

3x3 Avalanche Assessment Process & Reduction Method

Werner M黱ter Institut f黵 Schnee und Lawinenforschung, Davos, Switzerland

3x3 Assessment Process

3 x 3 Assessment Table and Reduction Method are to be used together to obtain acceptable avalanche risk. Do not use this system without a thorough knowledge of avalanches. This system is designed and intended for use inside Europe.

3 Criteria/ 3 Filters	Snow/Weather	Terrain	People	
Regional: Tour Planning Including Alternatives (at home)	Avalanche report, weather forecast, information from locals, etc.	Use 1:25,000 map, guidebooks, photos, own knowledge	Who's coming? Skill level? Knowledge of group? Who's responsible?	Researchable information & Expectations
Assessment →				
Local: Visible Area & Route Selection (in the area, as far as your eye can see)	General snow conditions, wind direction and loading New snow amounts, oddities, visibility, temperature How many and when made?	Check info previously received (relief, slope angle, steepness, ski tracks, etc.) Are there existing ski tracks?	Who's in my group? Equipment and transceivers with? Time plan for tour? Itinerary left with someone? How many groups are around group?	Personal Observations on-site before setting out. Continuous reassessment en route.
Evaluation →				
Zonal: Exact Location of Questionable Slope (every single slope as you set your track)	Check new snow amounts, visibility, solar radiation Assess possible slab potential What's keeping the snow together? Snowpack structure is characterized by its irregularity.	What's above and below me? Steepest part of slope? Near the ridge? Any wind pockets? Relief? Aspect?	How often has slope been skied? Communication? Tiredness? Discipline? Technique? Distance between each other? How wide a track? Spacing? Corridor? Single file? Safe zones? Alternate routes? Think! Important!	Last Check: Go or No Go?
Go/No Go? →				

Danger Potential Intermediate Sliding Scale (Hazard Levels of the Avalanche Report (AR))

LOW 2	MODERATE 4	CONSIDERABLE 8	HIGH 16	→ danger potential
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Reduction Method*

Danger Potential	Reduction Factors (RF) Pick one reduction factor from each	RF value	Avalanche Report (AR)	Danger Potential (DP)
1st CLASS				
No. 1 or No. 2 or No. 3	Steepest slope section 35°-39° (less than 40°)	2	1 Green	2
No. 2 or No. 3	Steepest slope section around 35°	3	2 Yellow	4
No. 3	Steepest slope section 30°-34° (less than 35°)	4	3 Orange	8
A 1 st class factor is required at Considerable Danger!			4 Red	16
2nd CLASS				
No. 4 or No. 5 or No. 6 or No. 7	Avoid the north sector: (NW-NNE aspects)	2	Reduction Method Formula (Not applicable for snowmobilers)	
No. 5 or No. 6 or No. 7	Avoid the "northern half" of the compass (W-NW to E-SE aspects)	3	Acceptable Residual Risk Formula (ARR) Most reliable in Northern Hemisphere between 40° and 50° latitude.	
No. 6 or No. 7	Avoid critical aspects and elevations	4	Ideally the acceptable risk factor (ARR) will be less than 1. Equal to 1 is questionable! The risk level in mountain environments can never be reduced to zero.	
No. 7	Use regularly tracked out (highly frequented) slopes	2		
All 2 nd class reduction factors are invalid with wet snow conditions! Important Notes: www.brooks-range.com/3x3				
3rd CLASS				
No. 8 or No. 9 or No. 10	Large group (more than 4 members) keep a safe distance apart	2	Example: You're skiing with one other person in a new area with no visible tracks. • AR is 4 = DP 16 • Steepest Slope angle is 38° = RF 2 • Slope is in Northern Section = RF 2 • Small group (2-4 persons) = RF 2	
No. 9 or No. 10	Small group (2-4 members)	2		
No. 10	Small group keeping a safe distance apart	3		
The minimum safe distance when ascending is 30 feet (10 meters). A very large distance is required when descending.				
* This Reduction Method should be used in conjunction with other factors such as, but not limited to, aspect and solar heating. Important Notes: www.brooks-range.com/3x3				
$\text{Formula: } \text{DP} = \text{ARR} \left(\frac{\text{RF} \times \text{RF} \times \text{RF}}{2 \times 2 \times 2} \right) = \frac{16}{8} = 2$				
The result is greater than 1 so No Go!				

The best working way to assess the avalanche danger level is to use the 3x3 Filter Method complemented by intuition and observation and double-checked with the Reduction Method.

See Overset Danger Factors on Rutsch/BoardblockTests card.

WARNING: PROPER USE OF THIS INFORMATION REQUIRES EXPERT TRAINING. THE PUBLISHER CANNOT AND DOES NOT GUARANTEE THE EFFECTIVENESS OF THE INFORMATION CONTAINED HEREIN. THE USER OF THIS GUIDE ACKNOWLEDGES THAT HE/SHE USES THE CONTENT AT HIS/HER OWN RISK. ©2007 BROOKS-RANGE MOUNTAINEERING EQUIPMENT CO. www.brooks-range.com info@brooks-range.com