Script - **‘Avalanches: Causes, Impacts and Management'**

(Digital download clip)

Whether it's winter skiing or summer climbing in the high mountains. Alpine sports inevitably involve personal risk. If an area suffers frequent avalanches skiers and climbers are less likely to come back year after year – one of the biggest challenges facing the local authorities is to reduce both the chances of avalanches happening when people are on the slopes and to reduce the impacts they have on property.

It's Saturday morning and David Masino is giving a snowboarding lesson to 14 year old Vladimir – he's one of an increasing number of Russians coming to the resort. But learning to ski isn't the reason most people come here....

David Masino – Ski Instructor
Chamonix is not just a resort that people come to for the ski slopes, there is a lot of off piste and mountaineering, so I think people are especially attracted to Chamonix because of that – because of all the off piste and free-riding that we have here.

The combination of steeply sloping valleys and lots of possibilities for people to ski away from the main runs or off piste might make Chamonix great for more experienced skiers but it also increases the likelihood of avalanches.

Gilles Brunot – Director Chamonix Met. Office
On average there are about 10 avalanches a year that get set off by skiers, and perhaps a hundred or so natural avalanches. When you get a lot of snowfall and bad weather a lot start naturally.

Avalanches occur when a number of elements combine to create a rapid downhill movement of massive quantities of snow – the causes of each on are different but the factors that make them more likely include:

Heavy snowfall – (Heavy snow)

Especially when the snow falls on open ground rather than a forested area. (Deforestation)

Steep slopes. (Steep Slopes)

Vibrations from off piste skiers, loud noises or earthquakes. (Vibrations)

How any underlying layers of snow have been affected by changes in temperature and (Nature of underlying snow)

Wind causing snow to pile up creating overhangs. (Wind direction)

And not all avalanches are the same. Depending on how these factors combine they create different types....

Gilles Brunot – Director Chamonix Met. Office
The are three main types of avalanche. Avalanches made up of snow that's wet. Whether that's due to rain or warm temperatures causing the snow to melt. Then there are powder snow avalanches – you get those when you've had a big fall of cold snow. And then you get the slab avalanches. These occur when you get a layer of

rigid snow on top of a softer more mobile layer.

Slab avalanches are the most dangerous to people and every year a number of skiers and climbers lose their lives as a result of them.

But these particular avalanches have been deliberately triggered by ski patrollers using explosives on the ground or dropped from helicopters.

It's all part of a sophisticated monitoring and prevention system aimed at reducing the risk of an avalanches occurring whilst people are on the slopes.

Laurent Valbert works in the avalanche risk prediction department at Chamonix's met office - and the first job he does everyday is collect information from patrols based at ski stations around the area.

Laurent Valbert – Avalanche Forecaster
So they tell me about the weather, the precipitation, the rain or snow, which occurred in the last 24 hours, and secondly they make measurements of the snow quality – the quantity of fresh snow, the total depth of the snow pack, and the quality of the different grains of snow.

The quality of different grains in the layers of snow is the single most important factor in determining the risk of a slab avalanche which is why ski patrol take regular depth soundings – and by combining these depth soundings with weather forecasts, Laurent is able to model the risk of avalanches taking place the following day at different altitudes.

Laurent Valbert – Avalanche Forecaster
Here we have observed soundings made by the ski patrols in different resorts. And for the forecast here we have forecast soundings. And we can have forecasts for different altitudes and different exposures. So here we have details of the different forecast soundings at different altitudes – this means from 600m to 2700m for the north exposure on the Chablais massif. And we can do the same for the Aravis massif and Mont Blanc massif and these different colours mean different grains of snow and we can determine the risk using this software.

There are five risk levels ranging from low to very high and they're used by ski station managers to help decide whether to trigger avalanches on in some cases close the ski station altogether. (low, moderate, considerable, high risk, very high risk.) But it's not just skiers that can be affected by avalanches.

Gilles Brunot – Director Chamonix Met. Office
Avalanches can affect roads and some houses. We work with the safety commission in Chamonix and they decide whether to close certain roads and evacuate some houses if there's a big risk in an area.

But closing roads prevents people moving around which isn't good for the tourist business so at vulnerable spots the government have also built avalanche proof tunnels like this one. At other points in the valley they've also built avalanche barriers – among them the Paravalanche de Taconnaz - the largest avalanche barrier in the world.

It might reduce the risks and impacts of avalanches but building tunnels and barriers and paying for monitoring teams all costs money. Most believe it's a price worth paying in order to make sure people can live here and the skiers keep coming back

year after year. But managing avalanches isn't the only challenge facing Chamonix's 15000 residents.

END

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