

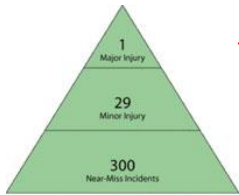
Critical Thinking
Beyond Swiss Cheese
and
Equilateral Triangles

Alberta Health and Safety Conference 2019

Dave Fennell

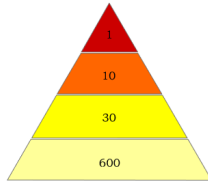
Director, Dave Fennell Safety Inc.

Critical Thinking on Traditional Safety Models in 2019 and Beyond



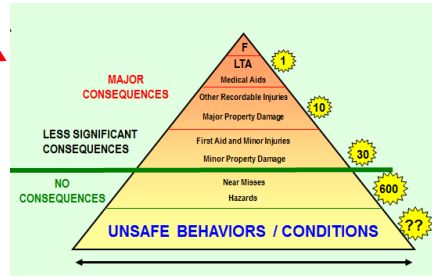
H.W. Heinrich (1931)

1939

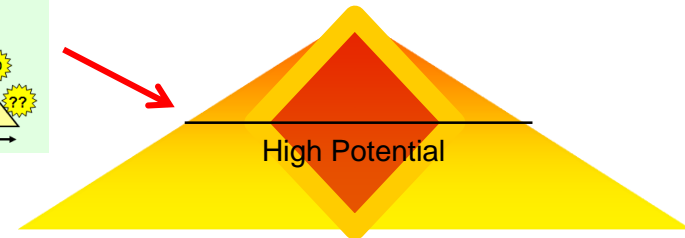


1969

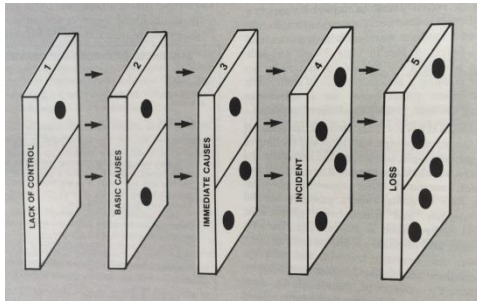
Major Injury / Fatality
Minor Injury
Property Damage
Near Miss



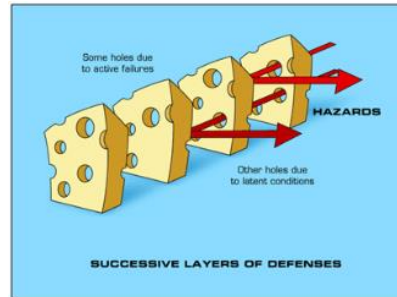
1990



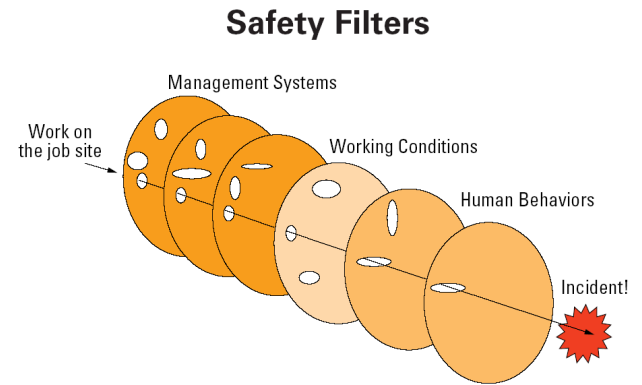
2019



1985



2000



2019

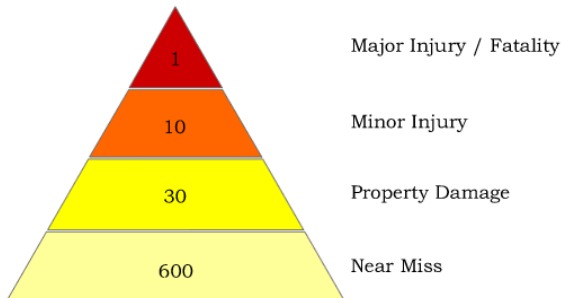
Critical Thinking on Traditional Safety Models in 2019 and Beyond

It is 2019 and it is time for Safety Professionals to do some **critical thinking on how we use some of the traditional safety models** that have guided our approaches to safety in the past. How can we use these models in 2019 to help our management, our workers and our clients improve safety? How can safety professionals build off these basics and what should these models look like in 2019 and Beyond. Let's focus on two fundamental models:

The Incident Triangle

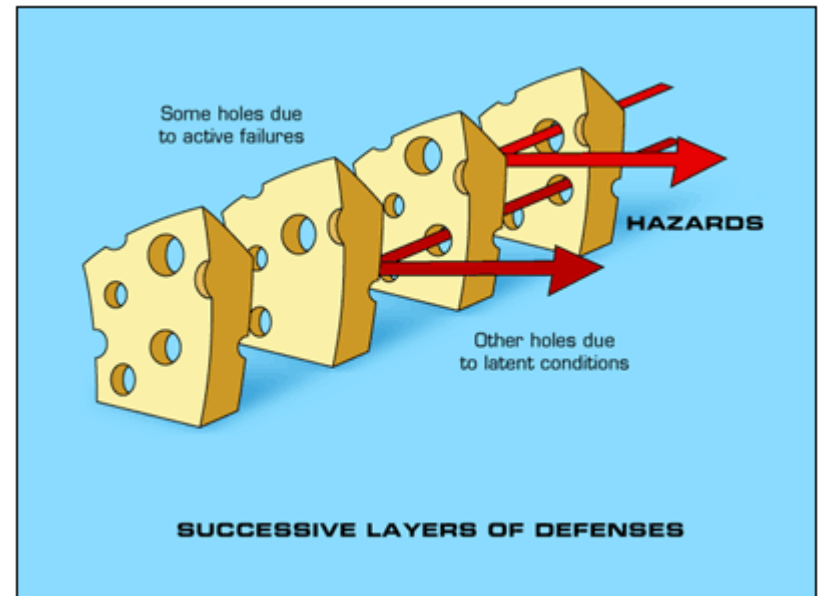


H.W. Heinrich (1931)



Frank Bird Update (1969)

The Swiss Cheese Model



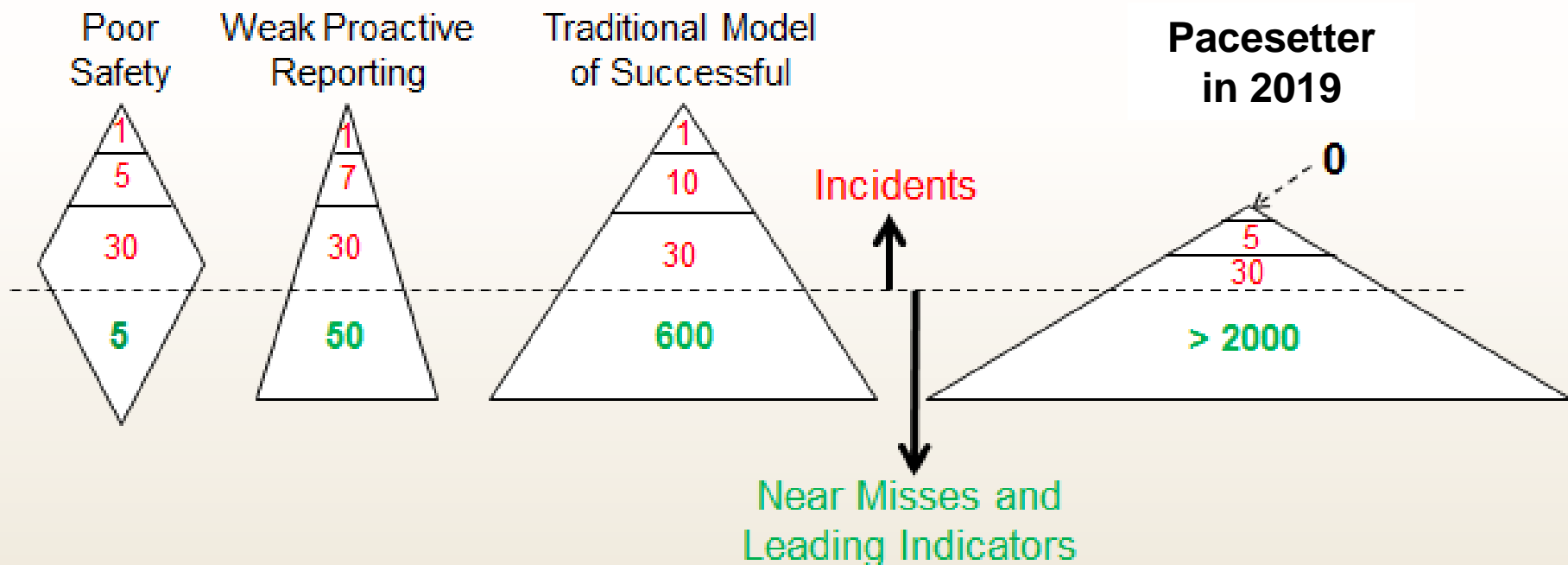
James Reason (2000)

Critical Thinking on Traditional Safety Models in 2019 and Beyond

The Incident Triangle

Organizations that are leaders and pacesetters in safety know the importance of the proactive aspects of safety. These organizations have developed a culture of being proactive, have strong reporting, have high worker participation and understand the relationship between the minor no-consequence events and the major incidents. The traditional incident triangle can be used as a touchstone to determine the effectiveness of the proactive aspects of safety but it needs to be viewed differently for progress and success in 2019 and Beyond.

