AIARE

Avalanche Research + Education

Backcountry Decision-Making Guide

Name _____

Address _____

_____

City _____ State _____

Phone # _____

Emergency Contact Person _____

Contact Person Phone # _____

USE THIS FIELD GUIDE. MAKE BETTER DECISIONS.

This guide contains essential tools designed to maintain awareness and help manage human factors that can challenge an individual or a group's backcountry decisions.

- **Follow** the step-by-step **checklists on pages 1-5.**
    - Page 1 is an overview of how to **Manage Your Avalanche Risk**, including a basic outline of how to **PREPARE** yourself for backcountry travel.
    - Pages 2-3 detail how to **PLAN YOUR TRIP** before you go.
    - Pages 4-5 guide your group's dialogue and decision process to **RIDE SAFELY** in avalanche terrain and **DEBRIEF THE DAY**.
- **Record** each day's trip plans, field notes, and observations on **pages 6-42.**
- **Reference** avalanche, snow pack, and weather observation conventions on **pages 56-63**.
- **Save** a life in the event of an avalanche accident; follow the **Avalanche Rescue Quick Reference on page 64 and the inside back cover**.

AIARE RISK MANAGEMENT FRAMEWORK

Each Season

PREPARE

Continue your avalanche education
Practice avalanche rescue
Track the season's conditions
Research backcountry trip options

Each Backcountry Day

PLAN YOUR TRIP

- ☑ Assemble Your Group
- ☑ Anticipate The Hazard
- ☑ Plan to Manage Avalanche Terrain
- ☑ Discuss Your Emergency Plan

RIDE SAFELY

- ☑ Conduct A Departure Check
- ☑ Monitor Conditions Along Your Route
- ☑ Check In With Your Group
- ☑ Recognize Avalanche Terrain
- ☑ Use Terrain To Reduce Your Risk

TEAMWORK

- ☑ Travel together. Decide together.
- ☑ Listen to every voice.
- ☑ Challenge Assumptions.
- ☑ Respect any veto.

DEBRIEF THE DAY

- ☑ Summarize Conditions
- ☑ Review Today's Decisions & Improve Today's Plan
- ☑ Submit Today's Observations

PLAN YOUR TRIP

☑ Assemble Your Group Date:

Group Check In.
Record names, contact info, and emergency numbers

Discuss:
- *compatibility of goals*
- *compatibility of skills, abilities, and equipment*
- *group size (optimal is 3-5)*
- *compatibility of risk tolerance*
- *any health issues*
- *if all agree to travel and decide together*

☑ Anticipate The Hazard Read the local avalanche advisory. Seek expert opinion.

Discuss current & forecast weather factors that can affect travel or hazard.
Consider snowfall, wind, and drifting snow, and warming.

Identify the avalanche problem and location. Discuss the danger trend and timing.

List primary problem first eg. Wind Slab	*Size*	*Elevation*	*Aspect*	*Terrain Features*	*Danger Trend & Timing*
#1					
#2					

Discuss the advisory's key message.
Highlight recent avalanches and travel advice.

☑ Plan To Manage Avalanche Terrain

Decide by Consensus: Voice all concerns. Respect any veto. Challenge assumptions.

Use pg. 3 to choose a route plan that considers today's group, weather, and avalanche concerns.

Record the following:
- *Today's terrain mindset*
- *Slopes and areas to avoid*
- *Route (include check-in stops). Note any important precautions on the route.*
- *Alternative route*
- *Turn around point and time*

☑ Discuss Your Emergency Plan Assign group gear.

- *Who else has our itinerary?*
- *Adequate food/water/warm layers*
- *S.O.S device (cell or satellite unit), emergency numbers*
- *Kit for evacuation and over-night emergency*
- *First aid kit*
- *Repair and tool kit*
- *Navigation tools*

WHAT GIVES US THE CONFIDENCE TO CARRY OUT THIS PLAN?

PLAN TO MANAGE AVALANCHE TERRAIN

Decide by Consensus: Voice all Concerns.
Challenge Assumptions. Respect any Veto.

Discuss route options that consider today's group, weather, and avalanche concerns.

- Use maps, photos and guidebooks to locate avalanche slopes along your backcountry route.
- Identify terrain with less exposure and consequence.
- Consider your time plan as it relates to hazard factors.

Adapt a terrain mindset that considers exposure.

- When the danger is elevated choose less exposed terrain.
- When the terrain or conditions are unfamiliar, or the group is uncertain, choose less exposed terrain.
- Consider traveling with an expert capable of managing current conditions and more complex terrain.

