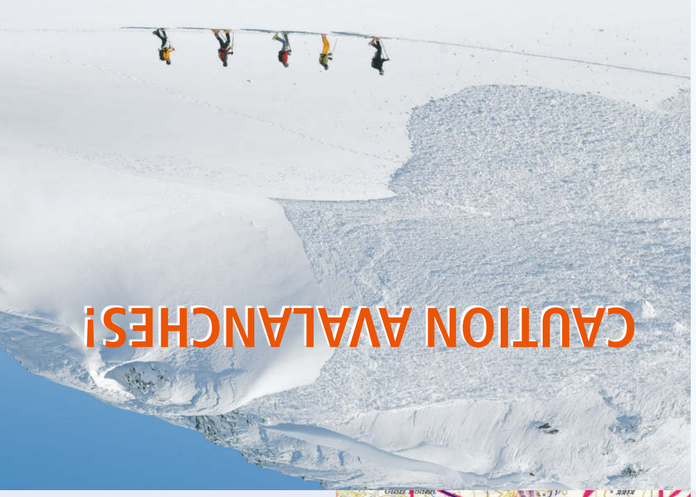


AVALANCHES ARE DANGEROUS!

- Even small avalanches can result in death or cause serious injuries.
- About 90% of all avalanche victims triggered the fatal avalanche themselves.

General precautions for risk reduction
- Stay informed on weather and avalanche conditions, trip planning.
- Wear transceiver on TRANSMIT, shovel and probe are in the backpack.
- Continuously reevaluate local conditions, terrain and human factors incl. schedule.
- Ride extremely steep or otherwise challenging sections one at a time.

Equipment

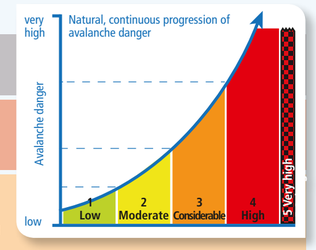
Standard avalanche safety kit:
- Avalanche transceiver (beacon)
- Probe
- Shovel

Additionally recommended: Airbag

Other important equipment
- Climbing aids (skins, snowshoes, crampons)
- Emergency first aid kit
- Cell phone and maybe emergency radio or satellite phone
- Navigation aids (map 1:25'000, GPS, altimeter, compass)
- Protection against sun and cold

AVALANCHE DANGER SCALE (abbreviated)

	Characteristics	Travel advice
5 VERY HIGH	**Catastrophic avalanche situation** Expect many large or even very large natural avalanches. Villages and transportation corridors are threatened.	Travel in avalanche terrain not recommended. Extremely rarely forecasted.
4 HIGH	**Acute avalanche situation** Whumpf sounds and shooting cracks are frequent. Avalanches can easily be triggered on many steep slopes. Natural and even large avalanches are likely. Remote triggering is typical.	Stay on moderately steep terrain. Pay attention to avalanche runout zones. Inexperienced persons should remain on the secured ski runs and trails. Generally only forecasted for a few days of the winter season. About 10% of avalanche fatalities.
3 CONSIDE-RABLE	**Critical avalanche situation** Whumpf sounds and shooting cracks are typical. Avalanches can easily be triggered, particularly on steep slopes with the aspect and elevation indicated in the avalanche bulletin. Naturally and remotely triggered avalanches are possible.	**Most critical danger level for back country recreationists** Optimal trail selection and risk reduction measures are necessary. Avoid very steep slopes with the aspect and elevation indicated in the avalanche bulletin. Recreationists with limited experience better remain on the secured ski runs and trails. Forecasted for about 30% of the winter season. About half of avalanche fatalities.
2 MODERATE	**Predominantly favourable avalanche conditions** Warning signs are rarely observed. Avalanches can primarily be triggered on very steep slopes with the aspect and elevation indicated in the avalanche bulletin. Large natural avalanches are not likely.	Choose your route carefully, especially on slopes with the aspect and elevation indicated in the avalanche bulletin. Cross very steep slopes one at the time. Pay attention to unfavourable snowpack structure (old snow problem). Forecasted for about 50% of the winter season. About one third of avalanche fatalities.
1 LOW	**Generally favourable avalanche conditions** No warning signs present. Trigger points are rare and mostly found on extremely steep slopes.	Ride extremely steep slopes one at a time! Watch out for cliffs! Forecasted for about 20% of the winter season. About 5% of avalanche fatalities.



