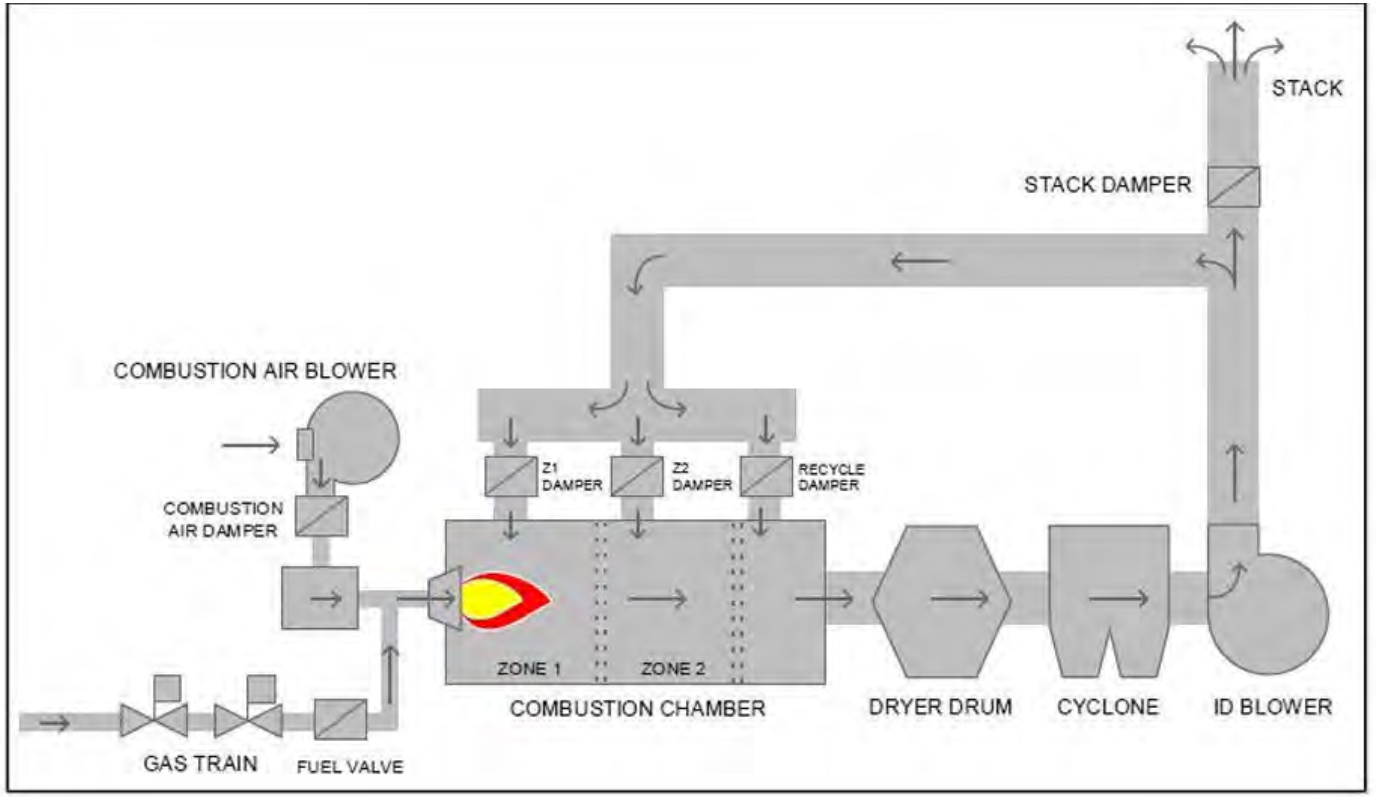


INCIDENT FREQUENCY AND TRENDS

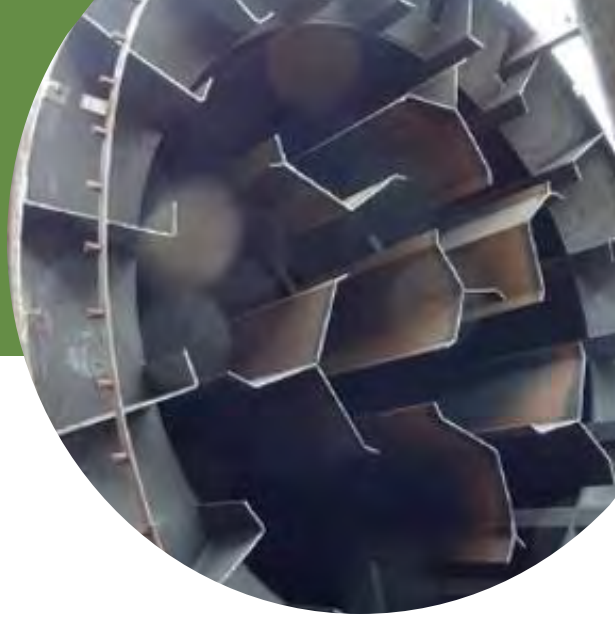
- Actual number is believed to be higher
- Loss can be significant
- FM Global (2013):
  - 25 years – 14 explosions involving dryers (5 in spray, 7 in drum, 2 flash)
  - Spray dryer manufacturer: 40 years – 285 fires, 56 explosions
- Dust Safety Science (2023) Mid-Year Incident Report: 27 fires, 2 explosions



ROTARY DRUM DRYERS



ROTARY DRYERS – TIME, TURBULENCE AND TEMPERATURE



- Time impacts the process of drying the same way your home dryer does with clothing.
- There are louvres within the dryer and as they rotate, the material hits them, they deflect material in different directions thus allowing the material to dry as it is working through the drum.
- The ID fan, located within the ducting for the drying system, determines how fast material moves through the drum.
- Turbulence: This is the force at which the material will cycle through the drum, mixing the hot gas and wet material to thus resulting in dried material.

ROTARY DRYERS – TIME, TURBULENCE AND TEMPERATURE

- The higher the outlet temperature, the dryer the material.
- Outlet temperature: there is a sensor right at the end of the drum – it is a temperature probe that takes a temperature reading, an inline thermocouple that constantly provides feedback to the PLC/HMI. There is also a sensor at the beginning of the drum, called the inlet temperature.
- The difference in the inlet temperature to the outlet temperature tells you how effectively the dryer is performing.
- Drum dryers require constant human interaction to assess moisture content and adjust as needed.

START-UP PROCESS

CREATE A STEP BY STEP PROCESS FOR STARTING

ALWAYS PERFORM FIELD INSPECTION PRIOR TO STARTING THE SYSTEM

STARTING THE DRYERS ARE A CRITICAL SAFETY STEP

DEVELOP 1 STANDARD FOR STARTING THE DRYER DRUMS

SHUTDOWN PROCEDURES

The Shutdown Procedure must be filled out every time the dryer is shut down!

ANY abnormal HMI or Spark Events must be recorded

Must be signed by team lead/ Supervisor

Must have a Cool down assessment time

Must record time when each stage of process has been completed

Constantly record temperature noting any swings or changes

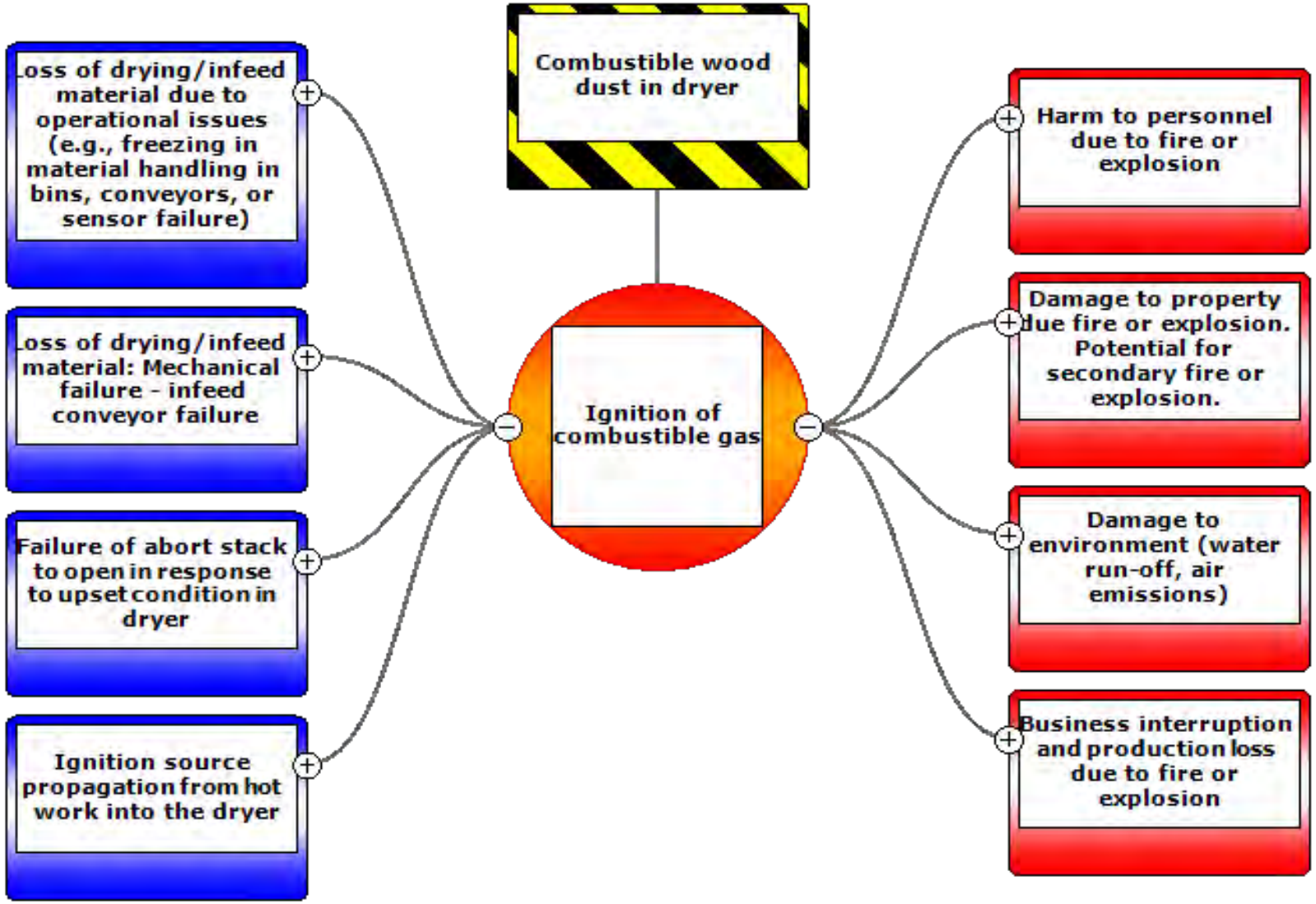
Must be reviewed by Management team to ensure it is filled out correctly every time

HOW DO WE MANAGE RISK IN THE DRYER SYSTEMS?

