

Pacific Safety

Risk Fundamentals

February 2018

Actsae Event Safety Conference

Agenda



- ❖ **Regulatory Considerations**
- ❖ **Intro - Hazard and risk**
- ❖ **Risk Management Process**
- ❖ **Lessons Learned**
- ❖ **Resources**

A close-up photograph of a wooden gavel with a brass band, resting on a wooden surface. In the background, a red maple leaf, a symbol of Canada, is visible.

Legal Requirements

- **Federal:**

- 19.1 (1)....develop, implement and monitor a program for the prevention of hazards in the work place that is appropriate to the size of the work place and the nature of the hazards and that includes the following components:
 - a) an implementation plan;
 - b) a hazard identification and assessment methodology;
 - c) hazard identification and assessment;



Legal Requirements

❖ British Columbia

- 115(1): ensure that the employers workers are made aware of all known or reasonably foreseeable health or safety hazards,
- 119(b): every owner of a workplace must give the employer or prime contractor the information known to the owner that is necessary to identify and eliminate or control hazards to the health or safety of persons at the workplace,

Safety and Compliance

Safety

- ❖ The first steps to take in providing a safe place of work, is to identify hazards that are reasonably foreseeable within your workplace, and then assess their risk level, and apply appropriate controls to eliminate or lower the risk

Compliance and Due Diligence

- ❖ This can help you not only provide a safer workplace, but can also demonstrate to any interested stakeholders that you have taken appropriate measures to comply with expectations

ALARA

❖ **As Low As Is Reasonably Achievable**

So how far do you need to go to identify and address hazards?

Due Diligence: requires employers to take all reasonable precautions, to prevent injuries or accidents in the workplace.

Negligence: a duty of care is owed to employees and that has not been breached



ALARA

❖ Regs, Reasonable, and Live Events Motion Picture

“Whenever there’s a hazard, if you’re not able to meet the straightforward, easy requirements that we list in the regulations, or maybe there’s a regulation that doesn’t exist, we’re still going to expect a risk analysis and hazard controls anytime a worker could be harmed,”

Lisa Houle, manager, industry and labour services at WorkSafeBC.

A close-up photograph of a brick wall, showing the texture of the bricks and the mortar joints. The bricks are reddish-brown and weathered.

Industry Challenges

❖ WSBC and Practical Solutions

Guideline 11.2-6 Fall Protection During Stunt Work, discusses acceptable alternative controls to be used when the regulated fall protection procedures are not practicable during a planned fall. It specifies personal fall protection equipment that may be used when regulated equipment, such as a safety harness meeting CSA or ANSI standards, cannot be used. As the guideline explains, “in the actual conduct of a stunt, such a harness may be too bulky or involve points of attachment that interfere with the intended fall.”

Hazard vs. Risk

Common Concepts

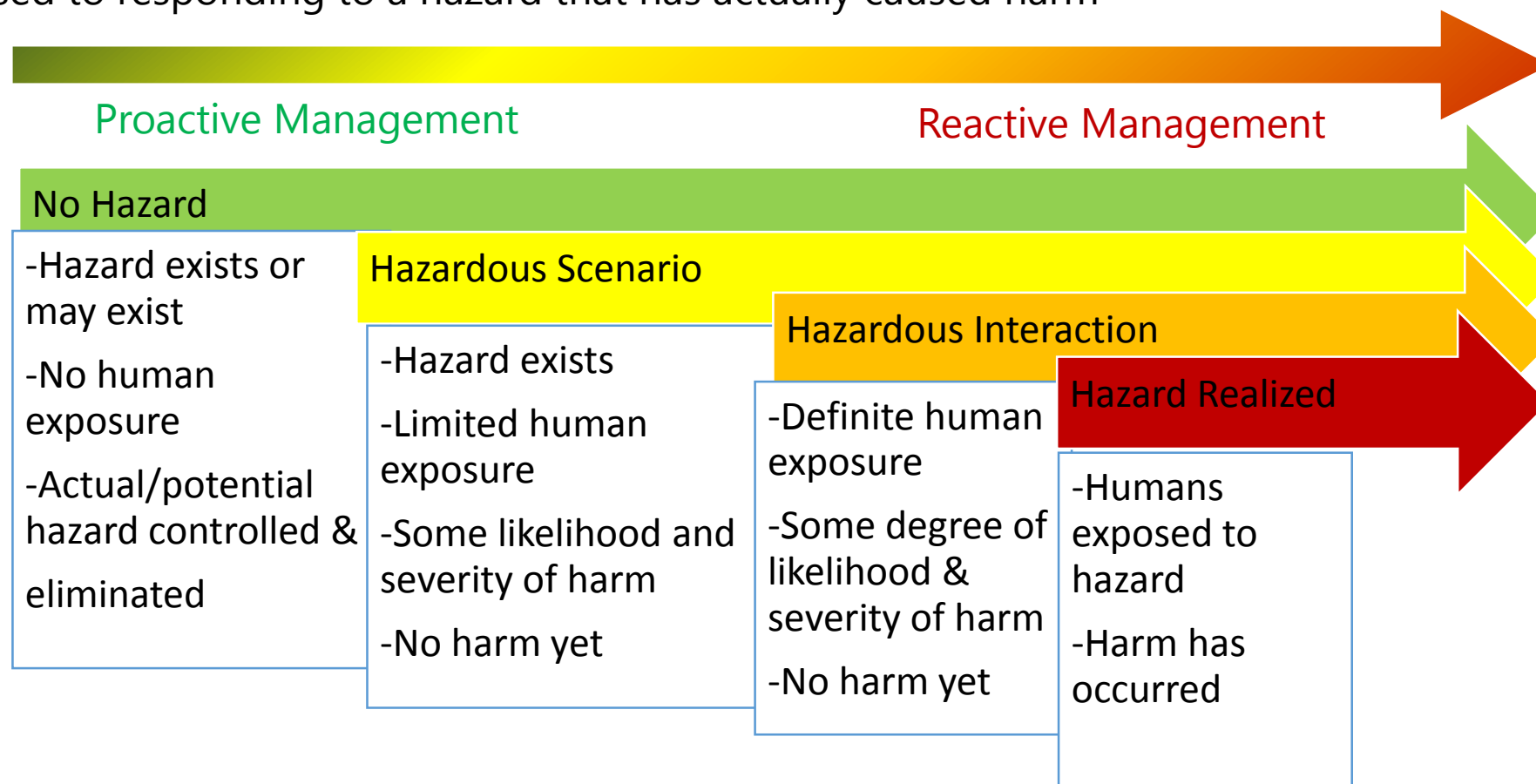
- ❖ A hazard is a condition, activity, or substance that may cause harm.
- ❖ Risk is the likelihood that a hazard will actually cause a degree of severity resulting in harm/loss