Avalanche danger levels

TRIP PLANNING

Goal

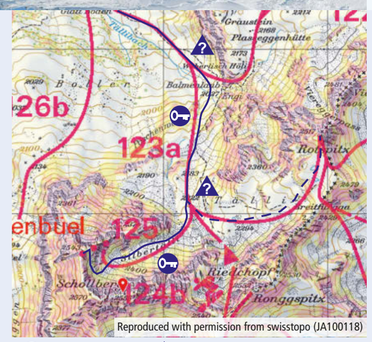
Recognise and avoid potential problems early enough (conditions, terrain, human factors)

Important considerations during trip planning

1. Choose appropriate trip (feasible/realistic). Various websites, maps and guide books can be used.
2. Gather information on conditions, terrain and human factors.
3. Draw the planned route onto a 1:25'000 topo map (do it yourself!).
4. Identify and assess cruxes.
5. Determine decision points and plan alternatives.
6. Estimate timelines, determine fixed times.
7. Review your entire trip plan and think about what could go wrong.

Possible online support for entire trip planning:
www.whiterisk.ch/tour

NOTE:
Don't cut short the process of going through the important considerations for trip planning (points 1-7) when using online tools or available GPS tracks.



Crux Decision point

Maps

Maps with coloured slope angles are very useful.

Swisstopo maps with different layers: **map.geo.admin.ch**
Wildlife protection areas: **www.wildruhe.ch**

Important: Take a hard copy map on your trip

ASSESSMENT AND DECISION FRAMEWORK 3X3

1. TRIP PLANNING

Trip destination with alternatives and schedule.

Conditions
- Avalanche bulletin (forecast)
- Weather forecast
- Info on planned trip from the online community (with caution)
- Time of the day / season
- Other info

Terrain
- Plan route on a topo map 1:25'000, incl. alternatives
- Ski touring guidebook and skitouring map
- Identify cruxes and assess options
- Info from locals

Human factors
- Who is coming along?
- How many people?
- Responsibility
- Participants' wishes and expectations
- Skills and fitness of participants / leader
- Equipment
- Timelines

Decision
Which tour is feasible?

2. LOCAL EVALUATION

Beliefs and conceptions = reality? Stay aware throughout the entire day, revise trip planning if necessary.

Conditions
- Look for warning signs
- Current weather, tendency
- Avalanche problems? Or is the avalanche situation favourable?
- Is the current avalanche situation similar to what is described in the bulletin?
- Visibility

Terrain
- View into cruxes
- Possible critical areas
- Route choice and possible alternatives
- Existing tracks

Human factors
- Transceiver check
- Check equipment
- Physical and mental state (personal, group)
- Timelines realistic?
- Heuristic traps
- Who else is out there?
- Encourage feedback culture
- Group dynamic processes

- What is the primary avalanche problem today?
- Where is it present in the terrain?
- How severe is the problem?

Decision
Which route?

3. INDIVIDUAL SLOPE

Final risk assessment, trail selection, travel techniques or avoidance

Conditions
- Avalanche problems in the slope? How severe are they? Or is the current avalanche situation favourable?
- Visibility
- Frequently traveled
- Other dangers (glacier, cornice, etc.)

Terrain
- Steepness
- Aspect and elevation (favourable / unfavourable)
- Shape of terrain
- Slope dimensions
- Possible consequences / terrain trap
- Trail selection

Human Factors
- Mental state (group, personal)
- Facts ↔ Feelings
- Tactics (spreading out, riding one at a time, regrouping at «islands of safety»)
- Communication
- Leadership/discipline

Do the assumptions match reality?

Decision
Individual slope possible? How?

Next trip

Reflection: Critical evaluation after a trip enhances the experience. Were there any suprises? What would you do differently next time?

Go / Go here No go

AVALANCHE BULLETIN

The avalanche bulletin provides information on the current snow and avalanche conditions in the Swiss Alps, occasionally also in the Jura. It is a forecast and describes the general avalanche situation for a region (smooth, gradual transitions!) but not for a single slope.

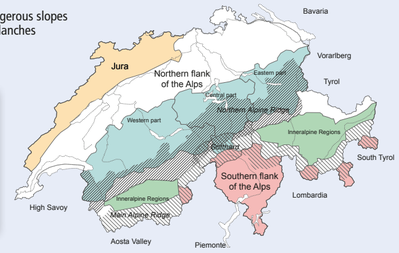
The avalanche hazard is described by the danger level, the prevailing typical avalanche problems and with a plot showing avalanche prone locations.

