

## OHS Guidelines Part 4 General Conditions

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*Background: This new guideline provides clarification regarding the new snow avalanche assessment requirements that came into force on September 1, 2009.*

### **G4.1.1 Snow avalanche assessment**

Issued September 1, 2009

#### **Regulatory excerpt**

Section 4.1 of the *OHS Regulation* ("*Regulation*") states:

A workplace must be planned, constructed, used and maintained to protect from danger any person working at the workplace.

Section 4.1.1 of the *Regulation* states:

(1) In this section:

*"active avalanche safety program"* means a program for monitoring daily, or more frequently if conditions warrant, the weather, snow and avalanche conditions, determining temporal fluctuations of avalanche hazards and implementing safety measures, closures or other methods specified in the program to reduce avalanche risk that has not been mitigated through use of passive measures;

*"avalanche"* means snow avalanche;

*"avalanche risk assessment"* means an assessment, done in accordance with CAA guidelines, of the terrain in and surrounding a workplace to determine if any person working at the workplace is at risk from a snow avalanche;

*"avalanche risk zone"* means a workplace or part of a workplace where an avalanche risk assessment determines that avalanches pose a risk to any person working at the workplace and risk control measures are required to make the area safe for work to be conducted;

*"avalanche safety plan"* means a documented plan meeting CAA guidelines, specifying passive measures to mitigate or reduce the avalanche risk to any person working at the workplace and any active avalanche safety program necessary to monitor and manage any avalanche risk that has not been mitigated through use of passive measures;

*"CAA guidelines"* means the Canadian Avalanche Association guidelines for risk determination, mapping and mitigation for snow avalanche risks as specified in the Guidelines for Snow Avalanche Risk Determination and Mapping in Canada and the Land Managers Guide to Snow Avalanche Hazards in Canada, published by the Canadian Avalanche Association in 2002;

*"passive measures"* means the application of CAA guidelines and other relevant standards and practices in engineering, geoscience and forestry to worksite and facility planning, location, design and use to mitigate or reduce the risk from avalanches without reliance on an active avalanche safety program, and may include the design and construction of physical defenses against avalanches;

*"qualified avalanche planner"* means a person

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- (a) who has training and experience in the development and implementation of active avalanche safety programs and is
    - (i) a professional member of the Canadian Avalanche Association,
    - (ii) a certified guide and a member of the Association of Canadian Mountain Guides,
    - (iii) a certified guide and a member of the Canadian Ski Guide Association, or
    - (iv) a qualified registered professional, and
  - (b) who, on and after September 1, 2011, meets the requirements of the CAA Recommended Minimum Training and Experience for Qualified Avalanche Planners published by the Canadian Avalanche Association in August 2008.
- (2) Before work commences in a workplace where there is or may be a risk from an avalanche to a person working in the workplace, an avalanche risk assessment must be prepared as follows:
- (a) for workplaces involving buildings, construction, logging, transportation corridors or other work areas that will be occupied by any person working in the workplace on a permanent, seasonal or scheduled basis, by a qualified registered professional and a qualified avalanche planner;
  - (b) for wilderness operations where any person working in the workplace undertakes short-duration activities in undeveloped terrain, by a qualified avalanche planner.
- (3) If an avalanche risk assessment conducted under subsection (2) identifies an avalanche risk zone, no work may be conducted in the avalanche risk zone at any time when snow conditions have the potential to create an avalanche unless an avalanche safety plan has been developed and implemented.
- (4) If any part of an avalanche safety plan
- (a) requires passive measures, that part must be prepared by a qualified registered professional, and
  - (b) requires an active avalanche safety program, that part must be prepared by a qualified avalanche planner.
- (5) If the avalanche safety plan required by subsection (3) includes an active avalanche safety program, a copy of that active avalanche safety program must be readily available to each person who administers or implements the avalanche safety program for the workplace.
- (6) An avalanche safety plan must be reviewed to ensure that the plan is appropriate and relevant to the conditions and activities for the workplace as follows:
- (a) whenever there is a significant change to the workplace contemplated by the plan;
  - (b) whenever there is a significant change to the surface terrain or forest cover in or surrounding the workplace.

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- (7) An active avalanche safety program must be reviewed to ensure that the program is appropriate and relevant to the conditions and activities for the workplace at least once every 60 months.
- (8) The review required under subsection (6) or (7) must have any passive measures reviewed by a qualified registered professional and any active avalanche safety program reviewed by a qualified avalanche planner, and following the review the avalanche safety plan must be amended as necessary by the person or persons who conducted the review.
- (9) On and after September 1, 2011, every active avalanche safety program approved before September 1, 2011 must have been prepared by, or reviewed and approved by, a qualified avalanche planner who meets the requirements of the CAA Recommended Minimum Training and Experience for Qualified Avalanche Planners published by the Canadian Avalanche Association in August 2008.
- (10) If an avalanche safety plan specifies procedures to be followed by persons working in an avalanche risk zone, each person working in the risk zone must be trained in, and comply with, any procedures applicable to that person's work.

