From Theory to Practice: Risk Management for Gap Year Programs

Jeff Baierlein

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GAP YEAR ASSOCIATION 2021 VIRTUAL NOVEMBER 8-10

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Outline of Session

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Introductions

Presentation: Safety Science

Discussion

Break

Presentation: Application to Gap Year programs

Self-Assessment

Small & large group discussions

Closure

Outcomes

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Participants will:

Understand risk management theories and models used across industries

Identify which models are most widely accepted as current best practice

Identify which model or models may be most useful for their program

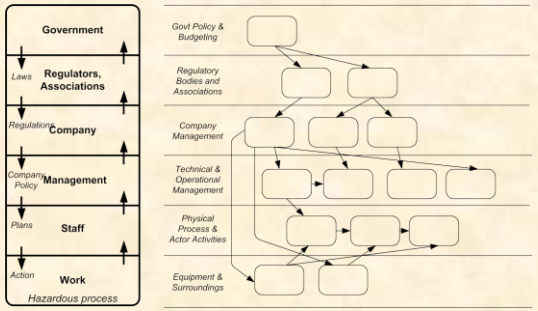
Understand the extent to which their current risk management structure reflects best practice

Establish an action plan for making any necessary improvements

Understand where to go to learn more about risk management for gap year programs

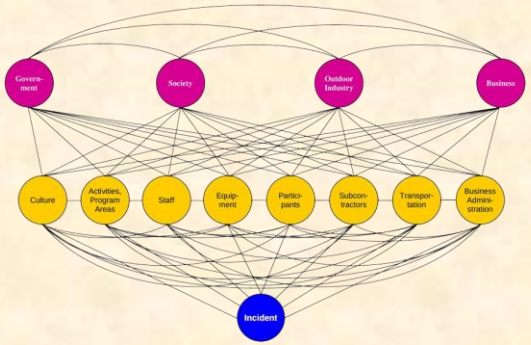
Principal Concepts

Many models of how to manage risk exist



It's important to use current models

Current models employ complex socio-technical systems theory



The Risk Domains Model is one current model

The Risk Domains model can be applied to gap year programs via resilience engineering and other techniques

On September 10, 2014, Ariel Newman died of heat stroke on the second day of a two-day hike in the Judean desert

Part of a gap year program organized by Mechinat Yeud in Israel

Gap year program included hiking, travel & "boot camp" regimen including running and navigation

The gap year program closed the following year

Basic Concepts

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Risk: the possibility of undesirable loss.

Risk Management: the process of maintaining risk at a socially acceptably level.

Four ways to manage risk:

Eliminate	Avoid certain activities, locations, conditions	No Afghanistan travel
Reduce	Institute sound safety practices	Assess providers before use
Transfer	Pass risk to insurers, contractors, participants	Liability waivers
Accept	Acknowledge some risk as unavoidable	Inherent risk

Safety Science

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The field of risk management includes:

- Career specialists
- Theories, models
- Academic journals
- PhD programs in risk management
- Best practices that apply across industries

Risk Management Models

The importance of using appropriate models:

- Your risk management system is based on theoretical models.
- Some models are now considered obsolete.
- You have a duty to use the current best thinking in risk management
- You may be held to that standard if an incident occurs.

Evolution in Safety Thinking

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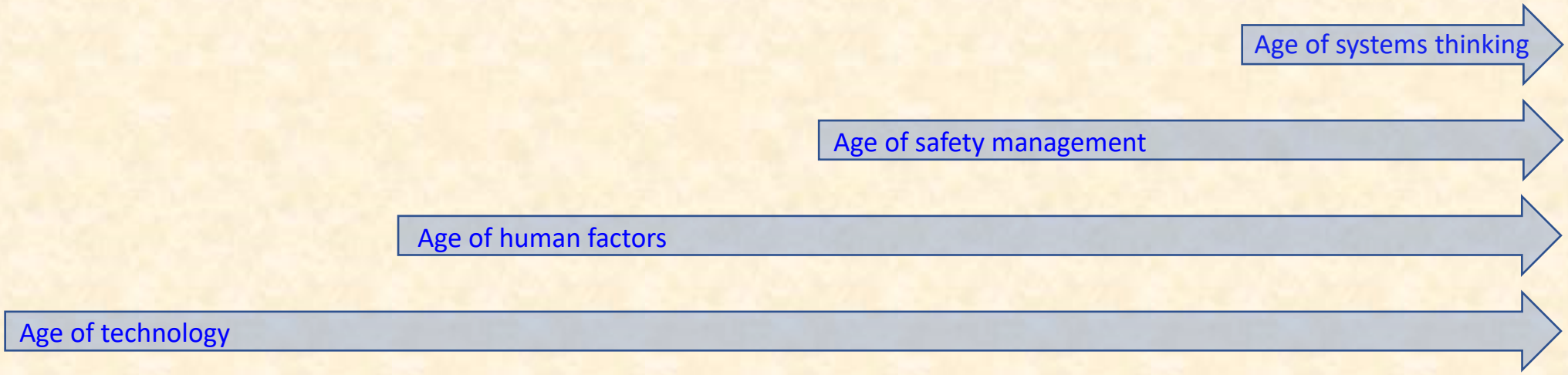

1800s	1970s	1980s	1990s
Technology	**Human Factors**	**Safety Management**	**Systems Thinking**
Humans as cogs in an industrial machine	Humans as hazards to be controlled	Adapting dynamically to risk environment	Complex socio-technical systems
Domino Model, Root Cause Analysis	Rules-based safety	Integrated safety culture	Resilience engineering

Adapted from: Defining the methodological challenges and opportunities for an effective science of sociotechnical systems and safety, Waterson et al., Ergonomics, 2015, Vol. 58, No. 4

Evolution in Safety Thinking

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Principle of causation	Single causes ('Root')	Multiple causes ('Latent')	Complex outcomes ('Emergent')
	OUTDATED	OUTDATED	CURRENT

(non-linear)

Epidemiological model (complex linear)

Sequential model (simple linear)