The danger level depends on:
- Probability of avalanche release (natural or human triggered)
- Distribution and frequency of dangerous slopes
- Number and size of expected avalanches

Avalanche bulletin Switzerland
(Issue: 8 and 17 h):
www.slf.ch or **App «White Risk»**
Weather:
www.meteoswiss.ch
European avalanche bulletins:
www.avalanches.org

Example danger plot
Old snow, snow drifts
N NW E
1800m
The aspects and elevations coloured black indicate avalanche prone locations.

Geographical terminology

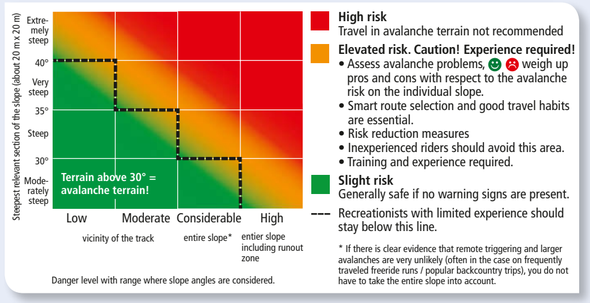


GRAPHICAL REDUCTION METHOD GRM

Simple risk check that links the avalanche danger rating with slope angles of unfavourable or favourable aspects and elevations. The GRM is the primary tool for trip planning.

Unfavourable slopes are often:
- Shaded slopes
- Slopes with recent wind loading
- Slopes with aspect and elevation indicated in the avalanche bulletin

Favourable slopes:
You can usually assume the next lower danger level for favourable slopes. e.g.:
- Slopes with aspect and elevation NOT indicated in the bulletin
- Slopes which are assessed as favourable due to observations.



Avalanche bulletin and Graphical Reduction Method GRM

IMPORTANT OBSERVATIONS

Warning signs

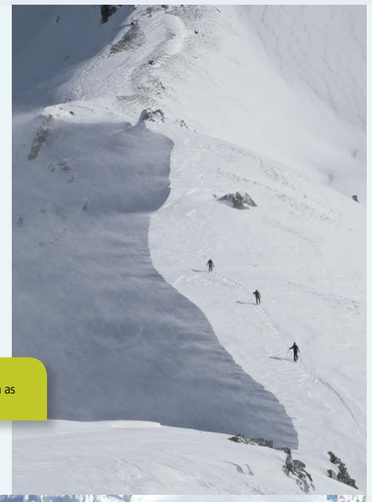
typical for avalanche danger level Considerable (level 3) or higher:
- Recent slab avalanches
- «Whumpf» sounds or
- Shooting cracks when stepping onto the snow surface

Simple observations which indicate increasing avalanche danger

- New snow and wind
- Fresh deposits of wind-drifted snow
- Rain on a dry snowpack
- Marked warming close to the melting point (0 °C; especially after snowfall)

NOTE:
Collect as much information as possible regarding the crux.

Remark:
Pay attention to diurnal variations in spring!



TYPICAL AVALANCHE PROBLEMS

		Typical indicators	Typical spatial distribution	Travel tips	GRM
New snow → wait Duration: 1 – 3 days	 New snow can form a slab and release as an avalanche.	• Critical amount of new snow has been reached. • Warning signs (especially recent slab avalanches)	• Danger often widespread • Danger often increases with elevation.	• Difficult to avoid • Be aware in summer too.	useful
Wind-drifted snow → avoid Duration: 1 – 3 days	 Recent deposits of wind-drifted snow can easily be triggered as a slab avalanche.	• Signs of wind action • Can be hard or soft • Variable ski penetration when breaking trail • Cohesive snow • Warning signs (recent slab avalanches, shooting cracks)	• Lee side of terrain features (terrain breaks, gullies, depressions) • Frequent at high elevations close to ridge lines • Highly variable over short distances	• Avoidance possible with careful route selection • Fresh wind slabs often problematic on slopes steeper than 30°	limited
Wet snow → go early, return early Caution during rain! Duration: hours	 Water weakens the snowpack.	• Rain / wet snow surface • Lack of overnight freezing • Temperatures above freezing / strong solar radiation • Substantial ski and foot penetration • Natural avalanche activity	• Variable across aspects and elevation bands (dependent on time of year and time of day) • Often close to cliffs that warm up in the sun	• Return early • Wait for cooler period • Beware of large naturally triggered avalanches	not really applicable
Old snow → travel cautiously Duration: Weeks to months	 Persistent weak layer below a cohesive slab	• Unfavourable snowpack structure • Warning signs (especially «whumpfs»)	• Areas with a shallow snowpack • Terrain transitions (e.g., convexities, edges of depressions and gullies) • Slopes with cliffs • Often northerly aspects	• Difficult to recognise • Avalanche bulletin provides useful snowpack information. • Simple snowpack tests can offer valuable insight. • At moderate avalanche danger avalanches may also release in deeper layers and become dangerously large.	Useful, apply defensively
Glide snow	Glide snow avalanches are a secondary problem on backcountry tours.	• Glide cracks	• Needs smooth ground (e.g. grass or rock slab) • Particularly on sunny slopes, typically also below tree line	• Do not stay below a glide crack for an extended period of time.	not applicable

Typical avalanche problems

RISK FACTORS

In addition to avalanche problems, slope angle, aspect and elevation, there are other important factors that need to be considered when assessing avalanche risk for the individual slope.