- Always follow written shutdown procedures every time a dryer is turned to cool down.
- Be aware of the dryer, recycle, inlet, outlet, stack temperatures at all times.
- Write down any anomalies from the procedure and report.
- Communicate to your supervisor when something out of the ordinary happens ie. Excessive sparking, temperature fluctuations, and take the appropriate steps.
- Ensure all deluges are working at all times.
- Airflow is always happening during the drying process, IF airflow stops Syngas can build up
- Use temperature gun to record outside temperature of ducts.
- Drum Dryers have spark detects spread throughout the system.
- All Dryers have many temperature sensors spread throughout them.
- Maintenance and cleanings are done as often as needed.
- Watch dryer pressures to ensure dryer systems stay negative.
- Ensure all other sensors are working (Prox, switches, Moisture Sensors, Level Sensors, etc)

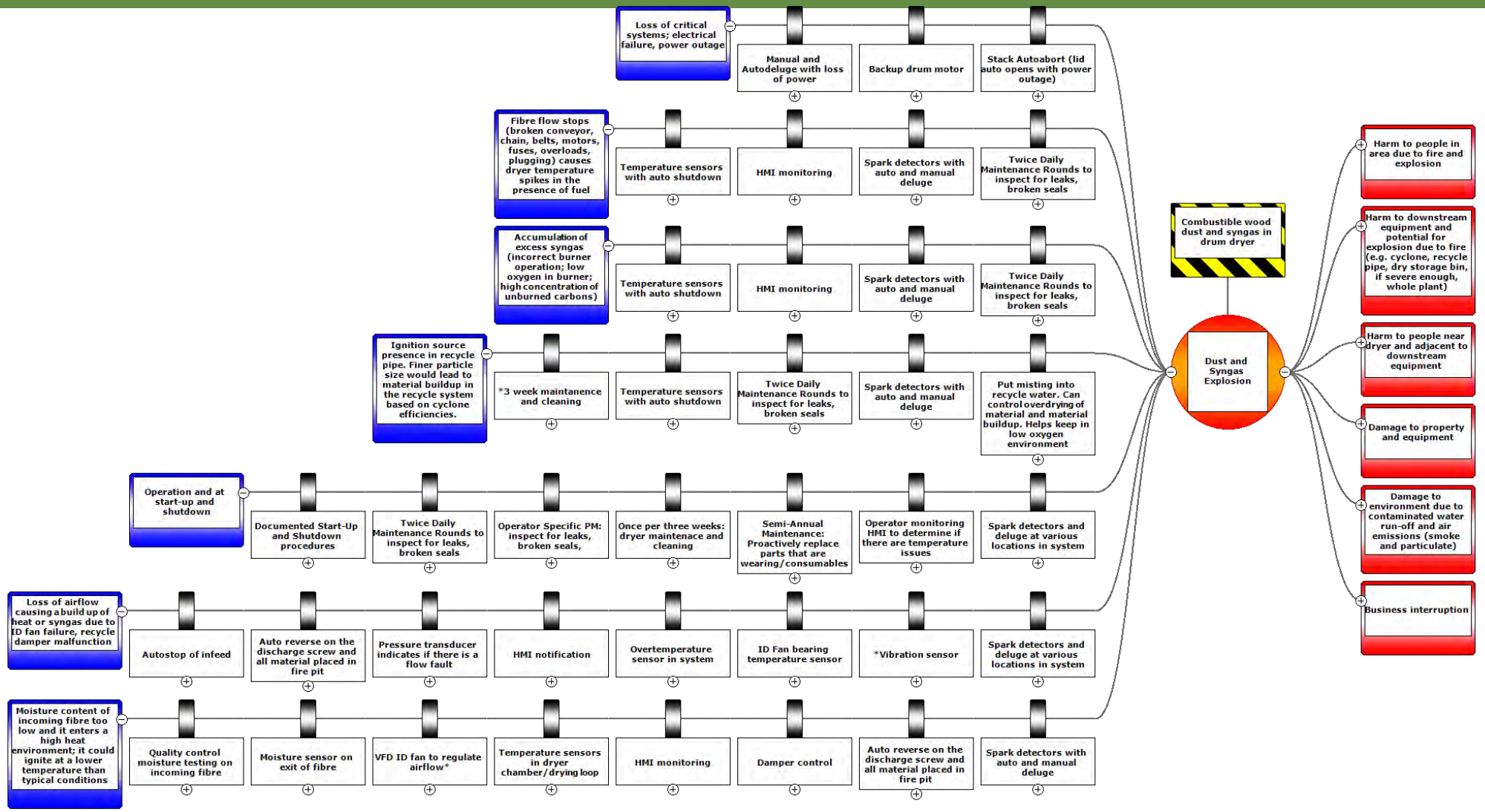
COMBUSTIBLE GAS BOW TIE ANALYSIS

- Completed in collaboration with Premium Pellet Ltd.
- Involved online workshop with frontline team members
- Summary report produced
- Discussed in more detail later in symposium



APPLYING BOW TIE ANALYSIS TO DRUM DRYERS

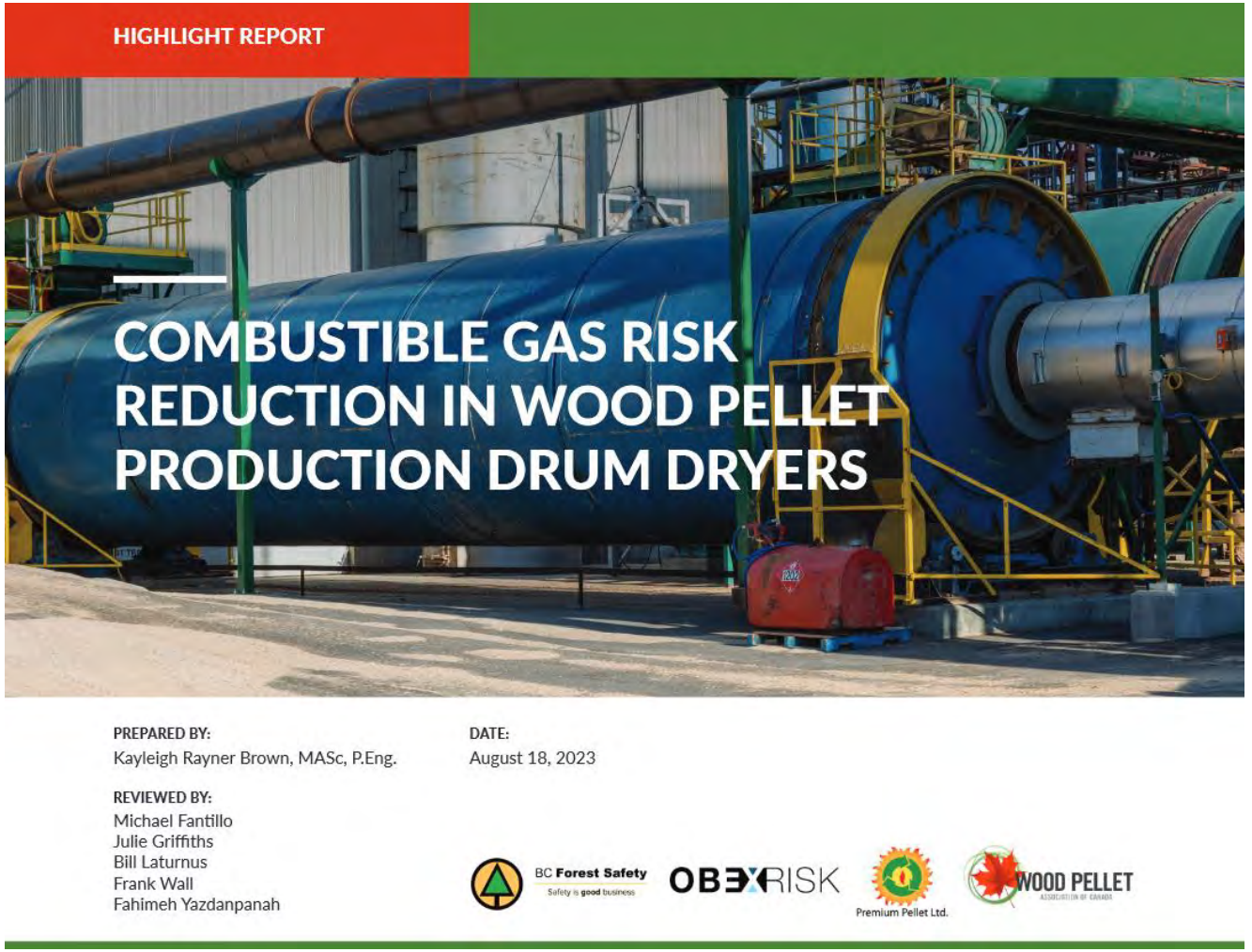
Excerpt: Combustible Dust in Drum Dryer



DRUM DRYER SAFETY – LEARNINGS FROM BOW TIE ANALYSIS

- Identified conditions that present risk of combustible gas ignition
- Affirmed the importance of critical controls:
  - Emergency shutdown procedures
  - Operator response and training
  - Confined space program
- Measures to ensure reliability of controls, such as:
  - Management of change program
  - Training
  - Drills
  - Preventative maintenance