Uncommon Concept

- ❖ Safety risk tends to focus on loss, however risk can also lead to gain

Hazard Scenarios

Assessing where potential harm to workers may exist, is a more proactive form of hazard assessment, as opposed to responding to a hazard that has actually caused harm



Hazard Identification

- ❖ Field level hazard assessment
- ❖ Inspections
- ❖ Tool box talks
- ❖ Job demand/hazard analysis
- ❖ Safe work method statements
- ❖ Incident reviews
- ❖ Other/s
- ❖ "We don't"

❖ "We don't"

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Defining Risk

What is Risk?

Merriam-Webster: Possibility of loss or injury

CCOHS: the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard

CSA Z1002-12: the combination of the likelihood of the occurrence of a harm and the severity of that harm.

ISO 31000:2009: The effect of uncertainty on objectives

Simple Risk



Severity x Likelihood = Risk

- ❖ Risk is simply how likely a degree of harm/loss is to occur.
- ❖ In people terms, what hazard exists that is likely to get someone hurt, and how badly are they likely to get hurt.
- ❖ We navigate risk every day.



Complex Risk

Risk is variable and has many moving parts

- ❖ We navigate risk every day.
- ❖ Some risk is easily visible and navigable
- ❖ Some risk is less obvious, and more difficult to identify
- ❖ How do we better identify and manage risk?

Risk

Navigating Risk Daily

Most of us **operate a half ton or more piece of equipment** to get **to work**, social events, shopping.

This equipment is **an intricate tapestry of mechanical parts, flammable liquid**, combustible materials, and is **operated frequently** and for prolonged duration, at high speeds, with **catastrophic potential for severity of harm**