Increasing risk:	Decreasing risk:
Bad visibility	Frequently travelled
Danger of fall over cliffs	Variable terrain/ convex terrain
Large group	Small group
Large slope	Small slopes with smooth runouts
Danger of deep burial Slope above, terrain trap	Slope is below
	Conservative route selection
Abrupt loading of snowpack (fall, regrouping)	Gentle loading of snowpack

Terrain:
- Avoid steepest sections of slope.
- Seek out convex terrain

Behaviour, good travel habits:
- Ride extremely steep or otherwise challenging sections one at a time.
- Spread out (ascent about 10 m, descent about 50 m or more)
- Set boundaries, descend gently, avoid falls
- Stop and regroup at «islands of safety»
- Clear leadership and communication

Risk reduction

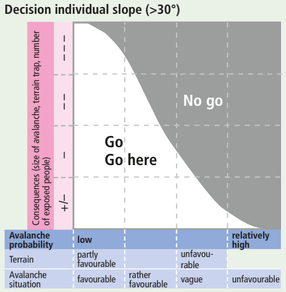
Conditions:
- Avoid fresh accumulations of drifting snow if at all possible.
- Continuously monitor daily temperature evolution and effect of solar radiation.
- Seriously consider turning back if you are caught in poor visibility, in unknown terrain and during unfavourable conditions.

DECISION MAKING FOR INDIVIDUAL SLOPES

Important questions

• What is the likelihood of triggering an avalanche? • Are there areas were triggering an avalanche is less likely?	Avalanche probability → RISK
• Type and size of expected avalanches? • Likely consequences if caught by an avalanche (burial, fall etc.)?	Consequences → RISK
• What is the ideal track? • What are the most appropriate risk mitigation measures? • Do the measures reduce the risk to an acceptable level?	Behaviour → RISK REDUCTION

Decision individual slope (>30°)



Behaviour
Reduce risk by selecting an optimal trail and applying good tactics (max. 1 square length)

CLUES:

Terrain
- Partly favourable: convex / small area > 30° / dense forest
- Unfavourable: widespread >35° / slightly concave / uniform

Avalanche situation
- Favourable: clear signs for favourable situation
- Unfavourable: Warning signs, fresh wind slabs, severe avalanche problem

Consequences
+/– : harmless avalanche / smooth runouts / only one person affected
– – – : dangerous avalanche / terrain trap / several people affected

Decision making for individual slopes

EDITED BY:

The «Snow Sport Avalanche Accident Prevention» core training team (www.slf.ch/kat), consisting of:
• WSL Institute for Snow and Avalanche Research SLF, Davos • Swiss Alpine Club (SAC) • Federal Office of Sports, Magglingen (BASPO) • Association of Swiss Mountain Guides (ASMG) • Swiss Army (Cen exce mtn tng) • Swiss Ski • Swiss Snowsports (SSSA) • Swiss Cableways (SBS) • Friends of Nature Switzerland (FNS) • Alpine Rescue Switzerland (ARS) • Rescue Organisation of Canton Valais (KWRO) • SSBS - Swiss Snowsports Association for Instructors and Schools • bfu – Swiss Council for Accident Prevention • Suva

Where to order: from the editors

Seventh, completely revised and extended edition (first version): © 2016

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Photos: • Title (© J. Mallaun) • Chapter Slab Avalanches (© M. Boss)

Concept / Graphics: Bärewärbig 3013, Bern and Eliane Friedli, Wabern

HUMAN FACTORS

PRESSURE

External pressure and expectations
Expectations or wishes can cause substantial pressure, which may affect decisions in risky situations.

Self-imposed pressure
Self-imposed pressure is quite often higher than external pressure. This is particularly pronounced if the expectations and needs of the group members are unclear.

HEURISTIC TRAPS

Rigidity / Wishful thinking / Goal orientation:
We tend to filter information in favour of our plan.

Crowds / Large groups:
Crowds naturally provide us with a sense of safety. Individuals feel less exposed to danger when in big groups.