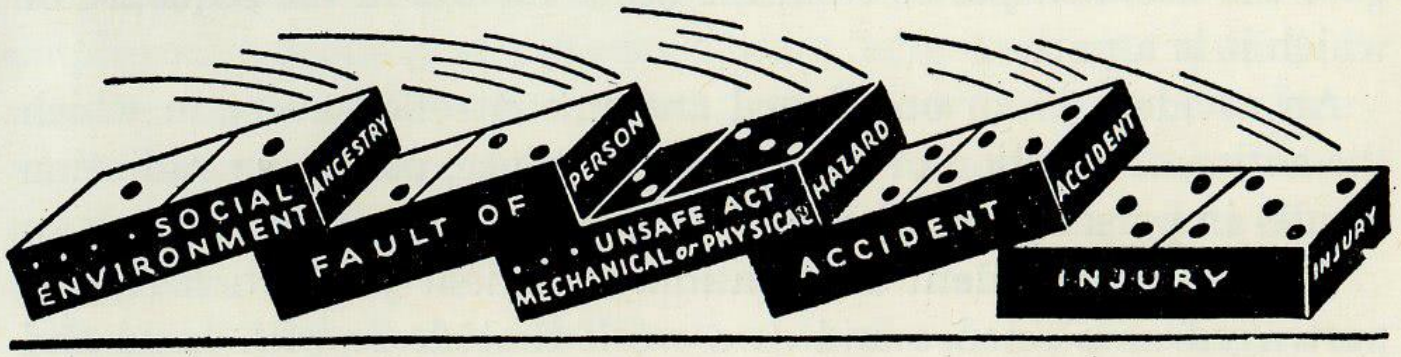
1920 1940 1960 1980 2000

Image credit: HaSPA (Health and Safety Professionals Alliance).(2012). The Core Body of Knowledge for Generalist OHS Professionals. Tullamarine, VIC. Safety Institute of Australia.

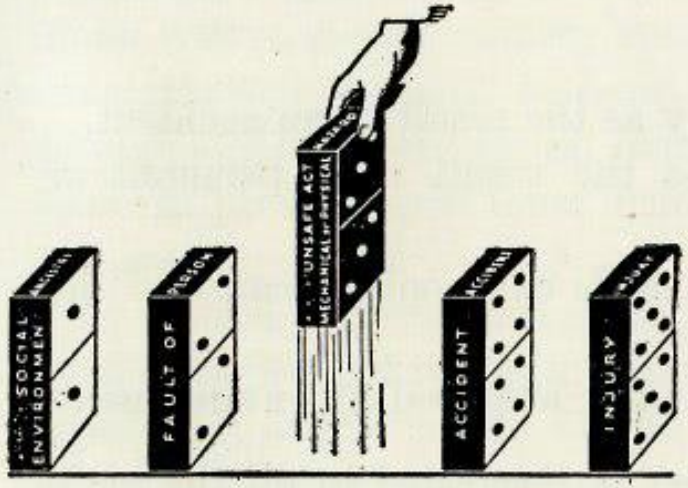
Linear Models

Domino model

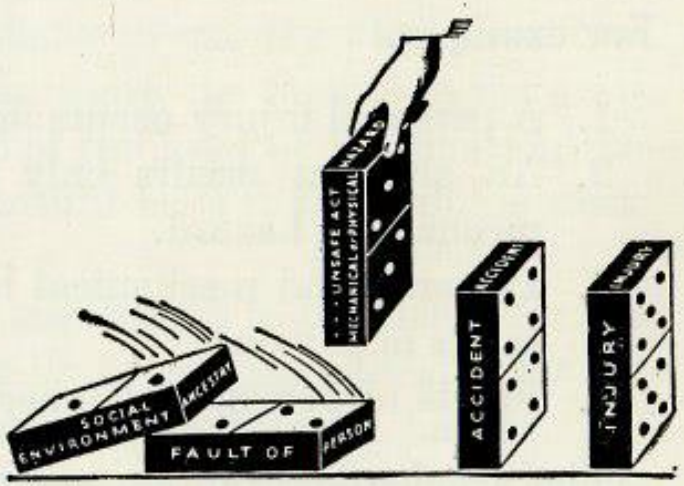
Herbert Heinrich, *Industrial Accident Prevention*, 1931.



The injury is caused by the action of preceding factors.



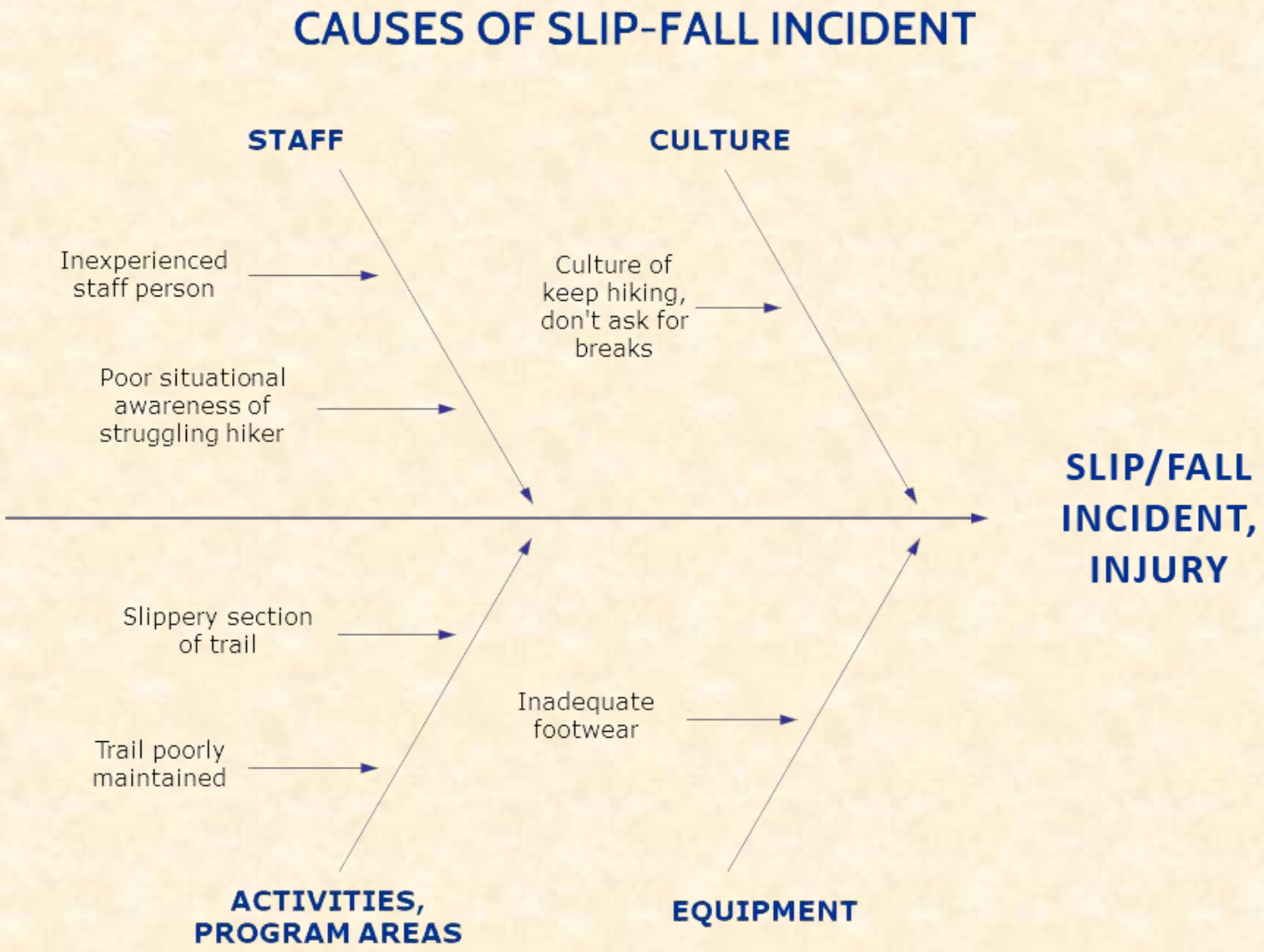
The unsafe act and mechanical hazard constitute the central factor in the accident sequence.



