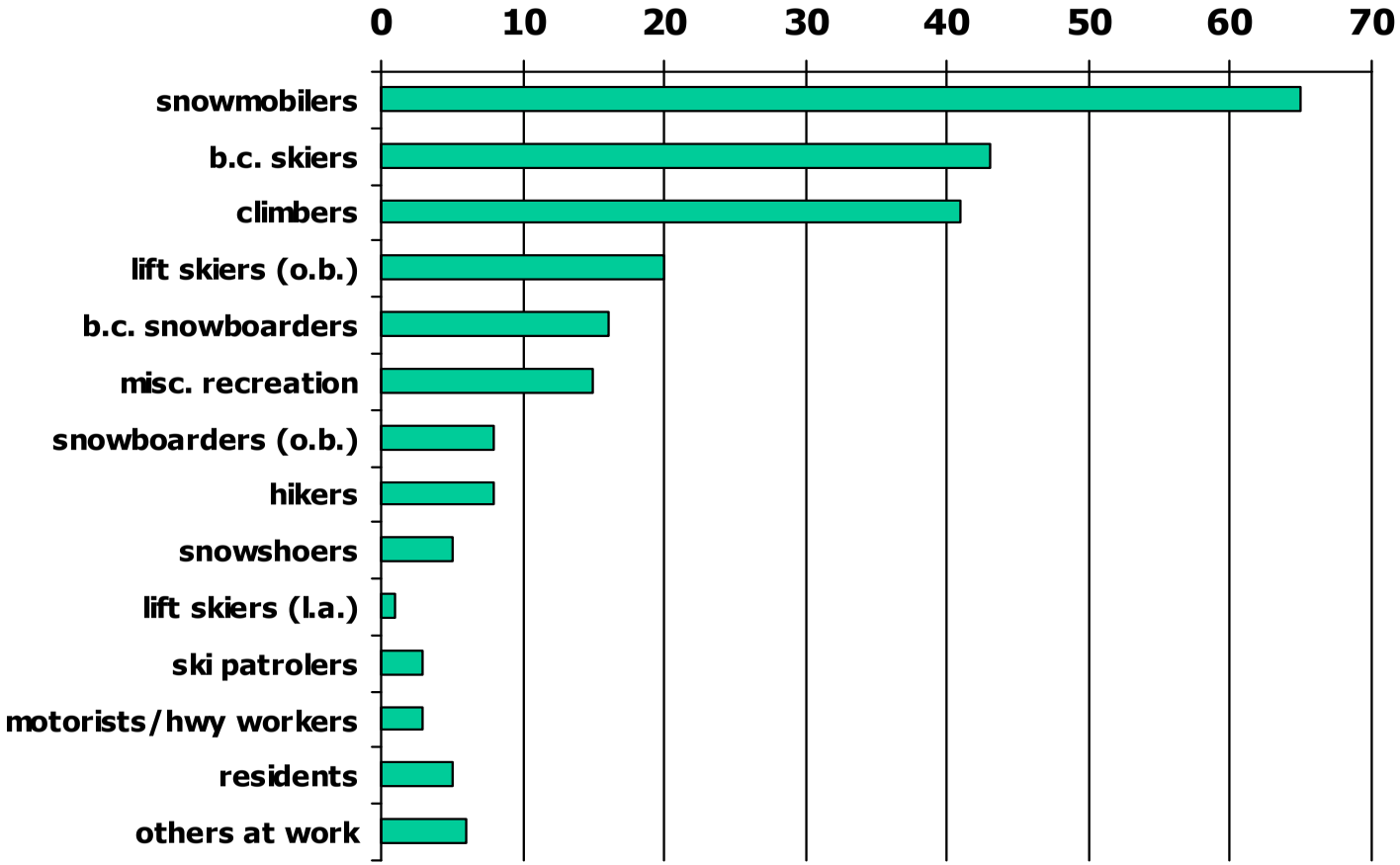
Outline

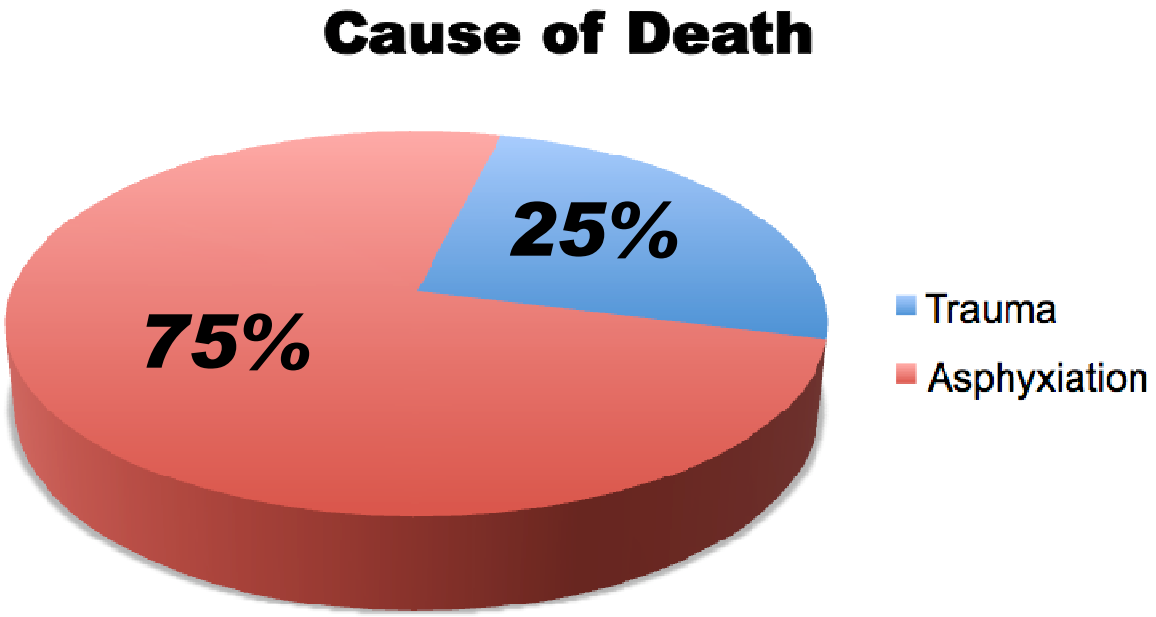
- The importance of speed and self-rescue
- Avalanche beacons fundamentals (how to look)
- Search fundamentals (where to look)