Section 1.1 of the *Regulation* provides the following definitions:

*"professional engineer"* means a person who is registered or licensed to practice engineering under the provisions of the *Engineers and Geoscientists Act*;

*"professional geoscientist"* means a professional geoscientist or licensee under the *Engineers and Geoscientists Act*;

*"qualified registered professional"* means

- (a) a professional engineer or professional geoscientist, and
- (b) in relation to a forestry operation, a person referred to in paragraph (a) or a professional forester or holder of a special permit under the *Foresters Act*;

### **Purpose of guideline**

The purpose of this guideline is to clarify some of the assessment requirements specific to snow avalanche terrain set out in section 4.1.1 of the *Regulation*. In particular, this guideline provides information regarding

- The preparation of an avalanche risk assessment and an avalanche safety plan
- The qualifications of the professionals who will be preparing an avalanche risk assessment and an avalanche safety plan
- Training requirements
- Avalanche control using explosives
- Additional resources to assist with compliance

### **Background**

Section 4.1.1 of the *Regulation* came into force on September 1, 2009. The requirements set out in section 4.1.1 apply to any workplace where there is or may be a risk from a snow avalanche to a person working there. Some of the industries to which this section applies include: ski hills, forest operations, land surveying, pipelines situated

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entirely within the province, eco-tourism (e.g. snowmobile and mountain guiding), power generation and transmission, property development, and lodging.

### Avalanche risk assessment and safety plan

As required by section 4.1.1(2) of the *Regulation*, an avalanche risk assessment must be conducted before work commences in a workplace where there is or may be a risk from a snow avalanche to a person working in the workplace. The assessment must be done in accordance with the Canadian Avalanche Association (“CAA”) guidelines specified in the *Guidelines for Snow Avalanche Risk Determination and Mapping in Canada* and the *Land Managers Guide to Snow Avalanche Hazards in Canada*.

If the risk assessment identifies an avalanche risk zone, no work may be conducted in that zone when snow conditions have the potential to create an avalanche unless an avalanche safety plan is developed and implemented (section 4.1.1(3) of the *Regulation*). As defined in section 4.1.1(1) of the *Regulation*, an avalanche plan is a documented plan that meets the above-noted CAA guidelines and specifies

- Passive measures to mitigate or reduce the avalanche risk (e.g. supporting structures, snow sheds, snow collector fences)
- Any active avalanche safety program necessary to monitor and manage any avalanche risk that has not been mitigated through use of passive measures (e.g. temporary or permanent closure, use of explosives)

A recommended generic table of contents for avalanche safety plans can be found in the CAA’s website at [http://www.avalanche.ca/CAA\\_Excellent\\_Qualifications](http://www.avalanche.ca/CAA_Excellent_Qualifications).

The *Regulation* requires that in certain cases the avalanche risk assessment and the avalanche safety plan be prepared by a qualified registered professional (“QRP”) and, in other cases, by a qualified avalanche planner (“QAP”). The following table summarizes those requirements. Further information regarding the required qualifications for QRPs and QAPs is provided below.

Requirement		QRP	QAP	Applicable provision of the OHS Regulation
Avalanche risk assessment	For fixed facilities (such as roads, buildings and other structures) and locations where people will work on a permanent, seasonal or scheduled basis	QRP together with a QAP		4.1.1(2)(a)
	For short-duration activities in wilderness or backcountry operations		✓	4.1.1(2)(b)
Avalanche safety plan	Part of the plan requiring passive measures	✓		4.1.1(4)(a)
	Part of the plan requiring an active avalanche safety program		✓	4.1.1(4)(b)

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WorkSafeBC prevention officers may consult with the Engineering Department regarding engineering aspects of avalanche safety plans.

### **Selecting a qualified registered professional**

For fixed facilities such as roads, buildings and other structures, and for locations where people will work on a permanent, seasonal or scheduled basis, the risk assessment must be prepared by a QRP and a QAP. Any part of a safety plan that requires passive measures must be prepared by a QRP.

As set out in section 1.1 of the *Regulation*, a QRP must be a professional engineer or a professional geoscientist who is licensed to practise in British Columbia. When the work is conducted in relation to a forestry operation, a professional forester licensed to practise in British Columbia or a holder of a special permit under the *Foresters Act* may also act as a QRP.