Today's Terrain Mindset

"Keep it simple and avoid avalanche terrain". Choose low angle and/or primarily forested terrain. Simple terrain means you are not exposed, or "many options exist to reduce or eliminate exposure".[1] If necessary, cross a run out zone one at a time.

"Limit exposure" by avoiding the obvious paths, steepest slopes, and trigger zones. Consider entering slopes below start zones or lower in the track. Or if in doubt, avoid avalanche terrain. The terrain may have avoidable terrain traps, mid slope start zones, overhead cornices, and less obvious avalanche slopes. Managing exposure requires experience, but "options exist to reduce or eliminate exposure with careful route finding".[1]

"Step it out cautiously" and reduce risk by choosing terrain with less consequence. Low or no chance of avalanches today. As the terrain may be steep and open, complex, and with multiple avalanche slopes, "minimal options (exist) to reduce exposure".[1]

Choose your terrain.

Acknowledge consequences.

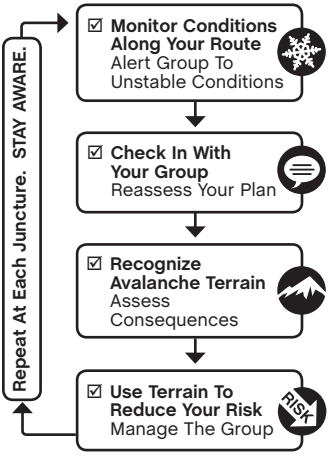
Have an alternative plan.

- Agree upon and document today's route through the terrain.
- Define the slopes or areas you plan to avoid.
- Note where you plan to stop, check in with the group, and reassess your plan.
- Discuss the precautions and backcountry travel protocols you will apply to your terrain choices.
- Identify a realistic less exposed alternative route, as conditions may turn out to be different than you think.
- Note your turn around point and time.

1 From the Avalanche Terrain Exposure Scale (Parks Canada). Read about it in the AIARE manual .

RIDE SAFELY

☑ **Conduct a Departure Check**
Confirm: gear, time plan, communication plan. Conduct a function check.



Record Key Observations & Tests

Location	*Observation*	*Relevance*

DEBRIEF

☑ **Summarize Conditions**

Review your pre-trip plan. Summarize how conditions developed.

- *How did today's weather affect conditions? What is the primary (avalanche) concern?*
- *Is the danger increasing or decreasing?*

☑ **Review Today's Decisions & Improve Today's Plan**

- *What were the strengths & shortcomings of today's plan?*
- *Where were we most exposed to avalanche risk?*
- *If we repeated the outing, what decisions or actions would be similar and what would we do differently?*

☑ **Submit Today's Observations**

References/Notes:

- *avalanches observed (p. 61)*
- *signs of unstable conditions (p.5 or 56-58) or snowpack observations (p. 44-51)*
- *field weather observations (p. 60)*
- *changes to the trip plan*
- *tactics used to reduce risk*

Monitor Conditions Along Your Route.

⚠ **Alert Group To Unstable Conditions.**

WEATHER

- **Heavy snowfall**: 30cm (12") past 2 days (even less with wind). Watch out for rapid accumulation (>2cm or 1"/hr.)
- **Recent drifting snow** means windslabs can form downwind of ridge lines.
- **Rapid warming** from sunshine or rain can make unstable snow. Extra caution with warming right after a storm.

SNOWPACK

- **Signs of avalanche activity** from today or yesterday.
- **Whumph!** This sound is a warning that weak layers are collapsing in the snowpack.
- **Cracks** in the snow surface that shoot out from skis or track.
- Overhanging or drooping cornices.
- A **slab above a weak layer** (reported or observed in tests).

Check In With The Group.

Reassess Your Plan.

- See anything **unexpected**?
- Hungry? Healthy? Engaged?
- Gear issues?
- **Will anything affect decisions or travel**?

Recognize Avalanche Terrain.

⚠ **Assess Consequences.**

- Does the slope match with today's strategy to limit avalanche exposure?
- Does this slope have the same aspect/elevation as today's avalanche problem?
- Is the steepest part of the slope inclined near or above 35 degrees?
- Is there a dangerous slope above or terrain trap below?
- Is there a known or obvious avalanche path (open path, flagged or broken trees, run out)?
- Are there steep convex roll overs or other hard to avoid trigger points?
- Is this a committing slope? Once there, will we still have a less consequential option?

Use Terrain To Reduce Your Risk.

Manage The Group.