About 97% of people killed in avalanches die while playing



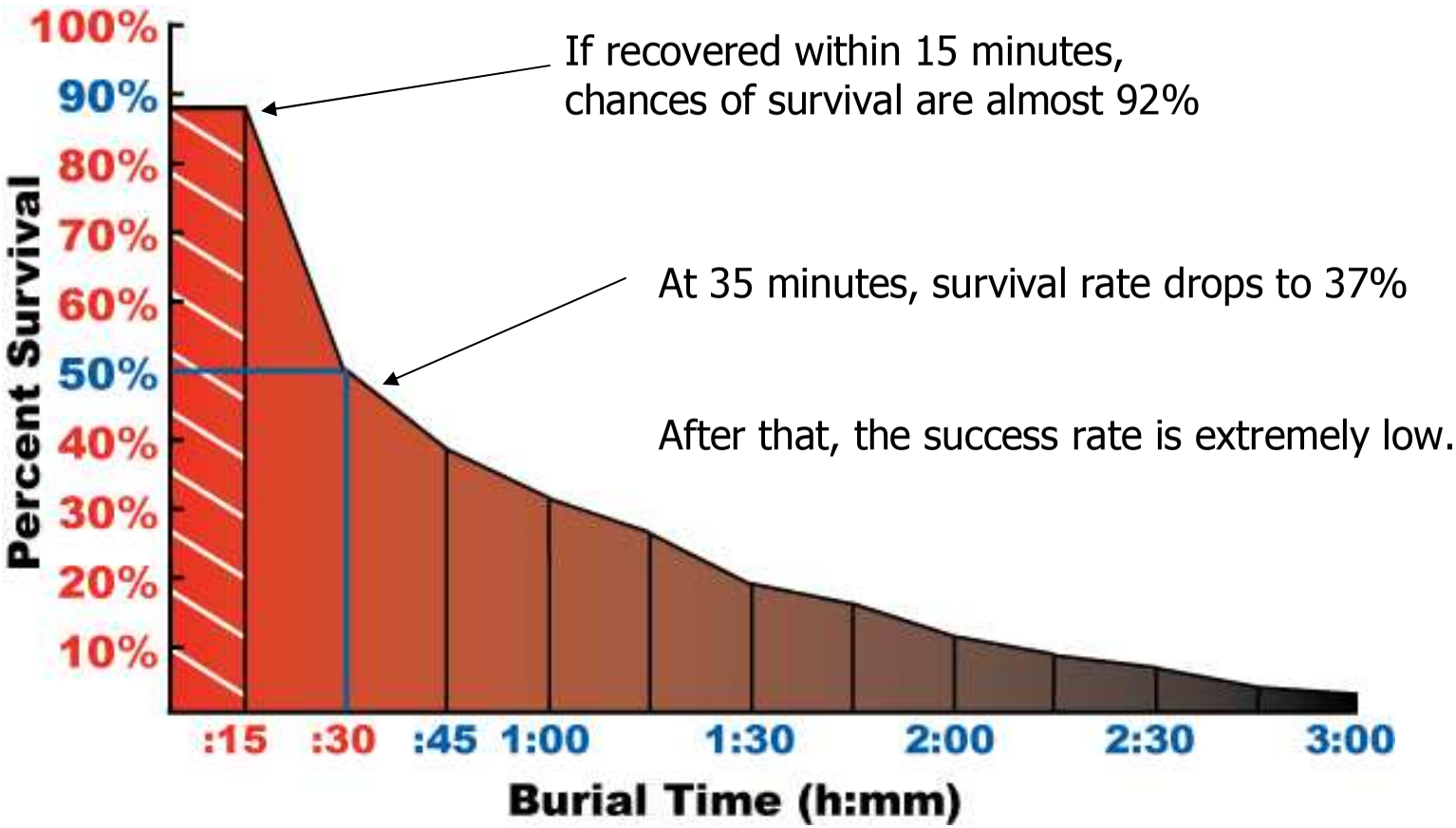
Source: AAA
U.S. Avalanche fatalities by activity, 1990 to 2002

Asphyxiation is the primary cause of avalanche fatalities



Source: AAA

...but if you get to them fast enough, you can save them



Source: AAA
(422 completely buried victims)

Only a member of your party or a companion will likely save your life

	Companion Rescue		Organized Rescue	
Alive	189	**(68%)**	58	**(15%)**
Dead	91 (32%)		317 (85%)	
	280		375	

Source: CAIC

…and most likely only if you have an avalanche transceiver

Search Method	Search Time	
Beacon	<15 min	1 Person
Search Dog	30 min	1 Trained Dog
Coarse Probe	4 hours	20 Person Probe Line
Fine Probe	16-20 hours	20 Person Probe Line

Source: AAA
Search times in 100mx100m area

What do you need for a rescue?

