Beyond Operator Error: Using systems to analyse events

WRMC Oct. 2013

Jeff Jackson
Professor, Coordinator
Outdoor Adventure Programs
Algonquin College in the Ottawa Valley

Bottom line:

1. It's easy to blame the operator – don't do it…
2. Sensemaking ≠ Decision making
3. Focus on system performance, not individual events

Agenda

- Operator Error: why we blame the guide
- Systems for organizing risk planning
- Active versus Latent Errors
- Systems based event investigation model

Operator Error: It's easy! Anyone can do it!

Mangatepopo Gorge, NZ
April 15, 2008
Sir E. Hillary Outdoor Pursuits Centre (OPC)

Operator Error: It's easy! Anyone can do it!

"If there were staff with higher qualifications who have worked in the industry for a number of years, that would help."

quote from OPC contract instructor during inquest; NZ Herald online Feb. 19, 2010

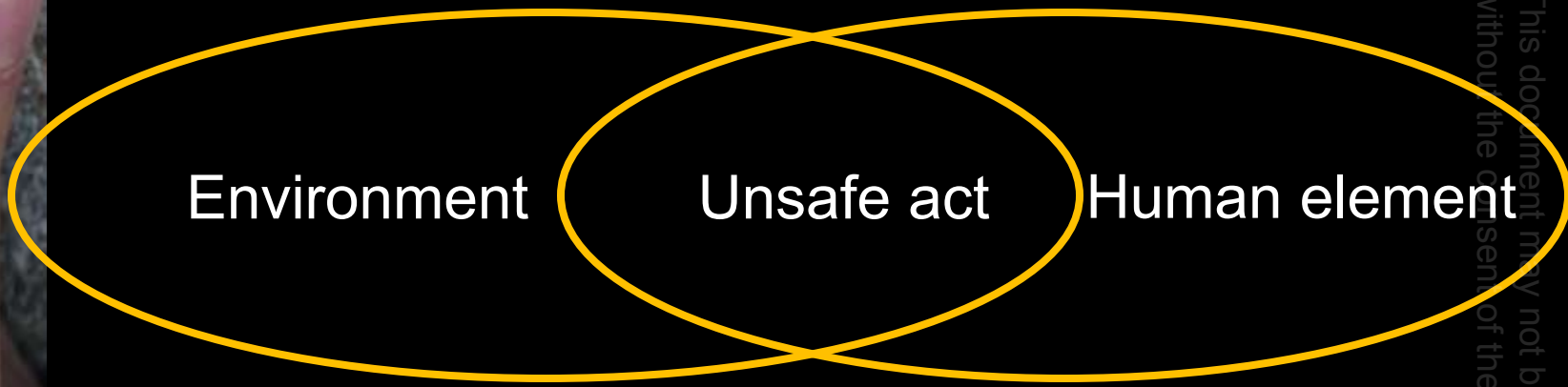
Operator Error: It's easy! Anyone can do it!

"The guide is at fault, 100% of the time." expert testimony by P. Sevcik, 2003

"...there is continual operator error..." (Perrow, 1999)

Why we blame the guide: ‘Accident’ paradigm

- Objective + Subjective + unsafe act



Why we blame the guide:
Evolution of Adventure Risk Management

Safety planning (1960, 1970)

Liability planning (1980)

Hazard based approach (1990, 2000)

(Trigger)

Why we blame the guide: Mainstream Risk Management

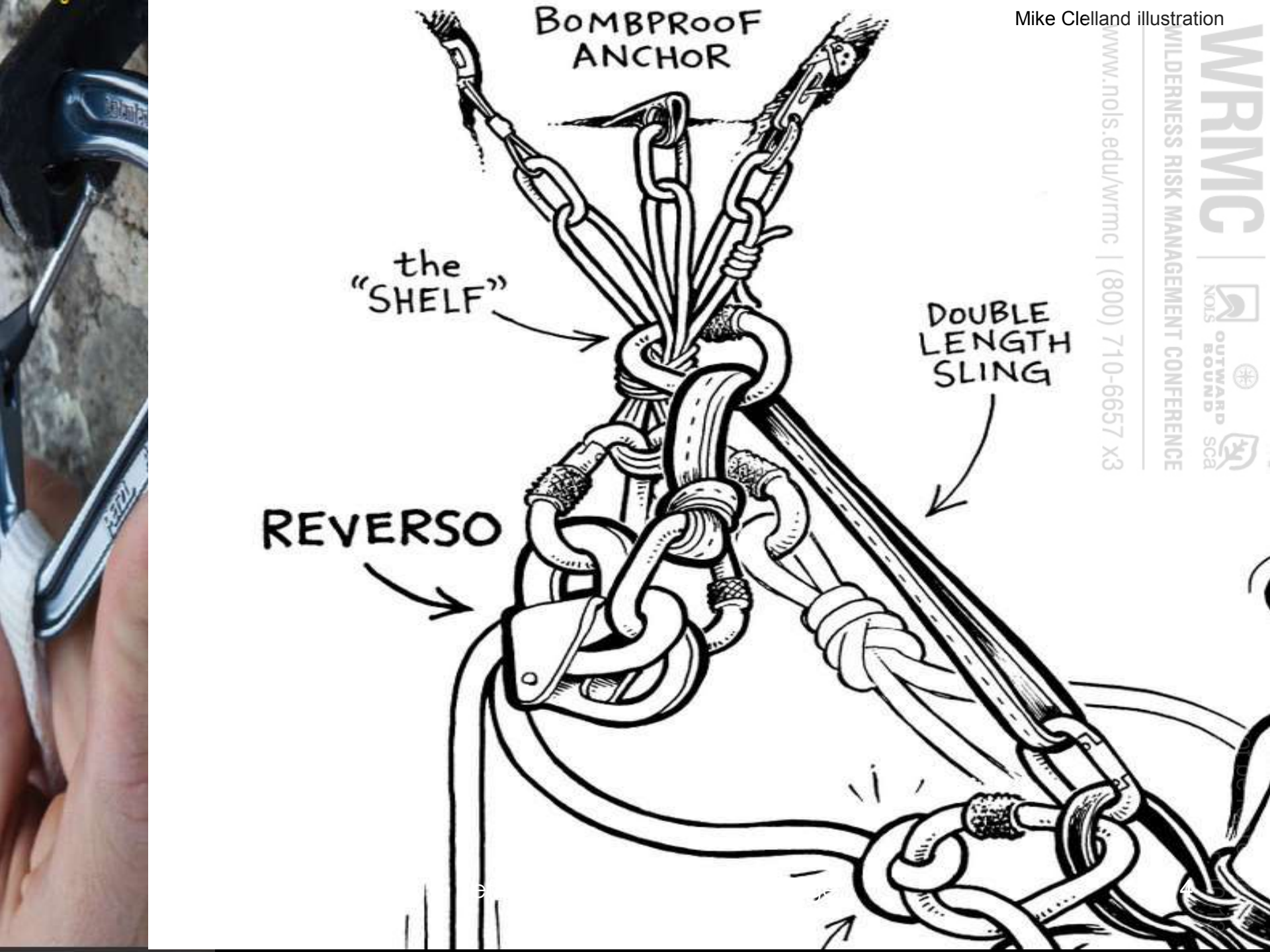
Identify the risks → Assess the risks → Implement Prevention, Control, Mitigation

Why we blame the guide: Psychological factors

- Hindsight Bias: retrospective connections not visible at the time (Hoffrage, Hertwig & Gigerenzer, 2000)
- Attribution Error: person over circumstance (Ross & Nisbett,1991)
- Confirmation Bias: match situation to what we already know (Reason, 2001)

Why we blame the guide:
Psychological factors

"Human fallibility, like gravity, weather or terrain, is just another foreseeable hazard..."



