



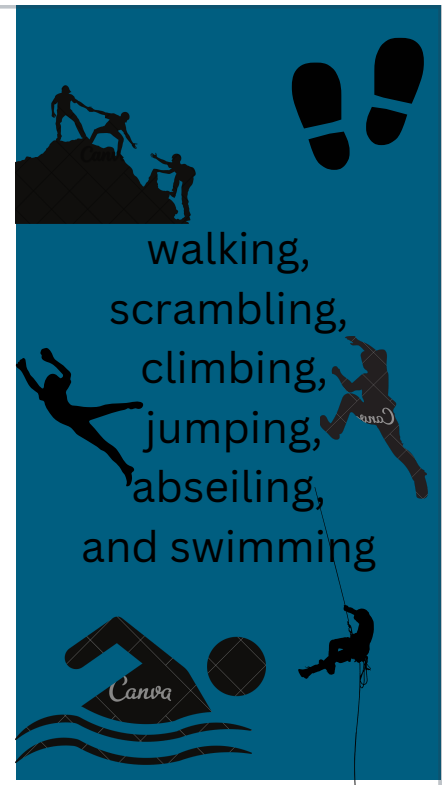
CRITICAL INCIDENT Portfolio

Rhein - 2109766 - Critical Incidents in Adventurous Activities



Introduction

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The Saxetenbach Canyon in Switzerland is known for its challenging and exhilarating canyoning experiences, attracting adventure enthusiasts from around the world.

Canyoning involves navigating through canyons using a variety of techniques including walking, scrambling, climbing, jumping, abseiling, and swimming.

The Saxetenbach Canyon had been frequented by adventure companies offering canyoning experiences for years. The area gained popularity due to its stunning natural features and the adrenaline-pumping nature of the activity. The activity providers there focused on providing a thrilling yet safe experience for their customers, employing trained guides and ensuring the use of appropriate equipment for the canyon descent.

(World Socialist Web Site N.D)

- ☑ waterfalls,
- ☑ rapids,
- ☑ sheer rock faces.
- ☑ sheer sides
- ☑ limited access points,



The Saxetenbach Canyon is characterized by steep and narrow gorges, fast-flowing water, and challenging natural obstacles such as boulders and rock formations. Therefore making it an exciting yet hazardous location for canyoning.

The topography of the area featured waterfalls, rapids, and sheer rock faces. The canyon where the disaster occurred had sheer sides and limited access points, making it difficult to navigate, especially during sudden and pronounced downpours that could swell the mountain streams into fast-moving water. This made it challenging for individuals to get out, emphasizing the risky nature of the terrain.

(The New York Times. 1999)

What happened ?

Lack of Weather Monitoring: The lack of sufficient weather monitoring meant the group was unprepared for the sudden weather event, contributing to the tragedy.

Unfamiliarity with Emergency Procedures: The group's unfamiliarity with emergency procedures further exacerbated the situation, hindering their ability to respond effectively.

Challenging Nature of the Canyon: The challenging nature of the Saxetenbach Canyon, with its narrow ravine and deep sidewalls, created a perilous environment, making escape impossible in the face of the oncoming flood



Sudden Weather Event: A sudden flash flood, triggered by a localized thunderstorm, unleashed a destructive force of water, logs, boulders, and mud, overwhelming the group and causing widespread devastation.

On July 27, 1999, one of the Adventure world party's of 21 people, including 18 clients and 3 guides, set off on a canyoning expedition in the Saxetenbach Canyon.

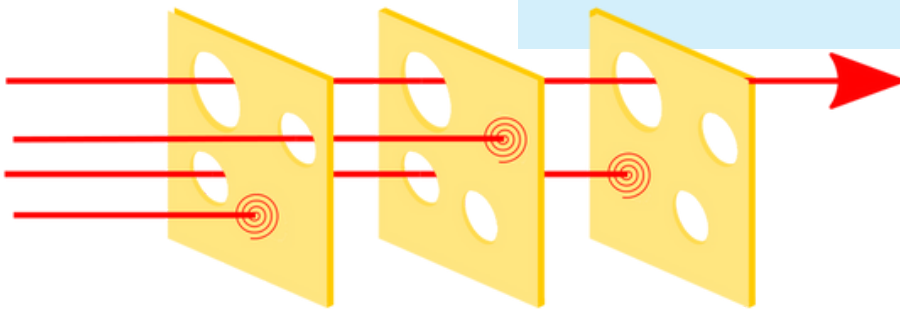
Tragically, a massive flash flood carrying with it; logs, water, boulders and mud so strong it was destroying nearly everything in its path resulted in the loss of all 21 lives. Several key factors were to blame for this incident, including the lack of sufficient weather monitoring, the group's unfamiliarity with emergency procedures, and the challenging nature of the canyon, which all contributed to the disastrous outcome. The immediate response was hindered by the inaccessible location and the overwhelming force of the flood.