1. Avalanche beacon follows electronic signal to buried victim

2. Probe verifies depth and location of buried victim

3. Shovel removes snow

4. Backpack to carry equipment

Analog & digital beacon controls: signal strength and direction

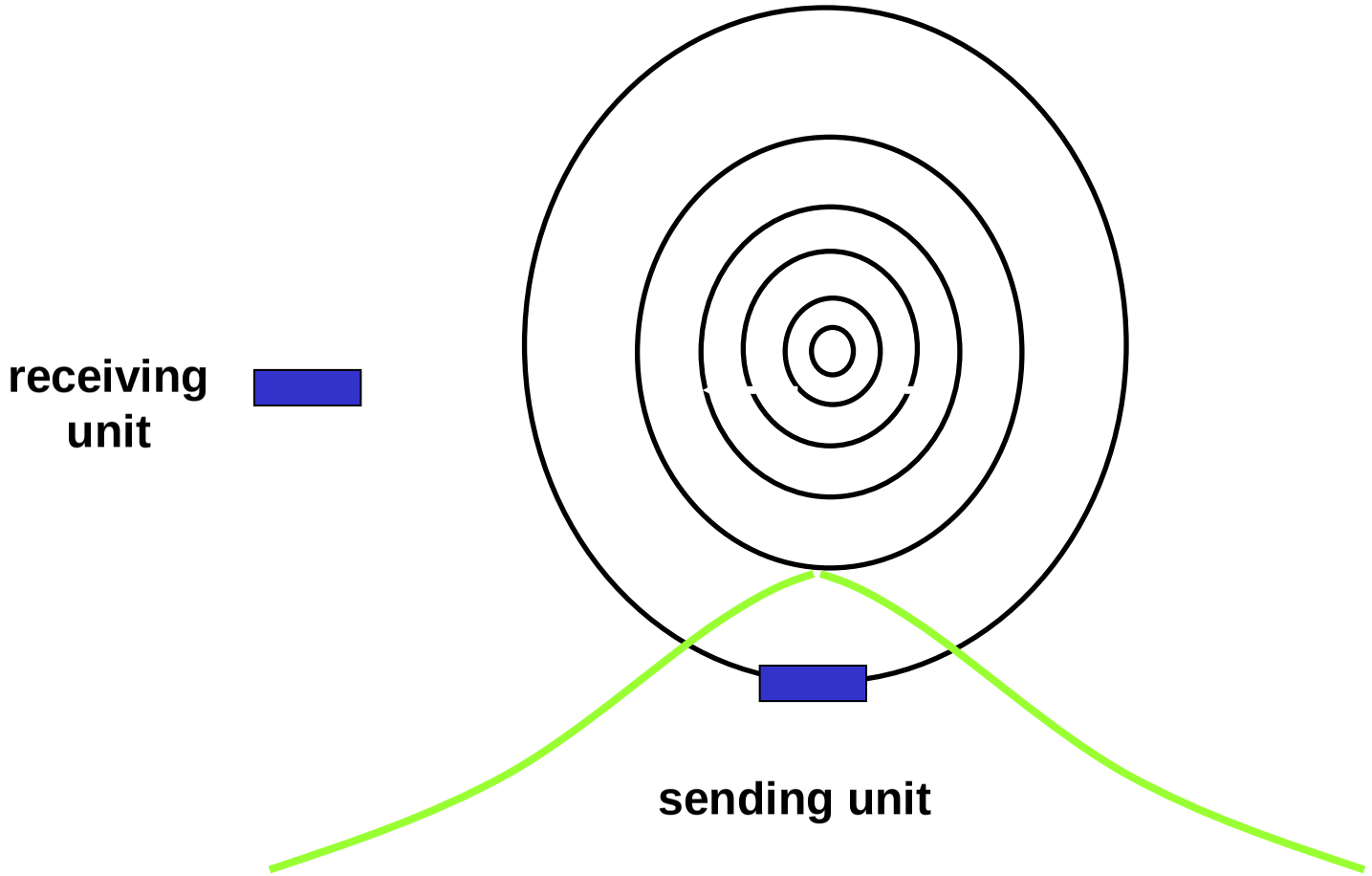
The ARVA 9000 beacon

Distance indicator

Flux line indicator