Ratios of Incidents to Proactive Reporting

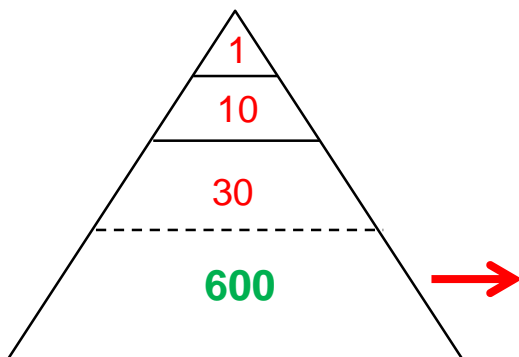


Critical Thinking on Traditional Safety Models in 2019 and Beyond

The Incident Triangle

The shape and ratios of the triangle are more than just symbolic of a change but need to become a touchstone for progression in modern safety. As an organization becomes safer there will be fewer incidents from which to gather information on the health of the system so it becomes important to tap into smaller events, near misses and observations of behaviours to gather information that will prevent incidents. These are all the indicators from below the 'consequence' line on the triangle. Organizations and safety professionals must now have a robust system for identifying and addressing the leading indicators.

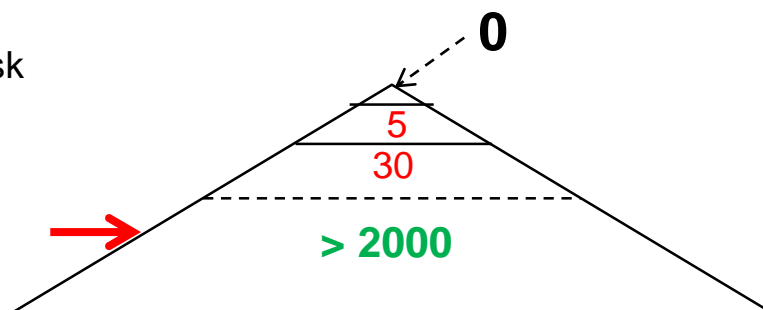
Traditional Model of Successful



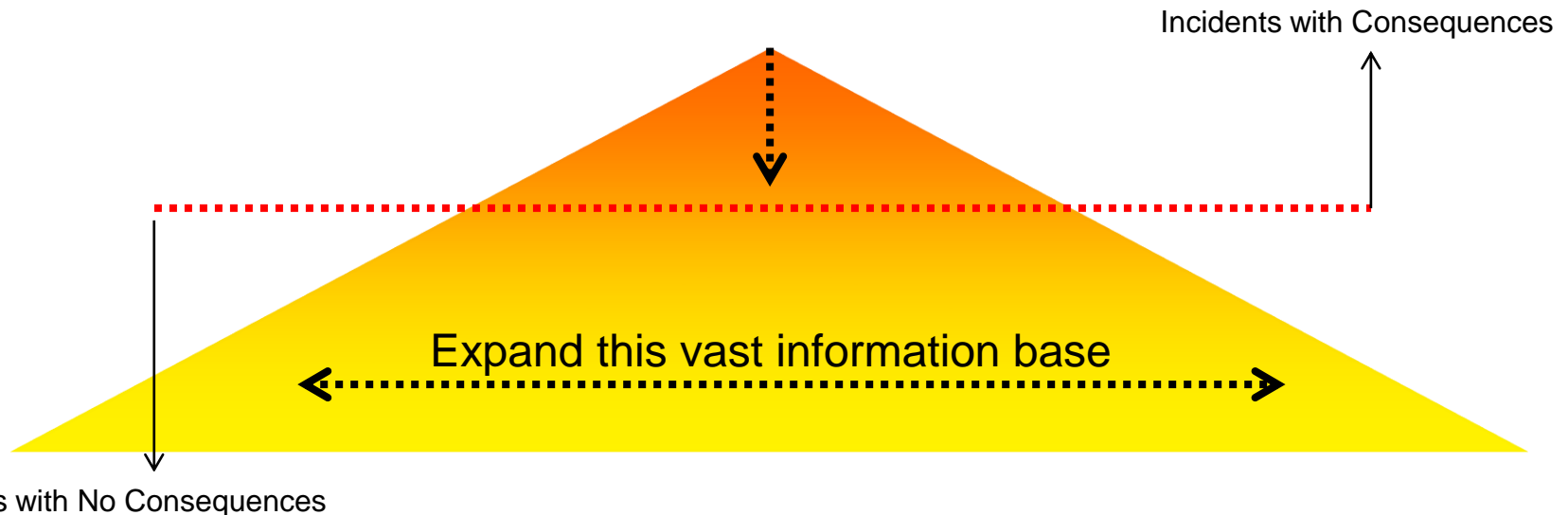
How do we get there?