Regroup prior to entering avalanche terrain and apply appropriate precautions:

- Choose a smaller slope.
- **One at a time**: minimize number exposed.
- **Watch each other. Regroup away from the avalanche hazard.**
- If your partner is stuck on the avalanche slope let them dig themselves out.
- Avoid travel above or below other groups.
- **Choose high ground out of the flow** of the avalanche.

PLAN YOUR TRIP

☑ **Assemble Your Group** **Date:**

Group Check In.

☑ **Anticipate The Hazard** Read the local avalanche advisory. Seek expert opinion.

Discuss current & forecast weather factors that can affect travel or hazard.

Identify the avalanche problem and location. Discuss the danger trend and timing.

Discuss the advisory's key message.

☑ **Plan To Manage Avalanche Terrain**
Decide by Consensus: Voice all concerns. Respect any veto. Challenge assumptions.

Use pg. 3 to choose a route plan that considers today's group, weather, and avalanche concerns.

☑ **Discuss Your Emergency Plan** Assign group gear.

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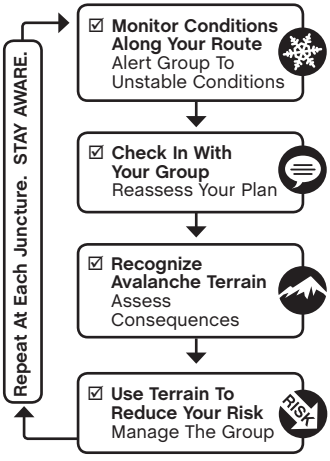

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☑ **Review Today's Decisions & Improve Today's Plan**

☑ **Submit Today's Observations**

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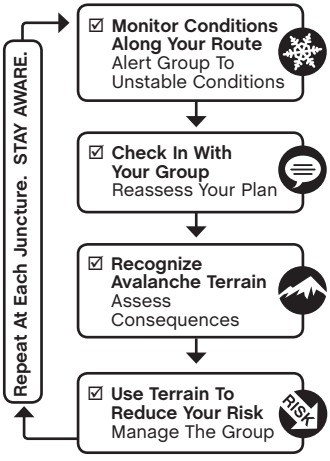

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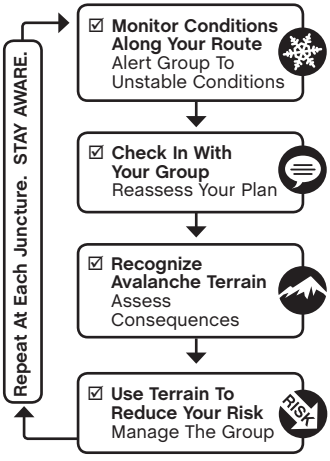

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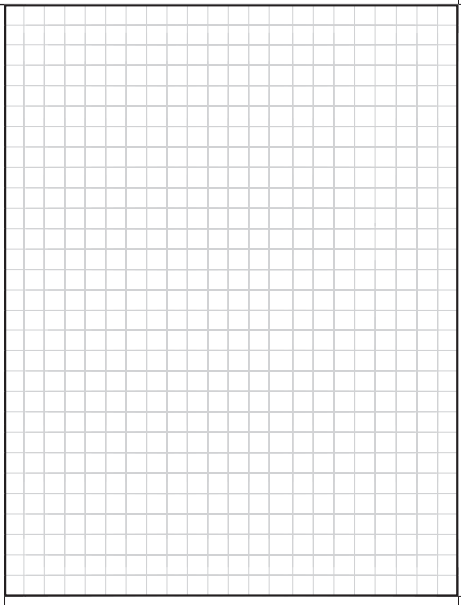
Test Profile Observations Date:

Observer(s)	**Sky Condition**
	Elev/Aspect
Site Location & Description	**Wind Speed/Dir**
	Slope Angle
	Air Temp
Test Objective	**Snowpack Tests & Comments**

Layer Depth (cm)



F 4F 1F.....P.....K

Softer.....***Hand Hardness***.....*Harder*

Total snow depth (HS cm)

Key Results?

Significance?

Common weak layer characteristics:

- Weak layer is softer (less than 1F resistance)
- Weak layer has angular, sugary grains (SH, DH, FC)
- Weak layer grains are large (>1mm)
- Layer above or below has finer grains (>0.5mm)
- Layer above or below is a step firmer
- Weak layer is found less than 1m deep

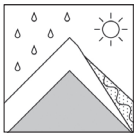
When identifying weak layers "*focus on soft coarse-grained layers, <u>especially</u> when just above or just below a harder fine grained layer, and between 20 and 85cm below the snow surface.*"
B. Jamieson, J. Schweizer. Dec. 2015.