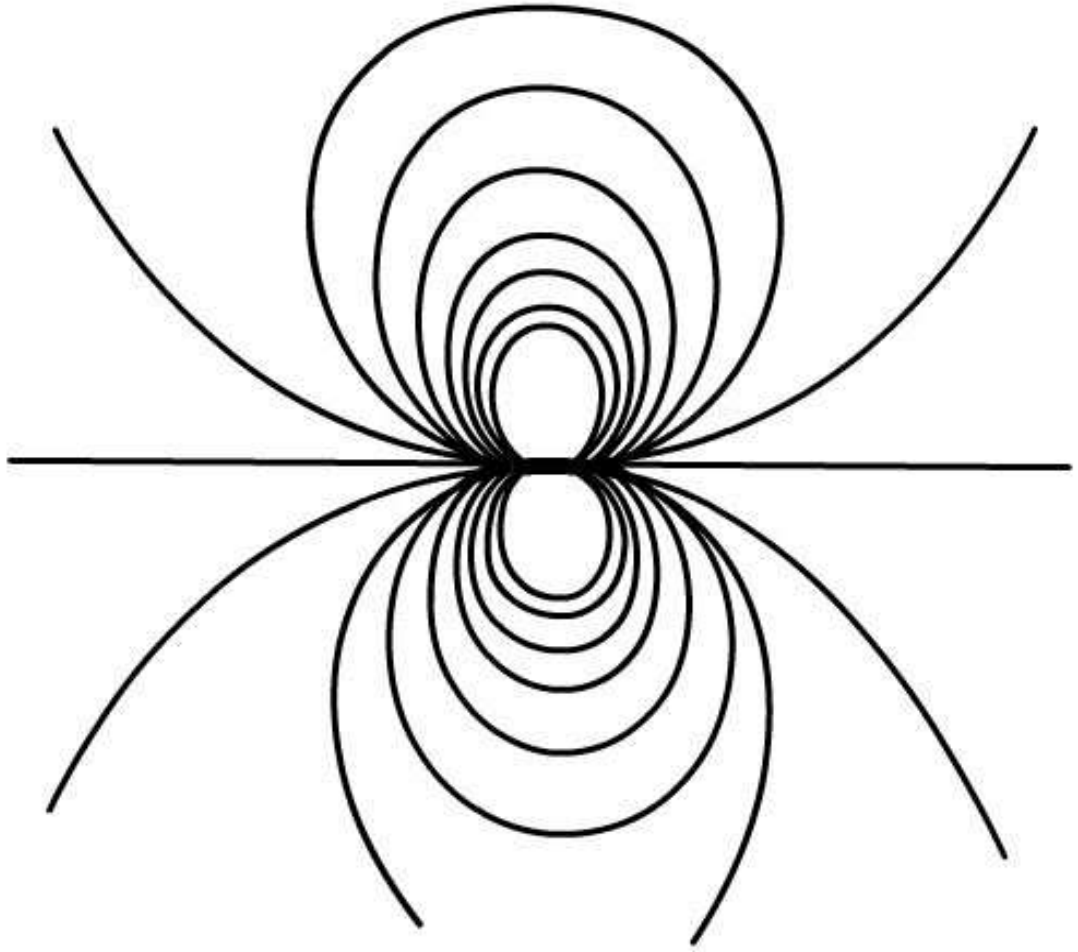
Signal light

Signal strength depends upon distance

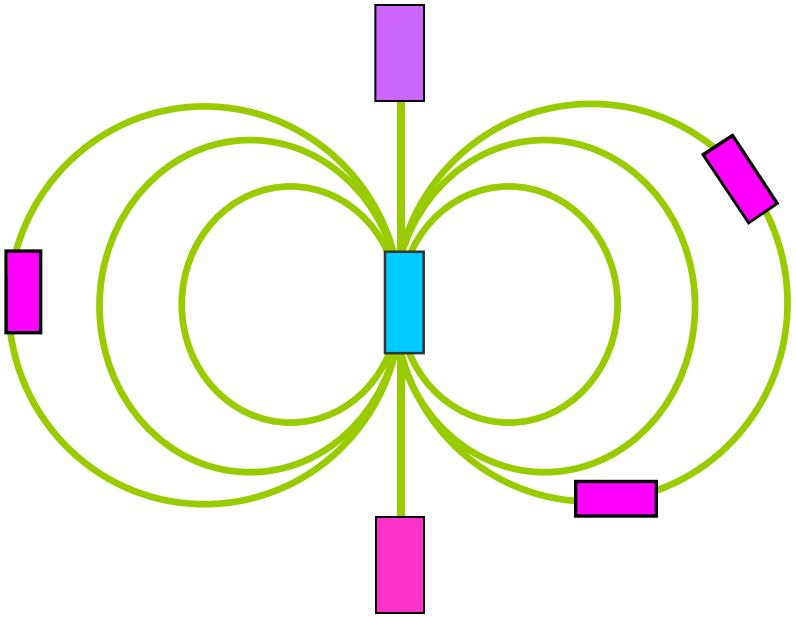


Signal strength forms a flux pattern

(like a magnet)

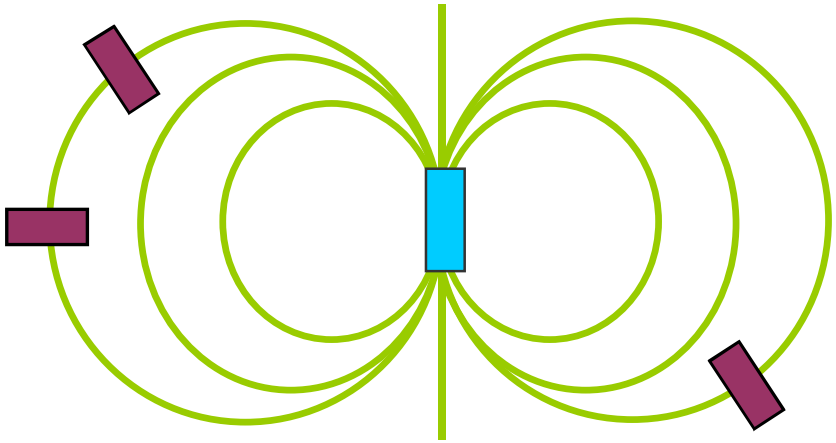


Signal strength depends upon orientation



maximum

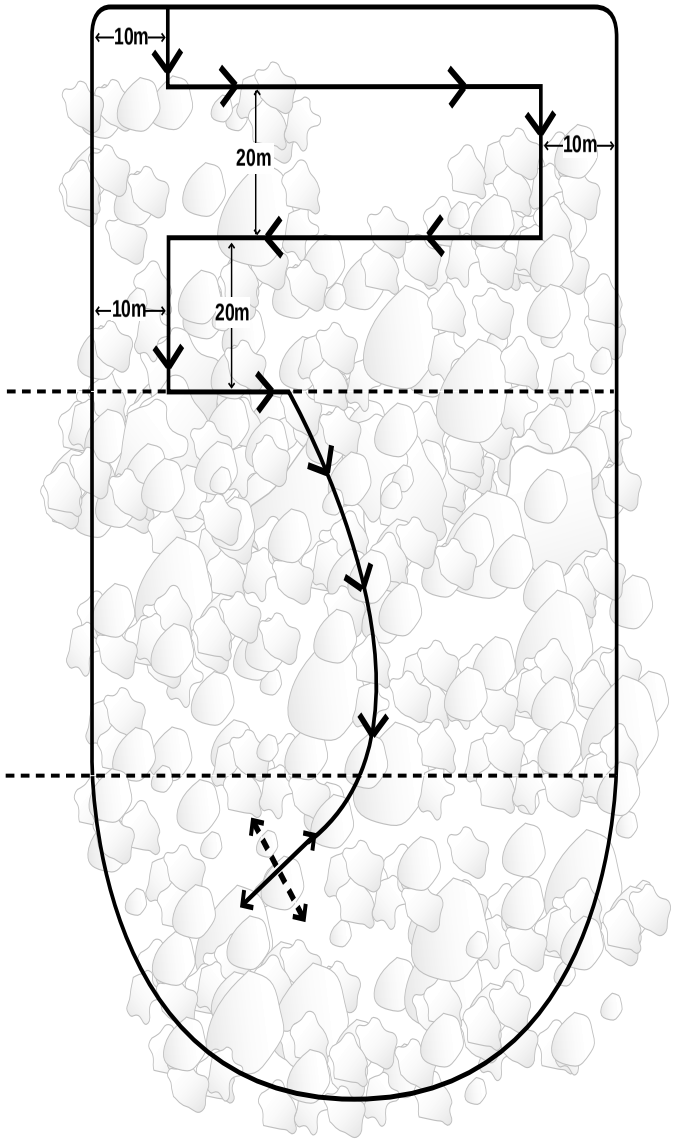
Signal strength depends upon orientation



