Accident Report Analysis Exercise: SAMPLE ANALYSIS

Sources

This analysis is based on two separate reports of an accident that occurred on Mt. Rainier, Emmons Glacier on August 31, 2013, in *Accidents in North American Mountaineering 2014* (Volume 10, Number 4, Issue 67):
Page 99, Fall on Snow, Fall into Crevasse – Fatigue, Unable to Self-arrest; and
Page 101: Fall into Crevasse, Fatigue

Note: The analysis below is speculative, and contains fictionalized material. It is a work of imagination and should not be seen to impute responsibility or blame on any party.

Knowns and Unknowns

1) Summarize the Known Information
After reading the accident report through, begin your analysis by summarizing the information that is **known** with reasonable certainty. As you write, resist the temptation to put a spin on events. Keep to the facts.

Sample Answer:

The climbers began their climb at some time during the night or early morning on the day of the accident. They were on the mountain with two other rope teams in the same large group, but the groups did not stay together. They summited, then began the descent. Late in the day, when the party was at about 11,400 ft, the middle climber slipped and slid about 15 ft into a crevasse, pulling his partners in after him. They all landed on a ledge about 40 feet down and sustained various injuries, some serious. The first rescuers arrived in the early morning hours the next day.

Synthesizing information from both reports and generally available info about Mt. Rainier, we know that on the ascent the climbing party was gaining elevation at a rate of no more than 500 ft/hour. Both reports mention fatigue as a factor. One victim reported that the party had strayed off route.

Surface conditions near the crevasse were described as "poor … crust plus powder snow lying on top of ice." The slope was described as "not very steep".

2) Summarize the Unknowns
Of the many **unknowns** in this accident, which seem to be the most significant? Is there enough information to enable you to meaningfully analyze the accident, or do you have to content yourself with superficial observations?

Sample Answer:

There are a lot of discrepancies between the two reports, and so things like the time the climbers left camp in the morning and the time of the actual accident are somewhat fuzzy. But the broad outlines are known.

We don't know exactly how the fall occurred. The middle climber, who was the first to fall, reported that he was able to self-arrest at the lip of the crevasse, but that he was pulled in by his falling partners. But we don't know what caused the middle climber to fall in the first place.

We also don't know any details about the judgment errors that might have led up to the accident, either in the long term lead-up or in the hours and minutes before the accident.

Chance Events vs. Human Error

3) Chance Events
What role might **pure chance** have played in the accident?
Identify actual or speculative causal factors over which the climbers had no direct control. (E.g. unpredictable weather, natural rock-fall, etc.)

Sample Answer:

There is a possibility that a chance event, such as collapse of a snow "step", or detachment of a small slab, played a role in causing the initial fall.

After the fall, the lucky fact that one climber remained uninjured enabled him to provide some low level of care to his injured companions.

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4) Human Error
What role might simple **errors** or **mistakes** have played in the accident?
Here, we're looking at things that would have been within the direct control and responsibility of the climbers, like movement errors (e.g. tripping over the rope); knot failure; or sloppy navigation.

Sample Answer:

The fall may have been the result of a movement error – e.g. a crampon snagging on a pant leg, a climber tripping on his front points or over the rope, or a simple loss of balance. The inability of the climbers to self-arrest may have been caused or exacerbated by low skill level.

Errors of Judgment

5) What role might **misjudgment** or **miscalculation of risk** have played in the accident? Is it possible to reconstruct stages in the party's decision-making process? (Here we would include cases where a climber took a "calculated risk" or "rolled the dice" – e.g. deciding not to rope up for fifth class terrain, or choosing to climb across a loaded avalanche path.) Be as specific as possible about what risks were underestimated or misrepresented.

Sample Answer:

The party was probably already moving very slowly by mid-morning. In light of this, it was probably an error in judgment to continue the climb. The party may have underestimated the importance of fatigue and its ability to precipitate accidents that otherwise would be unlikely.