The removal of the central factor makes the action of preceding factors ineffective.

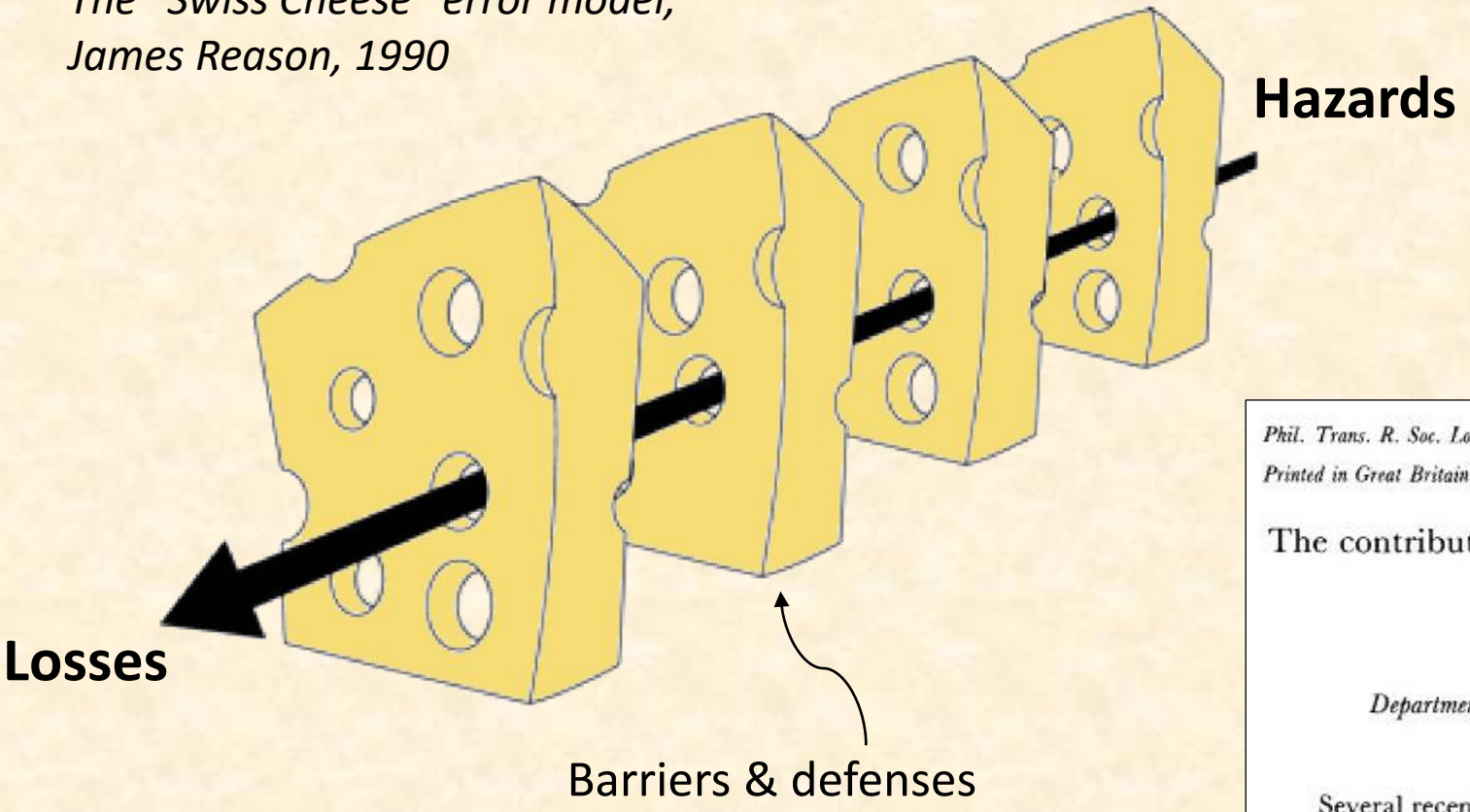
Linear Models

Fault tree analysis,
Fishbone diagram

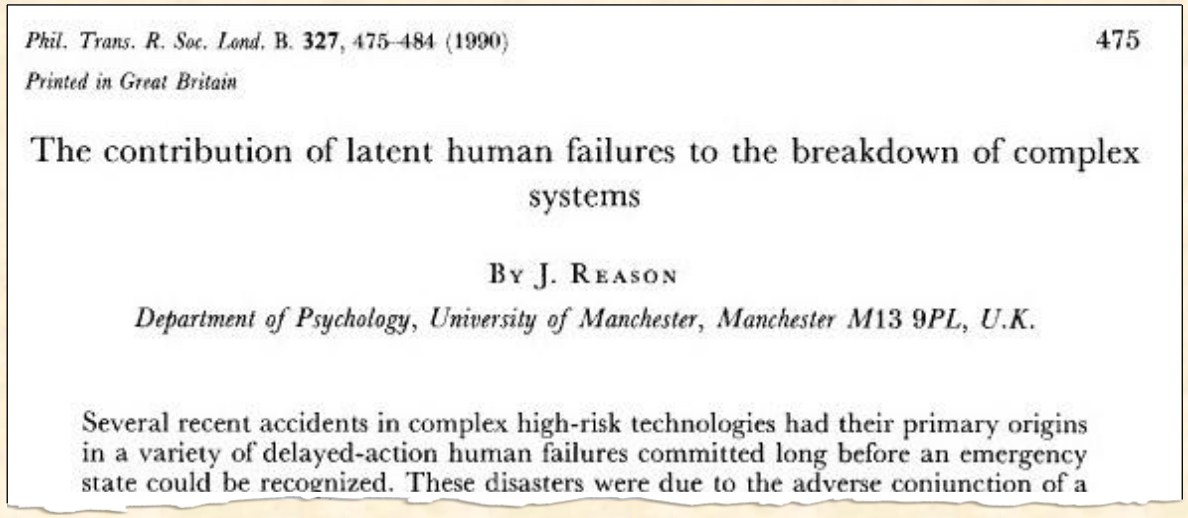


Epidemiological Model

The "Swiss Cheese" error model, James Reason, 1990



- Events + latent conditions
- Like an exposure + a pathogen reservoir
- Complex linear model
- First systems model



Phil. Trans. R. Soc. Lond. B. **327**, 475–484 (1990) 475

Printed in Great Britain

The contribution of latent human failures to the breakdown of complex systems

By J. Reason

Department of Psychology, University of Manchester, Manchester M13 9PL, U.K.