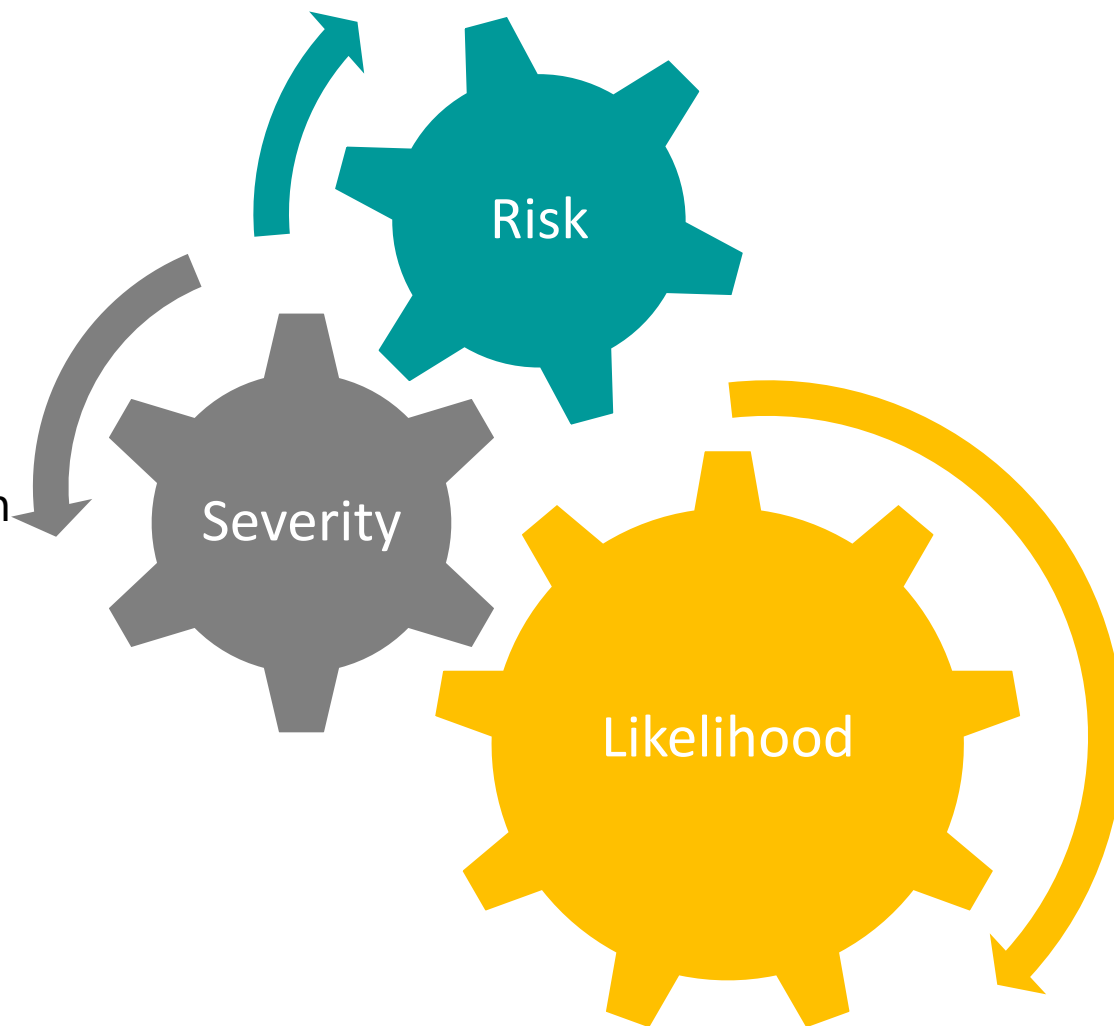
We operate this equipment with thin barriers of glass to protect us, and **optional restraints**, while exposed to environmental and **external hazards** including other **drivers** who may **not be fit for purpose**.

Many of us trust that we'll be safe today, because we were yesterday.

Risk

Components

Risk is a series of elements, or **variables** which influence each risk to increase or decrease likelihood of occurrence and severity of consequence



Risk

Assessing The Risk

BC 3,210,000 licensed drivers

BC	2012	2013	2014	2015	2016	5 yr avg BC	Crash Odds
Accidents	260,000	260,000	280,000	300,000	330,000	290,000	10%
Fatal	251	245	256	277	273	260	1%

Likelihood

- People: 2
- Frequency Exposure: Daily
- Duration Exposure: Low – small percentage of daily activity

Severity

- Severity of exposure to hazard: High – Serious injury, LTI

Risk

- Risk Level: High

Likelihood Elements

Risk

Likelihood

Exposure

What are the variables that will expose people to a hazard?

Occurrence of the Event

What can cause the potential hazard to be realized and cause harm?

Avoiding or Limiting Harm

How well can people identify, and avoid harm?

Components of exposure

Risk

Likelihood: Exposure

People Exposed

More people
creates
greater
likelihood of
hazard harm
being realized

Duration Exposed

The longer
people are
exposed to a
hazard the
greater the
potential
harm

Frequency Exposed

How often are
people
exposed to a
hazard can
increase the
chance of
harm

Probability of Exposure

The
mathematical
odds, or
chances of
the hazard
being realized

Risk

Severity of Harm:

Degree of injury, illness, or damage to the physical or mental health of the worker

Minor

Major

**Permanent
Injury/Death**

Risk

Consequence:

The outcome of a hazardous event.

Injury

Damage

Reputation

Qualitative vs. Quantitative Assessment

Based on existing knowledge, complexity of **variables**, and anticipated inherent risk levels, a **risk assessment** may be **qualitative or quantitative**.