1. More near miss reporting
2. Greater participation in NM reporting
3. Observations and interventions on at risk behaviour
4. More thorough identification and correction of hazards
5. More effort into assessment this proactive data

Pacesetter in 2019



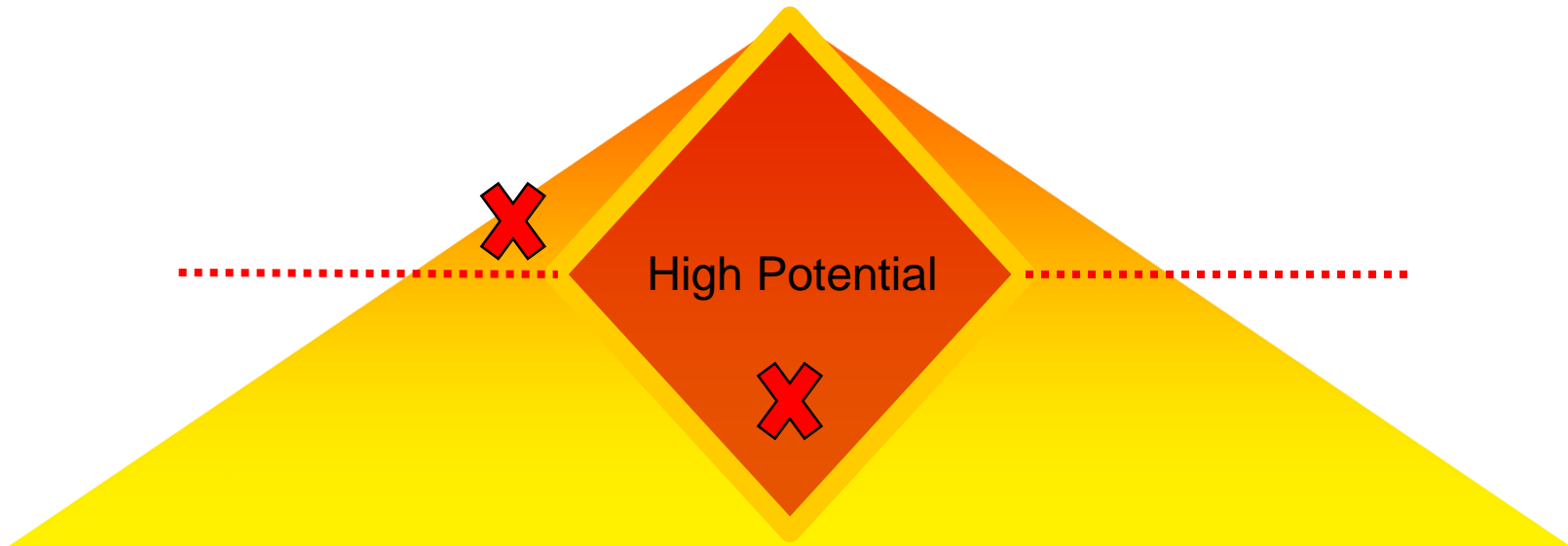
Promote proactive reporting and predictive safety



1. Create a positive culture on proactive reporting
2. Teach workers how to identify near misses
3. Create a simple reporting system
4. More observations and interventions on at risk behaviours
5. Visible management support
6. Follow up and Action on identified items

Request Dave's "How To" document for implementation of a near miss program

Focus on events with high potential



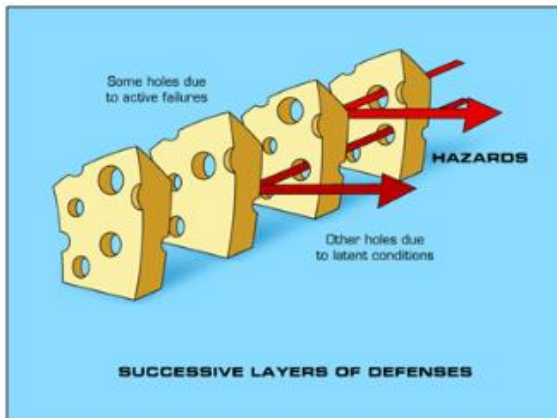
1. Develop a System for assessing potential (i.e. “Potential Hurt”)
2. Use a System for assessing integrity of the barriers (i.e. IRAT)

