Loose Wet Avalanches

Introduction

Loose wet avalanches are usually confined to surface layers, and are therefore often small. However, because of their high density, loose wet avalanches contain greater mass and are much more difficult to fight against than loose dry avalanches. They contain cohesion-less wet slushy snow, start from a point, and gather mass progressively in a fan-like shape. They are also sometimes called "point releases." In periods of significant, prolonged melt or rainfall loose wet avalanches can become large and destructive but this usually occurs in conditions where recreational activities are highly undesirable or impossible.

Development

Loose wet snow avalanches occur when the surface snow loses strength by becoming wet due to melting.

Time of the Season:
Loose wet avalanches are most common in late winter, spring, and summer.

Weather Patterns:
Loose wet snow avalanches are associated with warm temperatures, strong solar radiation, rain, or some combination of these factors.

Snow Climates:
Loose snow avalanches occur in all snow climates.

Spatial Distribution:
Loose snow avalanches require sufficiently steep slopes to initiate, generally at least 35 degrees and typically 40 degrees or more. Loose snow avalanches often start in steep, rocky terrain but can also be triggered in smaller steep glades and slopes.

Loose wet avalanches associated with solar heating are related largely to aspect, incline, and elevation. Sunny aspects gain significantly more solar radiation. On sunny aspects, steeper slopes collect more heat. Higher elevations receive sun earlier in the day and for longer periods. Loose wet avalanches associated with warm temperatures can occur anywhere temperatures become warm enough to cause melting of the snow surface. Wet loose snow avalanches associated with rainfall are limited to elevations below the snow line.

Avalanche Activity Patterns

Seasonal Timing and Persistence:
Loose wet avalanches are generally more common in late winter, spring, and late spring or summer when solar radiation is stronger, temperatures are warmer, and the potential for higher intensity rainfalls with greater accumulations are more likely.

Size and Propagation:
Loose avalanches are generally small, usually less than a size two and tend to involve only small portions of the avalanche path. The exception is larger loose wet avalanches triggered by extensive warm and sunny weather and perhaps with the addition of rain. These conditions can produce avalanches larger than size two, although they are generally not an issue until late spring, often after most winter recreational activities have ended.

Loose snow avalanches do not propagate as a fracture line, but start at a point and then collect more snow and get wider as they move downhill. It is common for multiple loose snow avalanches to start at different points and then join together.

Spatial Distribution and Variability:
Loose avalanches triggered by solar radiation are most prevalent on southeast through west facing slopes. Early in the season, slides are more common on high elevation, steep inclines, while later in the season less steep slopes at lower elevations can also be triggered.

Loose avalanches triggered by warm temperatures or rain are often widely distributed in terms of aspects and slope incline but variability over elevation is common: in a normal atmosphere, lower elevations are generally more prone to slides; if a temperature inversion or above freezing layer of air exists, higher elevations may be more prone to temperature induced avalanches than lower.

In all cases, a very firm, smooth layer below the loose snow on the surface tends to enhance instability.

Triggering:
Loose snow avalanches can often be triggered easily by ski cutting or started accidentally while skiing or traveling in steep terrain. Loose snow avalanches are generally not triggered remotely and are usually triggered at the point where the snow is disturbed, not involving snow from above.

Weather conditions that promote natural triggering include:

- Warming of the snow surface, rocks, or trees due to solar radiation (e.g. sunrise, dissipating cloud).
- Prolonged periods of above freezing temperatures.
- Rainfall events with intensities or accumulations high enough to saturate surface layers.

If more than one of these weather conditions occur together, the effect is greater than the sum of its parts.

Avalanches triggered by solar radiation or warm temperatures often go through a diurnal cycle in which stability decreases significantly (and often rapidly) as the sun comes up and temperatures rise, followed by an increase of stability late in the day and overnight as solar radiation drops off and temperatures fall.

Recognition and Assessment in the Field

Avalanche Activity:
Loose wet avalanches often occur in diurnal cycles due to varying solar radiation rates and temperature fluctuations.

Snowpack Layering, Tests, and Observations:
The weak layer is on the surface and is readily observed. Generally, loose snow avalanches are limited to depths of 50cm or less, although the exception may be when thicker layers or even the entire snowpack is saturated with water.

The ease of triggering, size, and power of loose snow avalanches can often be assessed by observing natural activity and by observing the results of careful ski cutting. Slopes can be tested by applying a trigger such as a rock, small cornice, or even a snowball.

Early signs of instability include:

- Pinwheeling.
- Snowballing.

Surface Conditions:
Surface conditions are highly indicative of instability. When loose, unconsolidated snow is observed, especially during periods when melting is occurring, the potential for loose snow avalanches and their consequences should be considered.

Risk Management Strategies

Slab avalanches are perceived as being much more dangerous than loose snow avalanches, but loose snow avalanches can be large enough to pose a threat to people. Even smaller loose snow avalanches can be a danger if the snow accumulates in a terrain trap or if the moving snow carries a person into obstacles or over cliffs.

Timing:
Timing is everything, especially when sun and warning temperatures are factors. Consider the likelihood that a diurnal avalanche cycle may be underway due to fluctuating temperatures and solar radiation. Consider the timing of solar radiation on slopes high above, where the sun may be strong much earlier and for much longer than in shaded valley bottoms. Start trips early in the morning, end them early in the day, and consider carefully your exposure late in the day.

Avoid travelling in avalanche terrain when it's raining.

Human Factors:
Because loose snow avalanches are considered less hazardous than slabs, there may be a tendency to underplay the consequences. Conditions can change rapidly when solar radiation, increasing temperatures, and rain are factors. Underestimating how quickly conditions change may lead to being in the wrong place at the wrong time, especially late in the day.

Terrain:
To manage the risk of loose snow avalanches, avoid situations that could result in being caught in a terrain trap or carried into obstacles or over cliffs. Loose snow avalanches can often be started by careful ski cutting and the slopes below can then be descended more safely after much of the loose snow has been cleaned off.

When descending large steep slopes, be aware of slides that gain size and speed from behind you. Travel on ribs and high ground to avoid avalanches that accumulate in gullies, and avoid situations that expose people to slides triggered by people above, especially if there are terrain traps (e.g. gullies or tree wells) in the area.

USE AT YOUR OWN RISK

Mountain travel is dangerous and can involve exposure to avalanches and other hazards. The advice and decision guidelines provided in this field book cannot eliminate these hazards, but they can help you understand and manage them. This field book is no substitute for training, experience, and choosing skilled and responsible travel partners.

To find an avalanche training course near you, visit www.avalanche.ca.

CITATION

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