CAUSE: Hazard from new snow and/or wind

PROBLEM	SIGNS OF UNSTABLE CONDITIONS	OBSERVATIONS AND TESTS	CONSIDERATIONS
Dry Loose Avalanche 	• Recent point releases observed in steep terrain. • Forms a fan-shaped avalanche with fine, even sized debris.	• Boot deep penetration into loose surface snow. • Ski tests on small slopes result in accelerating sluffs.	• Can be naturally triggered in steep terrain by falling snow, cornice fall, rock fall, increased wind or sun. • Rider triggered sluffs on steep continuous slopes can accelerate fast and run far. • Small slides dangerous when rider is carried into terrain traps or over cliffs. • Sluffs can trigger slabs in certain conditions.
Storm Slab Avalanche 	• Recent slab avalanches during or just after storm observed in steep sheltered terrain.	• Hand hardness in profiles shows denser storm slab has formed over less dense weak layer. • Decreased ski/foot penetration, snow cones illustrate recent snow settlement. • Snowpack tests show slab is not bonding to underlying weak layer.	• Triggers on convexities or steepest section of start zone. • Waiting several days after storm may reduce likelihood of triggering. • When storm slabs exist in sheltered terrain wind slabs may be also present in exposed terrain. • As with all slab avalanches, the deeper the weak layer and larger the slope the more destructive the avalanche.
Wind Slab Avalanche 	• Recent slab avalanches observed below ridge top, cornices, and cross-loaded features. • Observe snow drifting near ridge lines onto steep slopes.	• Evidence of wind-transported snow (drifts, plumes, cornice growth.) • Snow surface rippled and crusty or smooth and firm. • Once snow covered trees are now blown clean. • Moderate or strong mountain wind speeds reported at weather stations.	• Deposition zones may accumulate 3-5x more snow than snowfall accumulation in sheltered areas. • Strong winds may result in deposition lower on slopes or in less typical locations. • Riders commonly trigger slopes from thinner areas on either side or toe of wind slab. • The wind drifting of dry, loose surface snow and subsequent avalanching can occur days after the last snowfall. • New snow can bury and hide signs of prior wind event.

Cornice Avalanche 	• Recent cornice fall. •Cornice fall releases slab avalanches on slopes below.	•Cornice growth after heavy snowfall or drifting snow. • Cornice droop from sun. • Watch for wind slab problem on slope below new cornice formation.	• Cornices often break further back onto ridge top than expected. •Observers may underestimate sun's effect on the back of cornice when traveling on cool, shaded aspects. •Cornice fall chunks may not look large but have significant mass and can be destructive or trigger slope below.

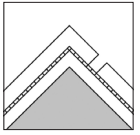
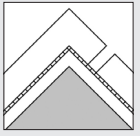
CAUSE: Hazard from warming or rain

PROBLEM	SIGNS OF UNSTABLE CONDITIONS	OBSERVATIONS AND TESTS	CONSIDERATIONS
Wet Loose Avalanche 	• Fan shaped avalanches with lumpy and chunky debris. • Rain on snow, especially on dry snow. • Pinwheels or roller balls.	• Wet snow surface from sun, heat or rain. • Air temperature at or above 0°C (32F.) • Timing is critical: danger can increase quickly (minutes to hours.)	•No freeze for multiple nights worsens condition. However, nighttime freeze can stabilize. • Avalanches may start from rocks or vegetation. • Can occur on all aspects on cloudy days/nights. • Conditions may also include increased hazard from cornice fall, rockfall or icefall. • Difficult to escape from loose wet or wet slab avalanches. Avoid terrain when wet conditions begin to penetrate into the snowpack.
Wet slab avalanche 	•Observe recent wet slab avalanches with debris that has channels/ridges, high water content. May entrain rocks and vegetation. •Prolonged warming trend or rain, especially the first melt cycle on dry snow.	• Avalanches may have rocks or dirt in debris. •Deep foot penetration through wet surface snow. • Snow profiles show slab is at 0°C (32F) and/or weak layer below is wetted.	• Loose wet conditions may lead to wet slabs. •Shallow snow areas become unstable first and may slide to ground. •Near by glide cracks may be widening during rapid warming or rain event. •Consequences of an avalanche in steep, confined or cliffy terrain increase as surface wetness penetrates deeper into the snowpack.