ExxonMobil's and Imperial Oil's “Mining The Diamond”

Critical Thinking on Traditional Safety Models in 2019 and Beyond

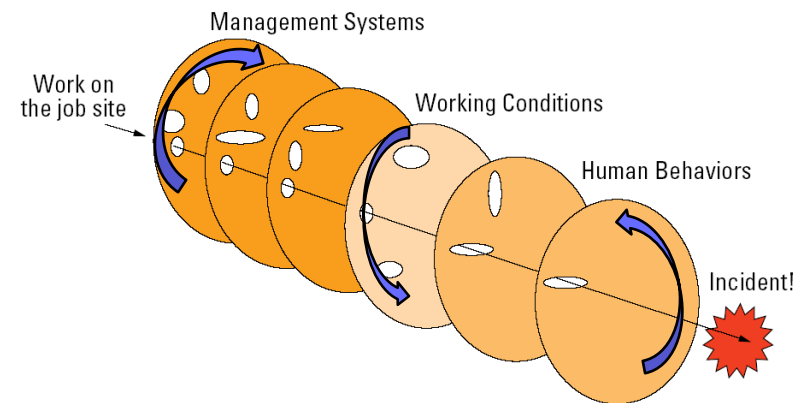
Safety Filters

Several decades ago a 'domino' model was used to demonstrate that an incident is the result of an event that triggers another and then another which eventually results in a loss or injury. James Reason advanced this concept by using a 'Swiss Cheese' model to show that an incident results from multiple failures, not necessarily triggered by another event. This helped us understand that the failures can be the result of multiple unsafe systems, conditions and acts. In 2019 we need to use a model that not only demonstrates that there are multiple causes but also that the work place is dynamic and the deficiencies in workplace conditions, management systems and behaviours can combine to result in incidents. The 'Rotating Safety Filters' provide this visual model that can be used for assessing work place safety, teaching workers and management how to prevent incidents and as a tool to assist with incident investigations.