Several recent accidents in complex high-risk technologies had their primary origins in a variety of delayed-action human failures committed long before an emergency state could be recognized. These disasters were due to the adverse conjunction of a

Complex Systems Model

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Characteristics of complex systems:

- Difficulty in achieving widely shared recognition that a problem even exists, and agreeing on a shared definition of the problem
- Difficulty identifying all the specific factors that influence the problem
- Limited or no influence or control over some causal elements of the problem
- Uncertainty about the impacts of specific interventions
- Incomplete information about the causes of the problem and the effectiveness of potential solutions
- A constantly shifting landscape where the nature of the problem itself and potential solutions are always changing

Examples of complex systems:

Global climate crisis

Inequity & exclusion

Gap Year programs

Complex Socio-technical Systems

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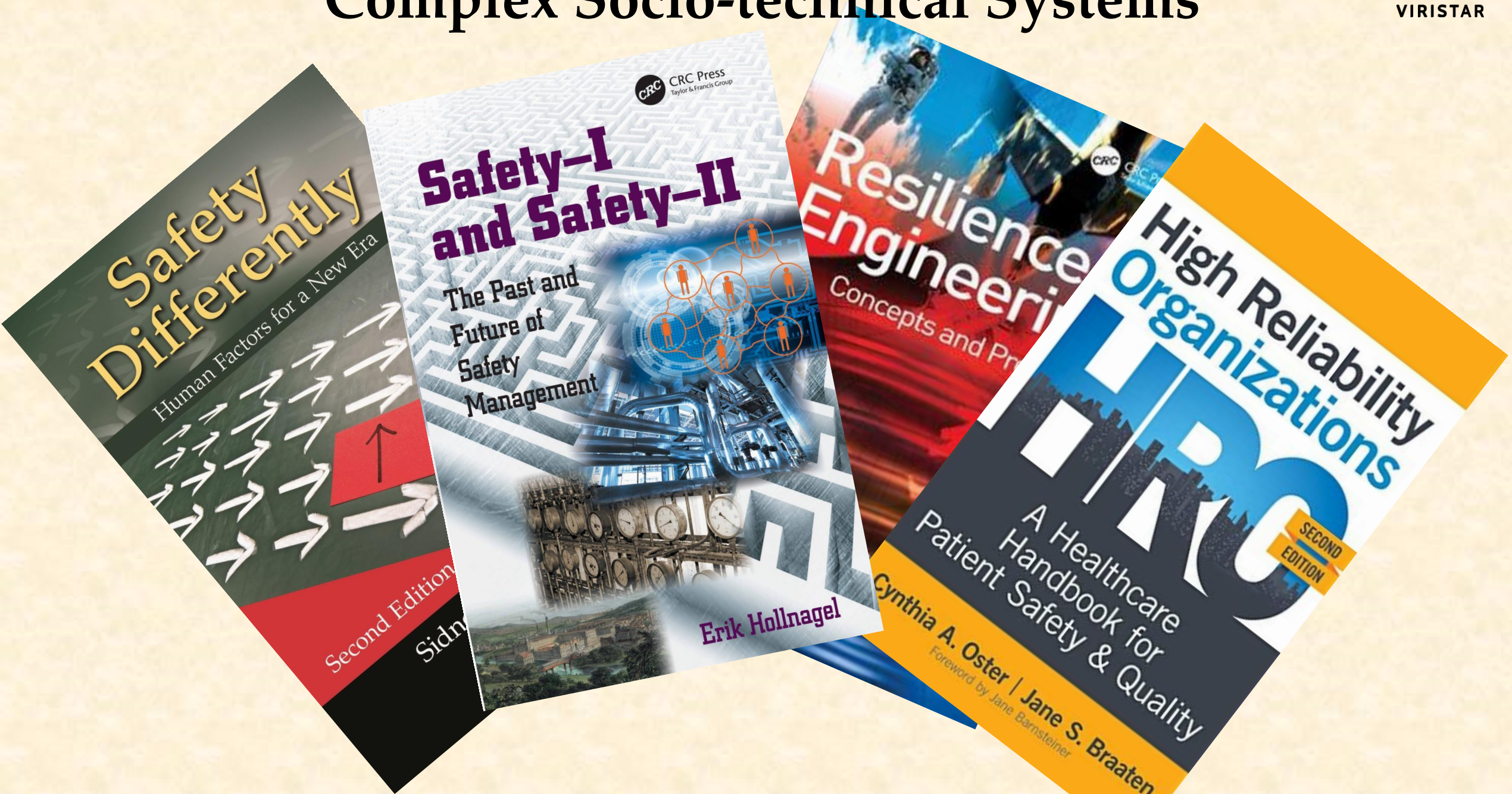