REFERENCES

CONTINUED ON NEXT PAGE

CAUSE: Hazard persists with old snow layers

PROBLEM	SIGNS OF UNSTABLE CONDITIONS	OBSERVATIONS AND TESTS	CONSIDERATIONS
Persistent Slab Avalanche 	• Advisories warn of persistent weak layer. • Collapsing/whumping or shooting cracks from rider's weight. • Warning: active avalanching may not be observed.	• Profiles reveal a soft coarse grained weak layer just above or just below a firmer fine-grained layer. • Advisories describe the weak layer as surface hoar, depth hoar or facets. • The weak layer fractures cleanly across the column in snowpack tests.	• Persistent weak layers can continue to produce avalanches for days or weeks making them especially dangerous and tricky to forecast. • Despite no natural avalanches in observed area, persistent slabs may be triggered by the weight of a rider—particularly soft slabs (4F to 1F) that are <1m thick. • Weak layer may have formed in select terrain or may be widespread. Multiple tests and expertise is required to identify extent and degree of hazard.
Deep Slab Avalanche 	• Advisories warn of deep persistent slab problem. • Recent but isolated large slab avalanche may indicate a sleeping problem is becoming active. • No result from rider tracks but cornice fall triggers deep slab.	• Track persistent slab conditions. • Snow profiles show increased depth of persistent layer. • Despite a recognizable weak layer in snow profiles column tests may not be conclusive.	• A "stubborn" or sleeping deep weak layer may reactivate after new snow, drifting snow or warming. • Deep slabs are difficult to forecast and manage. Large and/or historic avalanches may result. Avoid slopes with a known deeply buried & unstable layer. • Deep slabs have been remotely triggered from shallower weak snowpack areas, from low on the slope, or from adjacent slopes. • Observing and testing a weak layer deeper than 1m may be time consuming and strenuous.
Glide Avalanche 	• Observed slab release of the entire snow cover to the ground or to a near ground layer. • Glide slabs often proceeded by widening of full depth "glide cracks" visible on surface.	• When a glide slab releases other glide cracks nearby may also release. • Continued snowfall loading event and/or a significant warming and/or rain event may release glide slabs.	• Unlikely to be human triggered and nearly impossible to forecast. Large destructive avalanches result. • Often reoccur annually on the same, specific slope. This is the best clue. Avoid these slopes!

NORTH AMERICAN PUBLIC AVALANCHE DANGER SCALE

Avalanche danger is determined by the likelihood, size and distribution of avalanches.				
Danger Level		Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
[5] Extreme		Avoid all avalanche terrain	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
[4] High		Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
[3] Considerable		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas or large avalanches in specific areas; or very large avalanches in isolated areas.
[2] Moderate		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
[1] Low		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.
Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.				
No Rating		Watch for signs of unstable snow such as recent avalanches, cracking in the snow, and audible collapsing. Avoid traveling on or under similar slopes.		

SNOWPACK & WEATHER

Sky Condition

Clear (CLR)	○ No clouds
Few (FEW)	◷ ≤2/8 covered
Scattered (SCT)	◴ 3/8 to 4/8
Broken (BKN)	◍ >4/8 covered
Overcast (OVC)	⊕ 8/8 covered
Obscured (X)	⊗ Not visible
Valley fog – note top & btm	VF

Precipitation Type & Rate

No Precipitation	NO
Rain	RA
Snow	SN
Mixed Rain & Snow	RS
Graupel & Hail	GR
Freezing Rain	ZR
Very light snowfall	S-1
Light snowfall	S1
Moderate snowfall	S2
Heavy snowfall	S5
Very heavy snowfall	S10

Blowing Snow		Wind Speed	
None	No evidence of blowing snow	**Calm (C)** 0 m/sec 0 mph 0 kph	No air motion.
Light (L)	Limited & localized drifting snow. Dry snow begins to drift at 5m/s. Snow is transported in rolling and saltation modes	**Light (L)** 1-7 m/sec 1-16 mph 1-25 kph	Light to gentle breeze. Flags & twigs move.
Moderate (M)	Windward erosion&leeward deposition of blowing snow. Snowtransported by saltation & turbulent suspension. Visibilitybecomes obscured.	**Moderate (M)** 8-11 m/sec 17-25 mph 26-40 kph	Fresh breeze, small trees sway, flags stretched. Accounts for 80%ofleeward deposition of drifting snow
Intense (I)	Widespread scouring. Extensive downwind transportofsnow in turbulent suspension mode. Highly variable deposition	**Strong (S)** 12-17 m/sec 26-38 mph 41-60 kph	Strong breeze, whole trees in motion
		Extreme (X) >17 m/sec >38 mph >60 kph	Gale force or higher. Challenging to walk against the wind

Unknown - (U) Observations impossible because of darkness, cloud or fog.