Familiarity / Habit:
Familiar terrain feels safe. («There has never been an avalanche here. It has been fine until now.»)

Non-event-feedback:
What went well last time does not necessarily work out next time.

Exclusivity:
Euphoria of doing something exclusive prevents us from seeing and thinking clearly.

Social acceptance:
The fear of loss of acceptance or social status can lead to risky decisions.

Blind trust
Blindly trusting information from others means that you are not evaluating the situation properly. Examples:
- Avalanche forecast: «The avalanche danger rating is only Moderate! Nothing can happen to us today.»
- Blogs and trip advices in the web: «What went well yesterday is not necessarily relevant tomorrow.»

DECEPTIONS

- Slope steepness is underestimated on sunny slopes.
- Hard packed snow feels safer than soft snow.
- In poor visibility, it is difficult to accurately assess terrain.
- Strong winds will likely make it impossible for you to hear whumpf sounds.
- Existing tracks tend to make a slope appear more favourable.

Decision making process

DECISION SITUATION

Influence of organisation
Influence of group
Influence of individual
→ **PRESSURE**

Perception
→ **HEURISTIC TRAPS**
→ **DECEPTIONS**

Rules
(e.g. GRM, critical amount of new snow,...)
- simple
- not very flexible
- apply conservatively

Assessment and evaluation
- knowledge based
- flexible, complex
- adapted to current avalanche situation

→ **Experienced people**

Decision
Based on facts
→ **STRATEGIES FOR DECISION MAKING**

GO **NO GO**

Action
→ **COMMUNICATION**

Influence on next decision situation

STRATEGIES FOR DECISION MAKING

Create optimal conditions and make sensible decisions.
- Time-Out: Take a 2 minute breather at decision points to make sure you have the necessary time and space to make a proper decision.
- Six Thinking Hats: Visualize the problem from various perspectives.
- View the situation from the outside: How would I explain and justify my decision to an external person?

NOTE:
Always take a bad feeling seriously. Continuously weigh your good feelings against new observtions and facts: Don't give in to temptation!

COMMUNICATION

A lack of communication or unclear communication can lead to misunderstandings and wrong choices.
- Have the goals and expectations been discussed?
- Are there any possible misunderstandings?
- Pay attention to non verbal communication (eye contact, body language, etc.)

Strategies for better communication:
- Communicate early enough and faithfully.
- Get feedback: Has everybody understood directions and will they be followed?
- If necessary define communication rules.

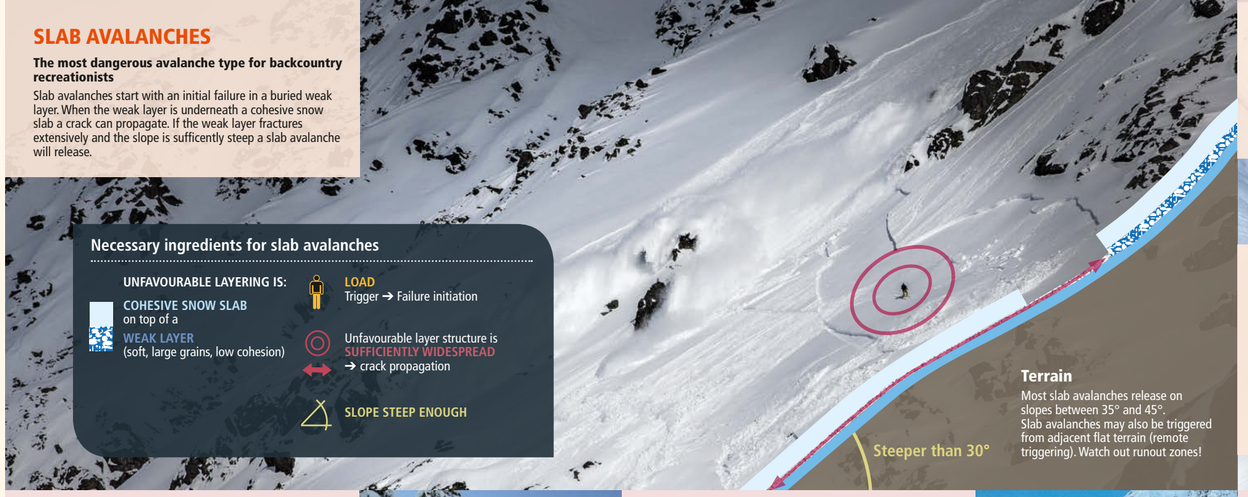
Groups
- In each group dynamics occur which influence the action and the resulting risk.
- A group is only as fast as the weakest member of the group. → Group-check tool SOCIAL

NOTE:
Clarify goal and expectations early enough.