COMBUSTIBLE GAS RISK REDUCTION IN WOOD PELLET PRODUCTION DRUM DRYERS



LESSONS LEARNED AND RECOMMENDATIONS

- Mechanical integrity
- Operating parameters (e.g., temperatures, capacity)
- Management of change
- Explosion isolation is recommended
  - Challenge: not possible to have explosion protection on the body of the rotary dryer
  - Need to mitigate effects of explosions and prevent them from propagating through process (causing secondary explosions)
- Spark detection and extinguishing in heated air and product lines
- FM Global Property Loss Prevention Data Sheet (e.g., high temperature switches interlocked with deluge)

CLOSING REMARKS

- Dryers pose the risk of fires and explosions
- Incidents occur more frequently than observed in media or described in literature
- Root causes range from mechanical failure to improper startup and shutdown procedure
- Recommendations for risk reduction include preventative maintenance, explosion protection and extinguishing, and formalized operating procedures
- Opportunity for working group to:
  - Investigate and systematically examine near-misses,
  - Assess risks and explore suitable risk reduction approaches, and
  - Standardize knowledge across industry

DRUM DRYER WORKING GROUP

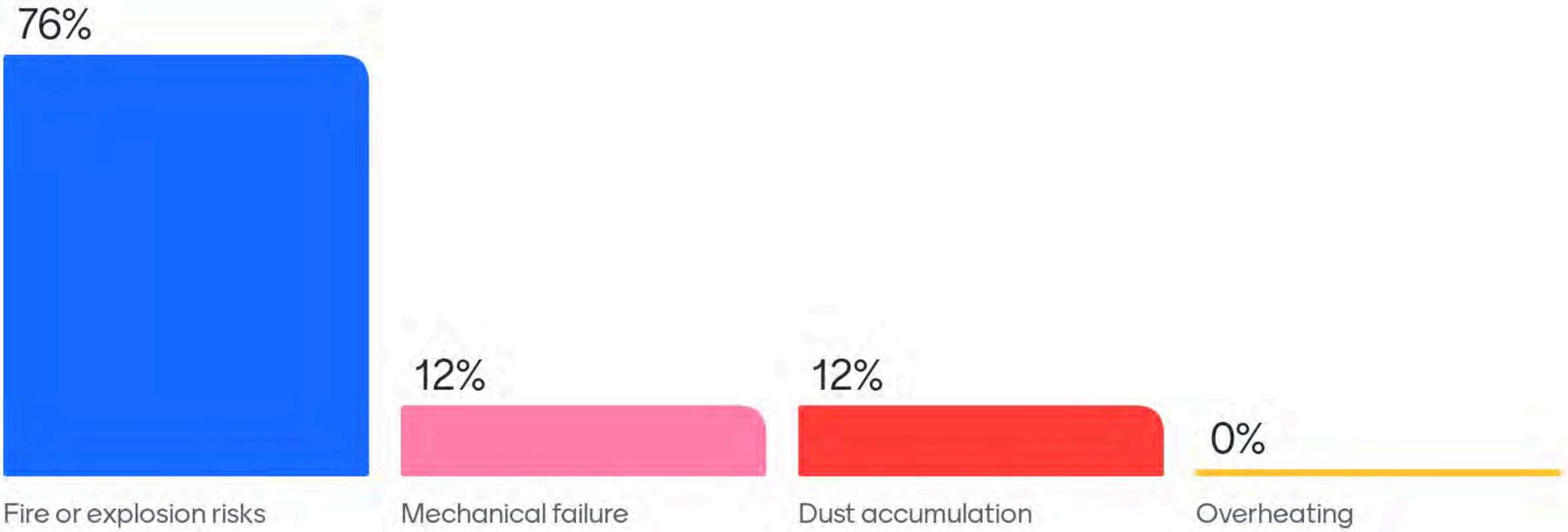
Working Group Deliverables

Similar to the belt dryer working group
(i.e., technical report, factsheet).

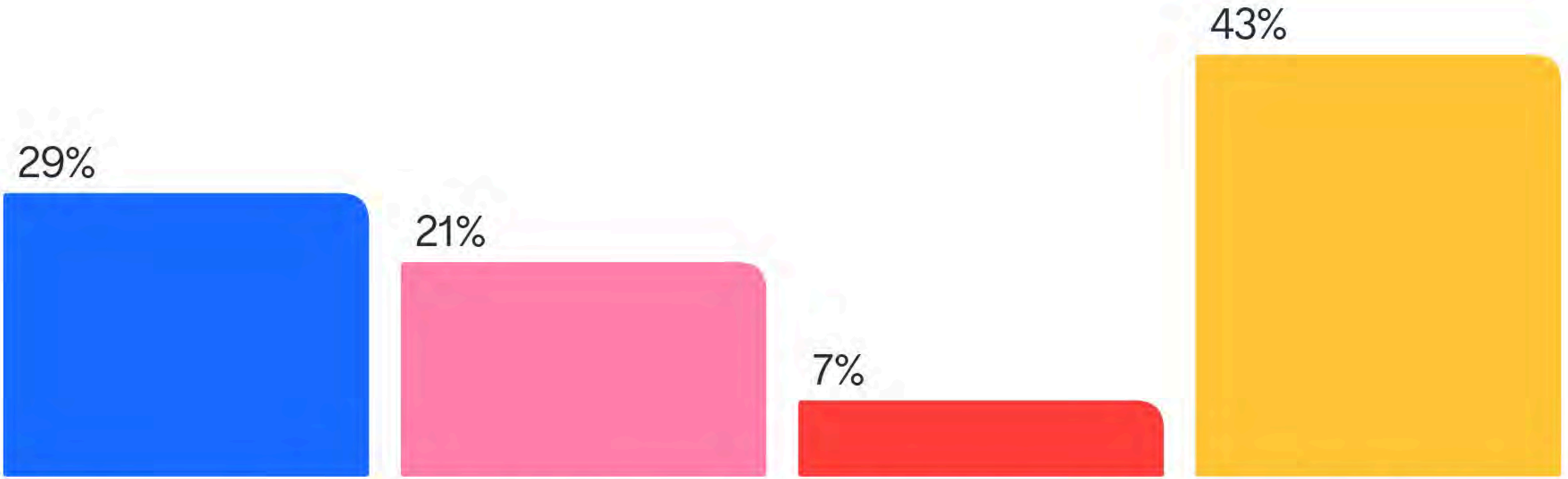
Interested in updates from the working group work?

Email Fahimeh Yazdan Panah (fahimeh@pellet.org)

What do you believe is the most common safety hazard associated with rotary drum dryers?



Which of the following safety measures do you currently implement in your rotary drum dryer operations?



What is the biggest safety challenge you face when operating rotary drum dryers?

Pitch

Power failure

Operator complacency

Difference in feed material moisture

TIME FOR PM

Understanding operation

Material stability

Distraction of operators

What is the biggest safety challenge you face when operating rotary drum dryers?

Losing power

Hot spots

Balance temp and time.

Feed interruption

Equipment reliability

Maintenance of critical systems

Run

Prioritizing

What's the first word that comes to mind when you think about safety in rotary drum dryer operations?

21 responses

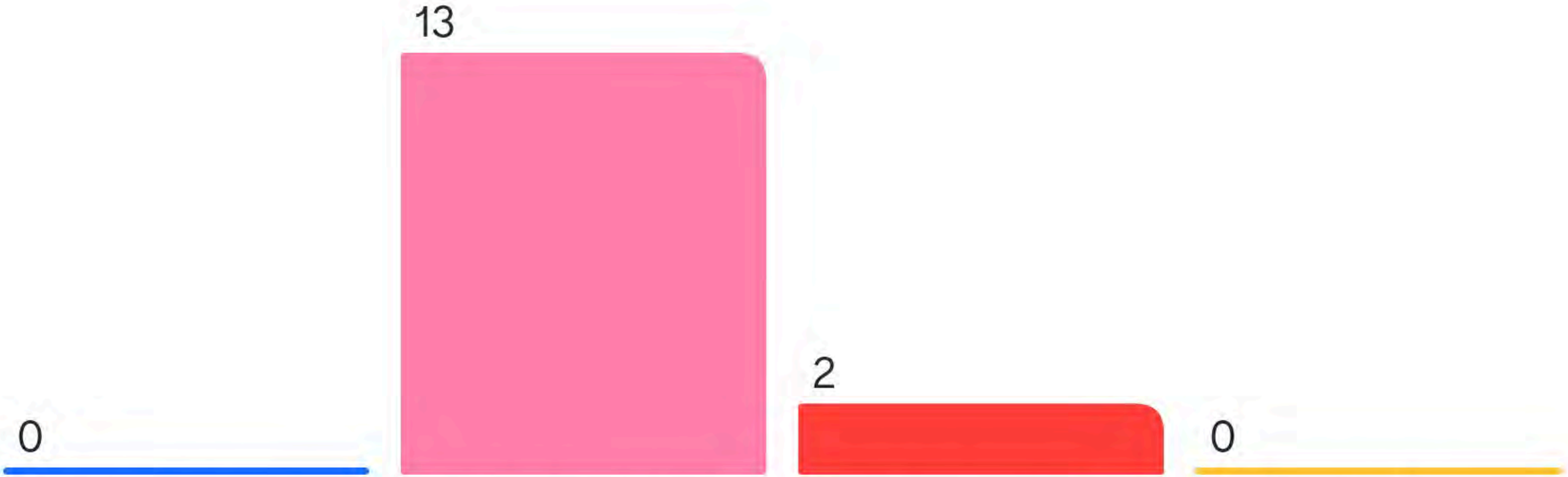
On a scale of 1 to 5, (1 strongly disagree, 5 strongly agree)...