minimum

The three phases of a transceiver search

Primary Search
>40m



Objective: Detect strong signal

Secondary Search
40-3m

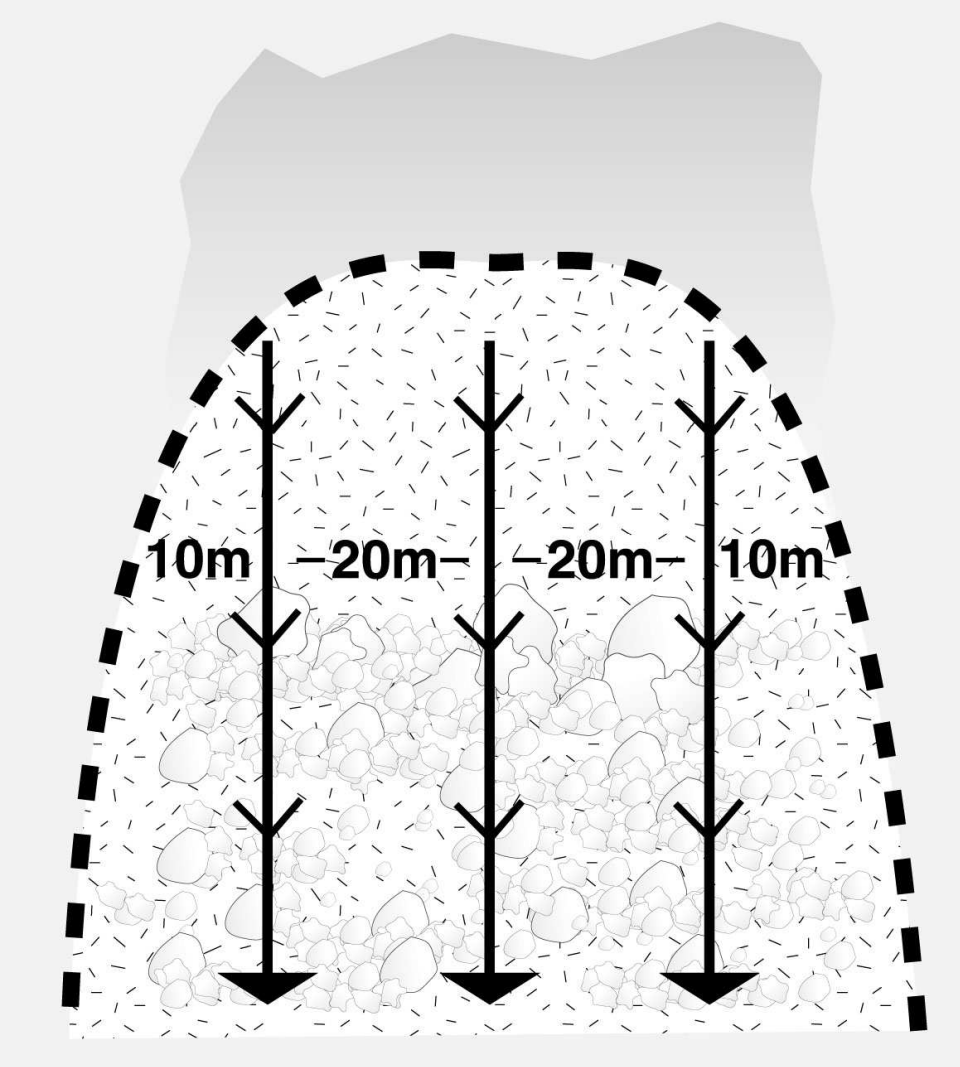
Objective: Get close to buried Transmitter (approx. 3 meters)

Pinpoint Search
<3m

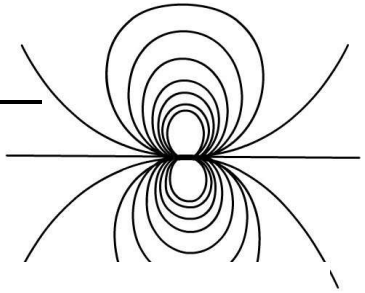
Objective: Locate strongest signal, Minimize probe/dig area

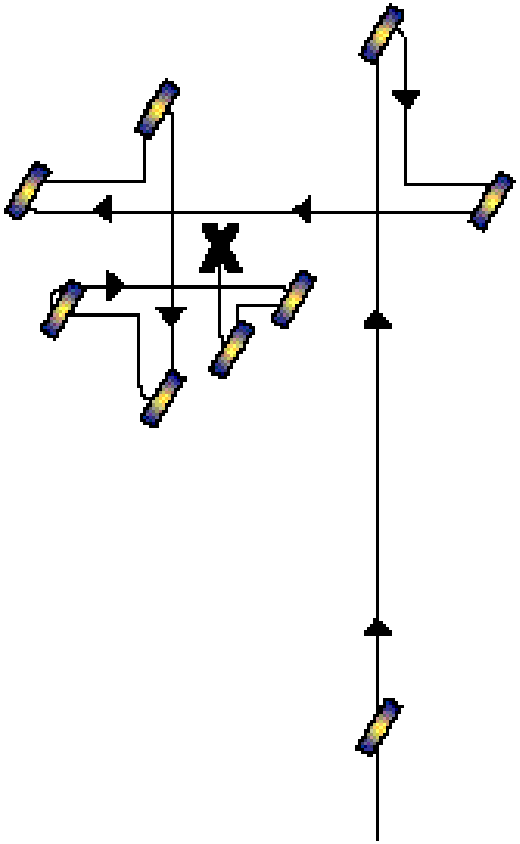
Standard search strip width is 20 meters

- Effective range for most modern transceivers: 10-15 meters
- This translates to a strip width of 20-30 meters

