

A Report on a Natural Hazard LEVEL 3

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To the Government of Alberta:

As requested, I have examined the information about the recent avalanche that occurred in Kananaskis Provincial Park and have prepared a report to suggest ways in which a further disaster can be avoided.

Hazard

An avalanche has been described as a large mass of snow in swift motion down a mountainside.

Location of Specific avalanche

A recent avalanche occurred on April 14, 2002 in Kananaskis Provincial Park, Alberta, which is near Calgary (CBC News Online, 2002). Two snowboarders were killed.

Mechanisms causing the avalanche

The snowboarders affected were out of bounds of the ski park, the area had not had deliberately-induced avalanches done beforehand while no one was in danger. This and the fact that several days of above-zero temperatures beforehand had weakened the base of the snow pile, and another heavy dump of wet snow made the danger greater. According to my research, avalanches are more likely to occur if there has been a large snowfall within a day because the extra weight can cause a slab of ice and snow to break off and fall down the slope. Over time, melting and refreezing stabilizes slabs because a bond is made between layers. On the leeward side (side opposite from where the wind is coming from) of a mountain, the snow piles up and the whole snowpack is unstable. Like what happened on April 14, 90% of all avalanches involving human beings are triggered by their victims. In this particular case, the disaster was triggered by the snowboarders who were building a ramp (The Scottish Avalanche Information Service, 2002).

Impacts of this avalanche

Of the 8 snowboarders in the path of the avalanche, 2 were killed and 1 was badly injured (CBC News Online, 2002). Almost everyone in the area volunteered and helped to search for the victims. The survivors of those in the path have been traumatized and the families and friends of the deceased have lost loved ones.

Advice on long term preparation for an avalanche

The authorities should know that training dogs to find buried people in snow is a good idea. Also it would be good to make sure that rescuers know the best way to find

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people quickly, like how to use long poles to search the snow layers efficiently. With these done the victims would have a better chance of being found while still alive. Another good idea is to put up signs telling people not to go out of bounds of ski parks where avalanches are probable and the risk of danger is increased. If the people obey the signs, then they will not venture into the dangerous and more hazardous areas. It would also be a good idea to have pamphlets to give skiers and snowboarders general information on avalanches and what to do when one occurs. Going even farther in the same direction, parks could have group information sessions on the dangers of avalanches. This would also inform people about the danger and would make everyone more aware of it and its mechanisms. In mountainous areas with remote highways where avalanches are frequent, it is a good idea to construct roofs above the roads so the snow continues from the mountain and runs off the roof, not touching or interfering with the road. This would avoid most if not all of the road blockages that interfere with the flow of traffic.

Advice on short and very short term preparation for an avalanche

A method widely used to help prevent avalanches is to deliberately set explosions near a hazardous area. These usually trigger the avalanche which takes away the risk for future avalanches. This deliberate avalanche would be induced under controlled conditions when no one is in the way or in danger of getting hurt. Researchers can study recent weather conditions to determine how strong the various layers of snowpack are, and evaluate the risk of avalanches in the area. All climbers and skiers should have an electronic radio beacon on them in order to make it easier for rescuers to locate them if they are buried in an avalanche. People should avoid getting near edges of cornices because they can be misleading and unsafe to walk on (See diagram). The public should be made aware of the following:

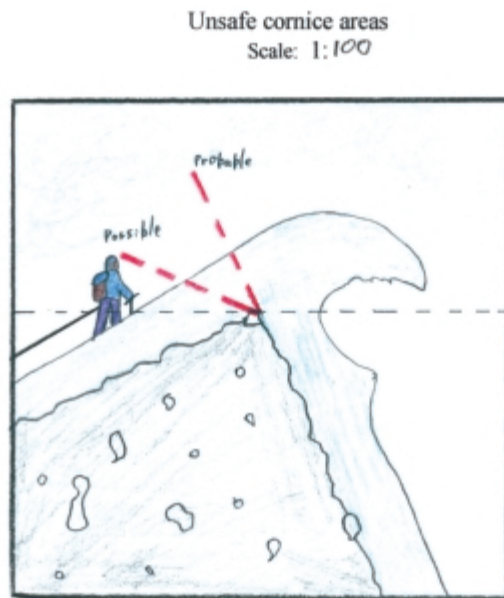
Even being directly above the actual rock edge, it is possible for the cornice to collapse. It becomes more probable as a person gets closer to the edge. The safest and therefore best way, no matter how appealing the view seems to be from there, is to stay away from the edge of the cornices. Falling cornices increase the risk of an avalanche where it lands and can easily become a trigger for disaster. If an avalanche is seen coming towards you, it is possible to run or ski out of its path and avoid being swept away altogether.