Mike Clelland illustration

"Human fallibility, like gravity, weather or terrain, is just another foreseeable hazard..."

"... The issue is not why an error occurred but ***how it failed to be corrected.***" (Reason, 1997)

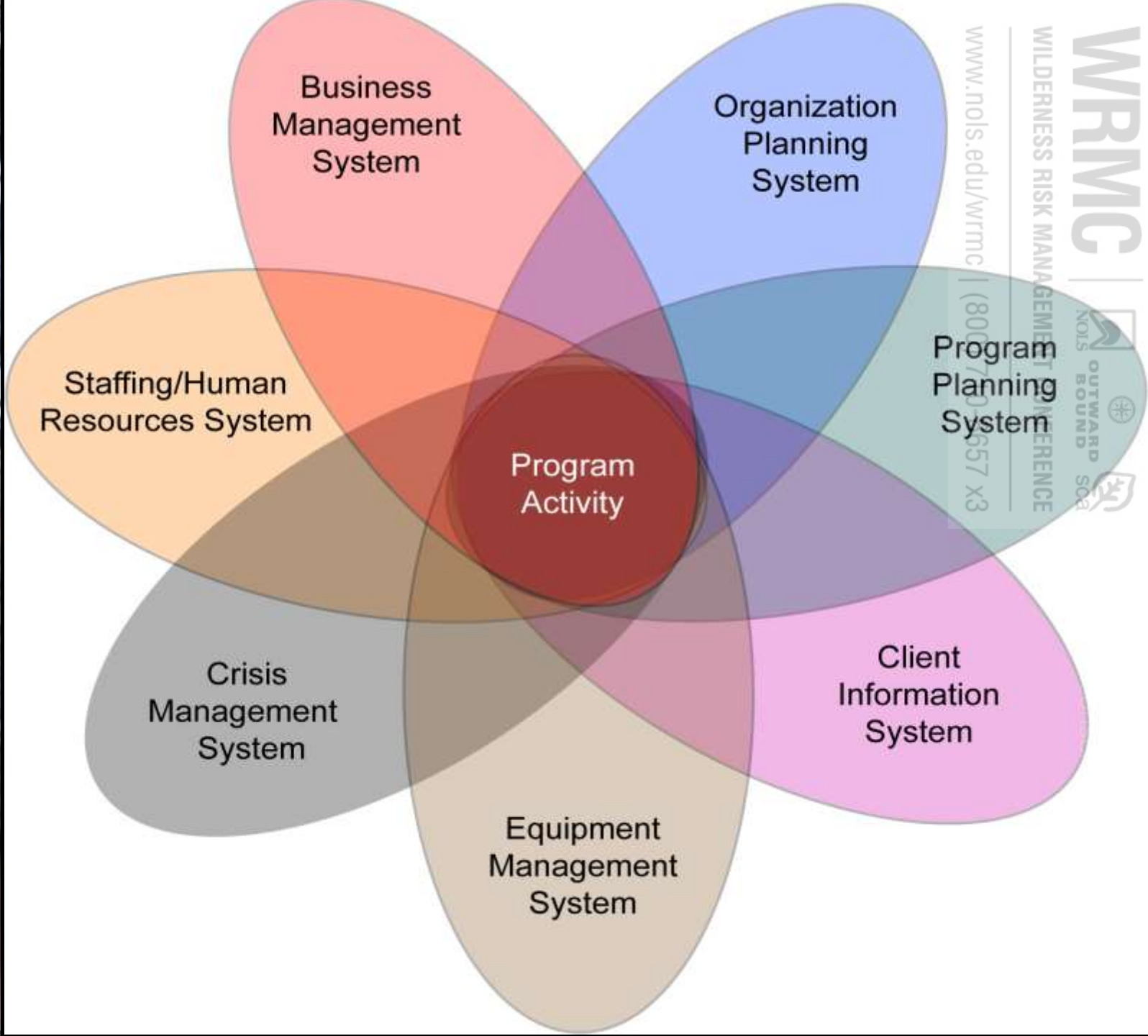
Evolution of Adventure Risk Management

Safety planning (1960, 1970)

Liability planning (1980)

Hazard based approach (1990, 2000)

System based approach (emerging)



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- Active versus Latent Errors
- Systems based event investigation model

Understanding errors:

Active errors:

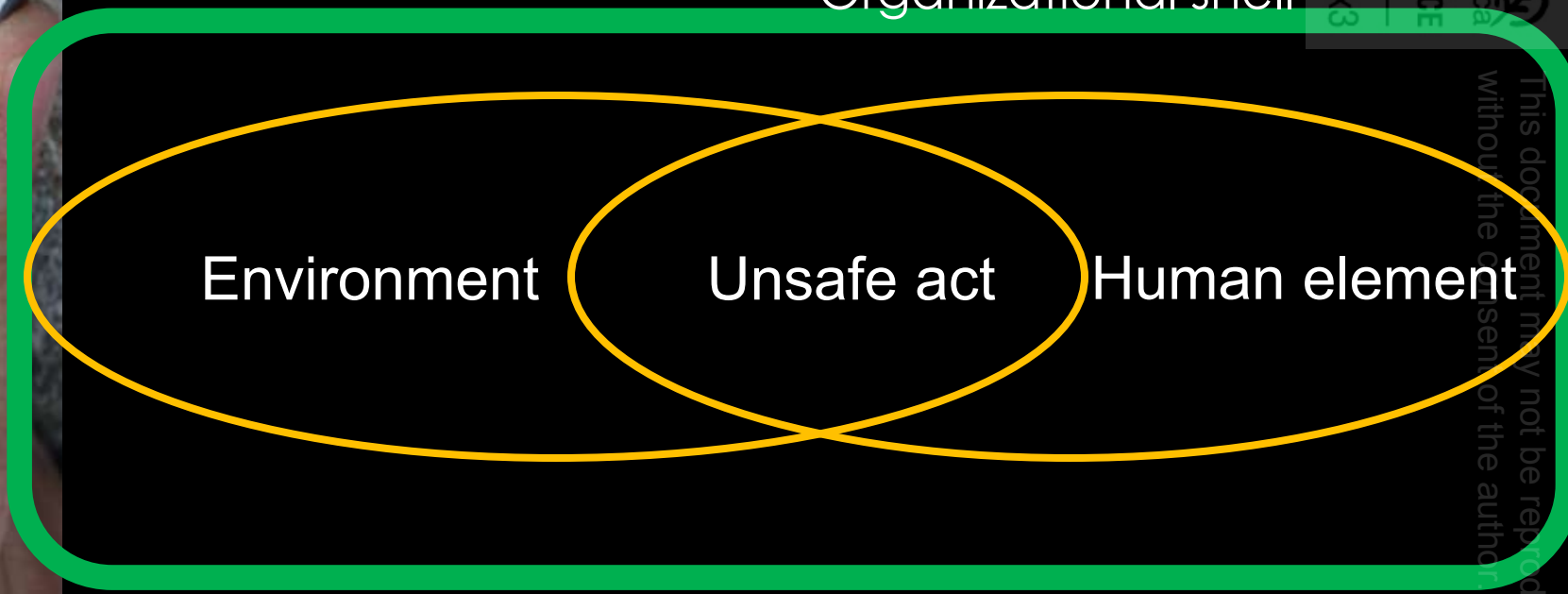
- Guide slips, lapses, mistakes
- ‘sharp end’
- Focus of trigger/event based RM