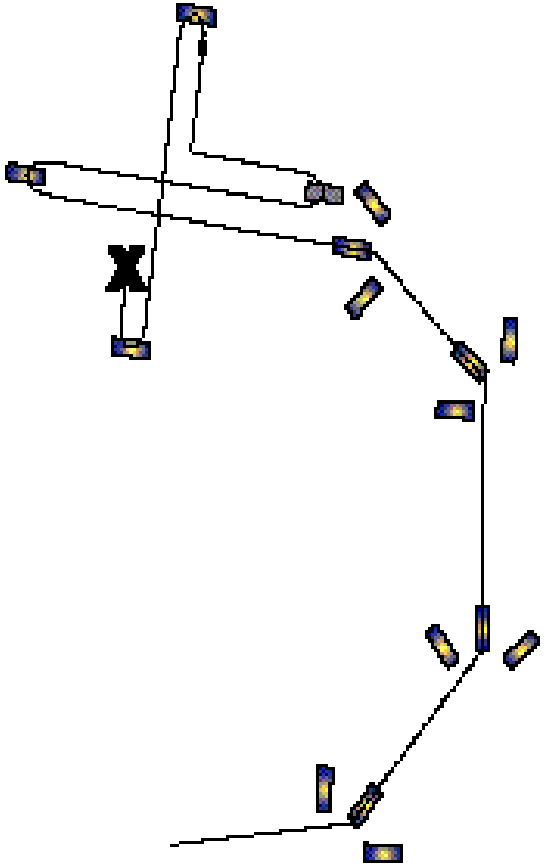


Fine (secondary) search techniques

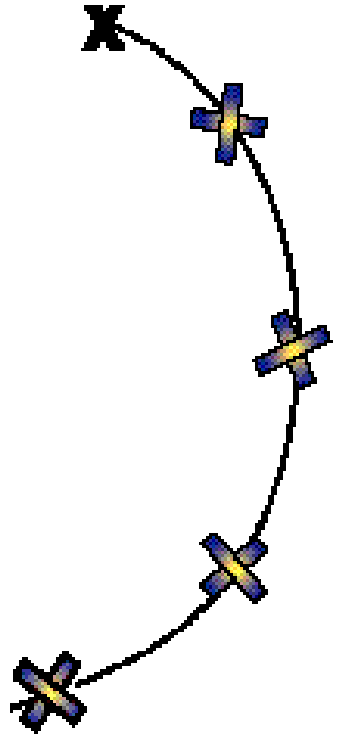




Grid

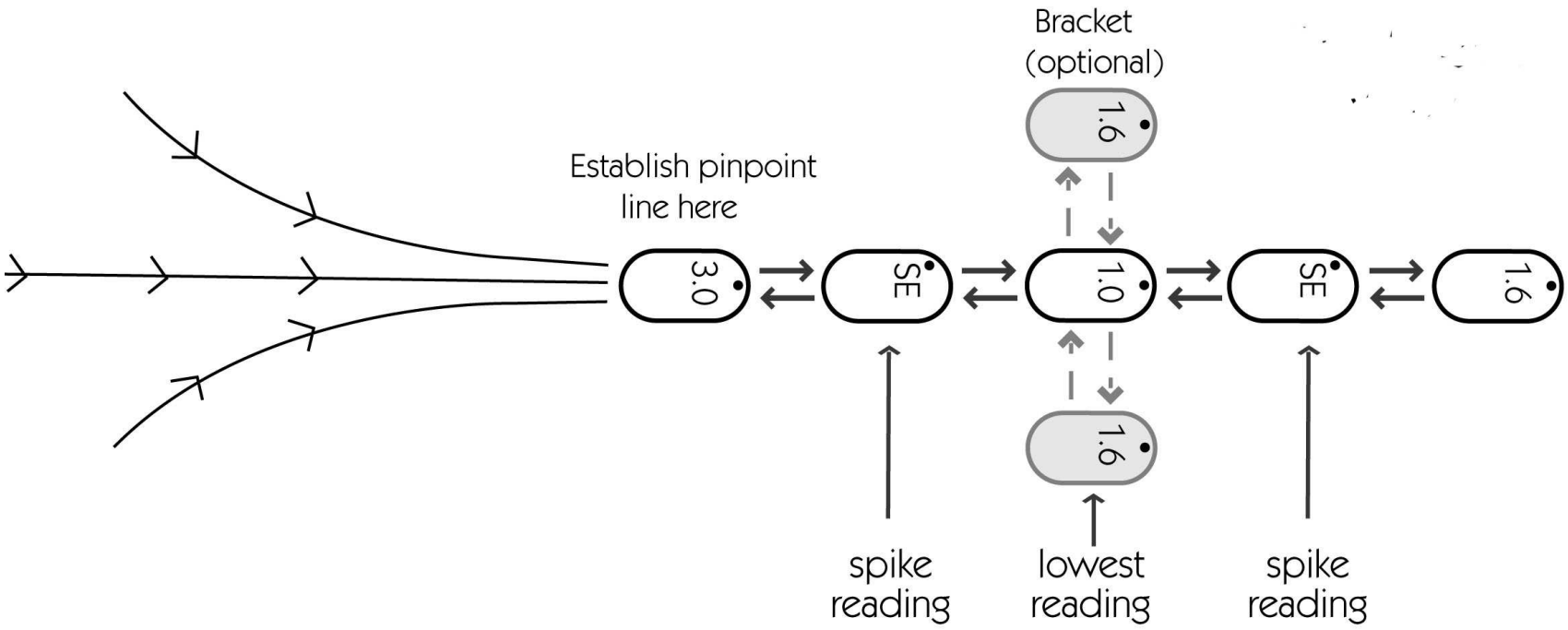


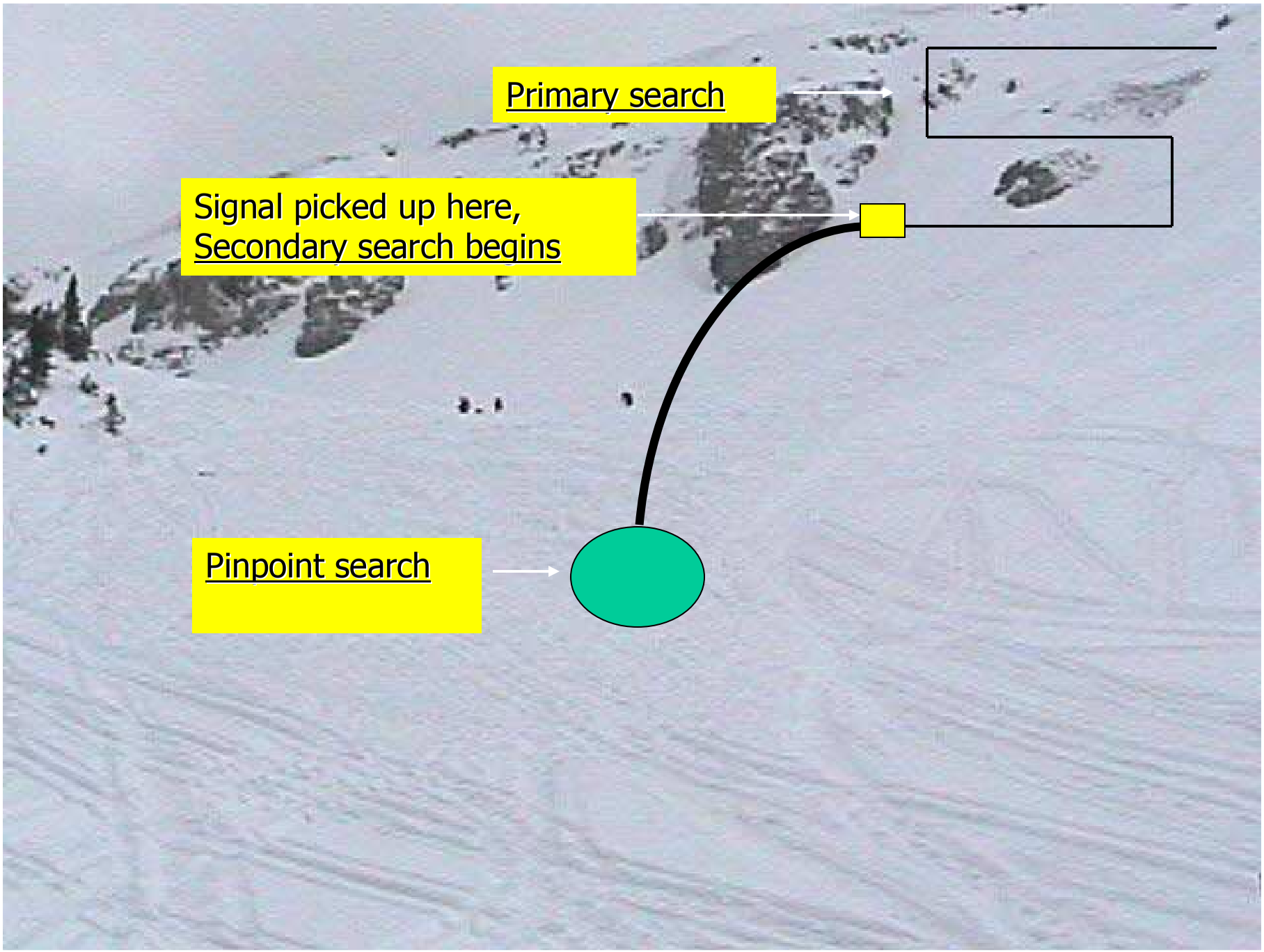
Tangent



Flux

Pinpoint search




Primary search
Signal picked up here,
Secondary search begins
Pinpoint search

If an avalanche occurs

Victim

- If caught, yell so other people see you. Then close your mouth.
- If you can grab a tree or dig into the slope, do it.
- Discard gear like skis and poles.
- Fight with all of your effort, try to stay on the surface.