How confident are you in the safety measures currently in place at your facility for rotary drum dryers?

Strongly disagree

Strongly agree

If a fire were to break out in your rotary drum dryer system, what is the first action you would take?



WOOD PELLET

ASSOCIATION OF CANADA

BC Forest Safety

Proposed Combustible Dust Regulations & Qualified Persons

Bill Laturnus

Photo: WPAC

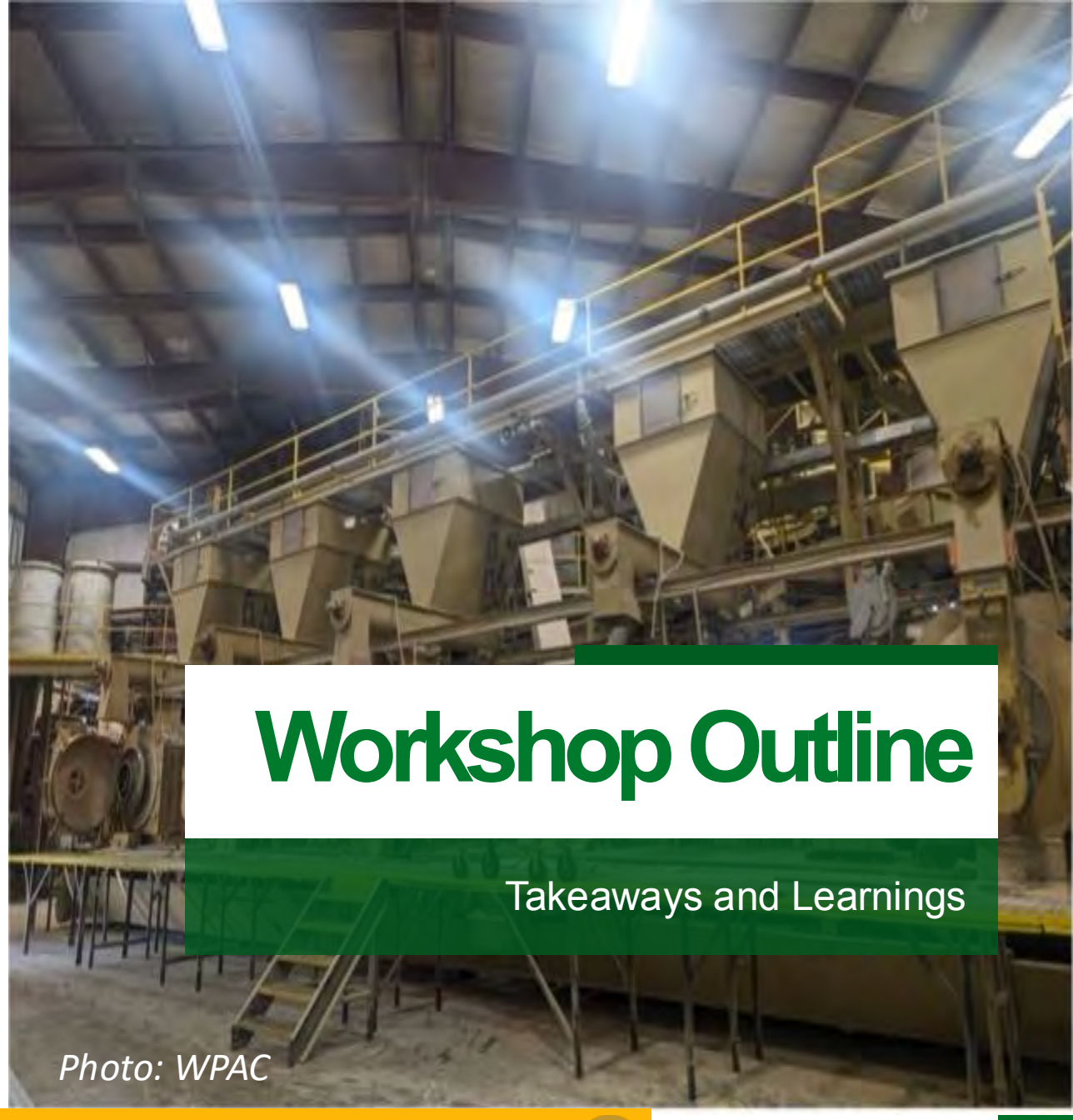
WOOD PELLET ASSOCIATION OF CANADA
Responsible, Renewable Clean Energy

Workshop Outline

1. Review the upcoming regulation changes to the Part 6 Occupational Health and Safety Regulations.
2. Review requirements for Qualified Persons

Takeaways and Learning Outcomes;

- **Explain key expectations of the proposed regulations.**
- **Evaluate and formulate next steps**



There are four sections in the proposed new regulations

- **SECTION 1**
  Combustible Dusts – Identification *(Assessment & Management)* ***(6.135-6.144)***
- **SECTION 2**
  Combustible Dusts – Risk Controls *(General)* ***(6.145-6.153)***
- **SECTION 3**
  Combustible Dusts – Risk Controls *(Machinery & Equipment)* ***(6.154-6.164)***
- **SECTION 4**
  Combustible Dusts – Risk Controls *(Fire and Deflagration Control)* ***(6.165-6.167)***

SECTION 1

Combustible Dusts – Identification, Assessment and Management (6.135-6.144)

This section in the proposed new regulation describes how to assess and manage combustible dust hazards.

- Begin with identifying combustible dusts in your facility
- You must assume it is ignitable and deflagrable unless determined by testing
- If you have combustible dust, you must develop:
  - **A combustion risk assessment**
  - **A combustible dust management program.**

- Joint Occupational Health and Safety Committee (JOHSC) and workers engaged throughout process
- Training on combustible hazards must be provided.

SECTION 2

Combustible Dusts – Risk Controls (General) (6.145-6.153)

Provides general methodologies for controlling hazards identified in combustion risk assessment and combustible dust management plan.

- Competent ignition source control
- Oxidant control
- Suspension control
- Foreign substance
- Bulk storage
- Collection & removal of combustible dust

➢ *The Combustible Dust Management Plan (as outlined in Section 6.140) describes how these controls are implemented and maintained.*

SECTION 3

Combustible Dusts – Risk Controls (Machinery and Equipment) (6.154-6.164)

Provides methodologies for controlling hazards related to specific machinery and equipment.

- General needs to select, locate, maintain and operate relevant machinery and equipment to minimize combustion risks.
- Malfunction alarms
- Automatic shutdown
- Dust collection systems
- Pneumatic conveying systems and centralized vacuum cleaning systems

- Air-moving devices
- Air-material separators – recirculation of discharged air
- Enclosureless air-material separators (and indoor use) are specifically mentioned
- Ducting
- Dryers

SECTION 4
Combustible Dusts – Risk Controls (Fire and Deflagration Control) (6.165-6.167)

Provides methodologies for controlling fires and deflagrations.

- **Fire control methodologies**
  - Must be able to suppress a fire and operated to minimize dust suspension.
- **Deflagration control methodologies**
  - Must be able to minimize effects of deflagration.
- **Requirements after a fire or deflagration**
  - Must establish and document procedures to restore to readiness and safely resume operations (Startup and Shutdown Procedures).

Performance-Based Approach to Risk Controls

Risk controls are performance-based rather than prescriptive for broader application of requirements

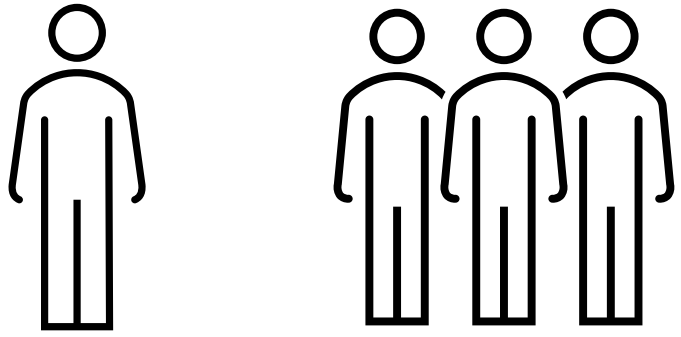
- Specific risk controls, such as deflagration isolation, are not specifically called out but are inherent to the options to be considered.
- Resources will be provided on controls like isolation, as required.
- Layers of protection should be considered, involving the consideration and application of every control available to the employer.
- Use the ISD hierarchy of control to aid in developing layers of control.

Qualified Person (QP)

Who a Qualified Person is will vary depending on the context and the specific section of the regulation being considered.

- OHSR 1.1: “Being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof.”