In order to prepare an acceptable avalanche risk assessment and safety plan, a QRP should have sufficient knowledge and experience in avalanches and snow science. The CAA's *Land Managers Guide to Snow Avalanche Hazards in Canada* provides the following guidance on selecting persons with avalanche expertise (p. 13):

Estimating avalanche return periods, size, impact pressures and boundaries of hazard or risk zones requires an avalanche consultant with substantial experience in the same or similar applications. Since these projects require a variety of skills, knowledge and experience, the expertise of the consulting team should be considered. A consultant with considerable experience with hazard mapping for roads may have less expertise with, for example, impact pressures on communication towers.

Land managers may request references on similar work from previous clients.

Formal training through university programs including courses on avalanches and/or a Canadian Avalanche Association Hazard Mapping Course contribute to the development of skills and knowledge, but such courses are insufficient without experience in the specific or similar application.

In addition to a CAA Hazard Mapping Course, other formal training programs that are helpful for QRPs are the CAA Professional L1, L2, and L3 courses.

Note: the QRP's scope of practice will be limited by the legislation that regulates that person's profession. For example, a professional forester acting as QRP will only be qualified to conduct the activities listed in the definition of "practice of professional forestry" in the *Foresters Act*. In addition, both the Association of Professional Engineers and Geoscientists of British Columbia and the Association of BC Forest Professionals specify in their Codes of Ethics that members should only undertake professional assignments when qualified by training or experience.

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### **Professional credentials required of a qualified avalanche planner**

For fixed facilities such as roads, buildings and other structures, and for locations where people will work on a permanent, seasonal or scheduled basis, the risk assessment must be prepared by a QRP together with a QAP. An avalanche risk assessment for wilderness operations, as well as any part of a safety plan that requires an active avalanche program, must be prepared by a QAP.

As specified in section 4.1.1(1) of the *Regulation*, a QAP conducting work before September 1, 2011 must have training and experience in the development and implementation of active avalanche safety programs and be one of the following:

1. A professional member of the CAA;
2. A certified guide and member of the Association of Canadian Mountain Guides;
3. A certified guide and member of the Canadian Ski Guide Association; or
4. A QRP.

Starting September 1, 2011, a QAP must meet the requirements noted above as well as those listed in the *Recommended Minimum Training and Experience for Qualified Avalanche Planners*, which was published by the CAA in August 2008. The document is available from the CAA's website at [http://www.avalanche.ca/CAA\\_Excellence\\_Qualifications](http://www.avalanche.ca/CAA_Excellence_Qualifications).

If a QRP is also qualified as a QAP, the assessment process and the development of the avalanche safety plan may be prepared and approved under the direction of that person.

### **Training**

If an avalanche safety plan specifies procedures to be followed by workers in an avalanche risk zone, section 4.1.1(10) of the *Regulation* requires each person working in the risk zone to be trained in, and comply with, any procedures applicable to that person's work. As stated in section 115(2)(e) of the *Workers Compensation Act*, the employer must:

...provide to the employer's workers the information, instruction, training and supervision necessary to ensure the health and safety of those workers in carrying out their work and to ensure the health and safety of other workers at the workplace.

The avalanche safety plan will specify the qualifications for the workers who will be needed to implement the program in the workplace. Typically, CAA-qualified avalanche workers (with a L2 or L3 certificate) will oversee and implement the active avalanche safety program through monitoring climate and snow conditions. They will also make decisions each day, or more frequently throughout the day if conditions are changing rapidly, on avalanche risk for activities planned for that day. The workers tasked with carrying out the measures specified in the active avalanche safety program will normally have completed a L1 CAA course.

### **Avalanche control using explosives**

If the active avalanche safety program requires the use of explosives, the blasting operations must be conducted in accordance with Part 21 of the *Regulation*. In particular, section 21.85(1) requires that the proposed work procedures be submitted to

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and accepted by WorkSafeBC before explosive charges are placed manually or projected for the purpose of avalanche control.

For further information regarding blasting requirements, please consult OHS Guidelines G21.85(1)-1. Board acceptance of procedures for avalanche control, and G21.85(1)-2 Assessment of Avalauncher device safety in proposed work procedures. Questions regarding the use of explosives may be directed to the Certification Services Department of WorkSafeBC.

### Resources

A copy of the *Guidelines for Snow Avalanche Risk Determination and Mapping in Canada* and the *Land Managers Guide to Snow Avalanche Hazards in Canada*, which are referenced in section 4.1.1 of the *Regulation*, can be ordered directly from the CAA.

Textbooks on avalanche safety, such as the one listed below, also provide useful information:

Weir, Peter. *Snow Avalanche Management in Forested Terrain*. Victoria: British Columbia Ministry of Forests, 2002

### Links

CAA: <http://www.avalanche.ca>

Association of Canadian Mountain Guides: <http://www.acmg.ca>

Canadian Ski Guide Association: <http://www.canskiuide.ab.ca>

WorkSafeBC Certification Services:

<http://www2.worksafebc.com/Topics/CertificationTraining/Home.asp>