Complex Socio-technical Systems

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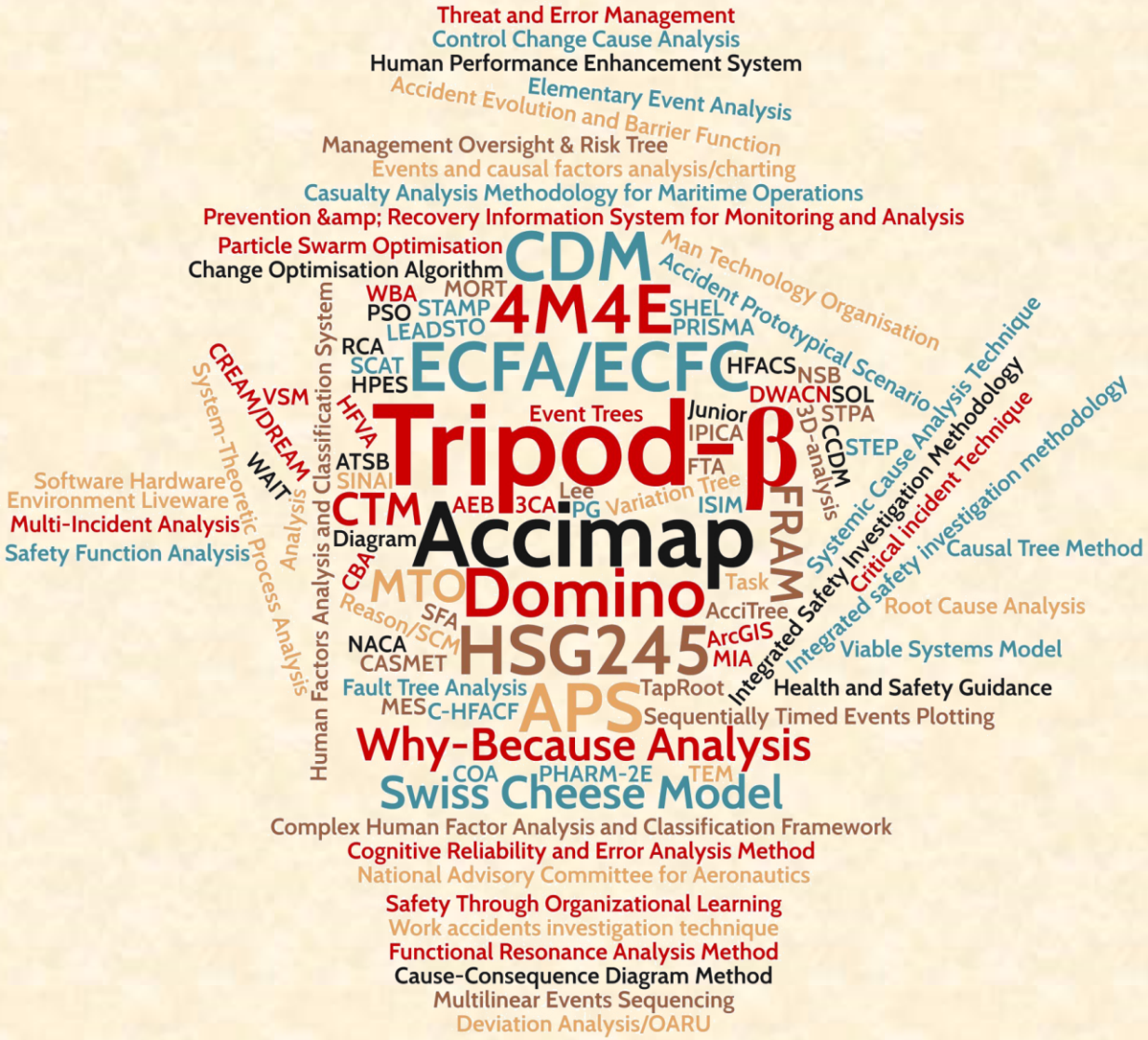
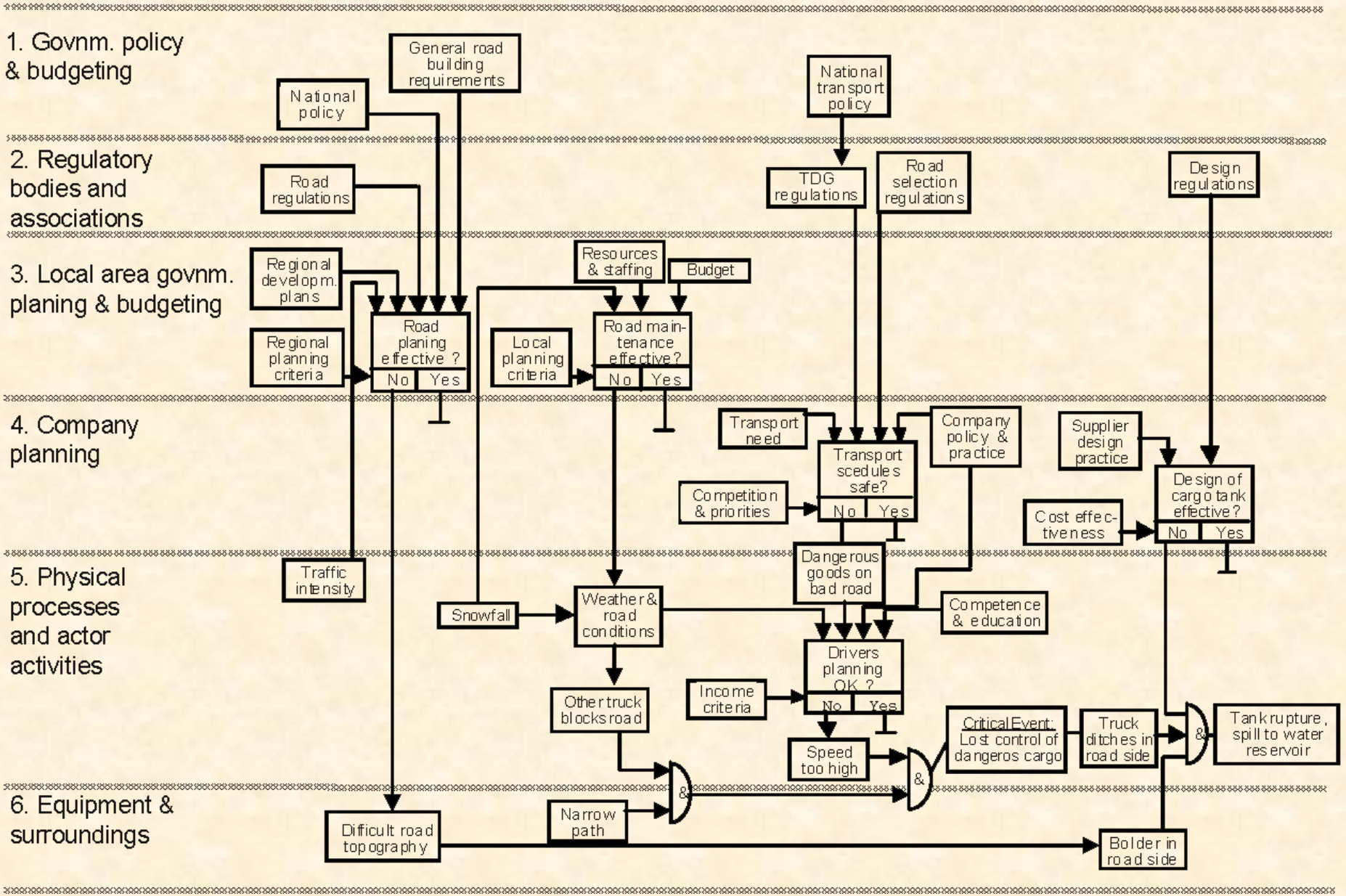


