

ICAR Avalanche Commission  
Best Prevention Practices Survey Results FINAL

**ICAR Avalanche Commission - Best Prevention Practices Survey Results FINAL**

**RESPONDENTS BY COUNTRY**

**Austria**      **Barbish Gebhard**, Austrian Mountain Rescue Service; **Walter Wurtl**, Mountain Rescue Austria  
**Canada**      **Clair Israelson**, Canadian Avalanche Association  
**Croatia**      **Frane Bebic**, Mountain Rescue Service of Croatia  
**France**      **Francois Sivardiere**, **Didier Le Gall** - ANENA,  
**Germany**      **Bernd Zehetleitner**, Bergwacht Bayern  
**Iceland**      **Auder Elva Kjartansdottir** - Icelandic Meteorological Office  
**Italy**      **S. Pivot**, AINEVA; **G. Frangioni**, CNSAS, **S. Sterpinio**, SVI-CAI  
**Liechtenstein**      **Peter Lampert** - FL LawD  
**Norway**      **Albert Lunde**, Norwegian Red Cross Rescue Corps  
**Romania**      **Ion Sanduloiu**, ANSM Romania  
**Slovakia**      **Jan Peto**, Mountain Rescue Service - Avalanche Warning Center  
**Switzerland**      **Hans-Jurg Etter**, **Jakob Rhyner**; SLF  
**USA**      **Doug Abromeit**, USFS National Avalanche Center, **Ethan Greene**, Colorado Avalanche Information Center

**SECTION 1: Availability, distribution and frequency of public avalanche forecasts in your country.**

**1.1 Who produces public avalanche forecasts in your country? Select all that apply**

	Govt Agency	NGO	Ski Resorts	Other (specify)
Austria	✓			
Canada	✓	✓	✓	
Croatia				none
France	✓		✓	
Germany	✓			
Iceland				not yet public
Italy	✓			
Liechtenstein				included in Swiss forecast
Norway	✓	✓	✓	
Poland				
Romania	✓			National Institute for Meteo and Forecasts
Slovakia	✓			
Switzerland	✓			
USA	✓	✓		

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**1.2 Avalanche forecast center organization**

	National	Regional	Ski Resorts	
Austria	✓	✓		
Canada	✓	✓	✓	
Croatia				
France	✓		✓	
Germany	✓	✓	✓	
Iceland		✓		
Italy		✓		
Liechtenstein				included in Swiss forecast
Norway	✓		✓	
Poland				
Romania	✓			an avalanche comission that will build a center
Scotland				
Slovakia	✓			
Sweden				
Switzerland	✓			
USA		✓		

**1.3 Avalanche forecast frequency**

	Daily	6/week	4/week	3/week	2/week	weekly	
Austria	✓						Every morning at 7:30. Some other provinces in Austria period did not have a daily forecast, but then they will have a longer period or then a new forecast if the situation changes
Canada	✓			✓		✓	National Parks and some ski resorts issue forecasts daily. 3 times per week for CAC forecasts. CAC - 1 time per week for remote, low use regions
Croatia							None
France	✓						Issued at 4 pm each day for the next 24 hours
Germany	✓						The reports will come out every morning at 07.00 am.
Iceland						✓	
Italy			✓	✓			Usually 3/4 times per week (for the majority of the organisations), but more if necessary (extraordinary avalanche forecast)
Liechtenstein							included in Swiss forecast, with same frequency
Norway							There are no regular public avalanche forecasts in Norway, apart from those issued during Easter- and winter-holidays, and some specific roads. Ski resorts issue their own forecasts.
Romania	✓						Usually, the forecast is daily, but if nothing new to be mentioned hasn't appeared, it could be at a couple of days.

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Slovakia	✓					
Switzerland	✓					
						7 regional avalanche forecasts (in combination map and text), 8am. 1 national over-all forecast 5 pm (1 page text, 1 map; 4 languages (E, F, G and I) 72h early warnings for safety professionals in imminent critical situations (40-70% prob. for reaching level 5)
USA	✓		✓		✓	There are 19 backcountry avalanche centers in the USA. Thirteen of the centers provide daily avalanche advisories, five of the centers provide two to three advisories per week and one of the centers only provides avalanche information

**1.4 What is the average size of your forecast regions? (sq. kilometers)**

	Small < 500	Medium 500 - 5000	Large 5-10,000	Huge > 10,000	
Austria		✓			500 - 5000 sq. km
Canada	✓			✓	100 sq km to 29,000 sq km; average 20,000 sq km
Croatia					
France	✓	✓			300 to 800 sq. km
Germany	✓				50 km
Iceland	✓				
Italy	✓				30 sq. kilometers each zone of forecast region
Liechtenstein					as in Switzerland
Norway	?	?	?	?	Natural mountain regions
Poland					
Romania		✓			about 2000 sq km
Slovakia	✓				150
Switzerland	✓	✓			total 27'000 km2, divided into 118 sub regions
USA	?	?	?	?	They vary widely