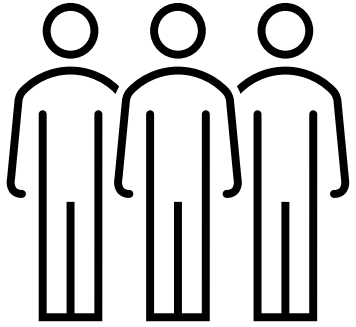
- Could be single person or team of people.



Qualified Person (QP)

Identifying Qualified Persons **INSIDE** Your Company

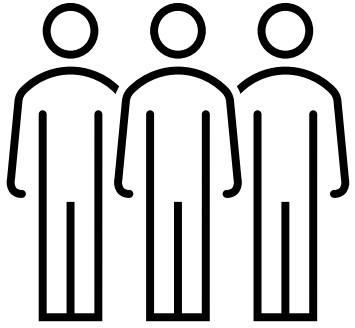
- Can be a team with combined knowledge and experience.
- Consider their degree of competency with the relevant regulations, codes and standards, the process, machines and equipment, possible ignition sources, how combustion can occur, what can go wrong, and the controls in place.



Qualified Person (QP)

Identifying Qualified Persons **OUTSIDE** Your Company

- Firm knowledge of the related NFPA Standards (Why NFPA).
- Expertise in combustible dust related hazards safeguards.
- Experience leading (or holding a significant role) with combustion risk assessments/dust hazard analyses (DHAs) in the past.
- Experience related to the process or industry segment.
- Examine completed work and consider if it meets the regulations; evaluate what kind of product have they produced and if it fulfills
the needs of the regulations.



Process Safety Management Implementation

Complete management system self-assessments based on CSA Z767 Process safety management standard.

- Accountability
- Safety Culture
- Process Risk Assessment and Risk Reduction
- Incident Investigation
- Management of Change
- Key Performance Indicators

Thank you for your participation

Contact information
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Photo: WPAC

Where are we and what's on the horizon?

Wood Pellet Association of Canada

Safety Summit

Prince George, BC

November 5, 2024

Presented by: Occupational Safety Officer, Mike Tasker, CRSP

WorkSafeBC

Our Prevention Mandate:

We engage employers and workers to reduce risks and keep workplaces healthy and safe through education, consultation and enforcement.

What are we focused on?

- Reducing provincial injury rate
  - Innovating through the “Law of diminishing returns.”
- Being risk based & data driven.
  - Reading the risk signals.
- Catastrophic risk
  - Process safety
- Emerging and stubborn risks:
  - Psychological health & safety
  - Musculoskeletal injury reduction
- Implementing 3 large regulatory enhancements
  - Combustible dust
  - First aid
  - Emergency planning for hazardous substances.

How are we doing it?

- Aligning our expertise and resources so they best serve the mission.
- Growing our internal specialization and expertise.
- Risk reduction as a prime driver.
- Enterprise-wide teams to “work the problem.”
- Growing strong partnerships with industry associations like WPAC.

What else?

Lots…lets keep the conversation going.

Thank you.

What words would you use to describe emerging safety risks in our industry?

12 responses

Which of the focus areas presented by WorkSafeBC should WPAC's Safety Committee focus on in 2025?

Wood Pellet & Bioenergy Safety Summit

WORKPLACE MENTAL HEALTH SKILLS FOR WORKERS AND SUPERVISORS

WOOD PELLET ASSOCIATION OF CANADA

Shirley Hogan
Manager of Education and Projects
Canadian Mental Health Association

MENTAL HEALTH: HOW TO SUPPORT OUR TEAM

Canadian Mental Health Association

Mental health for all

Presenter: SHIRLEY HOGAN

Canadian Mental Health Association

Vision:
A Canada where mental health is a universal human right.

Mission:
To ensure that all people in Canada experience good mental health and well-being.

Agenda

Understanding Mental Health

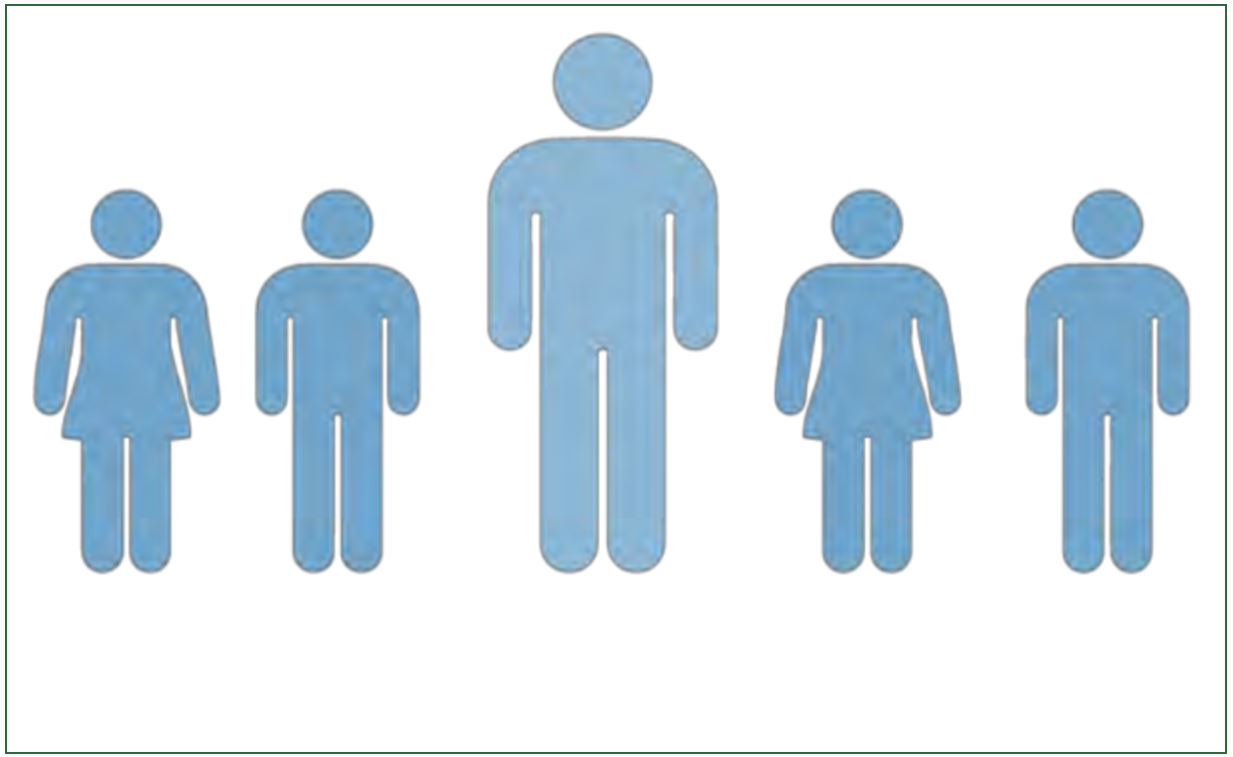
Reaching out

Understanding Resilience

What do these people all have in common?

Winston Churchill	Abraham Lincoln	Linda Hamilton	Eric Clapton
Jann Arden	Lionel Aldridge	Oprah Winfrey	Brooke Shields
Halle Berry	Mike Wallace	Russell Brand	Mathew Perry
Shayne Corson	Dan Reynolds	Leonardo DiCaprio	Lady Gaga

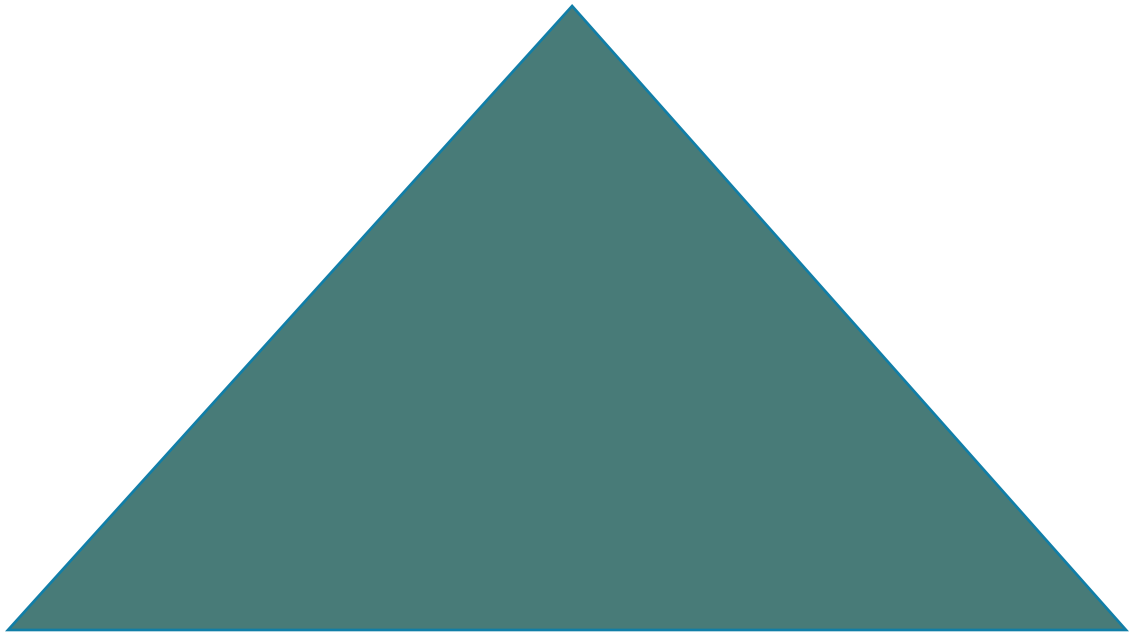
Did You Know



1 in 5 Canadians will experience a significant mental health or addiction issue this year

Mental Health Commission of Canada

Health



Why is this Important

- **30%** of disability claims are related to mental health problems and mental illness

- **$6.3 Billion** is the cost of absenteeism to Canadian Businesses due to lost productivity

- Over **500,000** Canadians are unable to work **per week** due to poor mental health

Why is this Important

- The economic cost of mental illnesses to the Canadian healthcare and social support system was projected as **$79.9 billion** for the year 2021.