More subjective analysis based on experience and knowledge

More analytical analysis based on high quality numerical data

3x3 risk matrix and heat map

Impact (Consequence)	Probability (Likelihood)		
	Low	Medium	High
High	0	2	1
Medium	3	1	1
Low	4	2	2



Risk Management Process

Control Risk vs. Managing Risk

Controlling Risk

- ☐ Eliminate hazard
- ☐ Reduce hazard likelihood
- ☐ Reduce hazard severity

Managing Risk

- ☐ Identify and Assess Risk
- ☐ Control and Treat Risk
- ☐ Communicate & Monitor Risk

Risk Management Process - CULTURE

- Maturity of the organization
- Effective leadership/management
- Effective communication
- Organizational accountability
- Recruiting and hiring
- Knowledge and education
- Incident history
- Change Management

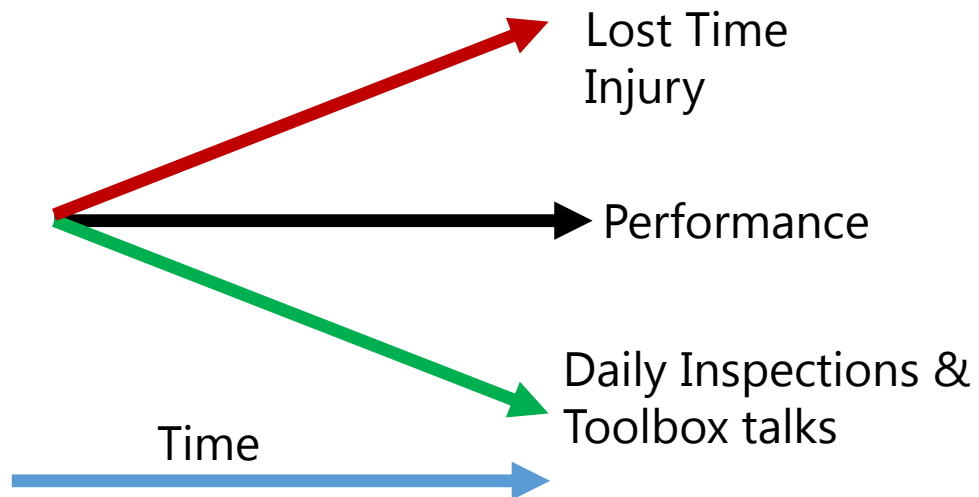


Multiple cultures can exist, creating diversity, synergy or conflict

Appetite and Tolerance

Risk Appetite

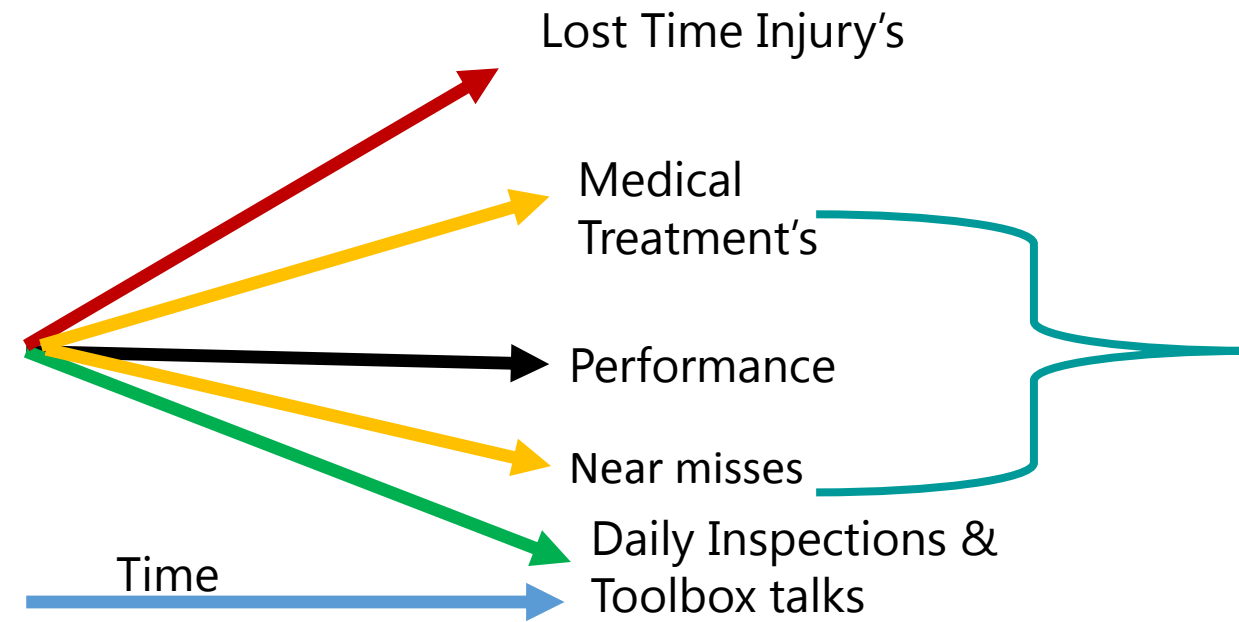
Amount of risk an organization will pursue or retain



2018-03-27

Risk Tolerance

Willingness to retain after treatment to obtain objectives



Risk Register

A risk register is a tool used to identify, assess, and control hazards, in the workplace. It is a scalable, methodical means to provide a catalogue of hazards that are being managed.