The incident occurred in the Saxetbach Gorge near the village of Saxeten, a narrow ravine with sections that made exiting up the deep sidewalls impossible, creating a perilous environment. The tragedy occurred during a localized thunderstorm. Adventure World, the company organizing the canyoning trip, faced criticism regarding its decision to proceed with the trip despite poor weather conditions. There were clear warnings, and local fire departments were on high alert due to the threat of high water. However, Adventure World gave the go-ahead for the groups to descend into the canyon. The disaster prompted an investigation into the responsibility of Adventure World. The company's operations managers, lead guide, and five guides who survived the accident were suspects in the ongoing investigation, facing possible criminal charges of "manslaughter through culpable negligence." There were claims of persistent pressure on guides to take groups into the gorge in bad weather, raising concerns about profit over safety and insufficient training for the guides. The tragedy not only led to loss of lives but also posed challenges in identifying the bodies, with some having to be identified by tattoos and teeth. The incident shed light on the dangers associated with adventure sports and the need for stricter safety standards and regulations within the industry.

(OCHA Services. n.d.)

Swiss Cheese Model

James Reason's Swiss Cheese Model is a widely accepted framework for understanding how accidents occur. According to this model, accidents result from the alignment of multiple "holes" in several layers of defense, akin to the holes in Swiss cheese, allowing hazards to breach these defenses and culminate in a catastrophic outcome.



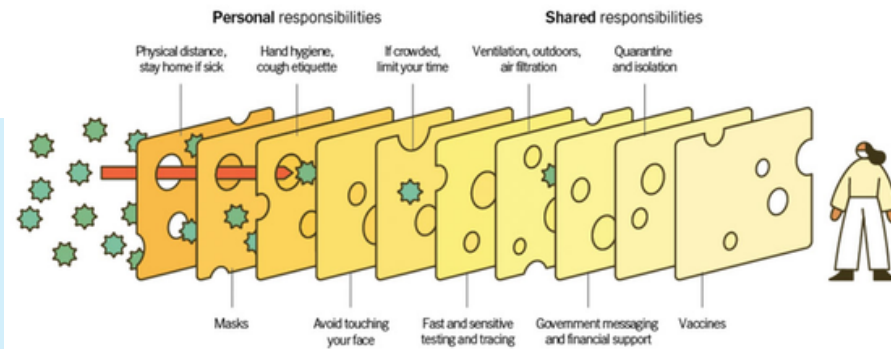
James Reason's Swiss Cheese Model is a prominent framework used to understand the occurrence of accidents and how they result from the alignment of multiple "holes" in several layers of defense. The model draws an analogy between these defense layers and slices of Swiss cheese, each with its own "holes." When these holes align, they create a clear path for a hazard to breach the system's defenses, leading to a catastrophic outcome. The Swiss Cheese Model is widely accepted and used in various industries, including healthcare, aviation, and engineering, to analyze and improve safety systems. By understanding the alignment of "holes" in the defense layers, organizations can identify weak points, implement corrective measures, and enhance their overall safety and risk management strategies to prevent catastrophic outcomes.

(Bell, A. (2018). How to Use the Swiss Cheese Accident Causation Model. Enterprise Training Solutions.) tein JE & Heiss K (2015 The Swiss cheese model of adverse event occurrence--Closing the holes.)

Application to Saxetenbach Canyon Disaster 1999

Multiple Layers Improve Success

The Swiss Cheese Respiratory Pandemic Defense recognizes that no single intervention at preventing the spread of the coronavirus is perfect. Each intervention (layer) has holes.