**1.5 How are public avalanche forecasts distributed in your country? (select all that apply)**

	phone	fax	email	website	radio	TV	newspaper	trailheads	MMS
Austria	✓	✓	✓	✓	✓	✓	✓	✓	
Canada	✓	✓	✓	✓	✓	✓	✓	✓	
Croatia									
France	✓		✓	✓				✓	Off piste trailheads, not backcountry trailheads
Germany	✓	✓	✓	✓	✓		✓	✓	
Iceland				✓					

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Italy	✓	✓	✓	✓	✓		✓		
Liechtenstein	✓	✓	✓	✓	✓	✓	✓	✓	✓
Norway	✓	✓	✓	✓	✓	✓	✓	✓	
Romania		✓	✓	✓	✓	✓	✓		
Slovakia	✓		✓	✓	✓	✓	✓		
Switzerland	✓	✓	✓	✓	✓	✓	✓	✓	✓
USA	✓	✓	✓	✓	✓	✓	✓	✓	

### 1.6 Length of avalanche forecast season

Austria	Nov 1 - May 1
Canada	Nov 15 - Apr 15
Croatia	None
France	Dec 15 - May 1
Germany	Dec 15 - May 1
Iceland	
Italy	Dec 1 - May 1
Liechtenstein	same as Switzerland (to be confirmed by Peter Lampert)
Norway	No specified season
Romania	Nov 20 - May 15
Slovakia	Dec 1 - May 1
Switzerland	Nov 15 - May 15
USA	Nov 1 - May 1

### 1.7 Estimated percentage of backcountry travellers that use avalanche forecasts before going into the mountains for recreation?

Austria	50% - 80%
Canada	50% of backcountry skiers and boarders, 10 % of snowmobile riders
Croatia	none
France	I really don't know and think nobody can say...
Germany	50 % of all backcountry ski tourists; 5 % of all off-piste riders
Iceland	none
Italy	50% (a difficult estimation; in the next season we'll submit a statistic form to the backcountry users)
Liechtenstein	Probably similar to Switzerland or Austria (to be confirmed by Peter Lampert)
Norway	No surveys done to clarify this. During Easter- and winter holidays; probably 80%
Romania	hard to say... about 40-50%
Slovakia	20% always, 50% sometimes
Switzerland	No systematic survey, about 50-60% (about 500'000)
USA	no response to this survey question

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**PROPOSED DRAFT ICAR Best Practices - Public Avalanche Forecast Programs**

- 1.1 There is a structured program providing avalanche forecasts and other warning services in avalanche prone areas of the country
- 1.2 Avalanche forecasts are produced by government agencies, or NGOs with some government funding. Ski resorts can provide useful local information.
- 1.3 National and/or regional avalanche forecast centres are most common. Ski resorts can supplement national and/or regional programs
- 1.4 Daily avalanche forecasts are most common. Frequent avalanche forecasts are preferable to bi-weekly or weekly forecasts
- 1.5 In the countries surveyed most avalanche forecast regions are <5000 sq. kms
- 1.5 Use "push" (fax, email, radio, TV, newspapers, trailhead postings, MMS) and "pull" (phone, website) methods to distribute avalanche information
- 1.6 The avalanche forecast season should run from late fall into late spring

**Section 2. The next series of questions are regarding avalanche training for backcountry users (non-professionals) in your country.**

**2.1 Does your country have a standardized curriculum for amateur avalanche skills training courses?**

	Yes	No	
Austria		✓	No. In Austria there are several mountaineering associations with different programs. Generally all of them do more or less the same ...
Canada	✓		Yes. AST Level 1 and 2
Croatia	✓		Yes.
France		✓	No. I personally think that is too bad
Germany		✓	We have different programmes in connection with the mountaineering schools and rescue groups, but there will be no official standard.
Iceland	✓		We have recreational courses and then Canadian Level 1
Italy		✓	No.
Liechtenstein			
Norway		✓	No.
Romania		✓	No.
Slovakia	✓		Yes. 3 courses
Switzerland		✓	No. For youth instructors: yes, for others: not yet, but it's on the way. A standard is given by curriculum of Federal Sports Agency, but many other courses are offered
USA		✓	No. Suggested educational guidelines have been developed by the American Avalanche Association

**2.2 Length of amateur avalanche training courses in your country (select all that apply)**

	1 day	2 day	3-5 days	6 days or longer	
Austria	✓	✓	✓	✓	
Canada		✓	✓		AST Level 1 - 2 days; AST Level 2 - 4+ days
Croatia	✓				
France	✓	✓			
Germany	✓	✓	✓		
Iceland		✓	✓	✓	
Italy	✓	✓			
Liechtenstein					
Norway	✓		✓		
Romania		✓			
Slovakia		✓			
Switzerland	✓	✓	✓		Many different courses, 3 to 5 days for observers, road workers and for community workers
USA	✓	✓	✓	✓	

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**2.3 Do you have a formal process in place to train and certify avalanche course instructors?**