Represents multiple failures in a system can result in an incident

Safety Filters

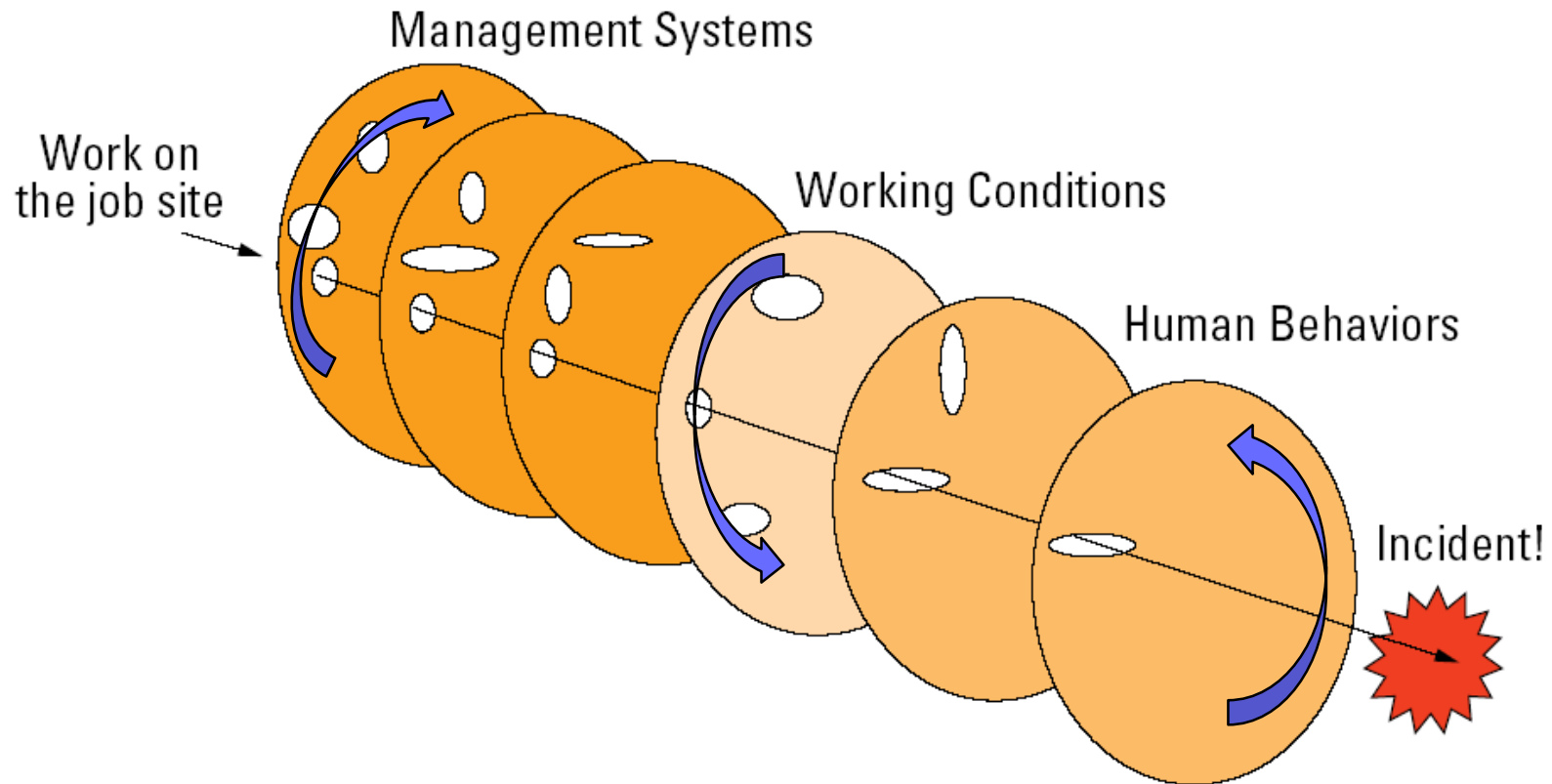


Represents multiple failures in management systems, physical conditions and behaviours can eventually line up in a dynamic work place to result in an incident.

Critical Thinking on Traditional Safety Models in 2019 and Beyond

Safety professionals need a model that represents both the multiple failures ('holes in the filters') that cause an incident and the dynamic nature of a system. A single hole in a single filter will rarely result in an incident. Incidents occur when the 'holes' (hazards, at risk behaviours, weak management systems) align.

