A DBR specialist estimates the size and mass of an avalanche as part of an observational program.

Un chercheur de la DRB évalue la taille et la masse d'une avalanche, dans le cadre d'un programme d'observation.

avalanche-prone areas. Secondly, we are heavily engaged in educating people on avalanche safety, and for this purpose, we collect and publish case histories of avalanche accidents."

For the western mountains of Canada, the peak of the avalanche season is January, the month of heaviest snowfalls. This is the period when the greatest material damage is experienced. Avalanche accidents involving skiers generally occur in February and March, one reason being that January is generally too cold for much skiing. On the other hand, mountain climbers reaching higher altitudes can encounter avalanches at any time of the year, whenever the conditions are right. These usually involve a snowfall with wind speeds of 30 km/h or more, or a snowfall followed by warm weather.

"The most common avalanches," says Mr. Schaerer, "are caused by the weight of new snow sliding on top of old snow. When snow is unstable, any small perturbation, such as the passage of a skier, vibration due to traffic or an explosion can trigger an avalanche. First, the snow slab that breaks away slides as a rigid body, but after a short time it disintegrates into small fragments. While the motion of avalanches is very complicated and has not yet been described satisfactorily in mathematical terms, the NRC observations suggest that typical dry snow avalanches consist of a core of dense snow flowing along the snow surface, accompanied by a cloud of powder snow. The powder cloud is well developed in avalanches of dry snow and has very little density; it is less pronounced in moist snow and absent altogether in wet snow avalanches."

Although the powder part is spectacular, Schaerer explains, the destructive power of the avalanche is contained in the flowing snow which has most of the mass and momentum.

To get observational data on their behavior, the Division of Building Research started to monitor avalanches in 1971 at a test site in the Rogers Pass area of the Trans-Canada Highway, in eastern British Columbia. The site, Tupper No. 1, is ideal for avalanche studies: it is readily accessible from a highway and experiences 20 to 30 avalanches every year, making frequent observations possible. Using buried seismic geophones and a battery of pressure sensors in the path of avalanches, the NRC scientists have recorded data on the speed, distribution of mass, and evolution of these dangerous phenomena, thereby permitting them to test theories that seek to explain avalanches and their destructive forces.

One of the aims of the DBR work is to come up with methods of predicting the maximum size of avalanches that can be expected during a 30-year or greater period at a given site, in order to estimate the protective measures needed. For this purpose, the field staff of NRC measures the mass of snow brought down and the distance reached by medium and large size avalanches at selected sites. One method of protection is to initiate avalanches with artillery or a dynamite explosion when it is recognized that conditions are right. When the snow cover is stabilized in this manner, there will be no further risk of avalanches in the area until the next snowfall.

Structures are also a means of