Government	*Passes laws*
Regulators, Associations	*Create regulations*
Company	*Sets policies*
Management	*Makes operating plans*
Staff	*Performs work actions*
Work	*May involve hazardouts processes*

AcciMap adapted from: Risk Management In a Dynamic Society: A Modelling Problem. Jens Rasmussen, Safety Science 27/2-3 (1997)

Complex Socio-technical Systems



Complex Socio-technical Systems

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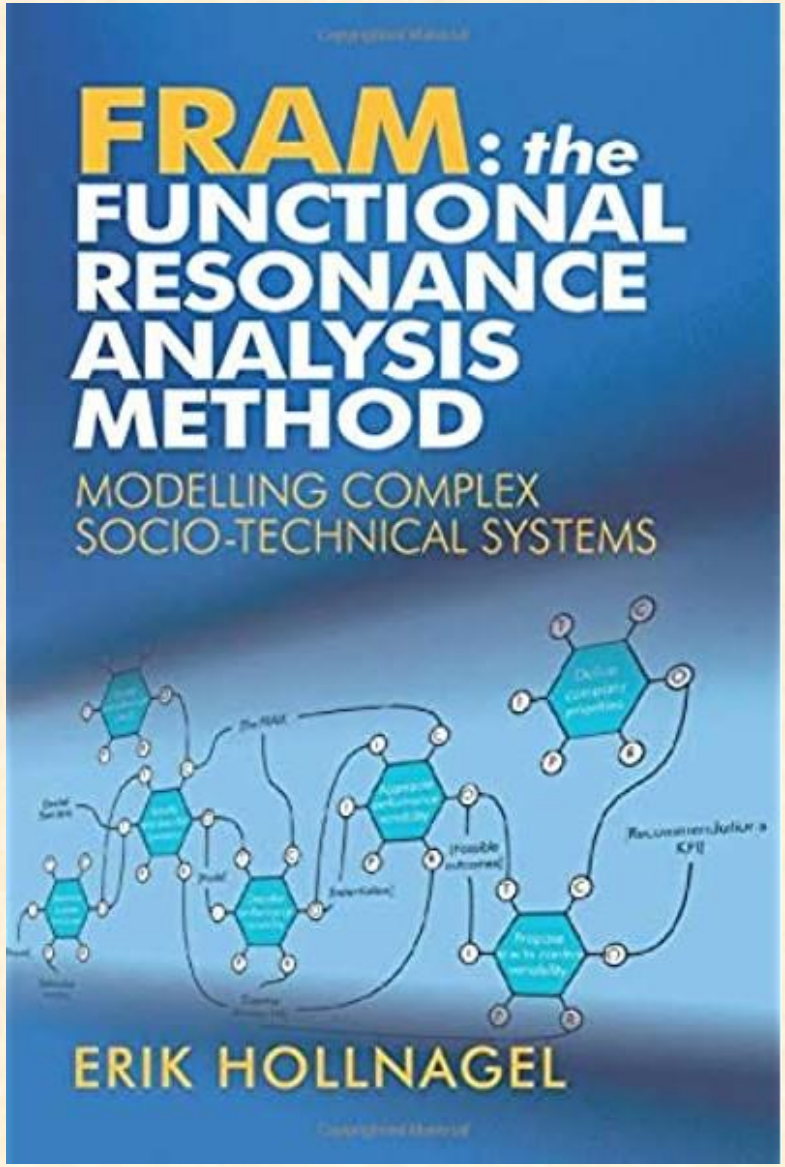
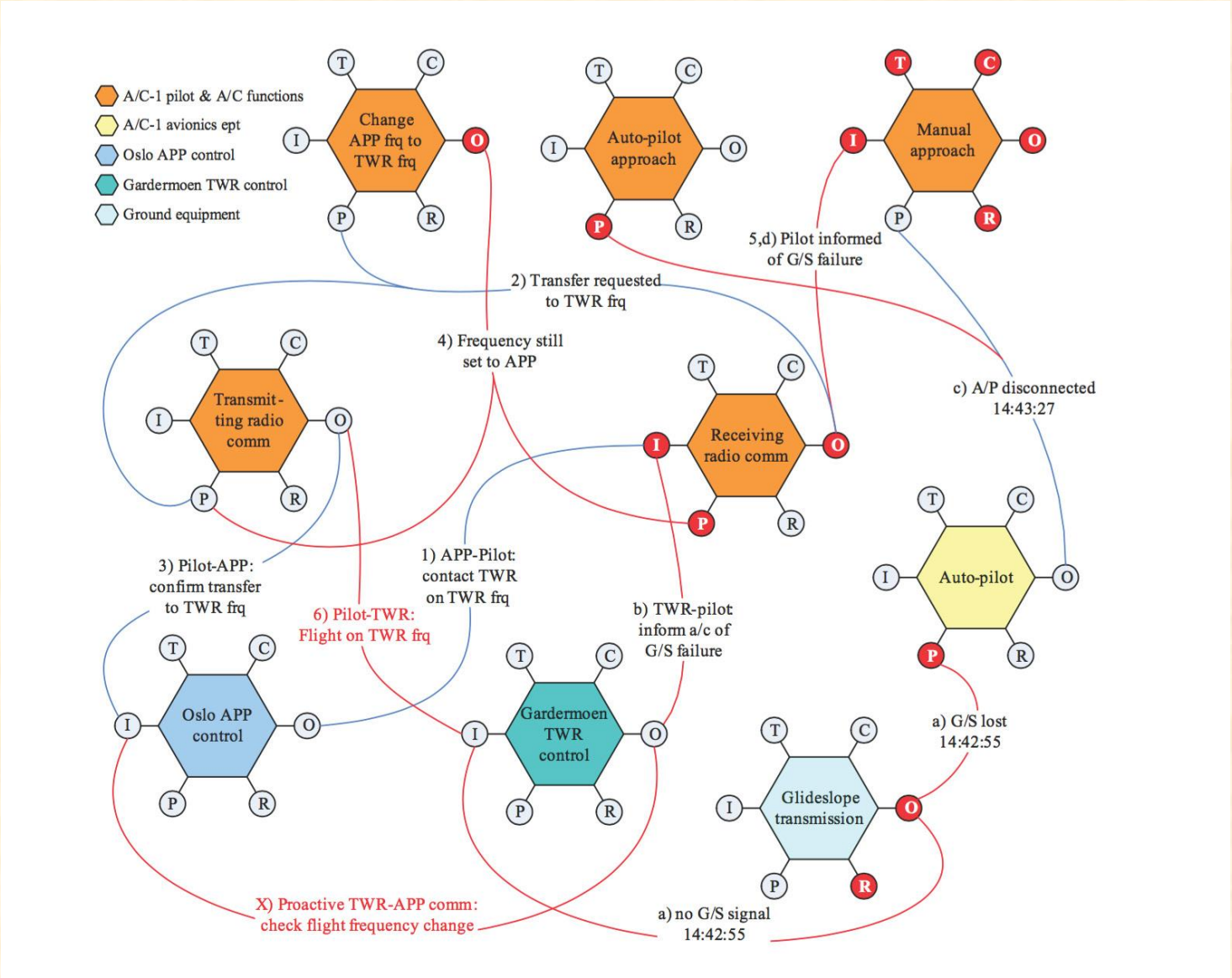
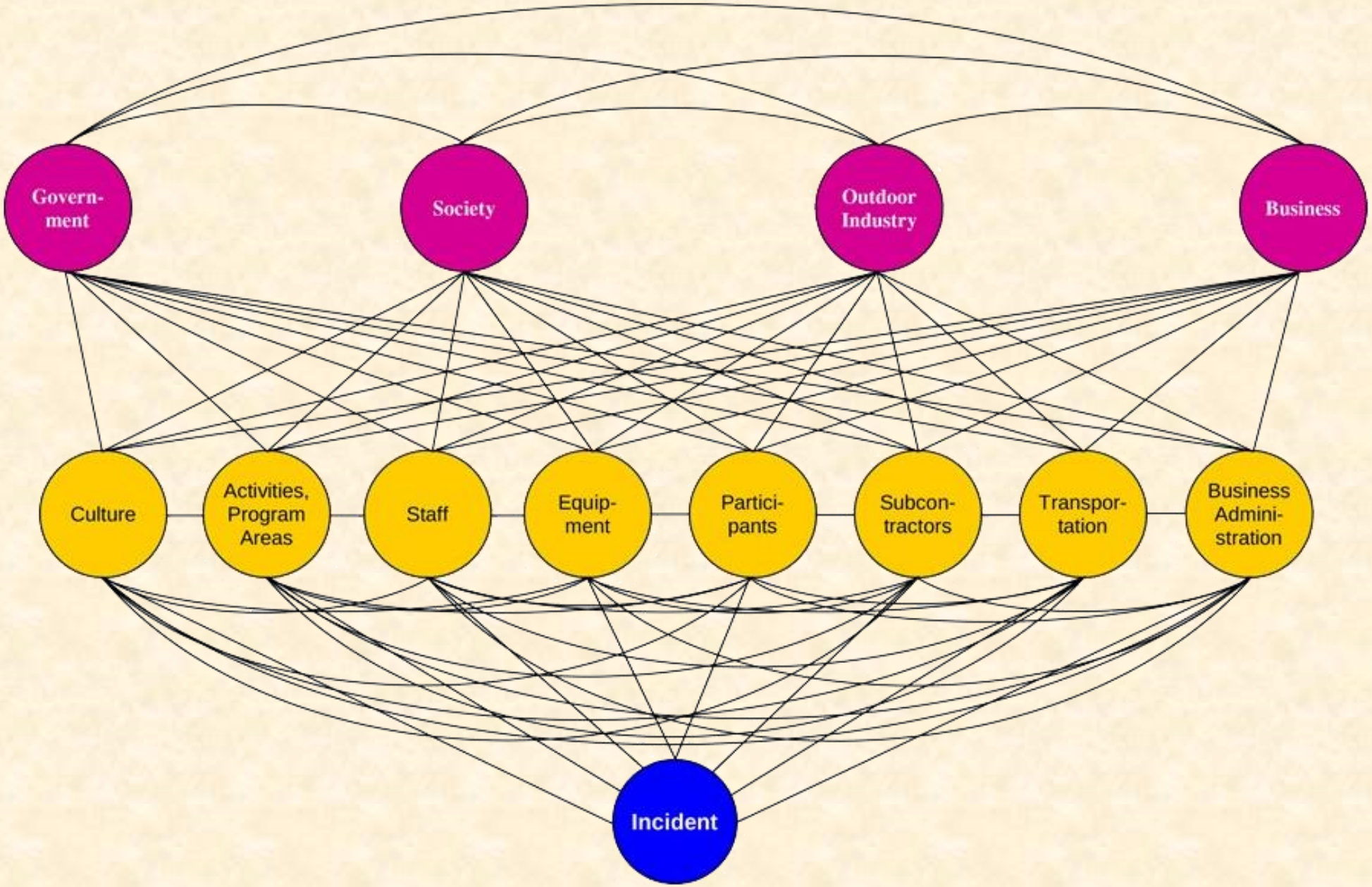