	Yes	No	
Austria	✓	✓	
Canada	✓		Must be CAA Professional or Active Member and have formal instructor training
Croatia		✓	
France	✓		French Alpine Club and the French federation for climbing and mountaineering have a formal process. Anena does not train avalanche instructors
Germany		✓	The IVBV Mountain Guides have a standard instruction programme.
Iceland	✓	✓	
Italy	✓	✓	
Liechtenstein			
Norway		✓	Some discussion on this matter the last few years
Romania	✓		We are working at it, now.
Slovakia	✓		
Switzerland	✓		Partly (for youth instructors: yes). Federal Sports Agency (Bundesamt für Sport BASPO) - A recently started program for avalanche prevention among 11 professional organisation (lead by SLF) strives for unified handling of education and (later) certification
USA		✓	The American Avalanche Association does certify avalanche instructors but a AAA certification is not required to teach avalanche classes

**2.4 How many levels of amateur avalanche skills training courses are available in your country?**

	One	Two	Three	Other	
Austria				✓	No "level system", but many individual courses - up to 30
Canada		✓			
Croatia	✓				
France		✓			
Germany		✓			
Iceland		✓			
Italy		✓			
Liechtenstein					
Norway				✓	No defined levels.
Romania	✓				
Slovakia		✓			
Switzerland		✓	✓		Depending on organisation
USA			✓		

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**2.5 Estimated number of students taught each year in all amateur avalanche skills training courses in your country.**

Austria	1000 - 2500
Canada	3000+
Croatia	40
France	Impossible to answer: too many different organism
Germany	800
Iceland	30
Italy	
Liechtenstein	
Norway	No data
Romania	Few hundreds
Slovakia	cca 100
Switzerland	About 1600? No survey, no precise number can be given
USA	20,000

**2.6 Do you have specific avalanche awareness and safety programs targeting tourists?**

	Yes	No	
Austria	✓		Training programs from the Mountain Rescue Services, Alpine Clubs and Mountain Guides coordinated by a NGO called Project "Save Communities." Different lengths for all levels
Canada		✓	
Croatia		✓	
France		✓	
Germany	✓		We have one day events: <a href="http://www.lawinentag.de">www.lawinentag.de</a>
Iceland		✓	
Italy	✓	✓	Some training centers with DVA in the ski resorts off piste areas
Liechtenstein			
Norway		✓	
Romania		✓	
Slovakia		✓	
Switzerland	✓		Billboards in ski areas (1 page per day (Regional avalanche forecast (7)) with map and text); on different (larger) ski resorts screens with daily information, CD White Risk. Many course offered by different organisations
USA	✓		Short public service programs on community television, trailhead signs, and brochures. These are targeted at both local user groups and tourists

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**2.7 Do you have specific avalanche awareness and safety programs targeting youth?**

	Yes	No	
Austria	✓		The program above includes all the youth. Specialy alpine clubs in there groups are working with young people. Different lengths for all levels
Canada	✓		Grades 1-6, 1 hour awareness. Grades 7-10, 2 to 4 hour programs. Grades 10 - 12, 2 to 4 hour programs.
Croatia		✓	
France		✓	
Germany	✓		We have programs at schools.
Iceland		✓	
Italy	✓		In the schools
Liechtenstein			
Norway	✓		Some lessons included in school, otherwise all voluntary
Romania		✓	
Slovakia		✓	
Switzerland	✓		In "youth and sport" weekend courses from mountain guides (good idea!) Broad and diverse efforts (schools,courses), but no general program
USA	✓		Know Before You Go and Alpine Safety Awareness DVDs that are played in schools and on public channels and school and organization classes provided by avalanche centers for youth

**PROPOSED DRAFT ICAR Best Practices - Avalanche Training for Backcountry Users (Non-Professionals)**

- 2.1 Avalanche training courses are available for non-professional backcountry users.
- 2.2 These training courses have well designed curriculum and content
- 2.3 These training courses are of varying lengths and levels for different target audiences
- 2.4 There is a process for training / certifying avalanche course instructors
- 2.5 These training courses are seen as "useful" and attract high numbers of participants annually
- 2.6 There are avalanche awareness and training programs specifically targetting tourists and youth

