Beyond Operator Error: Using systems to analyse events

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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
Operator Error: why we blame the guide

Systems for organizing risk planning

Active versus Latent Errors

Systems based event investigation model

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

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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

```
Environment       Unsafe act       Human element
```

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Why we blame the guide:
Evolution of Adventure Risk Management

Safety planning (1960, 1970)

Liability planning (1980)

Hazard based approach (1990, 2000) (Trigger)

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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

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“Human fallibility, like gravity, weather or terrain, is just another foreseeable hazard...”
“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)
Seven Systems of Risk Management Planning

- Business Management System
- Organization Planning System
- Staffing/Human Resources System
- Program Planning System
- Crisis Management System
- Client Information System
- Equipment Management System
Agenda

Operator Error: why we blame the guide

Systems for organizing risk planning

Active versus Latent Errors

Systems based event investigation model

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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)

Organizational shell

Environment  Unsafe act  Human element
“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)
Agenda

Operator Error: why we blame the guide

Systems for organizing risk planning

Active versus Latent Errors

Systems based event investigation model

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Systems based event investigation model:

- **Active Error:** Individual sensemaking and contributing actions
- **Latent conditions:** Role definition, authority, and group contribution
- **Latent conditions:** Organizational factors

Based on Snook (2000)
... bad people making poor decisions vs. good people trying to make sense of a situation. (Weick, 1998)
Systems based event investigation model:

Approach:

What  How  Why

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Systems based event investigation model:

Step 1:

**What happened**

- Lead up
- During
- Post

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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
  - During
  - Post

- Substitution test
  - Yes = Operator error
  - Deliberate vs. slip vs. mistake

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Systems based event investigation model:

Based on Snook (2000)

Active Error:
Individual sensemaking and contributing actions

Latent conditions:
Role definition, authority, and group contribution

Latent conditions: Organizational factors
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

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Systems based event investigation model:

Active Error:
Individual sensemaking and contributing actions

Latent conditions:
Role definition, authority, and group contribution

Latent conditions: Organizational factors
Systems based event investigation model:

Step 4: Organization factors

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

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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Crisis Management System

Define Crisis

Assess and Review

Business Continuity and Recovery

Public Information Management

Emergency Response Plan

Communication Plan

Roles and Responsibilities

Resource Identification
Systems based event investigation model:

Step 4: **Organization factors**

3. **7 systems**
   - Examine mapping
   - Control points
   - Interactions

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Systems based event investigation model:

Step 4: Organization factors

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

Organizational factors

Risk tolerance

Systems errors

Operating features

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### Systems based event investigation model:

**Step 4: Organization factors**

#### 4. Coupling of activity & operation

<table>
<thead>
<tr>
<th>Loosely Coupled</th>
<th>Tightly Coupled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slack: time, resources, options</td>
<td>No slack</td>
</tr>
<tr>
<td>Time between decisions</td>
<td>No time, rapid succession</td>
</tr>
<tr>
<td>Time to correct</td>
<td>No time to correct</td>
</tr>
<tr>
<td>Many options per decision</td>
<td>Few options</td>
</tr>
<tr>
<td>Flatwater paddling</td>
<td>Continuous class V</td>
</tr>
</tbody>
</table>

**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:

- **Active Error:** Individual sensemaking and contributing actions
- **Latent conditions:** Role definition, authority, and group contribution
- **Latent conditions:** Organizational factors

Based on Snook (2000)

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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


Outdoor Pursuits Centre, NZ: www.opc.org.nz/safety


Managing Risk
Systems Planning for Outdoor Adventure Programs

Jeff Jackson
Jon Heshka

Book info:
www.TheManagingRiskBook.com

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