Latent errors:

- Dormant, long term conditions
- ‘blunt end’
- Focus of systems based RM

Latent / System errors

"Human error is a consequence, not a cause." Reason (1997)



"We cannot change the human condition; people will always make errors.

We can change the conditions under which they work and make unsafe acts less likely." Reason (1997)

Jeff Jackson Algonquin College

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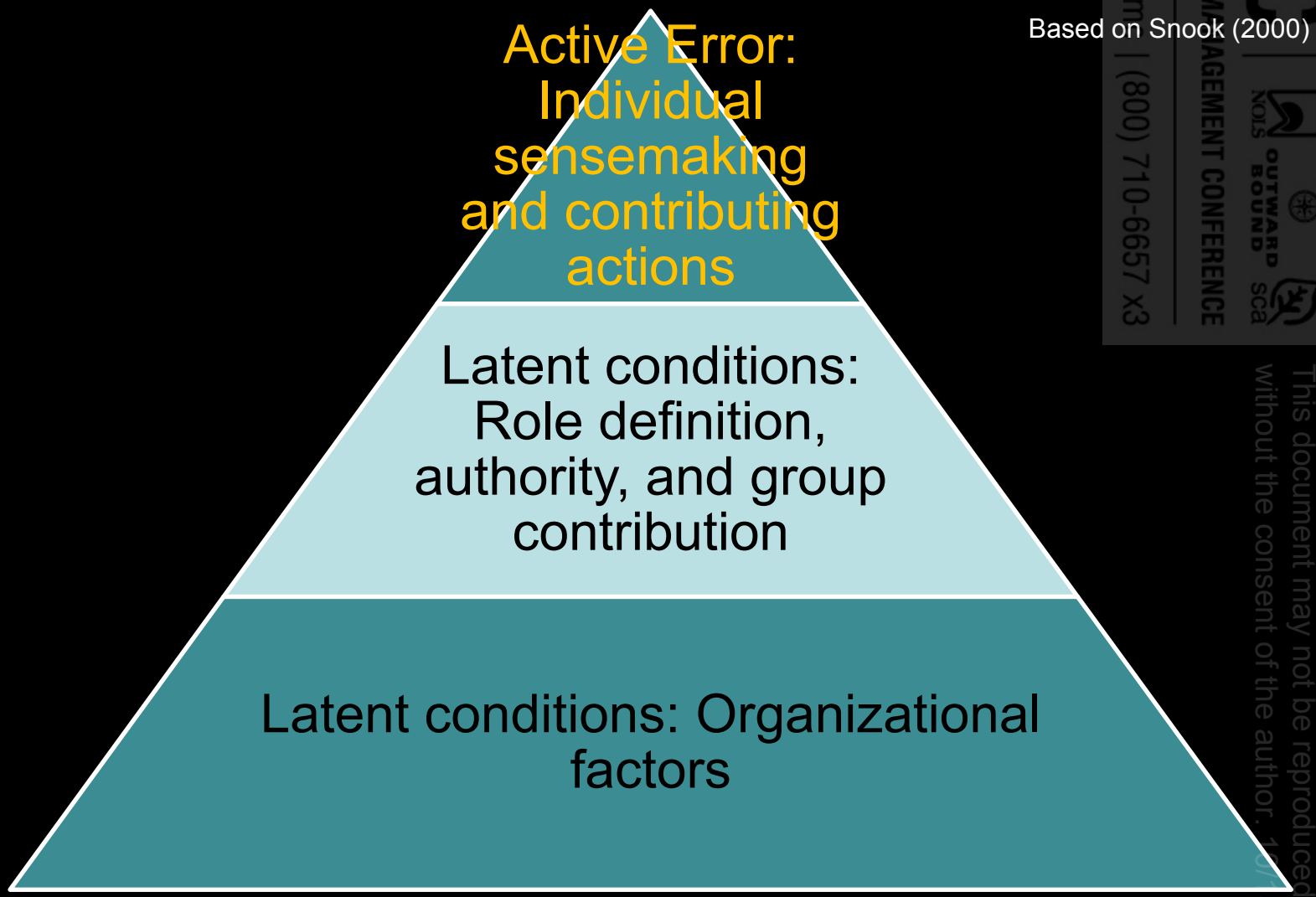
Systems based event investigation model:



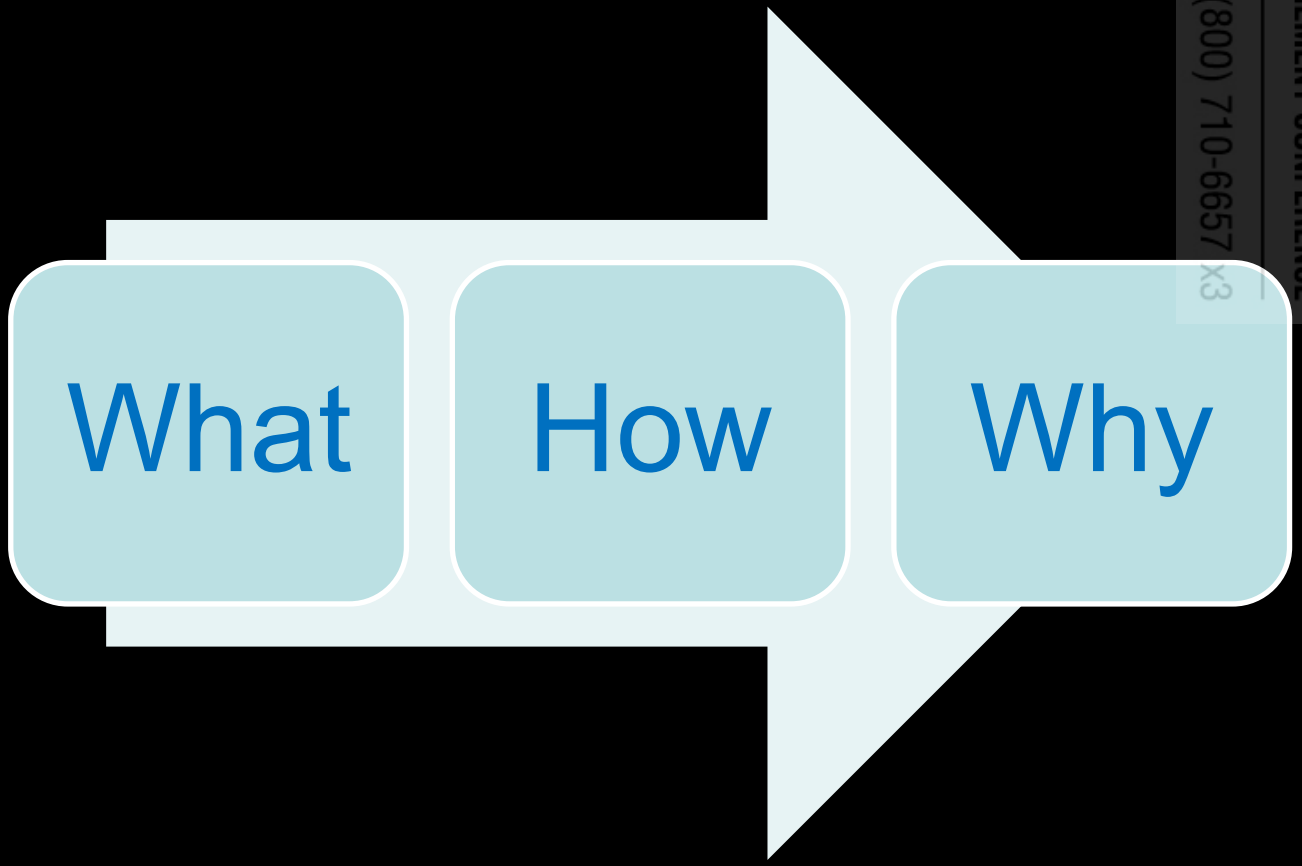
Based on Snook (2000)

Active Error: Individual sensemaking and contributing actions

... bad people making poor decisions vs. good people trying to make sense of a situation. (Weick, 1998)

Systems based event investigation model:

Approach:



Systems based event investigation model:

Step 1:

- What happened
  - Lead up
  - During
  - Post

Systems based event investigation model:

Step 2:

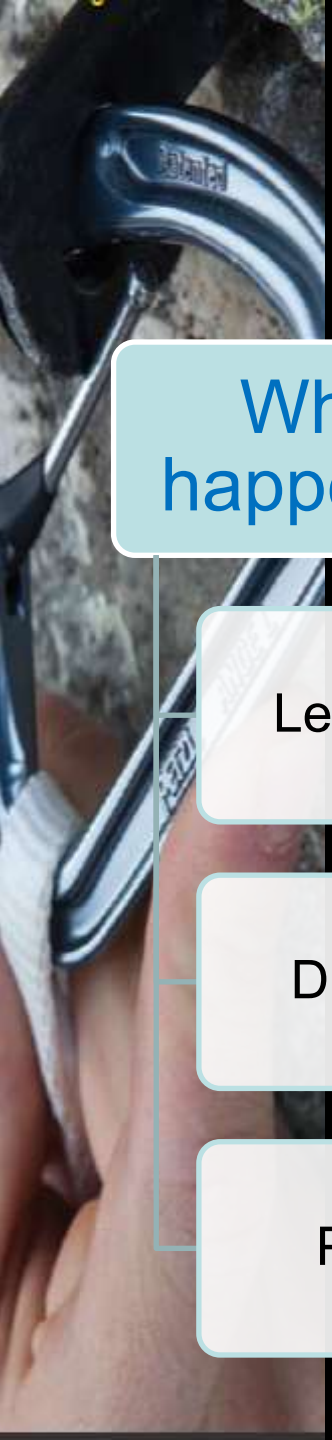
Operator vs. System induced error

- Substitution test:

'Given how events unfolded and were perceived in real time, is it likely that a new individual would have behaved any differently?'

Systems based event investigation model:

Step 2:



- What happened
  - Lead up
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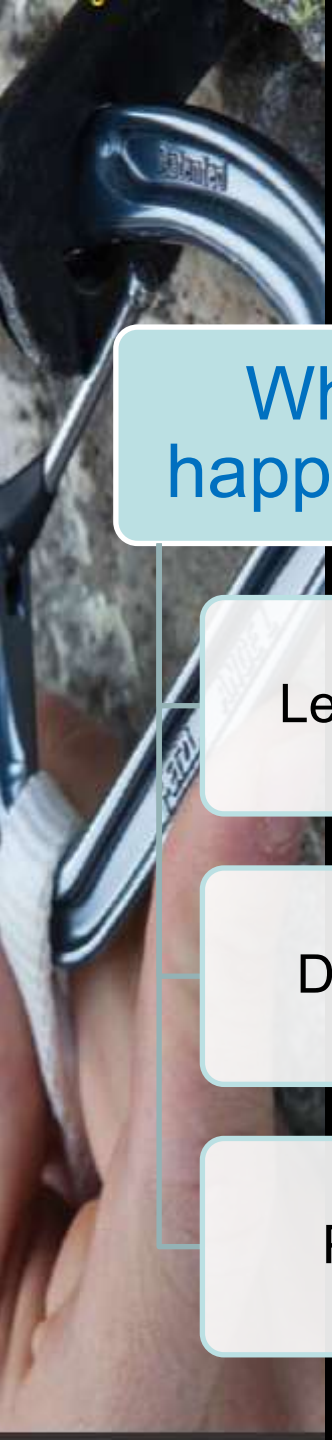
- Substitution test
  - Yes = Operator error
  - Deliberate vs. slip vs. mistake

Systems based event investigation model:

Based on Snook (2000)