*Wind estimates (speed and direction) should be averaged over a two-minute period prior to extent of blowing snow observation. Estimate speed to the nearest 5 mph. Note the direction **from** which the wind blows (N, NE, E, SE, S, SW, W, NW)*

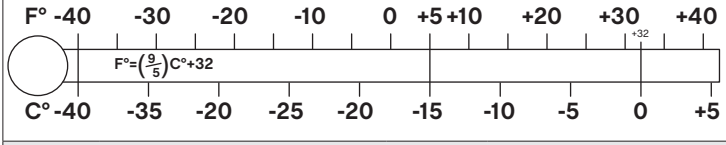
Main Class	Sub Class	Grain Classification (Fierz & others, 2009)	Code
+		**Precipitation particles (New Snow)**	**PP**
		Plates	PPpl
		Stellars, Dendrites	PPsd
		Graupel	PPgp
		Rime	PPrm
◎		**Machine made snow**	**MM**
/		**Decomposing & fragmented precipitation particles**	**DF**
	/	Partly decomposed precipitation particles	DFdc
	⁄	Wind-broken precip particles	DFbk
●		**Rounded grains**	**RG**
		Wind-packed	RGwp
		Faceted rounded particles	RGxf
□		**Faceted crystals**	**FC**
	□	Solid faceted particles	FCso
	▨	Near surface faceted particles	FCsf
		Rounding faceted particles	FCxr
∧		**Depth Hoar**	**DH**
	∧	Hollow cups	DHcp
	∧	Rounding depth hoar	DHxr
∨		**Surface hoar**	**SH**
○		**Melt forms**	**MF**
		Clustered rounded grains (held by large ice-ice bonds)	MFcl
		Rounded polycrystals (either wet or frozen state, >1 MF cycles)	MFpc
		Slush (separate particles in H20)	MFsl
		Melt freeze crust	MFcr
■		**Ice forms**	**IF**
	▬	Ice layer	IFil
	=	Rain crust	IFrc
	–	Sun crust, Firnspiegel	IFsc

AVALANCHE ACTIVITY

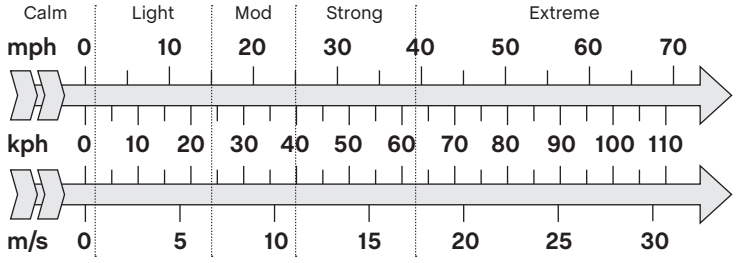
Record on the Field Observation or blank pages. Take photos! Relevant information may include:
Location (Description, elevation, GPS)
e.g. Red Lady Bowl, 12,200', 38°53'13"N 107°02'59"W
Time of Occurrence (Estimated or actual)
e.g. 20120304, est. late afternoon during warming event, 2pm?
Path Characteristic (Aspect, incline, start zone shape)
e.g. SE aspect; crown visible approx. 100' below ridgetop on >40° start zone in center bowl
Event Characteristic (# of avalanches, size, type, trigger, slab thickness/width, weak layer, vertical fall, notable observations)
e.g. 1 xR2D3, windslab, natural, est. 100cm deep x 45m wide crown, ran on Feb 26th sun crust, length 150m vert, stopped first mid-path bench, deep deposit, no other activity in area

Size - Relative to Path		Size - Destructive Force	
Data Code	**Avalanche Size**	**Data Code**	**Avalanche Destructive Potential**
R1	Very small, relative to path	D1	Relatively harmless to people
R2	Small, relative to path	D2	Could bury, injure or kill a person
R3	Medium, relative to path	D3	Could bury and destroy a car or destroy a wood frame house
R4	Large, relative to path	D4	Could destroy a railway car, large truck, several buildings or a substantial amount of forest
R5	Major or maximum, relative to path	D5	Could destroy a village or forest of 40 hectares (99 acres) or more

Temperature Conversions



Wind Speed Conversions



SNOWPACK TESTS

Compression Test: 30 x 30cm column, isolate to 100-120cm max depth from snow surface.

Deep Tap Test: 30 x 30cm column, isolate 10cm below the targeted weak layer.
Remove all but 15cm of the snow above the targeted weak layer (measured at the back of column.)