- As the snow slows, try to thrust a hand upward above the snow surface.
- Before the snow stops, try to clear an air space in front of your face.
- If buried, do not panic! Stay calm and try to relax.

If an avalanche occurs

Rescuer(s)

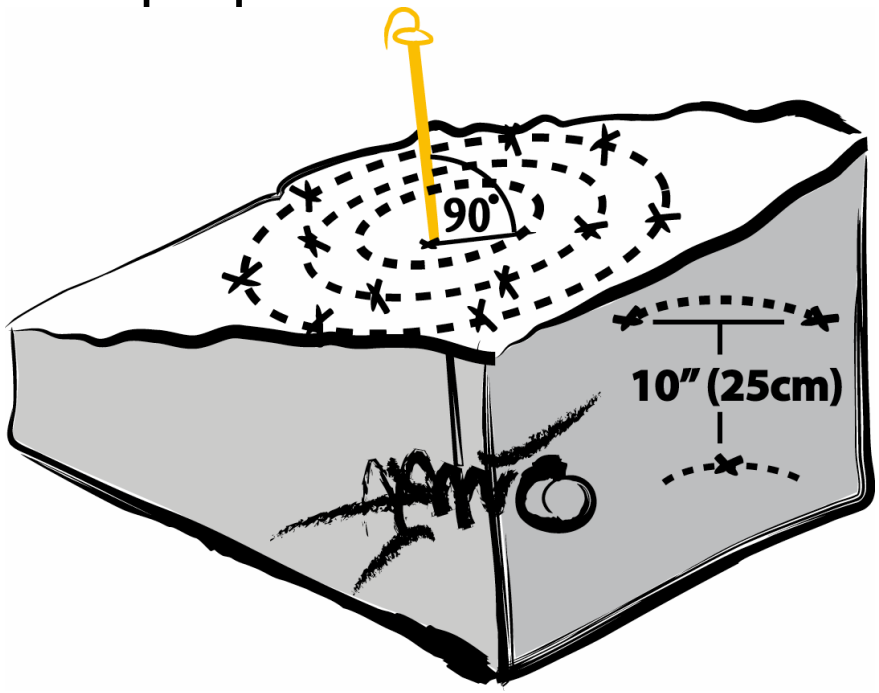
- Watch the victim(s) as they are carried down the slope. Look for "last seen point."
- Make sure it is safe to begin a search.
- Organize the search party.
- Mark the area where the victim was last seen and begin search here. Look for any clues.
- Begin beacon search
- When victim is located, confirm depth and location with probe dig fast but carefully.