Latent conditions:
Role definition, authority, and group contribution

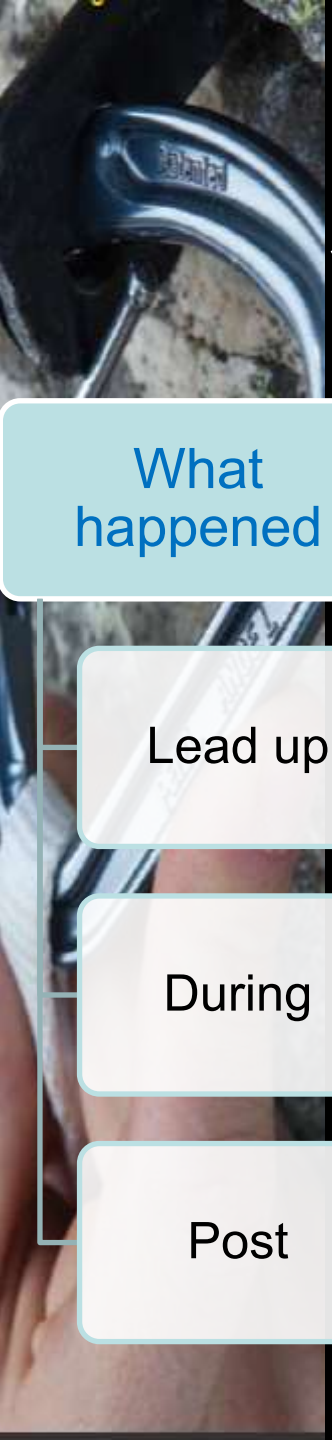


Systems based event investigation model:
Step 3: Group contribution

- What happened
  - Lead up
  - During
  - Post
- Substitution test
  - Yes = Operator error
  - Deliberate vs. slip vs. mistake
- Group contribution
  - Authority and role definition
  - Assumptions and expectations
  - Team functionality

Systems based event investigation model:

Latent conditions: Organizational factors



Systems based event investigation model:
Step 4: Organization factors

- What happened
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  - Post
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  - Yes = Operator error
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  - Authority and role definition
  - Assumptions and expectations
  - Team functionality
- Organizational factors
  - Risk tolerance
  - Systems errors
  - Operating features

Systems based event investigation model:

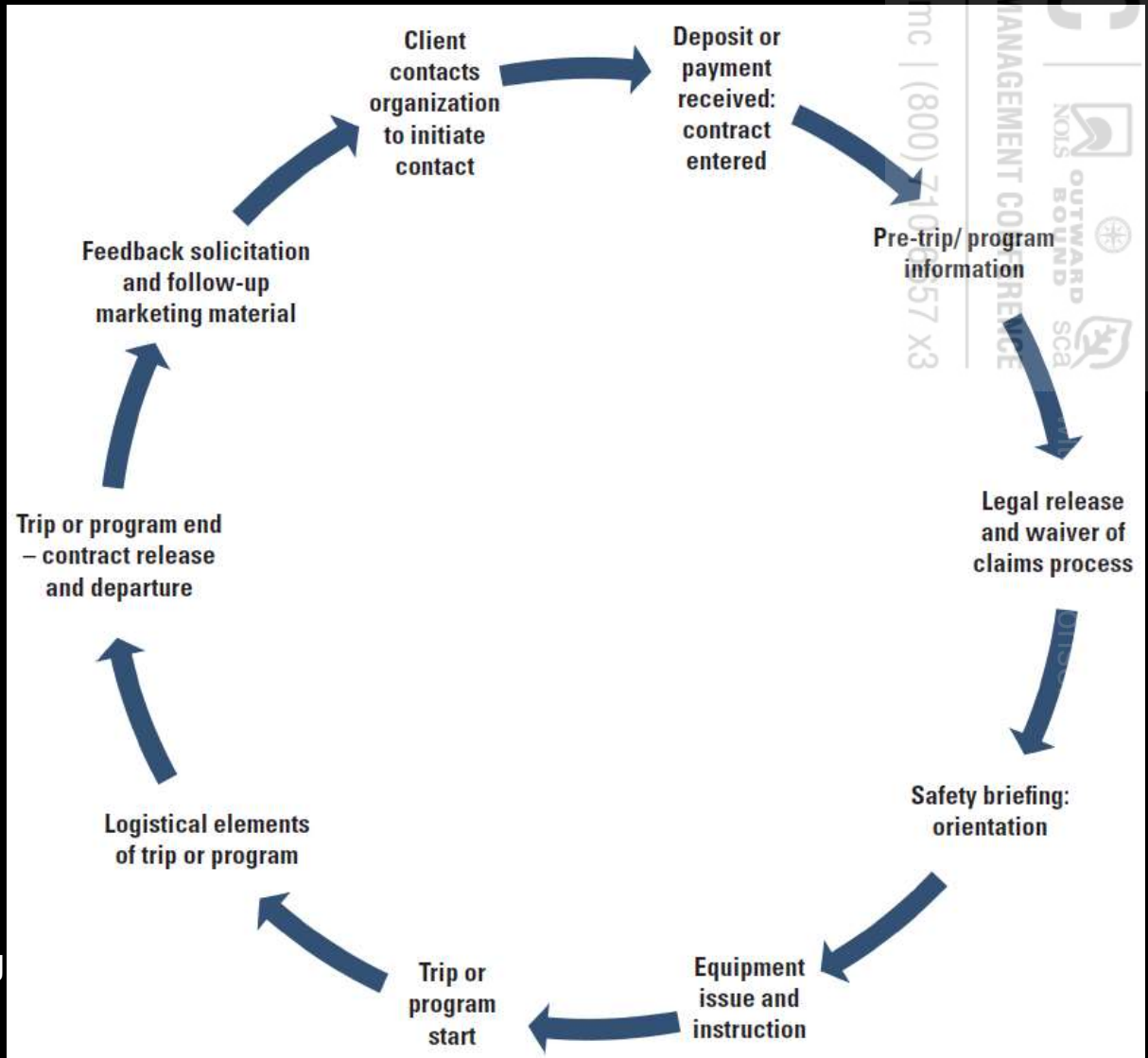
Step 4: Organization factors

1. Risk tolerance
   - Explicit
     - Written statement / mission driven
     - Marketing material
     - Program planning and exposure
   - Implied
     - Culture of safety
     - Management attention and $

Systems based event investigation model:

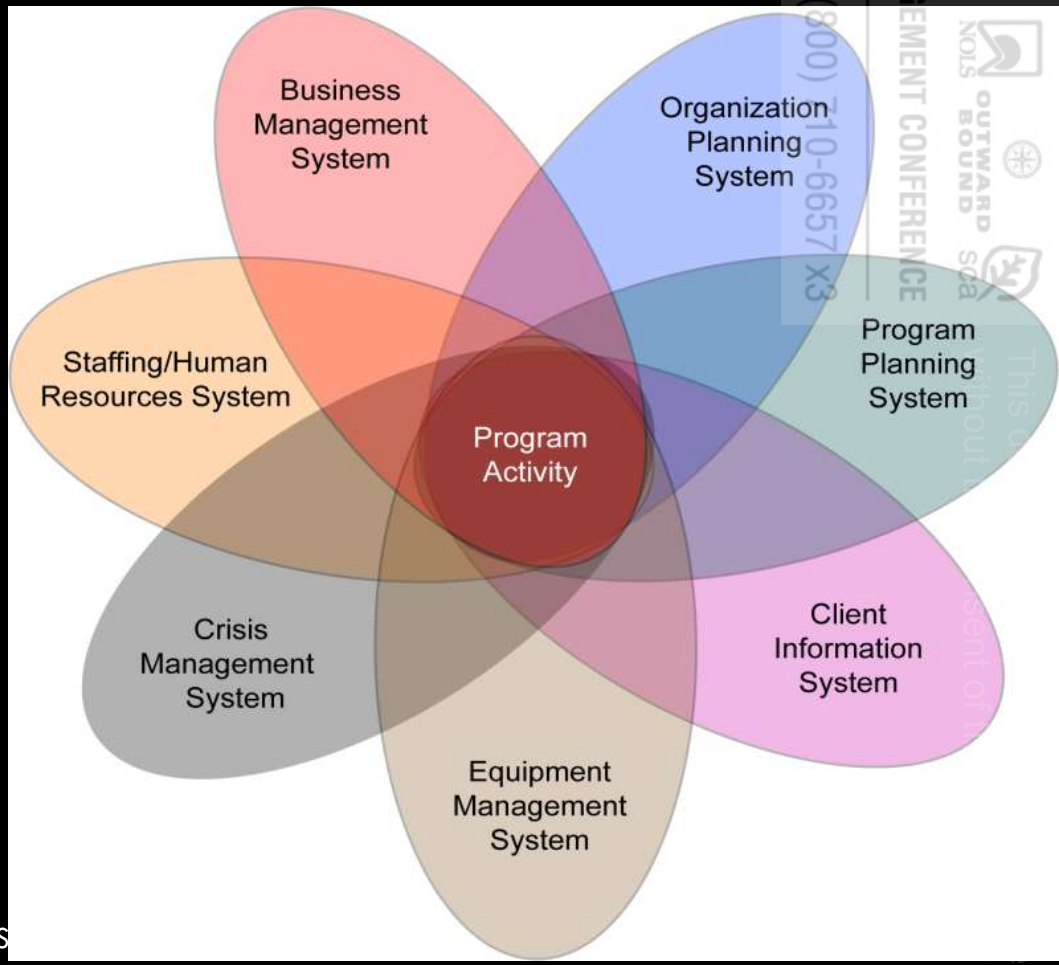
Step 4: Organization factors

2. Core process map



Systems based event investigation model:
Step 4: Organization factors

3. 7 systems



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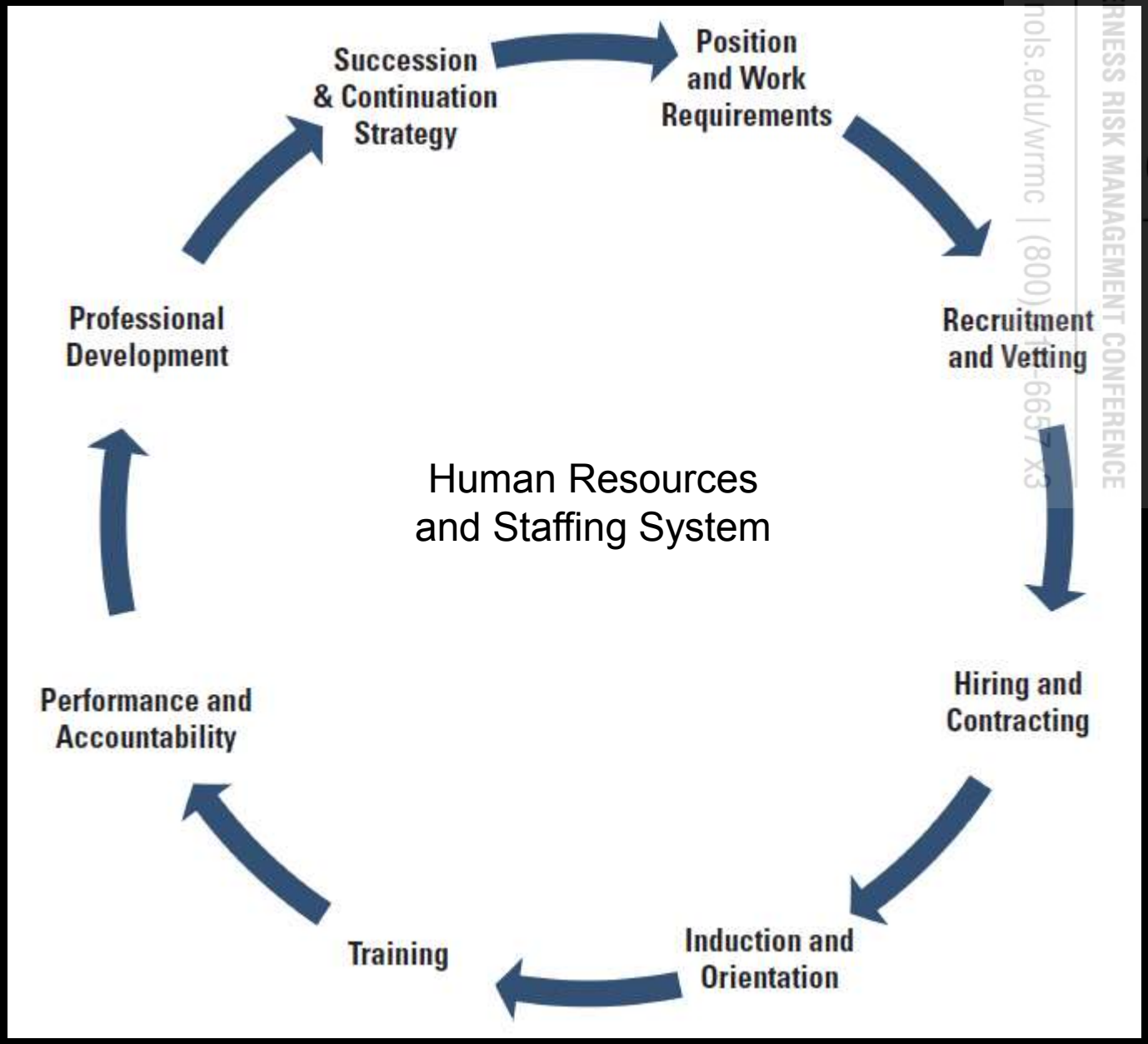
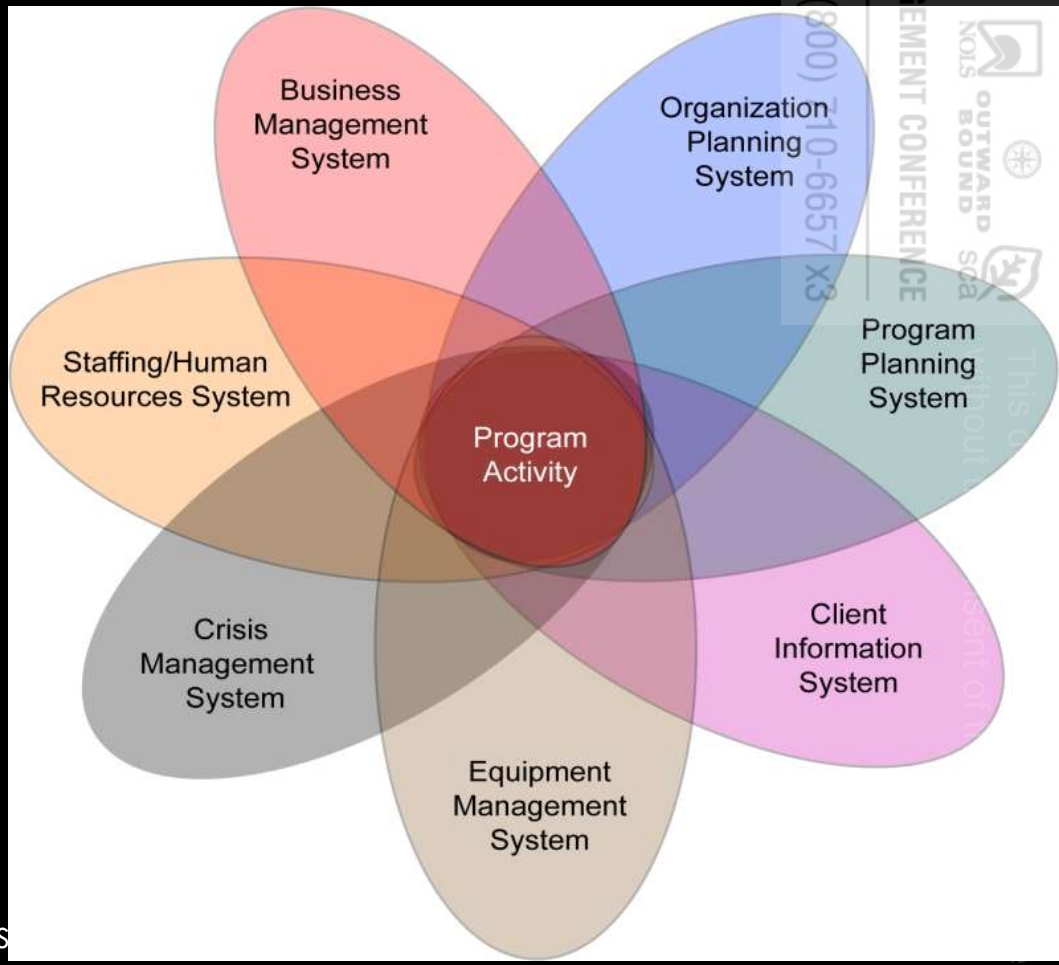