- Inputs that provide background information on the hazard
- An inherent risk component looking at the likelihood and consequence at the moment with limited or current controls
- Controls, what controls are in place or recommended that can reduce the risk
- Residual risk component looking at the likelihood and consequence to assess risk levels remaining after controls are put in place

Risk Register

Risk ID	Risk Inputs				Inherent Risk			Hierarchy of Controls	Residual Risk			Risk Treatment
	Source of Hazard ID	Assm't Date	Hazard Description	Hazard Type	Likelihood	Consequence	Risk	Controls	Likelihood	Consequence	Risk	Proposed Controls
RR-1												
RR-2												
RR-3												
RR-4												
RR-5												

0 - 5 = Low Risk		Severity of the potential injury/damage				
6 - 10 = Moderate Risk		Insignificant damage to Property, Equipment or Minor Injury	Non-Reportable Injury, minor loss of Process or slight damage to Property	Reportable Injury moderate loss of Process or limited damage to Property	Major Injury, Single Fatality critical loss of Process/damage to Property	Multiple Fatalities Catastrophic Loss of Business
11 - 15 = High Risk						
16 - 25 = extremely high unacceptable risk		1	2	3	4	5
Likelihood of the hazard happening	Almost Certain 5	5	10	15	20	25
	Will probably occur 4	4	8	12	16	20
	Possible occur 3	3	6	9	12	15
	Remote possibility 2	2	4	6	8	10
	Extremely Unlikely 1	1	2	3	4	5

Hazard List		
Air Quality	Inadequate Maintenance	Slippery Surfaces
Chemicals	Inadequate Muster Points	Spills
Compressed Air	Ladders	Stairs
Congestion	Limited Visibility	Stored Energy
Electrical	Manlifts	Temperature
Engulfment	Materials Handling	Tipping, Rolling
Exposure to Elements	Mobile Equipment	Traffic
Exposure to Leading Edge	Noise	Trailers
Falling Objects	Overhead Hazards	Uneven Surfaces
Fatigue	Pinch Point	Unsanitary Conditions
Flammability	Poor Ergonomics	Use of Hand Tools
Hazardous Atmosphere	Radiation	Violence
Inadequate Access/Egress	Seismic Instability	Wildlife
Inadequate Delineation	Sharp Edges	Working at Height
Inadequate Lighting	Sharps-Biohazards	Working in Isolation

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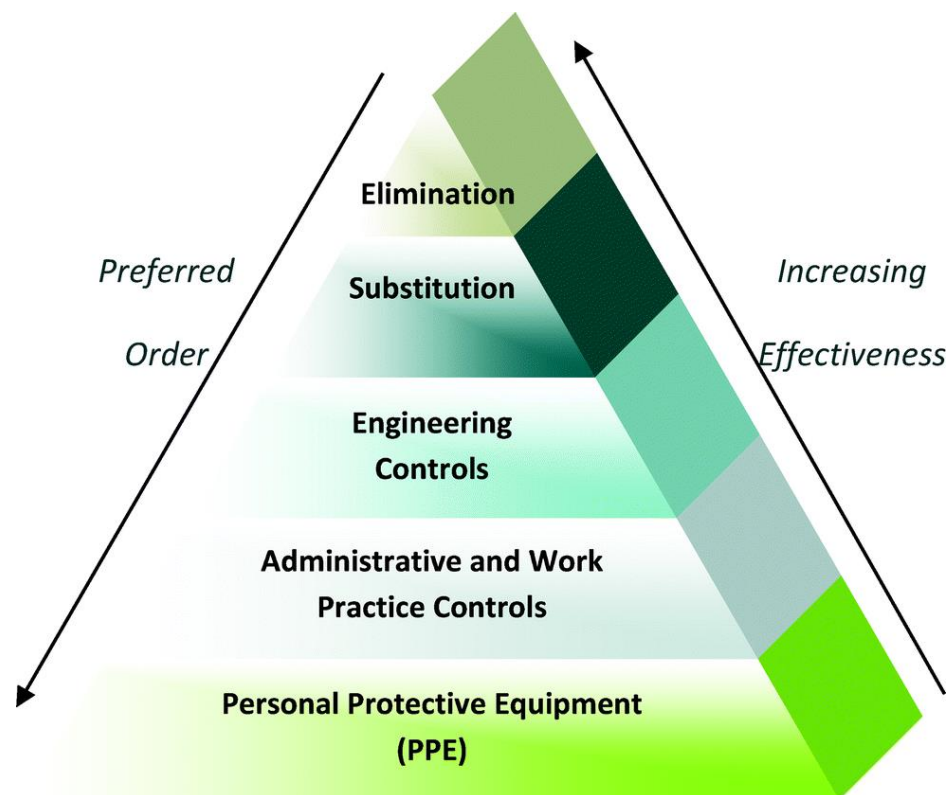
Risk Register - Hierarchy of Controls

Controls are means by which to eliminate, or reduce hazard risks to as low as reasonably achievable.