### Section 3. Avalanche accident prevention successes and challenges

#### 3.1 What is the greatest avalanche safety-accident prevention success for backcountry users in your country?

Austria	The "sicher am berg" program of the austrian alpine club with more than 1500 customers each winter (since 2006) You can get the avalanche forecast at 7:30 by mail, phone and other sources - so everybody can use them - if they want!
Canada	Establishment of the Canadian Avalanche Centre in 2004 to deliver public avalanche safety programs across Canada
Croatia	n/r
France	A 1-day workshop (400 persons in one single day in Grenoble last fall !)
Germany	www.lawinentag.de 200 People at a workshop with instructors from ski areas / mountain guides and mountain rescue. Every year !
Iceland	
Italy	Nothing to say
Liechtenstein	
Norway	The Norwegian "Friluftsliv"-tradition (Outdoor-life tradition), based on safety awareness and extreme "reduction methods"; avoid avalanche terrain. Main communication method: "Mouth-to-mouth". Norwegian law, regulating the use of motorized vehicles in terrain; in general it is totally forbidden.
Romania	Faragas mountains are very dangerous. Now we do have a permanent patrol on the ridge where the cable car arrives and the tourists are warned and if necessary, when the risk is very high, stopped.
Slovakia	
Switzerland	Avalanche forecasts; courses from swiss alpine club; 3x3 factors check General: constant or even slightly reducing number of fatalities (25/winter) despite strongly increased number of people "in the field." Specific: large accidents (> 3 fatalities) very rare.
USA	Daily avalanche advisories issued by backcountry avalanche forecast centers

**Successes:** Avalanche forecasts & warnings; avalanche awareness training, workshops; mountain life traditions; decreasing accident rates

#### 3.2 What is the greatest avalanche safety-accident prevention challenge for backcountry users in your country?

Austria	There are too many backcountry skiers without any education and without equipment (beacon, shovel, probe, abs, ...) Reduce accidents by off-piste skiers near lifts and slopes. They are mostly daily guests from outside Vorarlberg with little experience
Canada	Snowmobile riders in western Canada; lack of safety programs for backcountry users in eastern Canada and the Arctic regions
Croatia	n/r
France	To homogenise all the different courses that are given in France, and to give a professional level to the instructors that are mainly non-avalanche pro
Germany	A better average knowledge about avalanche dangers and every backcountry user with shovel, probe and beeper
Iceland	
Italy	Nothing to say

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Liechtenstein

Norway Lack of information (no or very few avalanche forecasts) and subsequent judgement based on correct information (focus).

Romania n/r

Slovakia To issue touristic maps with avalanche slopes

Switzerland To bring the avalanche danger information in best way to the users (good products for different users). Training program including human factors.  
Risk awareness.

Harmonized education and awareness programs. Reaching young people with modern media (CD whiterisk as a good element in this effort)

USA Skiers and snowboarders that leave designated ski areas and enter the backcountry and snowmobile riders

**Challenges:** Untrained, unequipped, unaware off-piste and backcountry users

**SECTION 4. Programs for avalanche workers (guides, ski patrollers, highway, rail and industrial site workers, etc)**

**4.1 Please list the type, duration and availability of formal avalanche training programs for avalanche workers in your country.**

Austria	Obligation: basic course 4 days and a second step 4 days. Every season different 4 days refresher courses A program of one week to learn how to check test fields and how to contact the avalanche forecast center. During this program also some time is for avalanche rescue and working in danger areas.
Canada	CAA Industry Training Level 1, 7 days. CAA Industry Training Level 2, 15 days
Croatia	n/r
France	Avalanche Programs are included in ski patrollers, mountain guides, hiking guides, ski instructors courses, all managed by different organisms without any connection with ANENA
Germany	3-5 days avalanche instructions for rescue groups at different levels
Iceland	We are trying to implement canadian level 1 as a standard
Italy	2a osservatore nivologico; 4 days (32 hours); 2b operatore e assistente al distacco artificiale di valanghe; 5 days (33 hours); 2c direttore delle operazioni; 7 days; 2d responsabile della sicurezza; 8 days
Liechtenstein	
Norway	Norwegian Mountain Sports Forum: basic: 3 days: Open. Norwegian Red Cross: 7 days, travel and rescue: Open. Other: Different privately run courses: Open. Armed forces: Closed courses for own personnel. UIAGM/IVBV: Closed courses for members
Romania	Only the mountain rescue schools and mountain gendarmerie have such courses of about 2-3 days, included in their winter training schools.
Slovakia	Mountain Guides - NAHVSR 14 days, every 3 years and 2 days. Mountain Rescue Service & Ski Patrollers
Switzerland	Avalanche danger estimation, theoretical and practical (data collection and interpretation). Duration 5 days; once in a year Ski Patrollers: Organized and Certified by Seilbahnen Schweiz (Cable Cars Switzerland) Road and Community Safety Professionals: Courses within IFKIS (Intercantonal Early Warning and Crisis Information System) Type A: Members of Services (two types for starters and repeaters/advanced) Type B: Leaders of Services (two types for starters and repeaters/advanced)
USA	They vary from the basic National Avalanche School to American Avalanche Association Professionals course and American Institute for Avalanche Education and Research Professional course

**4.2 Please list programs for recurrent training and ongoing professional development for avalanche workers in your country.**

Austria	Every season different 1 - 4 days refresher courses There are many possibilities for them in the training shedule of the local ministry of civil protection
Canada	Operator's annual pre-season training, 3 to 5 days. Mandatory Continuing Professional Development programs for CAA Professional and Active members
Croatia	n/r
France	Nothing is done in this field, except for mountain guides, by their national association, but on very unregular basis...
Germany	Every year different courses between 2-4 days
Iceland	