SLAB AVALANCHES

The most dangerous avalanche type for backcountry recreationists

Slab avalanches start with an initial failure in a buried weak layer. When the weak layer is underneath a cohesive snow slab a crack can propagate. If the weak layer fractures extensively and the slope is sufficently steep a slab avalanche will release.



Necessary ingredients for slab avalanches

UNFAVOURABLE LAYERING IS:
- **COHESIVE SNOW SLAB** on top of a **WEAK LAYER** (soft, large grains, low cohesion)
- **LOAD** Trigger → Failure initiation
- Unfavourable layer structure is **SUFFICIENTLY WIDESPREAD** → crack propagation
- **SLOPE STEEP ENOUGH**

Terrain

Most slab avalanches release on slopes between 35° and 45°. Slab avalanches may also be triggered from adjacent flat terrain (remote triggering). Watch out runout zones!

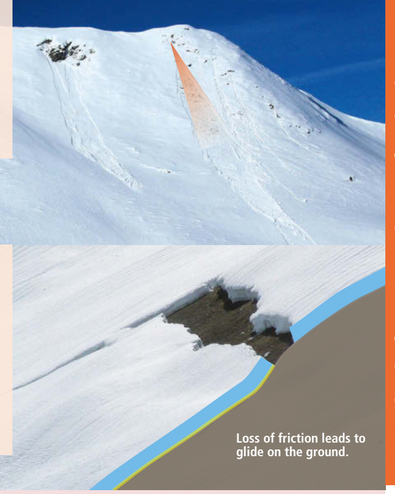
LOOSE SNOW AVALANCHES

Loose snow avalanches often release in terrain steeper than 40°. Compared to slab avalanches they are slow. New snow or wet snow with low cohesion is released.

GLIDE SNOW AVALANCHES

Glide snow avalanches form due to a loss of support between the snowpack and the smooth ground. The snow at the snow-ground interface must be moist or wet. The steeper the slope, the sooner the snow starts to glide.

Glide snow avalanches can not be triggered by backcountry recreationists.



Avalanche formation and types of avalanches

NEW SNOW PROBLEM

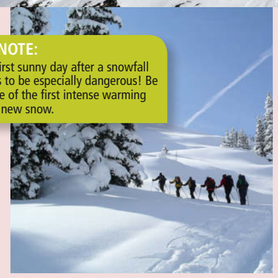
Critical amount of new snow reached = at least Considerable avalanche danger

10–20 cm when conditions are unfavourable
20–30 cm when conditions are fair to mixed
30–50 cm when conditions are favourable

Favourable:
calm or light winds, temperatures around freezing, old snow surface with small scale irregularities (e.g. frequently travelled, wind eroded), generally favourable snowpack

Unfavourable:
strong winds, (> 40 km/h, roaring wind), low temperature (below –5 to –10 °C) at beginning of snowfall, smooth and loose old snow surface, new snow denser towards the top, generaly unfavourable snowpack

NOTE:
The first sunny day after a snowfall tends to be especially dangerous! Be aware of the first intense warming after new snow.



Important questions:
- Amount of new snow?
- Characteristic of new snow: loose or cohesive?
- Temperature during snowfall? (evolution, changes)
- Character of old snow surface and of the snowpack in general?

Unfavourable old snow surface or snowpack | Favourable old snow surface or snowpack

after 2-3 days

WIND SLAB PROBLEM

Wind is the architect of slab avalanches through the creation of wind slabs.

Wind slabs form when loose snow is transported by wind.

Conditions for wind slab formation:
- Sufficiently strong winds
- New snow or erodible snow surface

Wind slabs are cohesive (= ideal slab) and may be hard packed or soft. Wind slabs in lee areas are often highly variable.

NOTE:
Recent wind slabs are easily triggered. Very strong winds form hard wind slabs which may falsely suggest more stable conditions.

Important questions:
- Age of wind slab?
- Depth of wind slab?
- Character of snowpack below the wind slab?

Wind-loading on unfavourable snowpack | Wind-loading on favourable snowpack

after 2-3 days

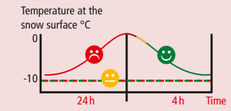
WET SNOW PROBLEM

Water weakens the snowpack and may cause wet snow avalanches. Especially the first wetting period is critical. Water infiltration into an already wet snowpack is less critical.

Typical wet snow situations:
- Spring situation: Increase of avalanche danger due to diurnal warming
- Thaw and rain: Water infiltration and additional loading in dry snowpack increase avalanche danger quickly, often in all aspects (typically in the middle of winter).