Advice on how to deal with the aftermath of an avalanche

Obviously, a good thing to do if an avalanche runs over a road and gets snow all over it is to close the road and hire people to plough and dig out the snow so traffic can get through again. If anyone is buried in the snow in the aftermath, then ski patrols should use long poles and dogs to find the victims quickly and efficiently before they die.

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Reference List

CBC News Online. "Avalanche kills two in Alberta." On-line. Internet. 22 May 2002.
Available: <http://www.csac.org/Incidents/2001-02/20020414-Canada.html>

The Scottish Avalanche Information Service. "Avalanches." On-line. Internet. 21 May 002.
Available: <http://wl.911.telija.com/u91107012/doomie45/tips/avalanche.html>

Teacher's Notes

Knowledge/Understanding

- The student identifies and describes the mechanisms of change as they apply to an avalanche in Kananaskis Provincial Park with considerable accuracy. Although the student's definition of an avalanche is somewhat general (i.e., "An avalanche has been described as a large mass of snow in swift motion down a mountainside."), it provides a good introduction to the report. A more detailed account of the mechanisms causing the particular avalanche follows (e.g. "... This and the fact that several days of above-zero temperatures beforehand had weakened the base of the snow pile, and another heavy dump of wet snow made the danger greater"). However, the student does not provide general background information about the weather conditions in the area that increase the likelihood of avalanches.

Thinking/Inquiry

- The student provides advice on short-term preparation for an avalanche that is of considerable effectiveness (e.g., to "deliberately set explosions near a hazardous area", to monitor weather conditions to evaluate the risk of an avalanche, to carry an electronic radio beacon when climbing or skiing). The student provides sound justification for the suggested preparations (e.g., to reduce the risk of further avalanches, to make it easier for rescuers to locate victims). However, the distinction between short- and long-term preparation is not always clear (e.g., the public might best be made aware of the danger posed by cornices through signs, pamphlets, and information sessions, which are discussed as long-term preparations).
- The student provides advice on long-term preparation that is of considerable effectiveness. The student's recommendations are practical and take into account the activities of visitors to a provincial park (e.g., "to put up signs telling people not to go out of bounds", "have group information sessions on the dangers of avalanches", "construct roofs above the roads so the snow continues from the mountain").

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- The student provides steps for dealing with the aftermath of an avalanche that are of considerable usefulness (e.g., closing roads, employing ski patrols and trained dogs quickly and efficiently). However, the student does not address the issue of dealing with people who may be injured.

Communication

- The student writes a report that has a considerable degree of clarity and logical organization. The material is organized under appropriate headings, and paragraphs are, for the most part, developed logically. Occasionally the student uses incomplete or poorly constructed sentences (e.g., “Even being directly above the actual rock edge, it is possible for the cornice to collapse.”).
- The student uses a voice and language that are appropriate to a considerable degree. The student addresses the report directly to the government and generally uses appropriate language (e.g., “According to my research”, “lee-ward side ... of a mountain”). However, at times the vocabulary is too simple (e.g., “a good thing to do if an avalanche runs over a road and gets snow all over it”).
- The student provides a visual that supports and enhances the written information to a considerable degree. The visual is informative and well drawn, although the labelling is minimal and the scale is incorrect. The visual effectively supports and extends the discussion in the text.

Application

- The student evaluates the impact of the hazard on the local population with considerable effectiveness. The student uses the consequences of a particular event (i.e., “Of the 8 snowboarders in the path of the avalanche, 2 were killed and 1 was badly injured ... Almost everyone in the area volunteered and helped to search for the victims. The survivors ... have been traumatized ...”) to provide a dramatic illustration of the danger to snowboarders, skiers, and climbers of going “out of bounds of the ski park”.

Comments

This work is representative of a solid level-3 performance. The student demonstrates a considerable degree of achievement of the expectations in all four categories of knowledge and skills.

The result is a clear and interesting report.

Next Steps

In order to improve his or her performance, the student needs to:

- include steps for accommodating those who might be injured during an avalanche;
- consider the economic effects of avalanches on local populations;
- provide more detailed labelling and a correct scale for the visual;
- edit and proofread to improve logical flow of ideas and to correct occasional errors in sentence structure.