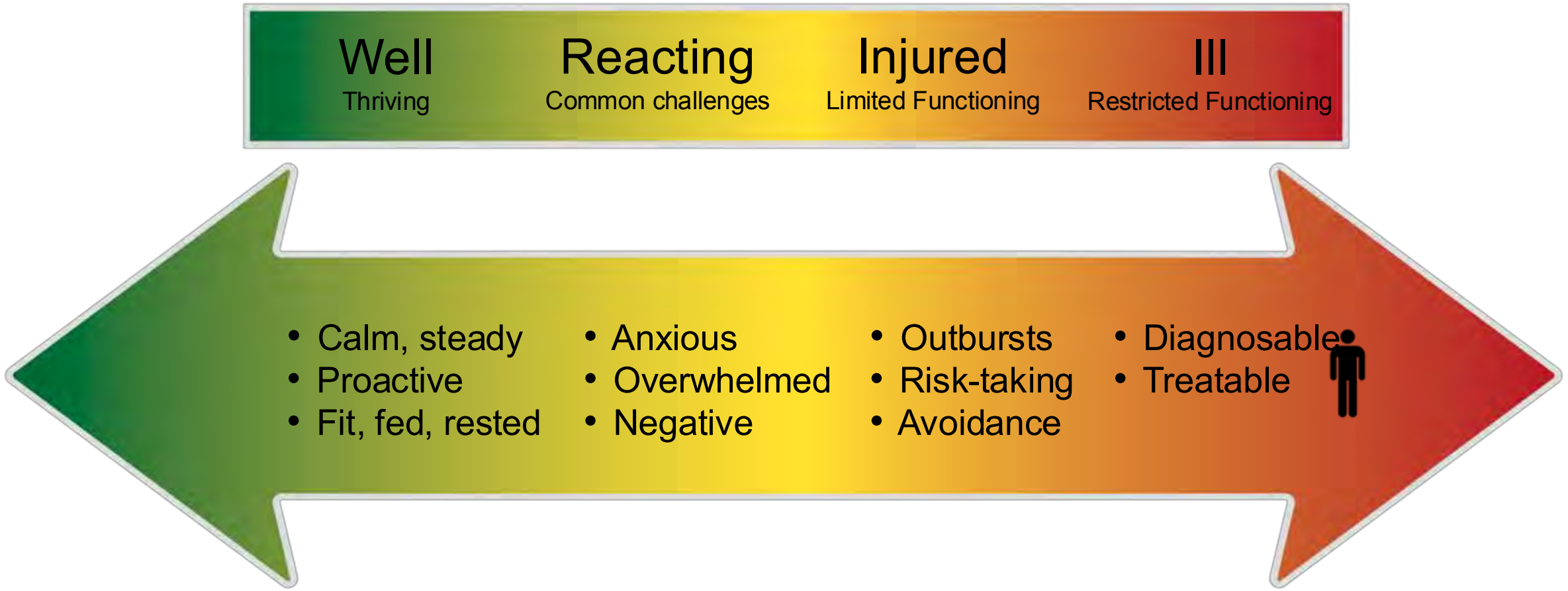
- A 2019 Deloitte study of 10 Canadian businesses that invested in mental health in the workplace, had after two years a median return on investment (ROI) of **$1.62 for every $1.00** spent and after 3 years or more the ROI was **$2.18 annually**

Why is this Important

Employees who have given a false reason for mental health related time off.	40%
Employees who have kept a mental health diagnosis hidden from workplace management.	82%
Employees who want executives to help normalize the mental health conversation.	50%
Employees who say they would be more productive at work if there was better mental health support.	82%

Ipsos, 2019

Mental Health Continuum



Owen's Story

How Mental Health Challenges Might Show Up At Work

- Depressed mood
- Changes in appearance
- Isolation / withdrawal
- Boredom or lack of motivation

How Mental Health Challenges Might Show Up At Work

- Absenteeism
- Presenteeism
- Decreased focus / concentration
- Forgetful

How Mental Health Challenges Might Show Up At Work

- Lack of co-operation
- Risk taking behaviours
- Insubordination
- Anger

Understanding Anger

Anger is a Secondary Emotion – there is something else below the surface

ANGER

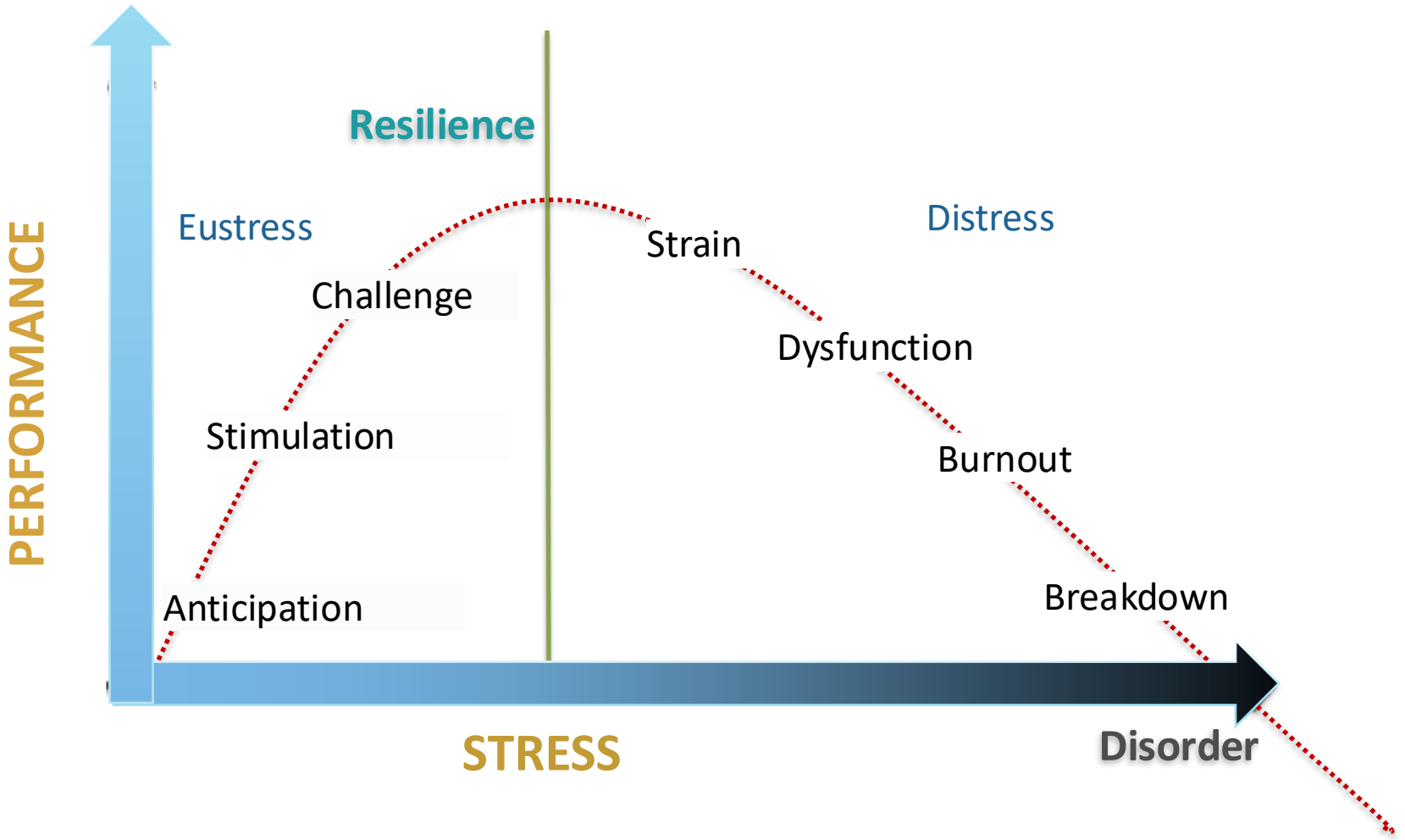
Fear	Loss
Guilt	Helplessness
Hurt	Anxiety
Grief	Humiliation
Rejection	