NOTE:
The higher the water influx into the snowpack and the weaker the snowpack, the higher the likelihood of wet snow avalanches!

Temperature
The deciding factor for changes in the temperature of the snowpack is the energy balance, which is predominantly driven by the amount of incoming and outgoing radiation as well as the wind.



Influx of water at unfavourable snowpack | Influx of water at favourable snowpack

takes longer

Important questions:
- Rain or melting snow surface?
- How much water flows into the snowpack?
- Consistency of snowpack (layering, temperature)?
- Penetration depth without skis?

Typical wet snow avalanche problems (New snow, Wind-transported snow, Wet snow, Old snow)

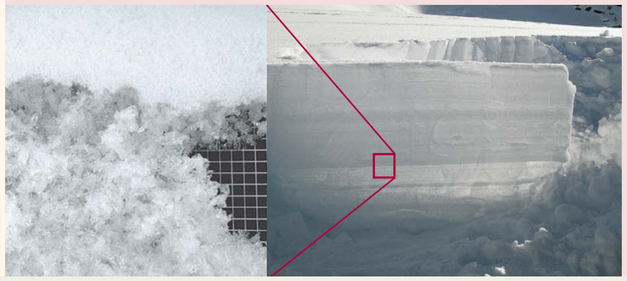
OLD SNOW PROBLEM

With an old snow problem weak layers are predominantly characterized by:
- soft layers with large facets or depth hoar with few bonds or
- buried thin surface hoar layers

Important questions:
- Combination slab – weak layer?
- Weak layer in the upper metre of the snowpack?
- Variability of snowpack?
- Snowpack information? Stability tests?

At least one persistent weak layer is underlaying at least partly cohesive snow

can persist for weeks or months



FAVOURABLE SITUATION

NOTE:
Only if there is clear evidence for a favourable avalanche situation, it is advisable to travel large slopes mainly steeper than 35°.

If there are no signs indicating an avalanche problem, the question arises:
Is the avalanche situation favourable?

Well settled large snowfall:
Settled and well bonded large new snow amounts lead to a favourable snowpack. Often in regions rich in snow.

Massive old wind deposits:
Often favourable when old wind deposits are generally thicker than 1 m. Caution at the edges of the deposits!

Cooling after warm period
Cooling after a significant warm period stabilizes the snowpack, e.g. supporting melt-freeze crust in the early morning in spring.

Favourable snowpack structure (combination slab / weak layer)
- The snowpack only consists of similar, well-bonded (slabby) layers.
- The entire snowpack consists of faceted snow with low cohesion.
- A weak layer lies on top of an otherwise strong snowpack.

SNOWPACK EVALUATION

The avalanche forecast and the SLF snow stability map provide information about the snowpack. In backcountry terrain several methods can be helpful for assessing the snowpack especially for old snow problems when warning signs are absent.

Simple observations
- **Penetration depth (with and without skis):** Allows to estimate how compact the upper layers are and also allows to identify weak base layers in shallow snowpacks. Thin weak layers cannot be detected.
- **Pole test:** Allows to assess differences in layer thickness and hardness and can also highlight spatial variations in the characteristics of the surface layers.
- **Test small slopes:** Deliberate triggering of avalanches on small, harmless test slopes, particularly when concerned about wind slabs and new snow instabilities.

Snowpack observations:
Ideal locations are small, undisturbed slopes with smooth runout and where the depth of the snowpack is slightly below average.
- Assessment of snowpack layering by recognising layer combinations
- Stability tests, e.g. ECT (extended column test): Allows to detect weak layer and to assess if a crack can be initiated and how well it propagates.

Rules of thumb:
- Lots of snow is better than little snow.
- A series of thick layers that are similar are better than a series of thin layers that are different.
- Today's snow surface is tomorrow's weak layer.

The snowpack is particularly unfavourable when:
- soft layers with large grains,
- underlie denser, cohesive and slabby layers,
- in the upper metre of the snowpack.

Note when doing stability tests:
- Combine the results from stability tests with snow profile information and other observations.
- Search for weaknesses in the snowpack. Inconsistencies are a serious sign of uncertainty.
- Cracks which fully propagate following slight loading indicate critial layering.

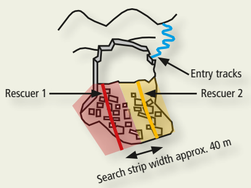
AVALANCHE ACCIDENT

If caught

Try to escape the avalanche area, let go of ski poles. If carrying an avalanche airbag, release it. As long as the snow is flowing, try to stay on the surface of the avalanche. Just before coming to a standstill hold your arms in front of your face and try to keep airways free from snow.