Considering how tired they must have been when they reached the crevasse that was the site of the accident, the climbers might have chosen to place pickets or other snow protection.

Perhaps most interesting, the three rope teams did not work together as parts of a larger climbing party. Why not? This is not a direct criticism; there is no particular reason why the rope teams should have been obliged to stay together. But the fact that one of the companion teams submitted an accident report that contained significant variances from the rangers' report, as well as subtle suggestions of blame, suggests that there may have been larger problems with team cooperation and cohesion.

Other Factors

6) What **intensifying** and/or **mitigating factors** might have affected the outcome? (E.g. bad weather/good weather; presence/absence of a professional rescue crew and fast response; etc.)

Sample Answer:

As mentioned above, fatigue may have eroded the skill level of the group, contributed to the initial fall, and slowed the reaction times of the two other rope team members.

The presence of two other companion rope teams on the route, as well as other parties on the mountain, may have saved the lives of the victims. The first 911 call was placed by a companion party on the evening of the accident, and the successful rescue was initiated early the following morning by a separate climbing party, one of whom was a doctor.

The lack of weather factors (e.g. snow, rain, cold) may also have prevented the accident from turning fatal, as the victims were able to survive 12 hours at the bottom of a crevasse before being extracted.

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7) What **secondary errors** and **compounding effects** might have played a role after the initial event? (Compounding effects are sometimes called "cascading effects".)

Sample Answer:

This incident does not appear to have a lot of compounding effects. After the crevasse fall, the victims remained in place until they were rescued.

However, if we accept the account in the first accident report, there was substantial risk of compounding errors associated with the first attempted rescue. A member of the rescue party became exhausted shortly before reaching the victims; had it reached the victims first, the rescue party would have faced a difficult choice of rendering aid or retreating, and might have risked exhaustion and the accompanying risks of errors and exposure.

Speculative Scenario

8) For the final part of this exercise, give your imagination free rein. Speculate about ways in which an accident like this one might have come about. Sketch a **scenario** that describes the an accident from start to finish in such a way that you can **imagine yourself playing a part in it**. Like a storyteller, "suspend disbelief" and allow yourself to delve into character, social relationships, and other wholly unknown factors. (Use the reverse side of this sheet if necessary.)

Sample Answer:

Let's imagine that the climbers involved in the accident, as well as the members of the other rope teams, were all members of an informal outing club associated with a college, large church, or community center. The climbers do not all know each other well (though some do). The trip has been hastily organized by an active member, and some less active members and new members have been roped in. All members have

been vetted by the trip organizer in terms of past experience, but not in terms of present fitness.

On the morning of the climb, the rope teams' intent is to stay together. The plan, only discussed in passing, is to meet and communicate every hour; with multiple rope teams, the expectation is that lagging members will be able to consolidate on one rope and descend, giving others a chance to summit. But team 2 is slow to wake up and prepare for the climb, and the members of team 1 feel annoyance at them. Once team 2 begins to "show signs of fatigue", team 1 pushes ahead without communicating, "assuming" that team 2 will turn around. Meanwhile, the leader of team 2 now feels torn between turning his group around and catching up with team 1 in order to communicate, offer lagging members of team 1 an opportunity to spin, and maybe get the chance to summit himself. He pushes on.

When the two parties cross paths again near the summit, the leader of team 1 is quite surprised to see that the second team has not turned around. His annoyance at the slow team, and his guilt over his own failure to follow the plan, has hardened into a desire to disassociate himself from the other party. He knows the party is now seriously extended, but he is in denial. The same is true of the leader of team 2. His own wounded pride, annoyance, and desire to summit have clouded his judgment.

Rope team 2 continues on to the summit, then begins its descent. The descent goes almost as slowly as the climb. The team wanders off route and becomes exhausted. The middle climber, the slowest and least experienced, lets his mind wander; slack accumulates, and he trips over the rope.