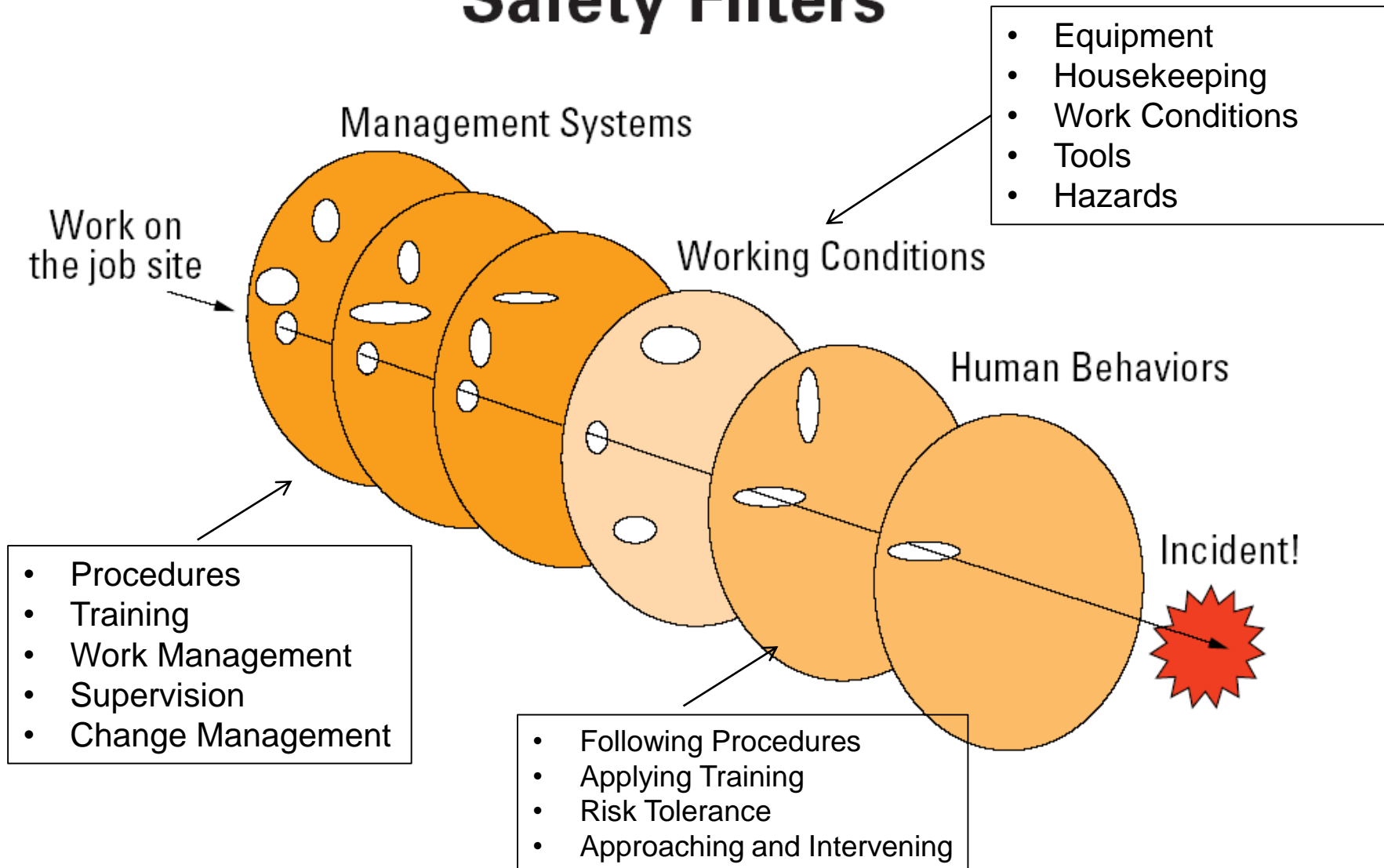
Safety Filters



Critical Thinking on Traditional Safety Models in 2019 and Beyond

The safety filters can become a touchstone for assessing the integrity of a safety system and can also be used as a tool to aid an investigator identify all the causes of an event.

Safety Filters

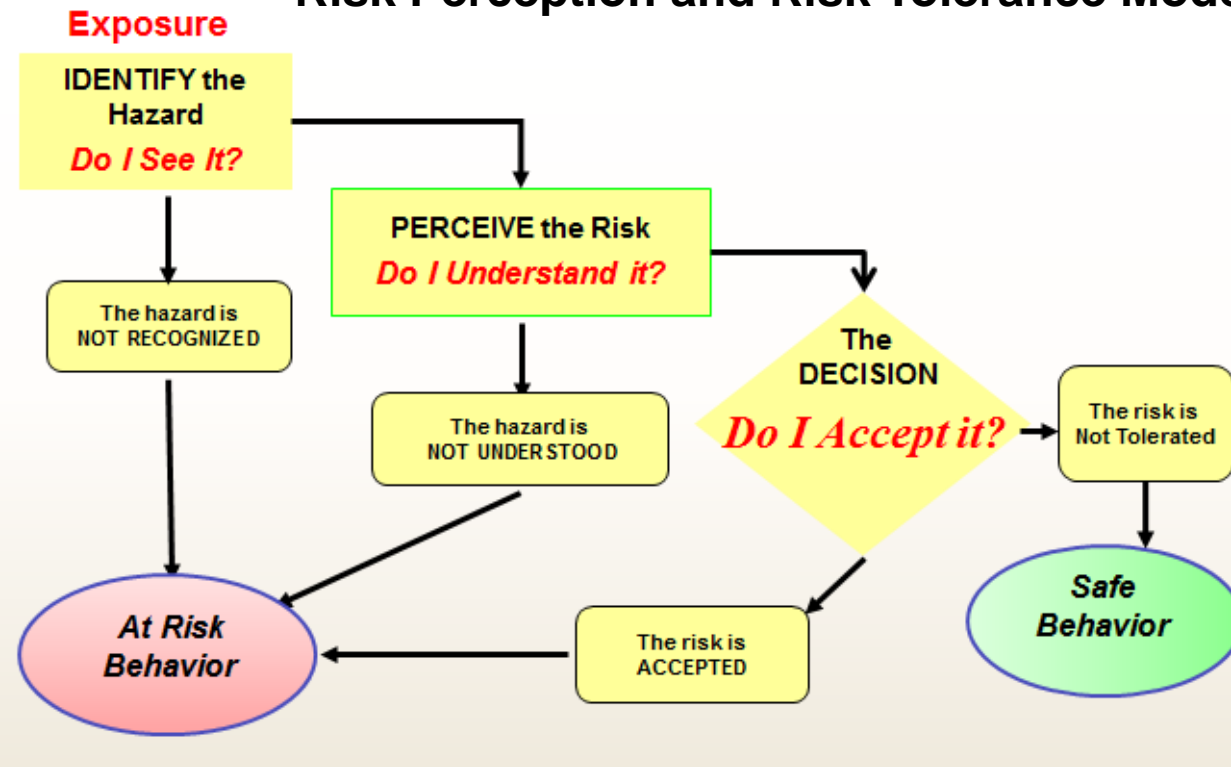


Critical Thinking on Traditional Safety Models in 2019 and Beyond

Risk Tolerance:

This is an area of safety that must become as engrained as the safety triangle and safety filters. Risk tolerance deals with the cognitive aspects of why we take risks, how we recognize risk acceptance in the workplace and what we can do about it to make our on the job and off the job activities safer. The safety professional of 2019 must understand and apply these concepts in their work places.