- The risk level associated with the hazard
- The nature and scale of the hazard
- The effectiveness of the control
- Difficulty of implementation of the control
- Potential to create new hazards



Risk Register – Hierarchy of Controls



Energy Source

- Prevent build-up of energy
- Reduce the amount of energy
- Prevent uncontrolled release of energy
- Modify rate or distribution of the released energy
- Modify the qualities of the energy

Barrier

- Separate in space and time, the victims from the energy being released
- Separate the victims from the energy by physical barriers

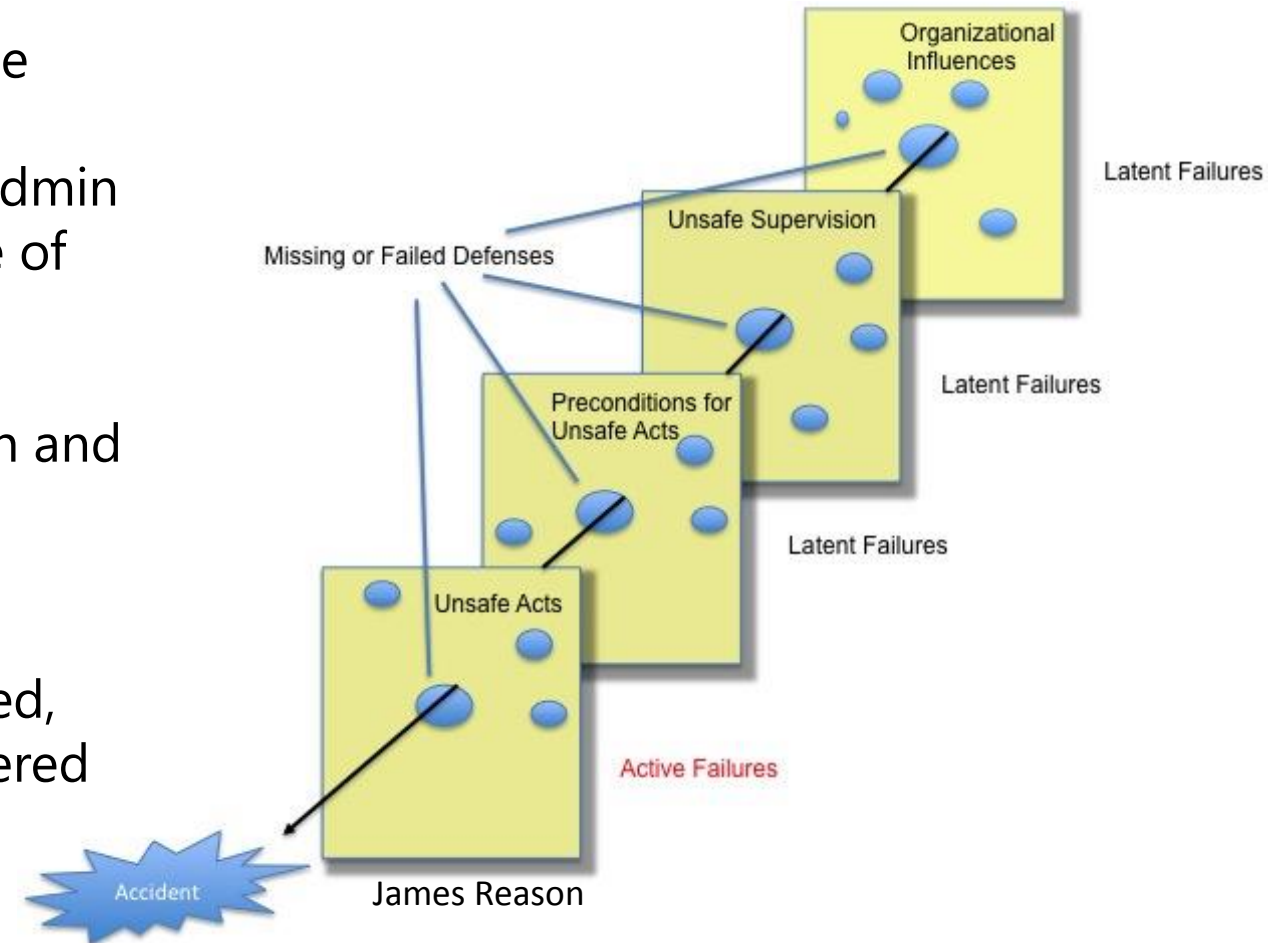
Vulnerable Target

- Make the vulnerable target more resistant to damage from the energy flow
- Limit the development of damage
- Rehabilitate the victims

William Haddon

Risk Register – Hierarchy of Controls

- Elimination is always the priority where possible
- Use of isolation, and engineering, along with admin and PPE is usually a balanced and effective use of controls
- Relying on a singular control requires thorough and effective use of the control, and may limit the reduction of risk
- Ineffective controls (PPE, Admin) are not advised, however if they are a last resort, should be layered and not considered as single control solutions