Systems based event investigation model:
Step 4: Organization factors

3. 7 systems
   - Examine mapping
   - Control points
   - Inter actions



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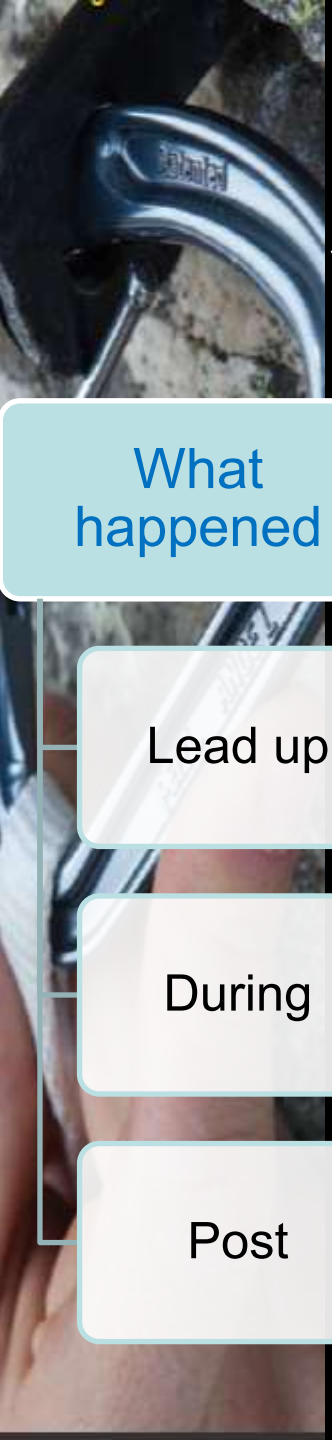

Systems based event investigation model:
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Systems based event investigation model:

Step 4: Organization factors

4. Coupling of activity & operation

Loosely Coupled	Tightly Coupled
Slack: time, resources, options	No slack
Time between decisions	No time, rapid succession
Time to correct	No time to correct
Many options per decision	Few options
Flatwater paddling	Continuous class V

Operational Coupling:
= Fast paced, high volume, tightly managed

Systems based event investigation model:

Step 4: Organization factors

5. Operational consistency
    1. Novel events = hi-potential
    2. Infrequent events = hi-potential

6. Capacity utilization (average)
    1. Peak load experience

Systems based event investigation model:

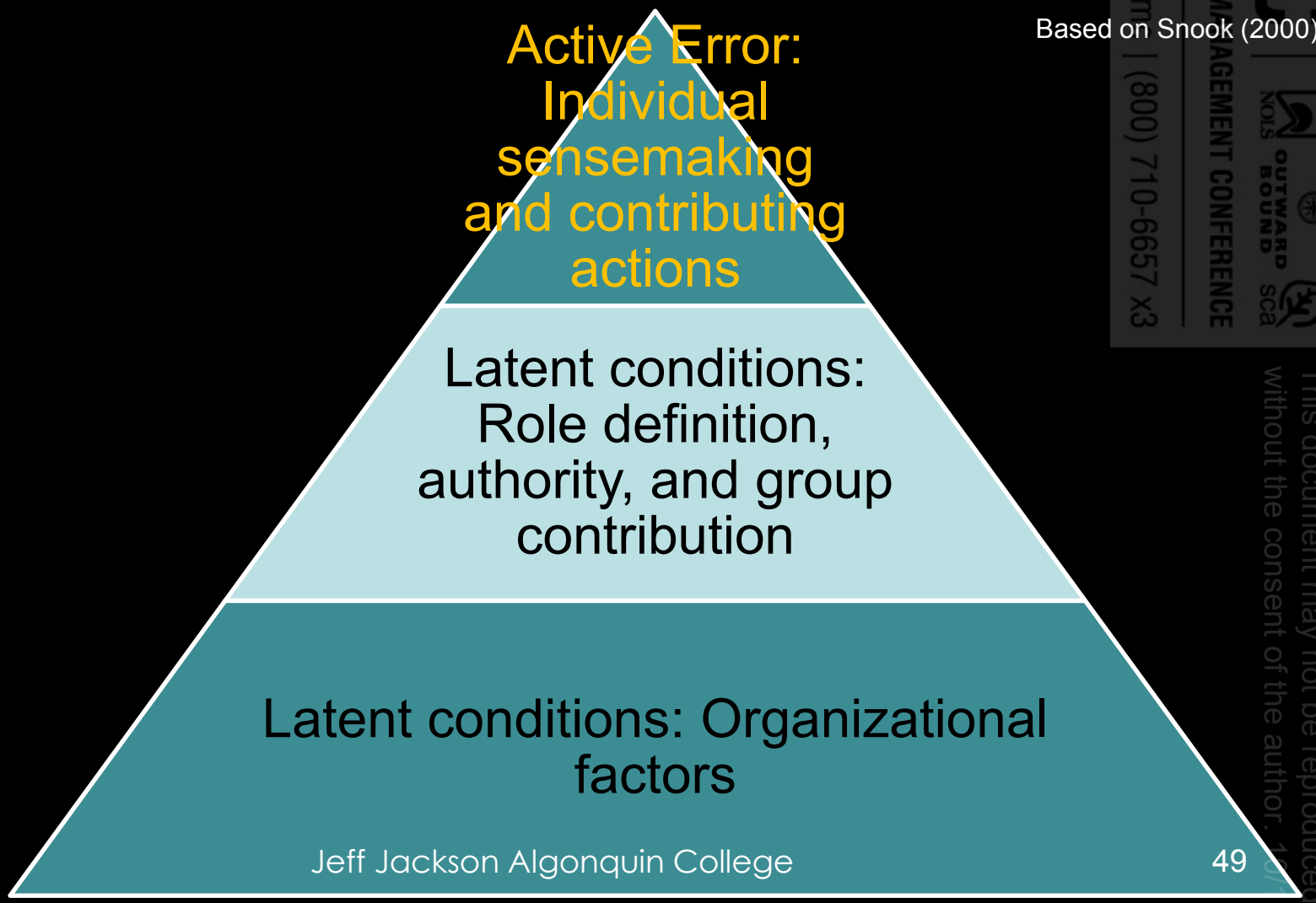
Step 4: Organization factors

7. Supervisory / management model
   1. Direction vs. autonomy
   2. Contracted service reliance
   3. Systems match complexity creep

8. Critical incident experience
   1. Guide experience at failure level
   2. Systems failure – ability to recognize

Systems based event investigation model:

Based on Snook (2000)



To do list:

1. Align explicit and implied risk tolerance
2. Check staff understanding of authority and role definition
3. Trial run a systems based event review

Bottom line:

1. It's easy to blame the operator – don't do it…
2. Sensemaking ≠ Decision making
3. Focus on system performance, not individual events

References / further reading

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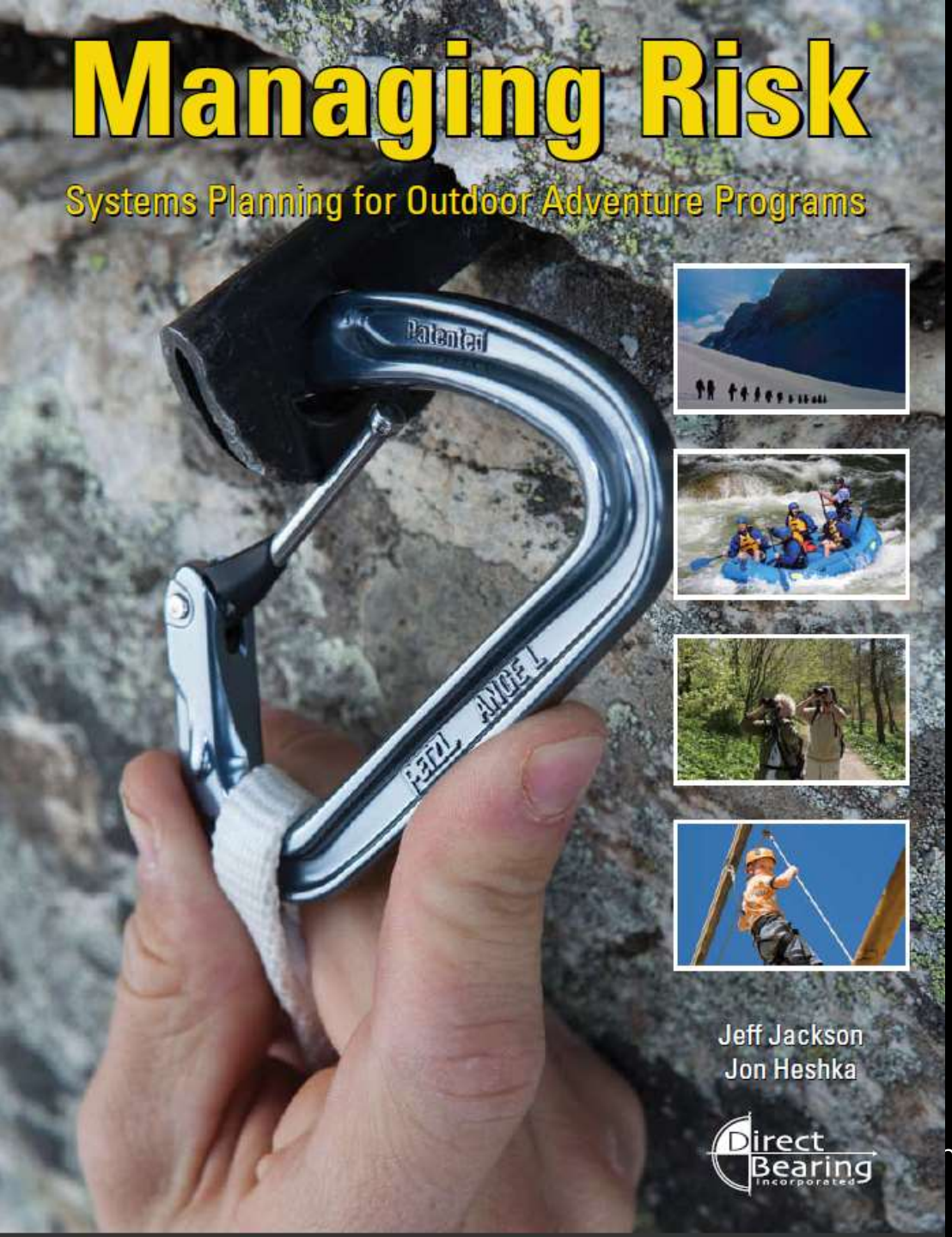

Book info:

www.TheManagingRiskBook.com