Risk Domains Model



Risk Domains Model

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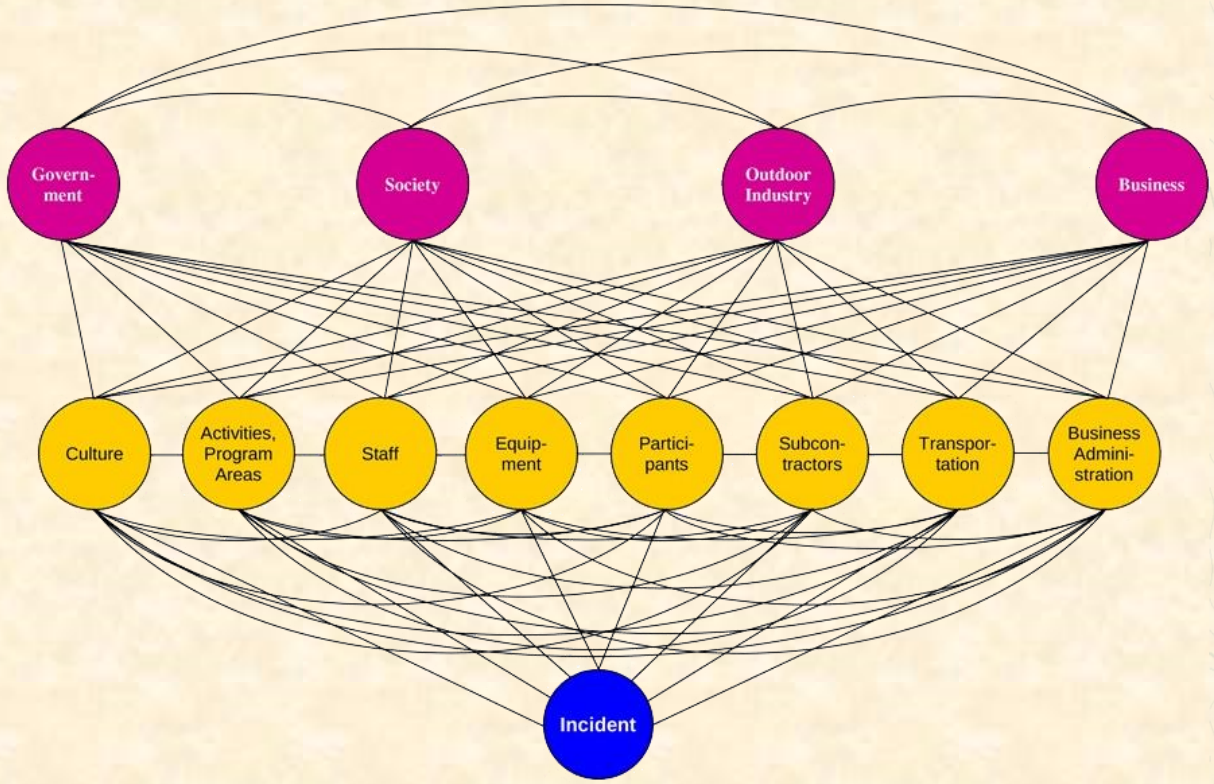