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Italy	Mandatory for the 2a course in the mountain guides and ski instructors formation programs
Norway	No defined programmes.
Romania	n/r
Slovakia	n/r
Switzerland	Avalanche danger estimation, theoretical and practical (data collection and interpretation) with special main topics. Duration 3 days; every 2 years. See 4.1 above
USA	Forest Service National Avalanche Center and American Avalanche Association workshops, Colorado Avalanche Information Center Professional Workshops and ISSW

**4.3. Is formal training or certification required for avalanche workers in your country? (Y/N) Please explain your answer to question 4.3 further.**

	Yes	No	
Austria	✓		Yes - if they work for the government (lawinenkommissionen) No - if they work for ski stations or other. They have to visit the basic training and yearly backups
Canada	✓		Yes - some categories. Level 1 ITP is de facto standard for employment in avalanche programs. Level 2 is de facto standard for team leaders and decision makers in avalanche programs
Croatia		✓	No - all workers
France	✓		Yes - all workers. There is not a real definition for avalanche workers in France. Usually they are patrollers, guides.
Germany	✓		All. It will be duty for all professionals to take part at the courses every year.
Iceland		✓	
Italy	✓		Yes - some categories of workers. Required for mountain guides, ski instructors, ski patrollers, rescuers, avalanche consultants
Liechtenstein			
Norway		✓	No - all workers. No formal requirements defined, apart from internal regulations in the various organisations and companies.
Romania		✓	No - all workers
Slovakia	✓		Yes - all workers. Every avalanche worker has to have avalanche training
Switzerland	✓		Some categories of workers. Ski patroller mandatory, community and road safety professionals in responsibility of Cantons, most of them force education
USA		✓	No - all workers. There are many roads to becoming an avalanche professional from on the job training to formal academic training

**4.4 Are government regulations in place for worker safety in avalanche prone work sites in your country? (forestry, mining, etc)**

	Yes	No	
Austria		✓	
Canada	✓		WorkSafeBC regulations, province of British Columbia only
Croatia		✓	

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France		✓	
Germany	✓		
Iceland		✓	
Italy		✓	
Liechtenstein			
Norway	✓		The common Law of Work Environment.
Romania		✓	
Slovakia	✓		Act 544/2002 about Mountain Rescue Service Ministry of Interior Edict about education of Mountain Rescue Service
Switzerland	✓		Guideline and Check list for organisation of avalanche services - Guideline and Check list for decision making and documentation
USA	✓		Both state and Federal regulations

**4.5 What is your greatest avalanche safety-accident prevention success for avalanche workers in your country. Please describe**

Austria	Training is an official duty. 25 different places where avalanche workers are controlling test fields and give their infos daily to the warning center. People with good experience are working in every city every day to decide if slopes or streets can be opened
Canada	Canadian operator's participation in CAA InfoEx program. CAA ITP L1 and L2 training as de facto standard for avalanche workers in western Canada.
Croatia	
France	Nothing to say
Germany	
Iceland	
Italy	Nothing to say
Liechtenstein	
Norway	Communicating safety awareness.
Romania	
Slovakia	
Switzerland	To train them on official courses. To give them needed information (automatic mountain stations for weather data). No avalanche accidents on roads and settlements since winter 99
USA	Avalanche control protocols dealing with communication, explosives, artillery and rescue

**4.6 What is your greatest avalanche safety-accident prevention challenge for avalanche workers in your country. Please describe**

Austria	To motivate not only the official workers for avalanche safety-training. To bring more safety and security to their work
Canada	Fatality rates for avalanche workers are very high compared to total workforce in province of BC
Croatia	
France	To homogenise the different courses and curriculum
Germany	

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Iceland	
Italy	Nothing to say
Liechtenstein	
Norway	Lack of information and a forum for exchange of knowledge
Romania	
Slovakia	
Switzerland	Supporting avalanche workers in presence of increasing public pressure to timely open and close roads, not only w.r.t. to technical issues, but also w.r.t. law and media. Risk communication. To bring all of them to courses
USA	Wide range of skills associated with people exposed to avalanche danger in their professions

**PROPOSED DRAFT ICAR Best Practices - Safety Programs For Avalanche Workers**

4.1 Avalanche workers receive specialized training

4.2 A hierarchy of training courses exist from basic to advanced; with special courses for specific work (e.g; mtn guides vs highway workers vs rescuers)

4.3 Programs exist for recurrent training and continuing professional development

4.4 Formalized training & credentials for "high risk" occupations, or persons with high levels of social responsibility

4.5 Mandatory compliance with all worker safety regulations; voluntary compliance with best practices

Successes - effective worker training programs; successful avalanche safety programs delivery

Challenges - motivating safety culture in workers; high fatality rates; standardization of courses, curriculum; information and knowledge exchange; risk management, communication; wide range of competency in people exposed to avalanche danger in their workplaces.