We All Experience Stress

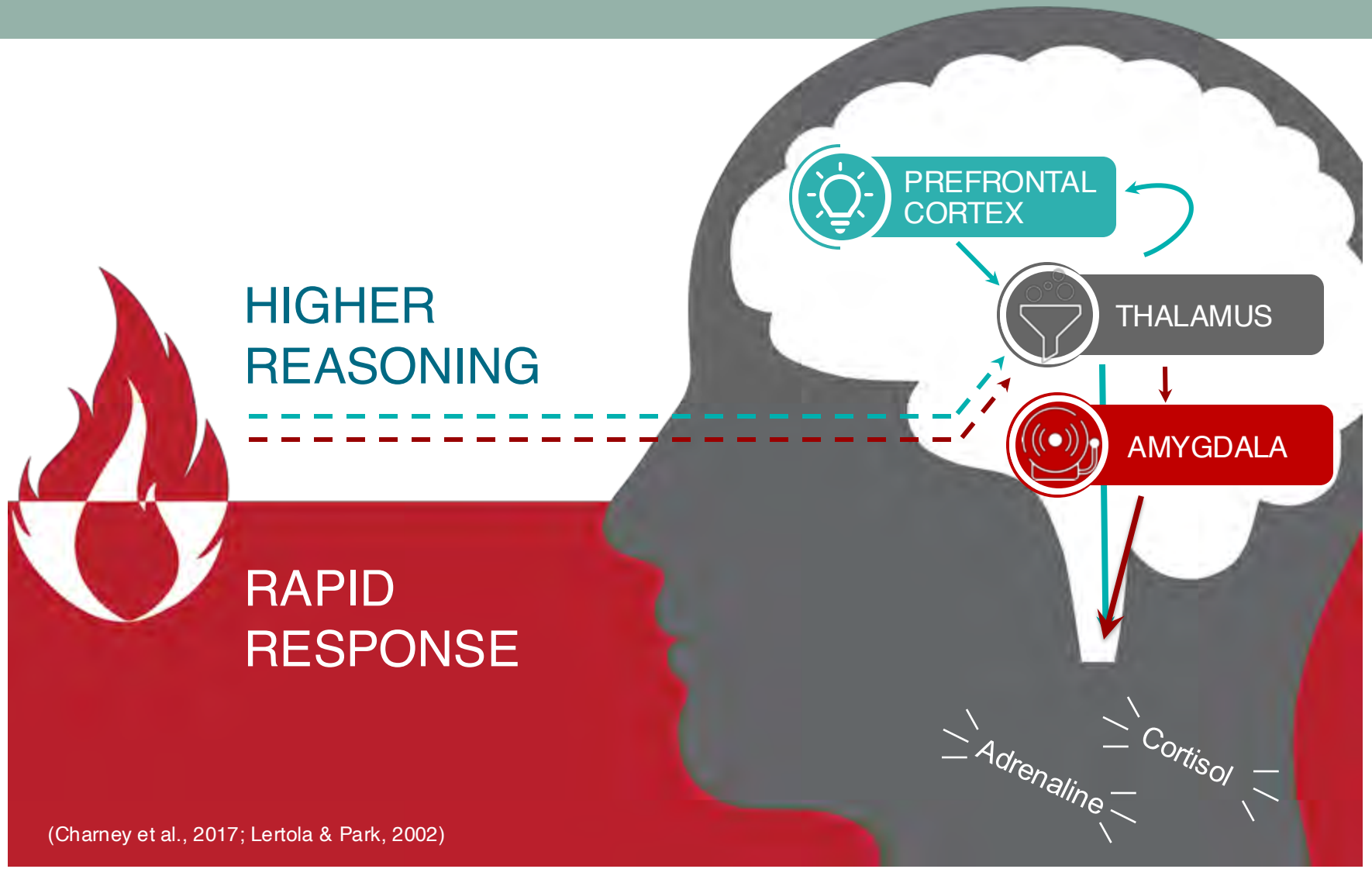
- Stress is the wear and tear on the body caused by the need to adapt to changes or demands in the environment

- Think about what are some of the stressors people experience

Stress Continuum



Our Brain on Stress



Alarm Response

Flight

Fight

Freeze

Fawn

Flight

- Over working
- Over thinking
- Anxiety
- Perfectionism
- Difficulty sitting down
- Avoidance
- High chance of burnout

Fight

- Angry outbursts, can be verbal or non-verbal
- Bullying
- Sarcasm
- Judgmental
- Always looking for the next “fight”
- Argumentative
- Poor Moral

Freeze

- Difficulty making decisions
- Feeling stuck
- Disassociation
- Isolating
- Numb
- Shut Down Exhaustion
- Sleeping a lot

Fawn

- People pleasing
- Often feeling overwhelmed
- No boundaries
- Co-dependent
- Engaging
- Self critique

Helping each other – Look out for changes

Mood	Normal mood fluctuations Calm/confident
Thinking/ Attitude	Good sense of humour Taking things in stride In control mentally Can concentrate/focus
Physical	Normal sleep patterns Few sleep difficulties Physically well Feeling energetic Maintaining a stable weight
Behaviour/ Performance	Physically & socially active Performing well No/limited substance use/ gambling

Helping each other – Look out for changes

Mood	Irritable/Impatient Nervous Sadness/Overwhelmed
Thinking/ Attitude	Displaced sarcasm Distracted/lose focus Intrusive thoughts
Physical	Trouble sleeping Lack of energy Changes in eating patters Some weight gain or loss Tense body posture
Behaviour/ Performance	Decreased activity/socializing Procrastination Regular but controlled substance use/gambling

Helping each other – Look out for changes

	Injured
Mood	Anger Anxiety Pervasively sad/Hopeless
Thinking/ Attitude	Negative attitude Recurrent intrusive thoughts Constantly distracted Can't focus on tasks
Physical	Restless disturbed sleep Some tiredness/fatigue Fluctuations in weight Sore muscles, tense jaw, tight shoulders
Behaviour/ Performance	Avoidance Tardiness Decreased performance Increased substance use/ gambling – hard to control

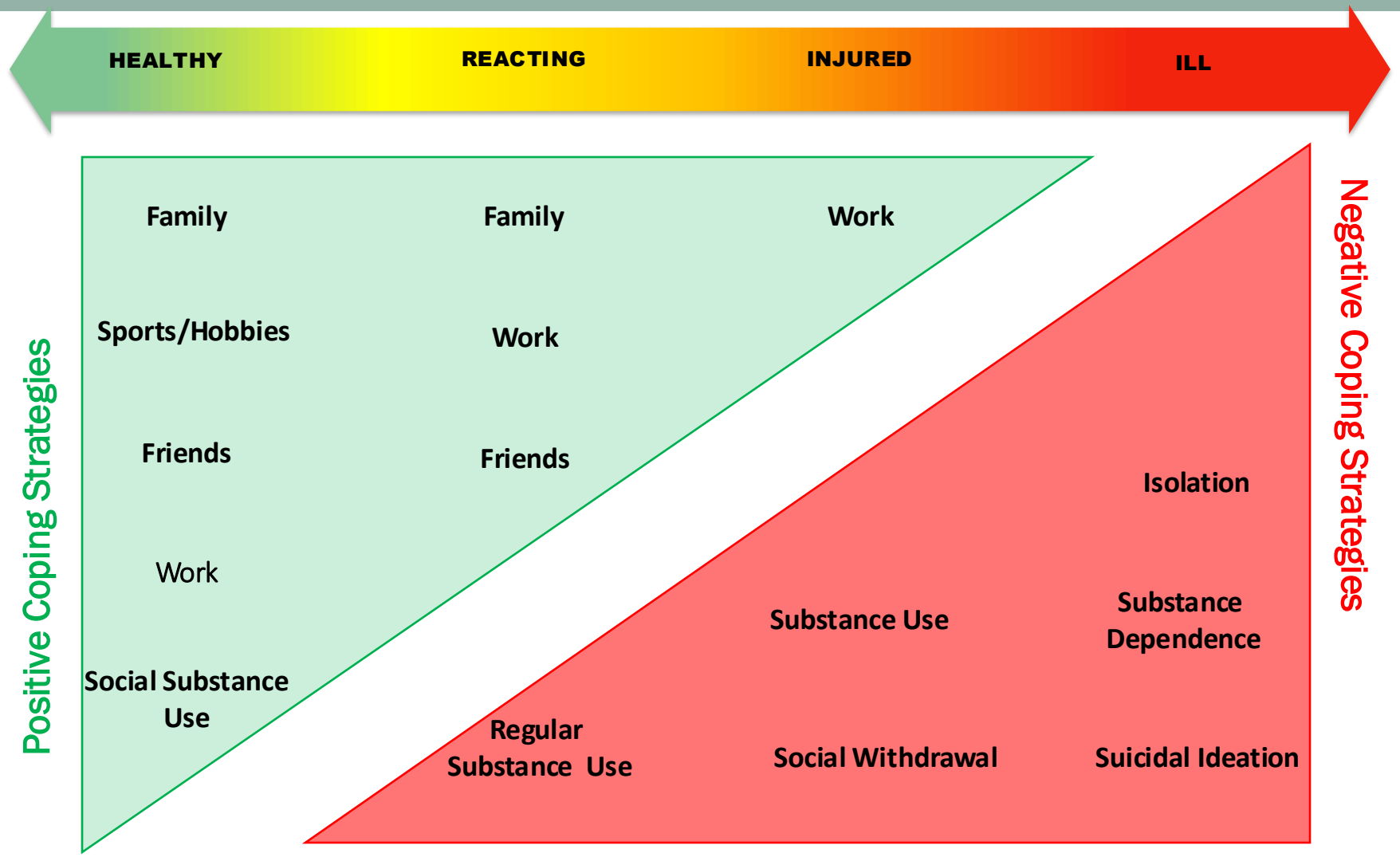
Helping each other – Look out for changes

Mood	Easily enraged/aggression Excessive anxiety/panic attacks Depressed mood/ numb
Thinking/ Attitude	Non compliant Cannot concentrate Loss of memory/cognitive ability Suicidal thoughts/intent
Physical	Can't fall asleep or stay asleep Sleeping too much or too little Physical illnesses Constant fatigue/exhaustion Extreme weight loss or gain
Behaviour/ Performance	Withdrawal Absenteeism Can't perform duties/tasks Substance or gambling disorder Other addictions

Helping each other – Look out for changes

	Healthy	Reacting	Injured	Ill
Mood	Normal mood fluctuations Calm/confident	Irritable/Impatient Nervous Sadness/Overwhelmed	Anger Anxiety Pervasively sad/Hopeless	Easily enraged/aggression Excessive anxiety/panic attacks Depressed mood/ numb
Thinking/ Attitude	Good sense of humour Taking things in stride In control mentally Can concentrate/focus	Displaced sarcasm Distracted/lose focus Intrusive thoughts	Negative attitude Recurrent intrusive thoughts Constantly distracted Can't focus on tasks	Non compliant Cannot concentrate Loss of memory/cognitive ability Suicidal thoughts/intent
Physical	Normal sleep patterns Few sleep difficulties Physically well Feeling energetic Maintaining a stable weight	Trouble sleeping Lack of energy Changes in eating patters Some weight gain or loss Tense body posture	Restless disturbed sleep Some tiredness/fatigue Fluctuations in weight Sore muscles, tense jaw, tight shoulders	Can't fall asleep or stay asleep Sleeping too much or too little Physical illnesses Constant fatigue/exhaustion Extreme weight loss or gain
Behaviour/ Performance	Physically & socially active Performing well No/limited substance use/ gambling	Decreased activity/socializing Procrastination Regular but controlled substance use/gambling	Avoidance Tardiness Decreased performance Increased substance use/ gambling – hard to control	Withdrawal Absenteeism Can't perform duties/tasks Substance or gambling disorder Other addictions

Impact of Distress



Things to consider before you start the conversation

- What have I noticed?
- What are the employees' strengths?
- Am I the best person for this conversation?
- Where to hold the conversation? (Is my office a safe space?)
- I do not need a diagnosis.