Source: Adapted from Ian M. Mackay (virologydownunder.com) and James T. Reason. Illustration by Rose Wong

Weather Monitoring and Emergency Protocols: The absence of adequate weather monitoring and clear emergency protocols represents the first layer of defense. This hole in the defense allowed for the group's vulnerability to the sudden flash flood, which initiated the sequence of events leading to the disaster.

Guides' Decision-Making and Inexperience: The lack of experience in handling extreme weather events and the guides' decision-making under pressure further contributed to the breaches in the defense, aligning with other vulnerabilities to create a clear pathway for failure.

Terrain and Force of the Flood: The challenging terrain of the canyon, combined with the overwhelming force of the flood, presented additional holes in the defense, making escape nearly impossible and reinforcing the catastrophic outcome.

The Swiss Cheese Model effectively illustrates how multiple layers of defense experienced temporary breaches, aligning to create a clear pathway for failure in the Saxetenbach Canyon disaster.

The model highlights that accidents are rarely caused by a single error, but rather by a series of systemic vulnerabilities and human errors aligning in a specific way. Perneger TV (2005).

(The Swiss cheese model of safety incidents: Are there holes in the metaphor?. BMC Health Services Research)

Risk Assessment

Real-Time Weather Monitoring
Emergency Procedures:
Continuous Training for Guides:
Client Briefings:
Safety Certification:
High-Water Alert System:

Drawing from the lessons learned from the disaster, a comprehensive risk assessment for canyoning activities at the site should involve the following measures:

Real-Time Weather Monitoring: Establish a robust system for real-time weather monitoring to anticipate and respond to sudden changes.

Emergency Procedures: Develop and regularly practice clear emergency procedures to ensure swift and effective response in critical situations.

Continuous Training for

Guides: Implement continuous training for guides to enhance their decision-making abilities and equip them to handle unexpected events.

Client Briefings: Provide comprehensive briefings to clients about potential risks, emergency procedures, and the importance of following guide instructions.

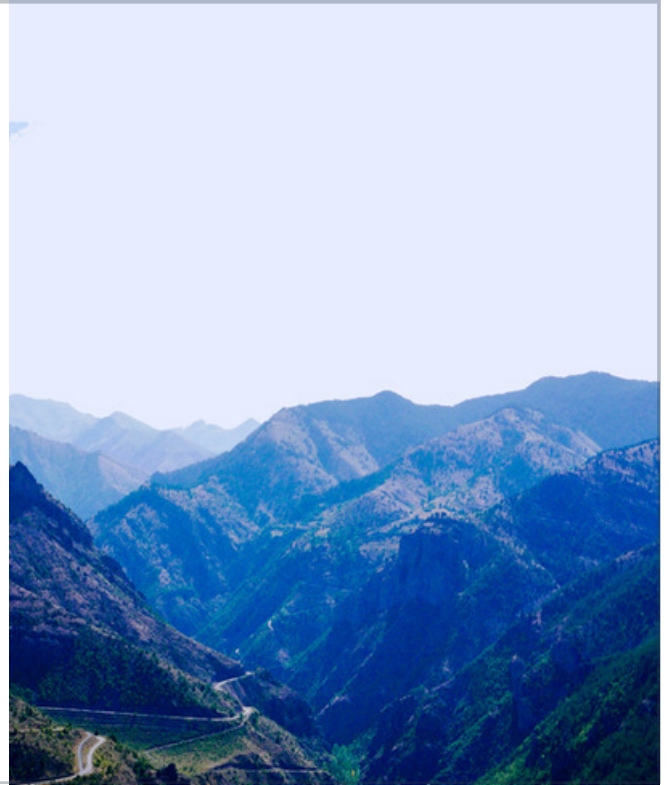
Safety Certification: Ensure that all adventure companies operating in the area are certified and have undergone thorough risk assessments and audits.

High-Water Alert System: Implement a high-water alert system combining near-term and longer-term weather predictions with runoff gauges and precipitation gauges in the gorge.