Risk Management Instruments

- Risk Transfer
- Incident Management
- Incident Reporting
- Incident Reviews
- Risk Management Committee
- Medical Screening
- Risk Management Reviews
- Media Relations
- Documentation
- Accreditation
- Seeing Systems

Manage risks in risk domains with policies, procedures, values and systems

Sidebar: Risk Assessments

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Limitations of Risk Assessments

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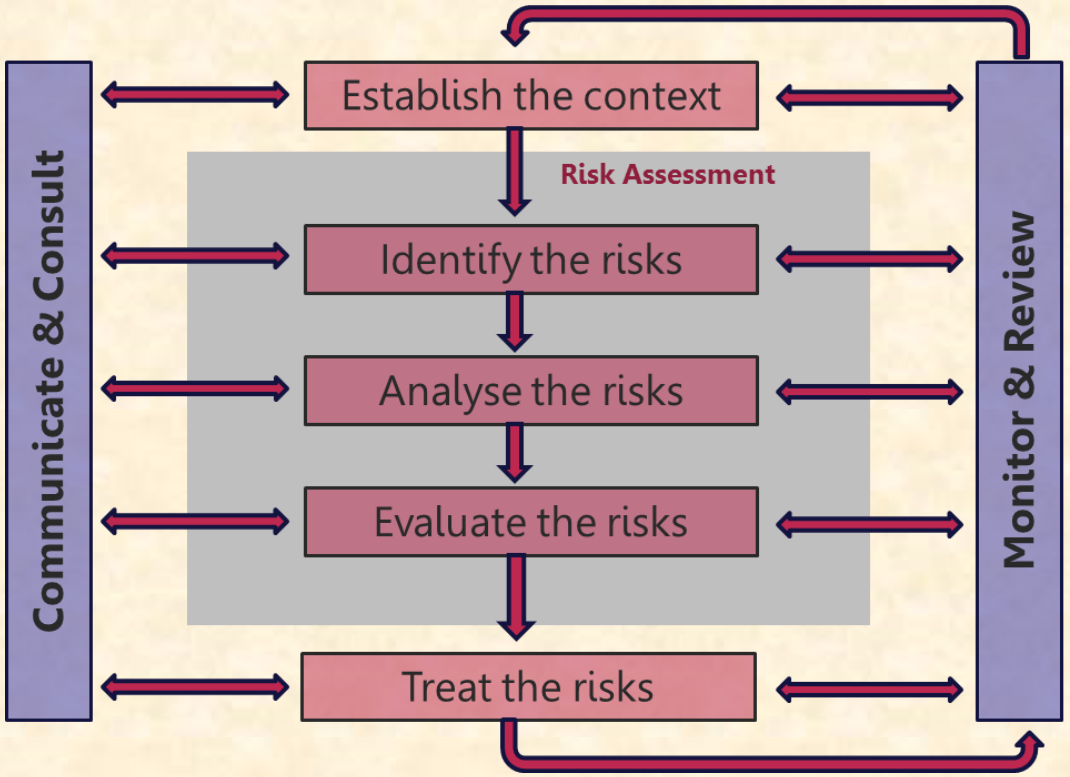
Probabilistic Risk Assessment (PRA) approach:

Risk	Probability	Magnitude	Treatment

		Magnitude		
		Slight	Moderate	Severe
Probability	Unlikely			
	Possible			
	Likely			



ISO 31000 Probabilistic Risk Management approach:

- Linear
- Weak on systems thinking
- Only applicable in limited situations

Limitations of Risk Assessments

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- Typically assesses only direct, immediate risks from specific activities, locations or populations, such as
  - weather
  - traffic hazards
  - equipment failure
- Typically **fails to account for underlying risk factors** such as:
  - poor safety culture
  - financial pressures
  - deficits in training & documentation
  - lack of regulatory oversight
- Typically **fails to account for human factors in error causation**, e.g.
  - cognitive biases
  - cognitive shortcuts (heuristics)
- **Fails to consider systems effects**: how multiple risks interact in complex and unpredictable ways that to lead to incidents

Limitations of Risk Assessments

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- Does not correlate with what research in complex socio-technical systems and human factors in error causation tell us about how incidents occur
- Therefore ineffective as a comprehensive risk management tool or stand-alone indicator of good risk management

"...current risk assessment practice is not consistent with contemporary models of accident causation."

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6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the Affiliated Conferences, AHFE 2015

All about the teacher, the rain and the backpack: The lack of a systems approach to risk assessment in school outdoor education programs

Clare Dallat*, Paul M. Salmon, Natassia Goode

Centre for Human Factors and Sociotechnical Systems, University of the Sunshine Coast, Faculty of Arts and Business, Locked Bag 4, Maroochydore DC, QLD, 4558, Australia

Abstract

Inadequate risk assessment has been highlighted as a contributing factor in the deaths of several children participating on school outdoor education programs. Further, whilst the systems thinking approach to accident prevention is now prevalent in this domain, the extent to which schools consider the overall led outdoor system during risk assessment processes is not clear. The aim of this study was to determine whether the systems thinking perspective has been translated into risk assessments for outdoor programs. Four school outdoor education risk assessments were analysed and Rasmussen's (1997) Risk Management framework was used to map the hazards and actors identified in the risk assessments. The results showed that the hazards and actors identified reside across the lower levels of the Accimap framework, suggesting a primary focus on the immediate context of the delivery of the activity. In short, from a systems perspective, not all of the potential hazards were identified and assessed. This suggests that current risk assessment practice is not consistent with contemporary models of accident causation, and further, key risks could currently be overlooked. The need for the development of a systems theory based risk assessment process is discussed.

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Part I of II

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