Reaching Out

What are three things you can say to start the conversation

Active Listening

- Check your motive
- Be curious – seek to understand
- Don’t make assumptions / judgements
- Clarify – ask questions
- Ensure you are clear on the outcome

Active Listening

- Repeat back what you just heard
- Remember non-verbal messages
- Validate feelings and concerns
- Use pauses / silence

Mental Health at Work – Changing the Culture

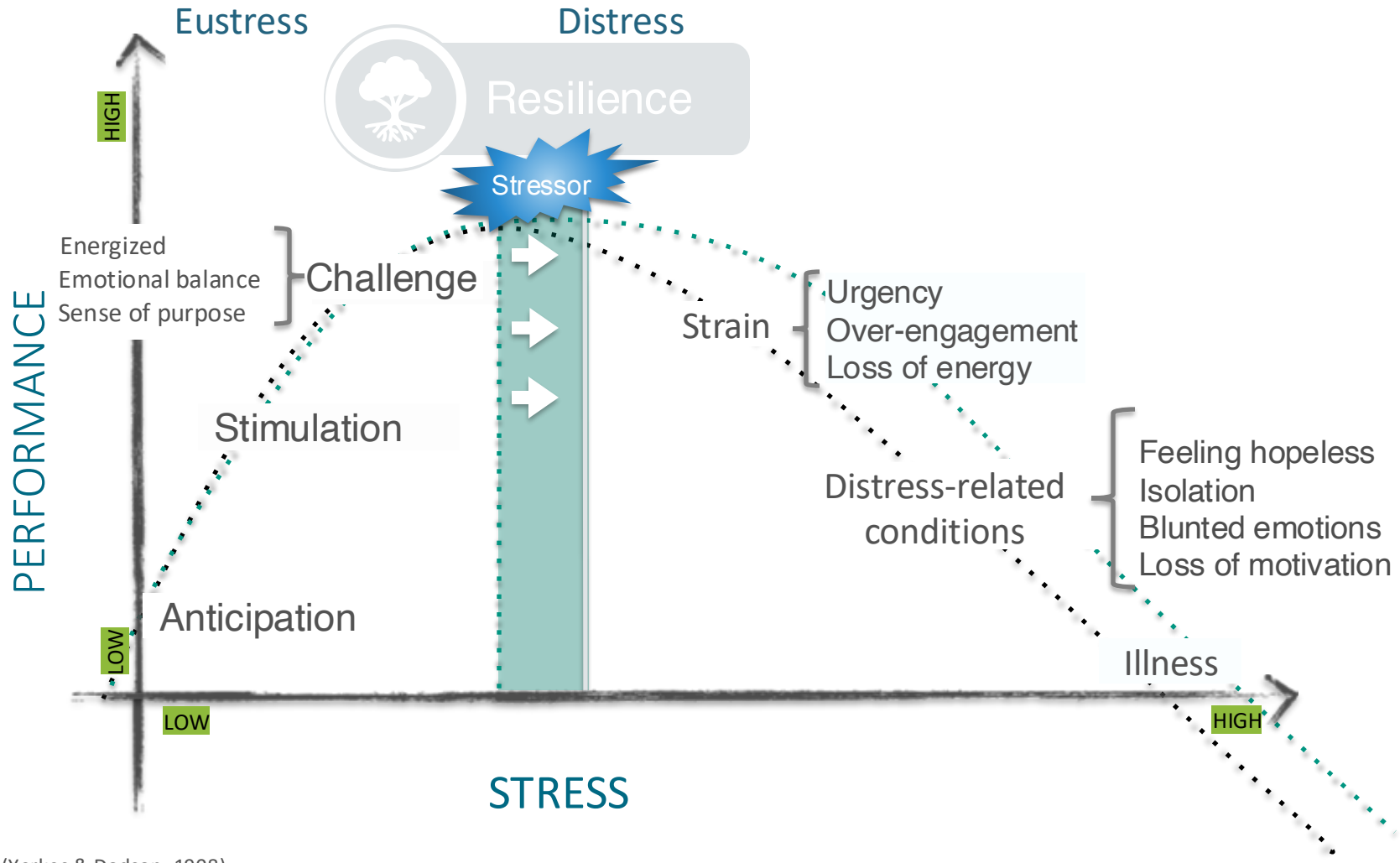
- Talk about mental health as a team and have conversations about mental health
- Discuss use of “sick time”
- Find ways to say we are thinking of you

Coming Back to Work

Remember

- We all have mental health and just like physical health, it can fluctuate
- Know your employee's and peer's baseline behaviours and be curious about changes to that baseline
- It's ok to ask how someone how they are doing
- YOU DO NOT HAVE TO FIX ANYONE!

Stress Continuum



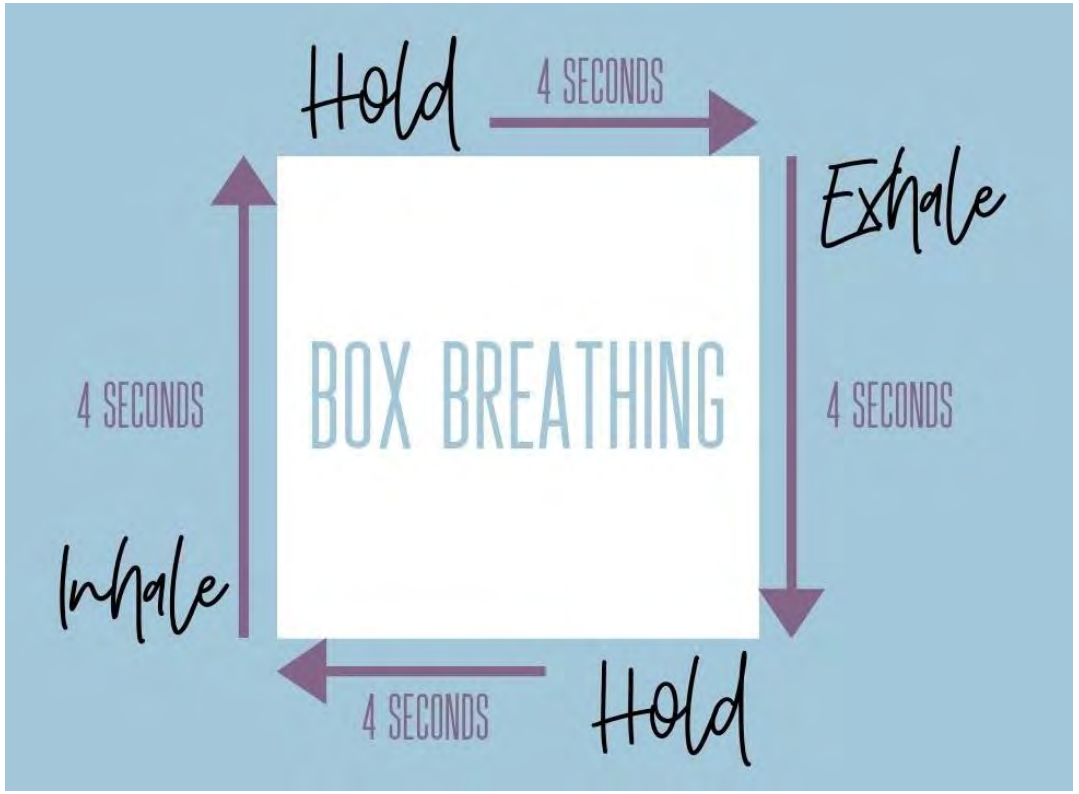
(Yerkes & Dodson, 1908)

Resilience

- Resilience is the ability to withstand adversity and bounce back from difficult life events.
- Being resilient does not mean that people don't experience stress, emotional upheaval, and suffering.
- Some people equate resilience with mental toughness, but demonstrating resilience includes working through emotional pain and suffering.

Breathing Mindfully

- Practice, make it a natural response
- Benefits are almost immediate
- You can do it anywhere, anytime
- Check your breathing before every conversation



Common Thinking Traps

- Mind Reading
- Catastrophizing
- Personalizing
- Over Generalization
- Filtering

Reframe Our Thinking

- I **have** to…

- I **choose** to…

Create healthy boundaries

Healthy Boundaries

- Large Boundaries
- Small Boundaries
- We can say no!

5 Day Challenge

- One thing that made you happy / one thing you are grateful for
- One thing someone else did nice for you
- One thing you did nice for someone else

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