(Wilderness Safety & Alaskan Adventure. nd)

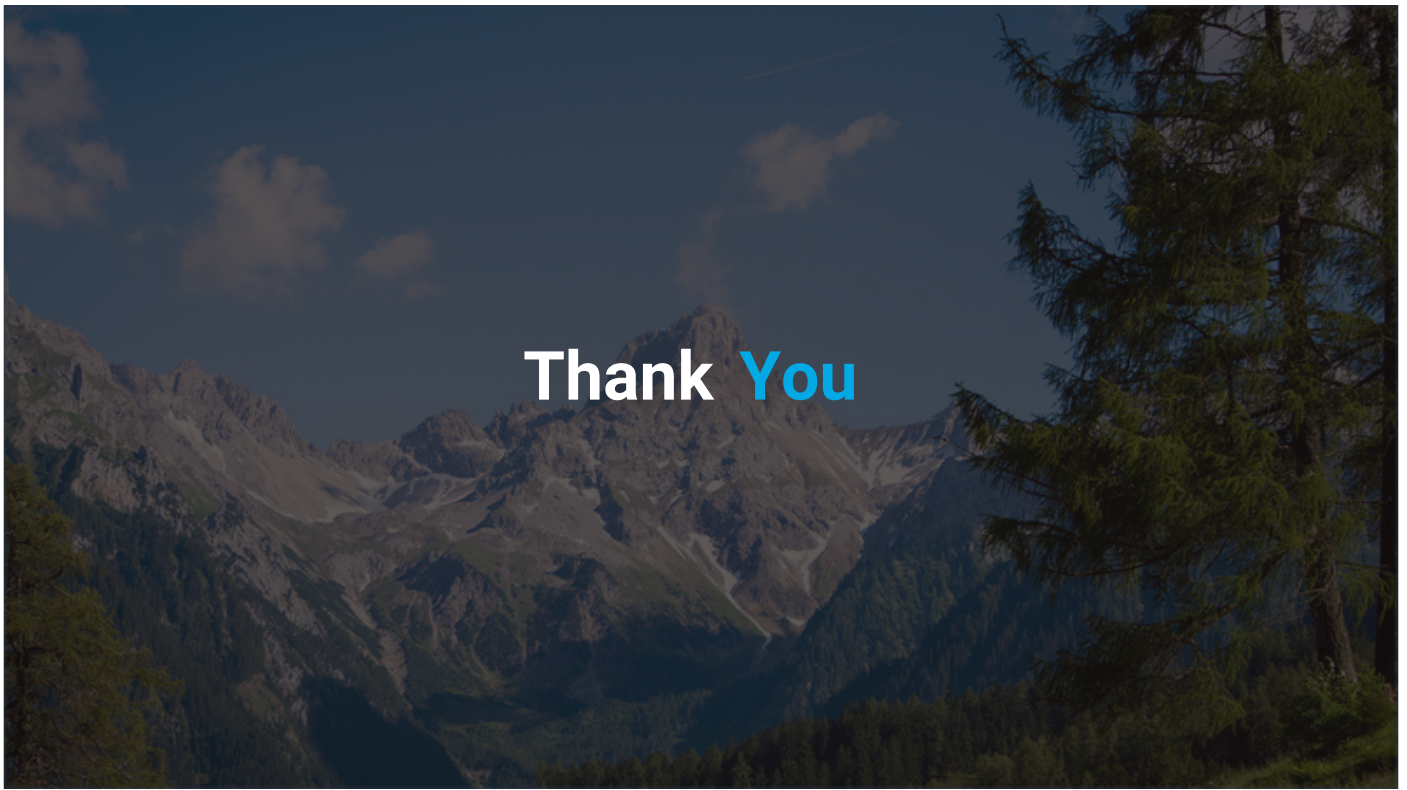
Using Reason's Swiss Cheese Model to analyze the Saxetenbach Canyon disaster provides a comprehensive understanding of how various factors and vulnerabilities converged to result in the tragic event. This analysis underscores the importance of addressing each layer of defense and implementing robust safety measures to prevent such catastrophic outcomes in the future.

Reflecting on this incident, my personal approach to outdoor adventures is deeply influenced. The Saxetenbach Canyon disaster serves as a stark reminder of the inherent risks involved in adventure activities. It emphasizes the need for thorough risk assessment, regular training, and the ability to adapt to changing conditions. The tragic consequences of inadequate safety protocols and decision-making under pressure have reinforced the understanding that prioritizing safety over external pressures is paramount.



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In conclusion, the Saxetenbach Canyon disaster serves as a solemn reminder of the critical need for stringent safety measures and continuous vigilance in outdoor adventure activities. This incident has significantly influenced my approach to outdoor adventures, emphasizing the non-negotiable priority of safety and thorough risk assessment in any adventure endeavor.

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