Term	Description	Data Code
Very Easy	Fractures during cutting or insertion of shovel.	CTV or DTV
Easy	Fractures within 10 light taps using fingers tips only.	CTE or DTV
Moderate	Fractures within 10 moderate taps from elbow using finger tips.	CTM or DTM
Hard	Fractures within 10 firm taps from whole arm using palm or fist.	CTH or DTH
No Fracture	Does not Fracture.	CTN or DTN

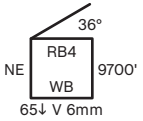
Extended Column Test: 30cm upslope x 90cm wide column, isolate 15 to 120cm deep.

Fracture propagates across the full column during isolation.	ECTPV
Fracture propagates across the full column on the same (#) tap as initiation (# is the tap that initiated fracture.)	ECTP #
Fracture initiates but does not propagate across the full column on the #th tap.	ECTN #
No fractures are initiated in the 30 standard loading steps.	ECTX

Comparison of **Fracture Character** & **Shear Quality Scales**

Fracture Characteristics	Fracture Character (Data Code)	Typical Shear Quality
A thin planar fracture suddenly crosses column in one loading step AND block slides easily on the weak layer.	Sudden Planar (SP)	Q1
Fracture crosses the column w/ a single loading step and is associated with a noticeable collapse of the weak layer.	Sudden Collapse (SC)	Q1
Planar or mostly planar fracture that requires more than one loading step to cross column and/or the block does NOT slide easily on the weak layer.	Resistant Planar (RP)	Q2
A fracture of noticeable thickness (non-planar fractures often >1cm), which usually crosses the column with a single loading step, followed by step-by-step compression of the layer with subsequent loading steps.	Progressive Compression (PC)	Q2 OR Q3
Non-planar, irregular fractures.	Break (BRK)	Q3

Propagation Saw Test: 30cm wide x 100cm upslope (or upslope length = to weak layer depth if >100cm deep) Isolate block below weak layer of concern.	
Description	**Data Code**
Draw the blunt edge of a saw upwards within the weak layer until the onset of propagation, or until the entire column has been cut.	
Propagation arrests somewhere within the weak layer before reaching the end of the column.	ARR
Propagation ends at a fracture through the overlying slab.	SF
Propagation continues uninterrupted to the end of the column.	END
Record **PST x/y (Arr, SF, or End) down z on yymmdd**, where x is the cut length, y is the column length, z is the weak layer depth, and yymmdd is the weak layer ID.	
Rutschblock Test: 2.0m wide x 1.5m upslope column, isolated 1.2m max depth.	
Loading Steps That Produce a Clean Shear Fracture	**Data Code**
The block slides during digging or cutting.	RB1
The skier approaches the block from above and gently steps down onto the upper part of the block (within 35 cm of the upper wall).	RB2
Without lifting the heels, the skier drops once from straight leg to bent leg position (feet together), pushing downwards and compacting surface layers.	RB3
Skier jumps up and lands in the same compacted spot.	RB4
Skier jumps again into same compacted spot.	RB5
*For hard or deep slabs, remove skis and jump on the same spot. *For soft slabs or thin slabs where jumping without skis might penetrate through the slab, keep skis on, step down another 35 cm (almost to mid block) and push once then jump three times.	RB6
None of the loading steps produced a smooth slope-parallel failure.	RB7
Release Type Description	**Data Code**
Whole block, 100-90%	WB
Most of block, 80-50%	MB
Edge of block, 40-10% of block releases on a planar surface.	EB



A field notebook method for recording a RB score, amount of block released (center of box), slope angle, elevation, crystal form and size, depth of weak layer, and aspects (clockwise from top). Arrows can be used to indicate whether the depth of the weak layer was measured from the snow surface or the ground (e.g. 65cm below the snow surface). Record amount of slab released (e.g. WB, MB, EB.)

AVALANCHE RESCUE QUICK REFERENCE

–CALL FOR HELP; DO NOT LEAVE SITE–

☑ **STOP. ASSESS SAFETY! ENSURE NO FURTHER HAZARD**
- Risk of a second avalanche?
- Move to defined safe location

☑ **CHOOSE A LEADER**
- Delegate tasks

☑ **HEAD COUNT**
- How many missing?