If not caught

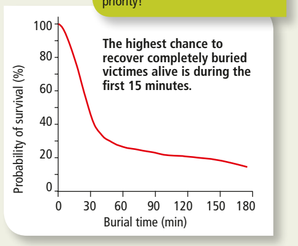
- Watch the avalanche flow and the persons caught (note the last seen point)
- Gain an overview – think – act; assess your own safety, avoid further accidents
- Alert rescue service: Phone, radio (if no connection, alert later)



Search

- Determine primary search area (in the direction of flow below the last seen point)
- Begin searching immediately with eyes, ears and transceiver (turn off transceivers that are not in use)
- Pinpoint search with avalanche probe (leave probe at hit)
- As soon as search is terminated set all tranceivers to TRANSMIT again.

NOTE:
Companion rescue has the highest priority!



Alert

Phone (Call or SMS) / App
Switzerland (Rega): 1414 / Rega-App
Canton Valais: 144
International emergency: 112 / App Echo 112

Accident Report

Where	is the accident location?
Who	is calling (Name, phone number, location)?
What	happened?
When	did the accident happen?
How many	completely buried victims, helpers?
Weather	in the area?

Air rescue

Do not approach the helicopter before the rotor has stopped. Only embark or disembark in the company of a crew member.

Important advice at landing place:
- Ensure no loose objects are left lying in the area (clothes, backpack, etc.)
- Pay attention to skis, avalanche probes, etc.
- When the helicopter is on final approach remain at the same location and kneel down
- Keep visual contact with pilot

Extricating

- Dig generously (conveyor belt system)
- Uncover head and chest as fast as possible, clear airways, check if there is a breathing cavity in the snow (snow filled airway = no breathing cavity)

First aid

- According to BLS (Basic Life Support)
- If no existing vital signs, start with resuscitation
- Prevent further cooling
- Watch and take care of the victim very carefully

TERRAIN

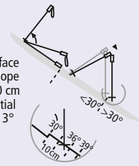
Slope angle

- The essential slope section for assessing the slope angle is 20 m x 20 m.
- Consider steep slopes above and below the route, especially at Considerable avalanche danger.
- Slope angle maps with coloured steepness are very useful to determine slope angles.

Rules for estimating slope angle:
- Kickturn necessary: > approx. 30°
- Slopes below large rock faces: approx. 35°
- Steep slopes with cliffs, moraines: > approx. 40°

Measuring methods:
with help from ski poles of equal length or with inclinometers

If the suspended pole contacts the snow surface below the mark, the slope is steeper than 30°, 10 cm of difference to the initial mark represents some 3° of slope angle.



Slope angle classification:

• moderately steep:	flatter than about 30°
• steep:	steeper than 30°
• very steep:	steeper than 35°
• extremely steep:	steeper than 40°

Slope angle and shape of terrain

- Shaded slopes (cold) are often less stable than sunny slopes.
- Sunny slopes may become critically unstable during intense warming.
- Variable terrain offers more alternatives for safer route selection.
- Sparse woods do not protect from avalanches.
- Ridges are generally safer than gullies and convex terrain.
- Ridgeline areas are generally critical after new snow fall and wind.

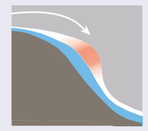
Slope dimensions, terrain traps

- How much area does the slope cover, does it run out smoothly?
- Is there danger of being swept over cliffs or being buried in hollows or riverbeds?
- Is there an increased danger of injury trough collision with boulders or trees?

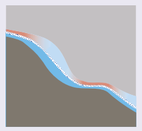
Typical avalanche terrain

- between 35° und 45° steep
- relatively unifom
- slightly concave terrain

If terrain feature or aspect change, the snowpack also changes within a few metres!

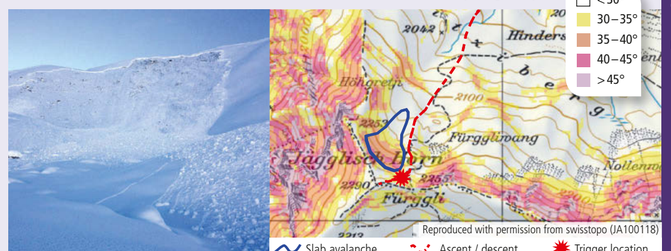


Particularly critical slope areas after wind-drifted snow situations



Particularly critical slope areas where avalanches can be triggered with old snow problems

Slope angle map



Terrain