Risk Management Elements

ISO 31000:2009(E)

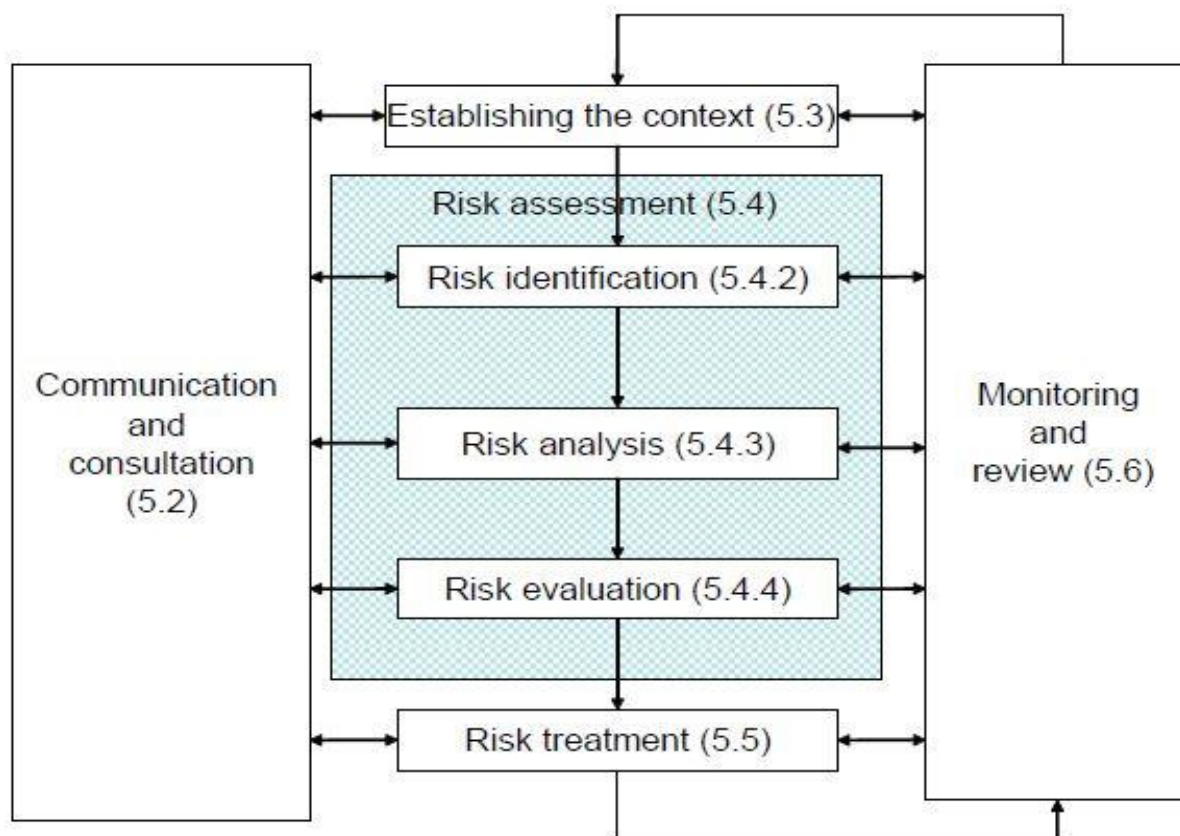


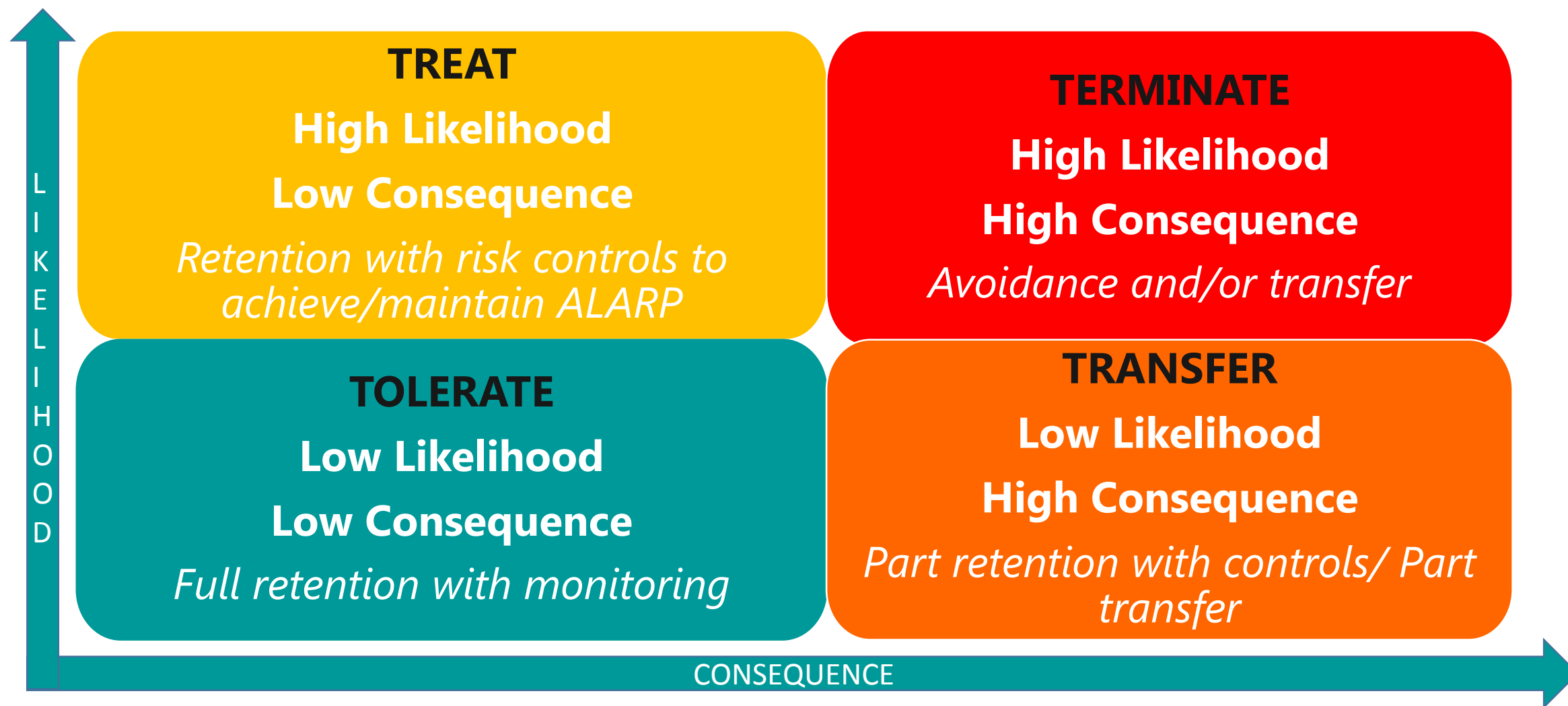
Figure 3 — Risk management process

Risk Register – Managing Residual Risk

Treat, Tolerate, Terminate, or Transfer

- Treat means you will look to further reduce the risk level, improving or introducing further controls
- Tolerate means you believe you have reduced the risk as low as is reasonably achievable
- Terminate means you have eliminated the risk as it is intolerable
- Transfer means you are sharing the risk of the hazard with a 3rd party, this may be a specialty contractor, insurance, etc.

Risk Register – Managing Residual Risk



Risk Register – Hierarchy of Controls

The a-ha moments...

- No incidents, so “controls are effective” is not accurate
- They have a number of controls, but they’re not key influencers on likelihood or severity
- They had a qualitative understanding of risk, but a quantitative review results saw they underestimated the risk
- There is a control that is being used, but not effectively

Practical- Lessons Learned

- Get people involved, the right people will add value, and safety is about people!!!
- Most clients don't have a thorough catalogue of hazards
- Risks aren't assessed formally, and may be under or overestimated
- Using a risk register can create more awareness, and focus on actual risk levels, and provide some due diligence defence
- Risk appetite and tolerance are uniquely part of culture