☑ **CALL FOR HELP (911)**
- Location, Nature of Emergency, Name, # in group, # missing

☑ **SWITCH ALL TRANSCEIVERS TO SEARCH MODE**
- Check that no transceivers are transmitting

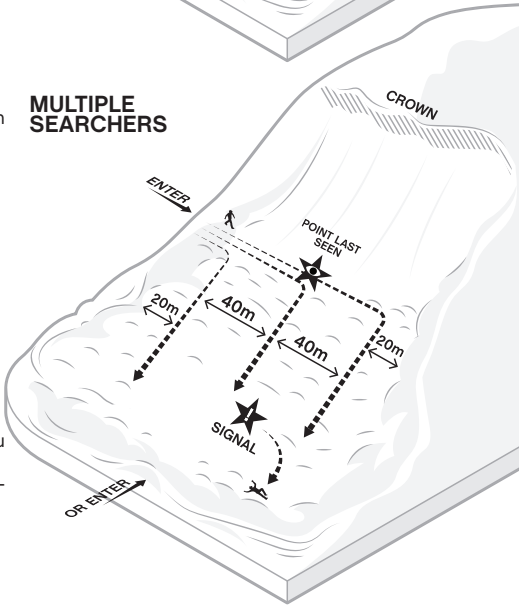
☑ **DETERMINE WHERE TO SEARCH**
- Below POINT LAST SEEN
- In line with clues
- Areas of debris, especially terrain traps

☑ **SEARCH FOR SIGNAL & VISUAL CLUES**
- Enter debris from side or toe of path
- Search strips 40m apart (~40 strides)

☑ **YELL TO OTHERS WHEN YOU FIND A CLUE OR RECEIVE A SIGNAL**
- Pull clue out of snow and leave on snow surface
- Put a marker in the snow where you begin to follow signal
- Call for a second searcher to assemble probe and shovel

SINGLE SEARCHER

MULTIPLE SEARCHERS



☑ **FOLLOW SIGNAL TO BURIAL AREA**

- SLOW AND PRECISE as you approach 10m
- Keep transceiver near the snow surface during final approach
- Around 5m, place a marker on the snow that points along the approach trajectory

☑ **LOCATE BURIAL WITH TRANSCEIVER & PROBE**

- If possible, 2nd searcher PROBES LIKELY BURIAL AREA in front of transceiver searcher's trajectory until closest signal located
- Locate the closest transceiver signal by bracketing ahead/behind and to the sides, maintaining consistent transceiver orientation
- Pinpoint using the probe, from the center of the closest signal, outwards in a circular pattern
- Probe strike = victim location LEAVE PROBE IN PLACE!

☑ **SHOVEL FAST & EFFECTIVELY**

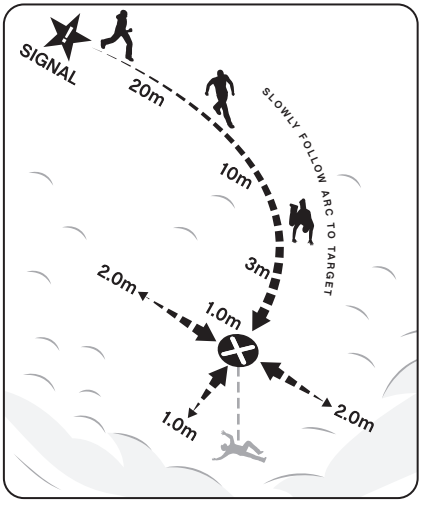
- Start with a large step downhill and away from the probe, 2 or more steps if deep burial
- Dig towards the probe; throw snow far away!
- CHANGE SHOVELERS OFTEN (if rescuers available)
- Careful shoveling as you reach your buried companion
- Expose face immediately

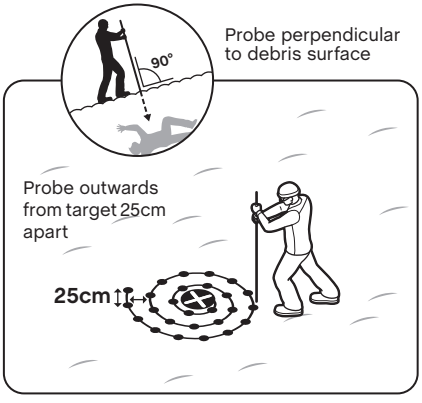
☑ **PATIENT CARE**

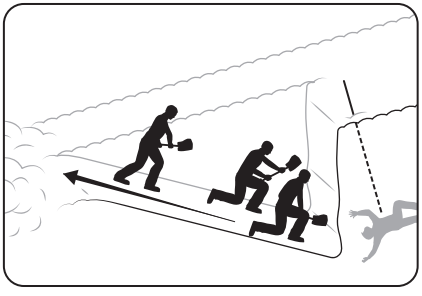
- Clear airway
- Provide First Aid or CPR as required
- Move to safe terrain
- Plan evacuation and follow up on call for help

☑ **IF HELICOPTER COMES TO YOUR AID**

- Secure loose items so they do not blow away
- When heli lands, wait for rescuer to come to you







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