**SECTION 5. Avalanche Safety Programs for Public Facilities**

**5.1 In your country are there comprehensive avalanche protection programs for villages, public roads, railways, etc?**

	Yes	No	
Austria	✓		
Canada	✓		In western Canada only
Croatia		✓	
France	✓		
Germany	✓		
Iceland	✓		
Italy	✓		
Liechtenstein			
Norway	✓		Some defined road stretches, railways and villages.
Romania		✓	
Slovakia			
Switzerland	✓		Very extensive programs last 50 years (2 Billion Candian Dollars) - large near future challenge: maintenance
USA	✓		Active and passive programs

**5.2 Is engineered avalanche protection used in your country (i.e. fences, structures, tunnels, galleries)?**

Austria	Many, all of them to make villages and streets safe
Canada	National Parks, BC Ministry of Highways, railways in western Canada
Croatia	None
France	Few
Germany	Several
Iceland	Many
Italy	Many
Liechtenstein	
Norway	Many
Romania	Fences and covers
Slovakia	
Switzerland	Yes, many fences, structures, tunnels, galleries
USA	Several

**5.3 Is avalanche hazard zoning used for transportation routes or inhabited structures in your country?**

Austria	Required by law.
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Canada	Commonly in use in western Canada only
Croatia	Rarely in use.
France	Required by law.
Germany	Required by law.
Iceland	Required by law.
Italy	Required by law. Commonly in use.
Liechtenstein	
Norway	Required by law. Commonly in use. Ref: Norwegian Geotechnical Institute
Romania	Required by law
Slovakia	
Switzerland	Required by law. Pioneered by SLF in Switzerland
USA	Commonly in use. Varies according to states and counties

**5.4 Are active avalanche control methods used to protect transportation routes or inhabited structures in your country?  
(i.e. explosives, closures, etc.)**

Austria	Delivered by government
Canada	Combination of government and private contractors is common for transportation in western Canada
Croatia	No active avalanche control measures in place
France	Combination of government and private contractors
Germany	Delivered by government
Iceland	Delivered by government
Italy	Delivered by government
Liechtenstein	
Norway	Combination of government and private contractors
Romania	No active avalanche control measures in place
Slovakia	
Switzerland	Combination of government and private contractors
USA	Combination of government and private contractors

**5.5 Are avalanche disaster and evacuation plans required by law for avalanche prone transportation routes and inhabited structures?**

	Yes	No	
Austria	✓		Every district and every village must have this plans
Canada		✓	No regulations require these mitigations
Croatia		✓	
France		✓	
Germany	✓		
Iceland	✓		

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Italy	✓		Like each kind of disaster, it's in a Civil Protection government plan.
Liechtenstein			
Norway	✓		All communities are obliged to conduct risk assessments for all types of danger/accidents
Romania		✓	
Slovakia			n/r
Switzerland	✓		Most avalanche prone inhabited or community has it. Responsibilities are diverse, safety in village is primary responsibility of community. Roads: there are community, cantonal, and national roads, for which the responsibility resides with the respective levels.
USA		✓	Many locations have them but they are not required by law

**5.6 What is the greatest avalanche safety-accident prevention success for public infrastructure in your country?**

Austria	A lot of engineered avalanche protection - structures, tunnels, galleries
Canada	The avalanche control safety record on roads in western Canada
Croatia	
France	Nothing to say
Germany	
Iceland	Hazard zoning and protection measures.
Italy	Nothing to say
Liechtenstein	
Norway	Hazard zoning and protection measures
Romania	
Slovakia	
Switzerland	No accidents in villages and roads since avalanche winter 99. Courses and trainings for officers
USA	Explosives and military artillery

**5.7 What is the greatest avalanche safety-accident prevention challenge for public infrastructure in your country?**

Austria	There are many areas without avalanche protection
Canada	Lack of regulatory requirement for avalanche zoning for human habitations in many avalanche prone regions of Canada
Croatia	
France	Nothing to say
Germany	
Iceland	There are many areas without avalanche protection.
Italy	Nothing to say
Liechtenstein	
Norway	Money to implement various measures. Miles and miles of unprotected roads throughout the country, from north to south.
Romania	

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Slovakia  
Switzerland Economic pressure to enlarge buiding zones and keep closure time short. To bring all these officers to trainings and courses  
USA Loss of military artillery

**PROPOSED DRAFT ICAR Best Practices - Avalanche Safety Programs for Public Facilities**

5.1 There are comprehensive programs in place to protect villages, roads, railways, etc from avalanches

5.2 Avalanche hazard zoning is is required by law

5.3 Protection from avalanches is achieved by a combination of engineered structures (fences, galleries) and active avalanche control measures ( explosives, closures, etc)

5.4 Government agencies and/or private contractors are responsible to deliver active avalanche control programs

5.5 In European alpine countries a legal requirement for avalanche disaster and evacuation plans to be in place is the norm. This is less common elsewhere