Risk Perception and Risk Tolerance Model



10 Factors That Influence Risk Tolerance

- 1) **Overestimating Capability and Experience**
 - Reinforce the correct way of doing the Job (LPO, Stop & Think)
- 2) **Familiarity with the Task**
 - What could go wrong THIS time?
 - How would I teach a new person how to do this tasks?
- 3) **Seriousness of Outcome**
 - How bad could it be?
- 4) **Voluntary Actions and Being in Control**
 - Integrate Stop & Think into personal and voluntary activities
- 5) **Personal Experience with an Outcome**
 - Keep the 'corporate memory' active
 - Find personal stories to reduce scepticism
- 6) **Cost of Non-Compliance**
 - Remove barriers to compliance
 - Increase cost of non compliance
- 7) **Confidence in the Equipment**
 - Stay informed on the limitations of the equipment
 - Stop and Think ... "What would happen if it failed?"
- 8) **Confidence in Protection and Rescue**
 - PPE is a last line of defence and has limitations
- 9) **Potential Profit & Gain from Actions**
 - Remove rewards for risk taking
 - Eliminate barriers to doing the tasks the 'right way'
- 10) **Role Models Accepting Risk**
 - Address risk takers immediately
 - Recognize 'Erosion of Standard' address it immediately
 - Calibrate risk tolerance at every Stop and Think moment



Critical Thinking on Traditional Safety Models in 2019 and Beyond

Conclusion

The safety professional of 2019 must maintain critical thinking on all aspects of safety to improve the safety in their organizations and for their clients.

The Incident Triangle:

The severity and frequencies represented on the Incident Triangle must now be viewed through the lenses of what success looks like in 2019. This means more attention to the proactive aspects of safety and teaching organizations how to create a robust reporting system that will actually expand the base of the triangle and thus result in fewer incidents of consequence.

The Safety Filters:

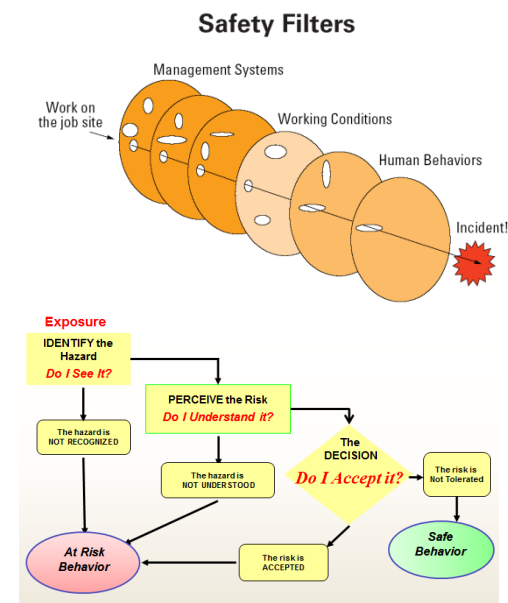
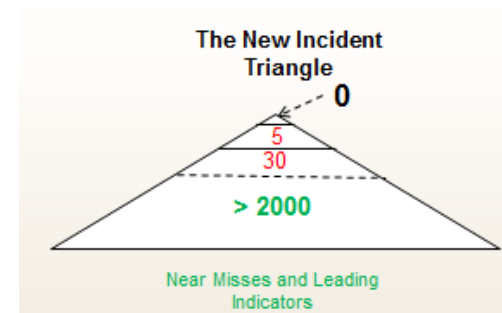
The work place is dynamic and incidents are the result of multiple failures that combine. The 'holes' in the filters need to be identified proactively and the safety professional of 2019 needs the ability to predict how these holes could combine to cause an incident. Assessing incidents against the filters can help identify ALL the causes and aid in establishing practical preventative actions.

Risk Tolerance:

Critical thinking on safety in 2019 must include an understanding of the cognitive aspects of risk. The risk tolerance model needs to become as much a fundamental of safety as the other two models.

The Safety Professional:

Today's safety professional must be a critical thinker who can apply both traditional and newer safety models to communicate safety in the workplace.



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