- Culture is critical, take time to assess and calibrate to the relevant safety cultures

Summary of Concepts

- Hazard & risk, severity & consequence, etc. are not interchangeable use the terms in context
- Risk has many variables that can be influenced (frequency, exposure, severity) use the right controls for the right effect
- Risk assessments can be qualitative or quantitative depending on requirements, consider the complexity, and level of risk
- Change management, don't do too much, too fast, and communicate the plan, and progress
- Risk management is a continual improvement process, you can't get it all the first time!

Hazard and Risk Resources

- CCOH - <https://www.ccohs.ca/topics/hazards/>
- CSA Z1002-12 - <http://shop.csa.ca/en/canada/occupational-health-and-safety-management/canrsa-z1002-12-r2017/invnt/27032762012>
- ISO 31001 - <http://shop.csa.ca/en/canada/introduction-to-iso-31000-risk-management/invnt/500470272011>
- RIM - <https://www.rims.org/resources/StandardsandPractices/Pages/default.aspx#>
- WSBC - <https://www.worksafebc.com/en/health-safety/create-manage/managing-risk/assessing-risks>

Hazard and Risk Resources

CCOH Due Diligence- <http://www.ccohs.ca/oshanswers/legisl/diligence.htm>

WSBC and Regs in Performing Arts - <http://www.cos-mag.com/personal-process-safety/35299-ohs-in-the-spotlight-in-entertainment-industry/>

WSBC Performing Arts Guidance - <https://www.worksafebc.com/en/health-safety/industries/arts-entertainment>

For more information or slide summary

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