Greatest successes

Europe - hazard zoning and engineered protection measures

N. America - use of artillery, explosives to control avalanches - transportation

Greatest challenges

Europe - cost to build and maintain engineered protective structures

N. America - lack of common legal requiremetn for avalanche hazard assessment / zoning, access to military artillery

**SECTION 6. Organized avalanche rescue programs**

**6.1 Are avalanche specific training programs available for avalanche rescuers in your country? Please list and describe duration, content, availability**

	Yes	No	
Austria	✓		Different courses from 1 - 15 days with refreshing courses every year. This is included in basic training of our rescuers and in all backups
Canada	✓		Province of BC only; 3 days, avalanche SAR content, available for all SAR volunteers
Croatia			
France	✓		Probably but not done by ANENA - Ask PGHM and CRS
Germany	✓		1 - 5 Day Courses
Iceland	✓		All avalanche training is run by the search and rescue school
Italy	✓		Yes. Each rescue team decides a specific training.
Liechtenstein			
Norway	✓		Norwegian Red Cross: 7 days: organised rescue, open. Other voluntary organisations; dog handlers etc. Armed forces: Closed courses of varying length
Romania	✓		About 3 days in our winter schools and some specific ones, more rare, also of about 2-3 days.
Slovakia			
Switzerland	✓		For ski patrolers yes (6 days for beginners, once a year) and advanced training every 4 years mountain guides yes in winter course for beginners, once a year for volunteers partly in alpine club
USA	✓		Rescue training is typically part of more cumulative courses however there are some rescue specific courses including dog handling

**6.2 Are these programs mandatory for avalanche rescuers in your country?**

	Yes	No	
Austria	✓		
Canada		✓	No avalanche specific training is available for SAR responders in many avalanche prone regions of Canada, especially in eastern Canada and arctic regions
Croatia		✓	
France	✓		included in their courses
Germany	✓		
Iceland		✓	
Italy	✓		
Liechtenstein			
Norway		✓	
Romania	✓		

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Slovakia			n/r
Switzerland	✓		Only for mountain guides and ski patrollers
USA		✓	

**6.3 Does your country have avalanche rescue dog training and certification programs in place? List and describe duration, content, availability**

	Yes	No	
Austria	✓		Yes - integrated in our mountain rescue service - must be a rescuer and have a three year training to be ready for rescues
Canada	✓		Yes, RCMP have a formal avalanche profile training process. CARDA serves to train and certify volunteer rescue dog teams - western Canada only
Croatia			
France	✓		Policemen and "Gendarmes" have their own dog courses. ANENA deliver a 17-day training course once a year in December, followed by about 20-23 avalanche dog teams
Germany	✓		Rescue dog courses every year one week obligatory for all dog handlers. Every month one day additional training.
Iceland	✓		
Italy	✓		
Liechtenstein			
Norway	✓		Yes. The Norwegian Rescue Dog Association; 3 levels of 1 week each, mainly dog handling and cooperation with other rescuers. Open.
Romania	✓		Duration of about 10 days
Slovakia			
Switzerland	✓		Yes, different steps and special profiles of qualification. Please go to (in German language) <a href="http://www.alpinerettung.ch/Lawinenhunde.144.0.html">http://www.alpinerettung.ch/Lawinenhunde.144.0.html</a>
USA	✓		

**6.4 What is the average time to alert and dispatch a rescue team for avalanche response in your country?**

Austria	5 - 15 min. They are always available by pager and could be lift off by a helicopter within max. 15 min.
Canada	20 min for national parks, ski resorts and heli-ski operations. 1 - 4 hours for volunteer teams
Croatia	
France	Ask PGHM and CRS (gendarmes and policemen in charge of mountain rescue in France), members of CISA
Germany	Average 22 minutes from alarm to the avalanche field
Iceland	20 minutes
Italy	20 minutes
Liechtenstein	
Norway	To alert and dispatch helicopter team with dog:15 minutes, in general. Average response time last five years; 50-55 minutes, north and south.
Romania	Roughly, from one to four hours, because there are teams which are close to the hazard areas and others where the uninhabited area is great and the response is a lot longer.

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Slovakia  
 Switzerland Near to ski areas: few minutes (5 - 15 minutes). For back country: < 20 minutes from alarm till to the avalanche field, if weather conditions are ok for helicopter; alert depending on mobil-net (ca. 60-70% over all Swiss mountain area)  
 USA It varies widely from 5 minutes to 3 days.

**6.5 Are terrestrial and avalanche rescue teams fully integrated with helicopter services in your country?**

	Yes	No	
Austria	✓		yes - mountain rescue service is responsible for both of them - it is optimal integrated
Canada	?	✓	No, except in National Parks
Croatia			
France	✓		
Germany	✓		
Iceland	✓	✓	They work together but are two different rescue teams.
Italy	✓		
Liechtenstein			
Norway	✓		
Romania		✓	Not yet, we are in course to do it
Slovakia			
Switzerland	✓		
USA	✓	?	In some limited locations

**6.6 What is your country's greatest avalanche SAR success?**

Austria  
 Canada The readiness and avalanche rescue response capacity in National Parks  
 Croatia  
 France NTS : nothing to say  
 Germany 3 Years ago: One person get rescued after 11 hours alive in an avalanche  
 Iceland Big rescue work when avalanches hit towns.  
 Italy Nothing to say  
 Liechtenstein  
 Norway Co-ordination, integration and co-operation, and what we call "dugnad": A lot of skilled, voluntary, unpaid rescuers all over the country, willing to spend time preparing themselves.  
 Romania In 2005 we had an avalanche what caught 11 skiers in an off slope area. 5 of them died because of injuries but the other 6 were found and dug out  
 Slovakia  
 Switzerland Trained ski patrolers and helicopter crews with professional avalanche rescue chiefs

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USA Beacon proficiency classes provided by backcountry avalanche centers

**6.7 What is your country's greatest avalanche SAR challenge?**

Austria	
Canada	Capacity of SAR volunteer teams in remote regions of Canada, especially in eastern Canada and the arctic
Croatia	
France	NTS
Germany	
Iceland	avalanches hitting towns.
Italy	Nothing to say
Liechtenstein	
Norway	Keeping up the spirit with voluntary work, and the level of ambition
Romania	Covering all the area with helicopter
Slovakia	
Switzerland	That all of them train and work together in the different areas
USA	Discrepancy in SAR services

**PROPOSED DRAFT ICAR Best Practices - Organized Avalanche Rescue**

- 6.1 Organized avalanche rescue services exist in all avalanche prone areas of the country
- 6.2 There are comprehensive, mandatory training (and recurrent training) programs in place for rescue team members
- 6.3 Avalanche rescue dog training and certification programs are in place
- 6.4 Avalanche rescue teams are fully integrated with helicopter services
- 6.5 The average time to alert and dispatch a rescue team for avalanche response is <20 minutes

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**SECTION 7. Other information regarding avalanche protection programs in your country.**

**7.1 Estimated % increase in avalanche risk exposure for activity groups in the last 20 years.**

	Backcountry ski/board	Freeride (off-piste)	On Ski Run	Alpinist	On Roads	Buildings	Snowmobile	Other	
Austria	>50	>50	>50	21 to 30	11 to 20	Decrease, steady	Decrease, steady	11 to 20	
Canada	>50	>50	11 to 20	up to 10%	41 to 50	Decrease, steady	>50		
Croatia									
France	What do you mean by avalanche risk exposure ?								
Germany	21 to 30	Not possible to give elect, because Freeriding was not a sport 20 Years before	11 to 20	11 to 20	31 to 40	~	~	~	
Iceland	There has been increase in snowmobile accidents. But still the biggest threat is avalanches hitting towns.							increase	
Italy	increase	increase	increase	increase	Decrease, steady	Decrease, steady	up to 10%		
Liechtenstein									
Norway	We have no exact data on these matters.								
Romania	up to 10%	up to 10%	Decrease, steady	11 to 20	Decrease, steady	Decrease, steady	up to 10%		
Slovakia									
Switzerland	Decrease, steady	41 to 50	Decrease, steady	Decrease, steady	Decrease, steady	Decrease, steady	~		
USA	>50	>50	11 to 20	>50	>50	>50	>50		

**7.2 Estimated percentage of people using avalanche safety devices (transceivers/shovel/probe, ABS, etc.) by activity group.**

	Backcountry ski/board	Freeride (off-piste)	On Ski Run	Alpinist	On Roads	Buildings	Snowmobile	Other
Austria	51 - 75	31 - 50	0 - 15	31 - 50	0	0	0	
Canada	76 - 100	16 - 30	0	0 - 15	0	0	0 - 15	
Croatia	~	~	~	~	~	~	~	
France	51 - 75	15-20	0	0	0	0	0	
Germany	51 - 75	0 to 15	0	0	0	0		
Iceland					0	0	No info available.	
Italy	51 - 75	15 - 30	0	0 - 15	0	0		
Liechtenstein								
Norway	0 - 15	15 - 30	0	0 - 15	0 - 15	0 - 15	0 - 15	0 - 15
Romania	15 - 30	0 - 15	0	15 - 30	0	0	0	
Slovakia	~	~	~	~	~	~	~	
Switzerland	76 - 100	76 - 100	0	76 - 100	0	0	0 - 15	
USA	51 - 75	16 - 30	0 - 15	16 - 30	0 - 15	0 - 15	16 - 30	

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**7.3 What is the estimated percentage of avalanche fatalities involving foreign tourists in your country annually?**

	0 - 10	ten - twenty	21 - 30	31 - 40	41 - 50	>50	
Austria					✓		Germany, Italy, USA
Canada			✓				USA, Germany, France
Croatia	✓						
France			✓				UK, N. America, Scandinavia
Germany		✓					Austria, Italy, Switzerland
Iceland		✓					one from norway 10 years ago
Italy		✓					Germany, Austria, France
Liechtenstein							
Norway	✓						Austria, Finland
Romania	✓						Germany
Slovakia							
Switzerland		✓					Germany, France, Italy
USA	✓						n/a