Avalanche Rescue Checklist

- ✓ Organize, appoint leader, avalanche lookout, question eyewitnesses.
- ✓ Note who is missing.
- ✓ Assess further danger.
- ✓ Identify escape routes.
- ✓ All beacons to receive mode.
- ✓ Establish and mark victim's last seen point.
- ✓ Search for surface clues – leave them in place
- ✓ Focus search on major deposits below last seen point
- ✓ Primary/coarse search – obtain beacon signal
- ✓ Secondary/fine search – home in on beacon signal (flux line)
- ✓ Pinpoint search – one searcher beacon while others probe & dig
- ✓ Manage digging so as not to re-shovel
- ✓ Turn off the victims' transmitters as you find them
- ✓ Care for victims – ABCs – keep victim warm
- ✓ All beacons back to transmit mode

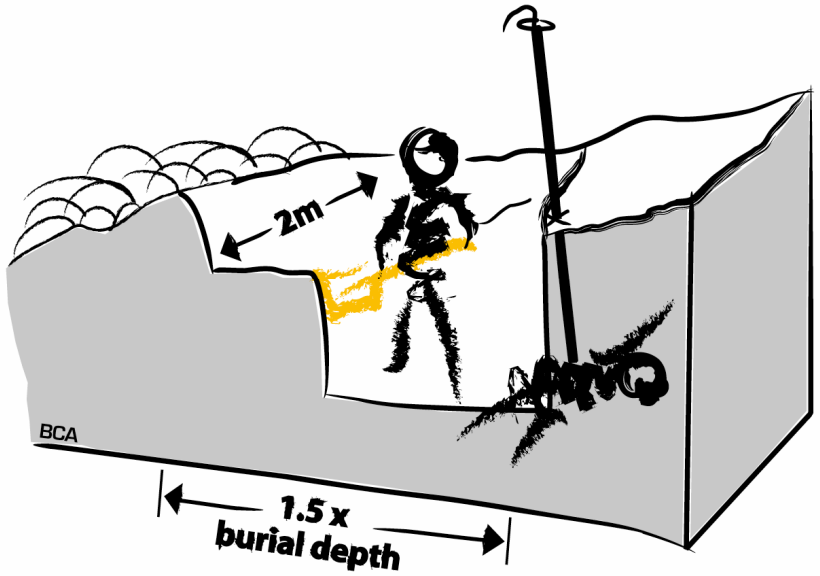
Proper Probing

- Begin probing at the lowest distance reading.
- Probe in concentric circles until you strike the victim.
- Make each probe hole about 10 inches (25cm) apart.
- Your probe should enter the snow perpendicular to the slope.
- Once you have confirmed the victim's location, leave the probe in the snow.



Strategic Shoveling

- Shoveling consumes the majority of time and effort in an avalanche rescue.
- Do not take shoveling skills for granted.
- Begin digging downhill of the probe about 1.5 times the burial depth (note depth marking on probe to determine this distance).
- If one rescuer, make the hole at least one “wingspan” wide.
- If more than one rescuer, work side by side, make hole two wingspans wide (about 6ft/2m).



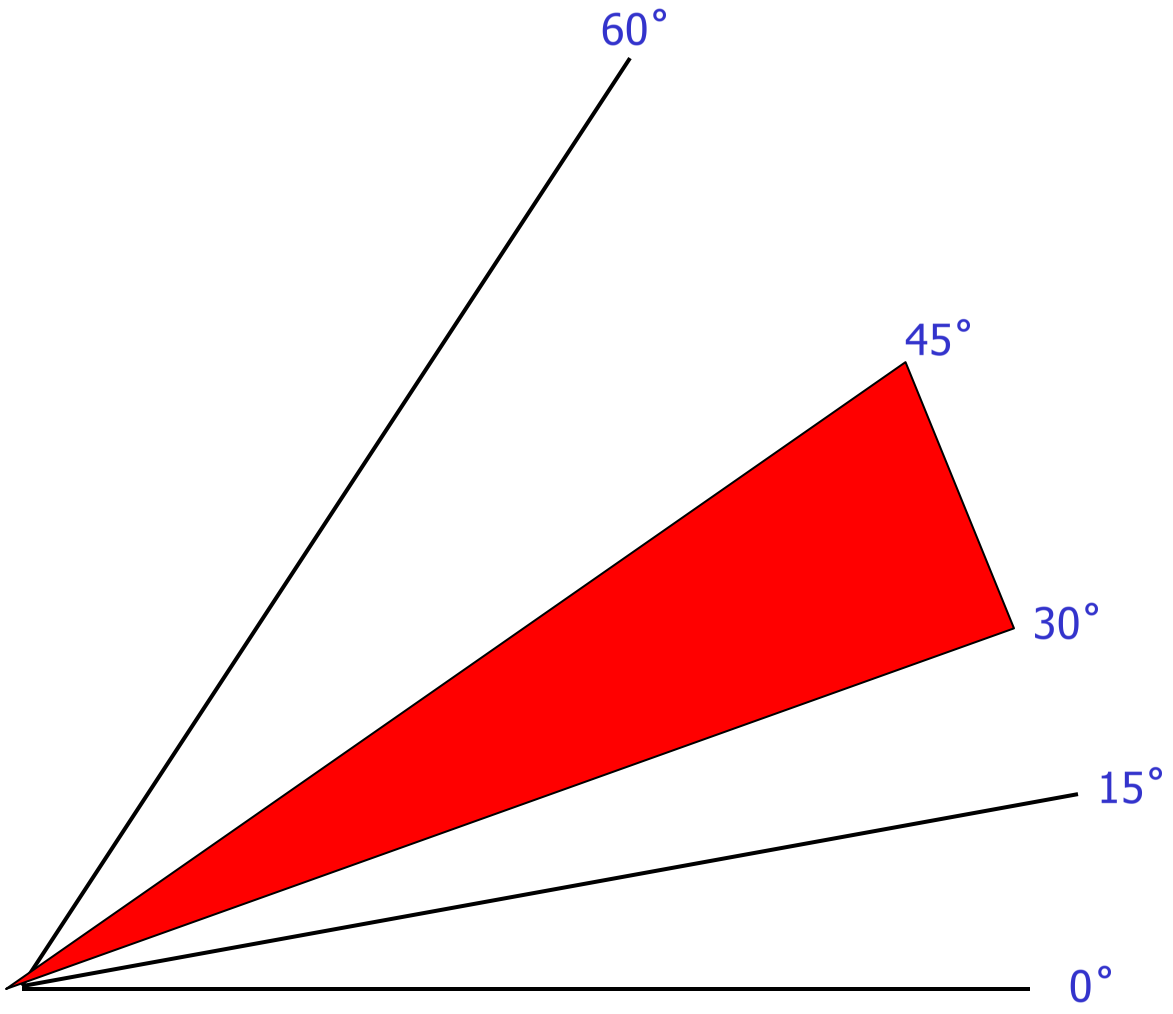
Avy avoidance and safe travel

Weak snowpack

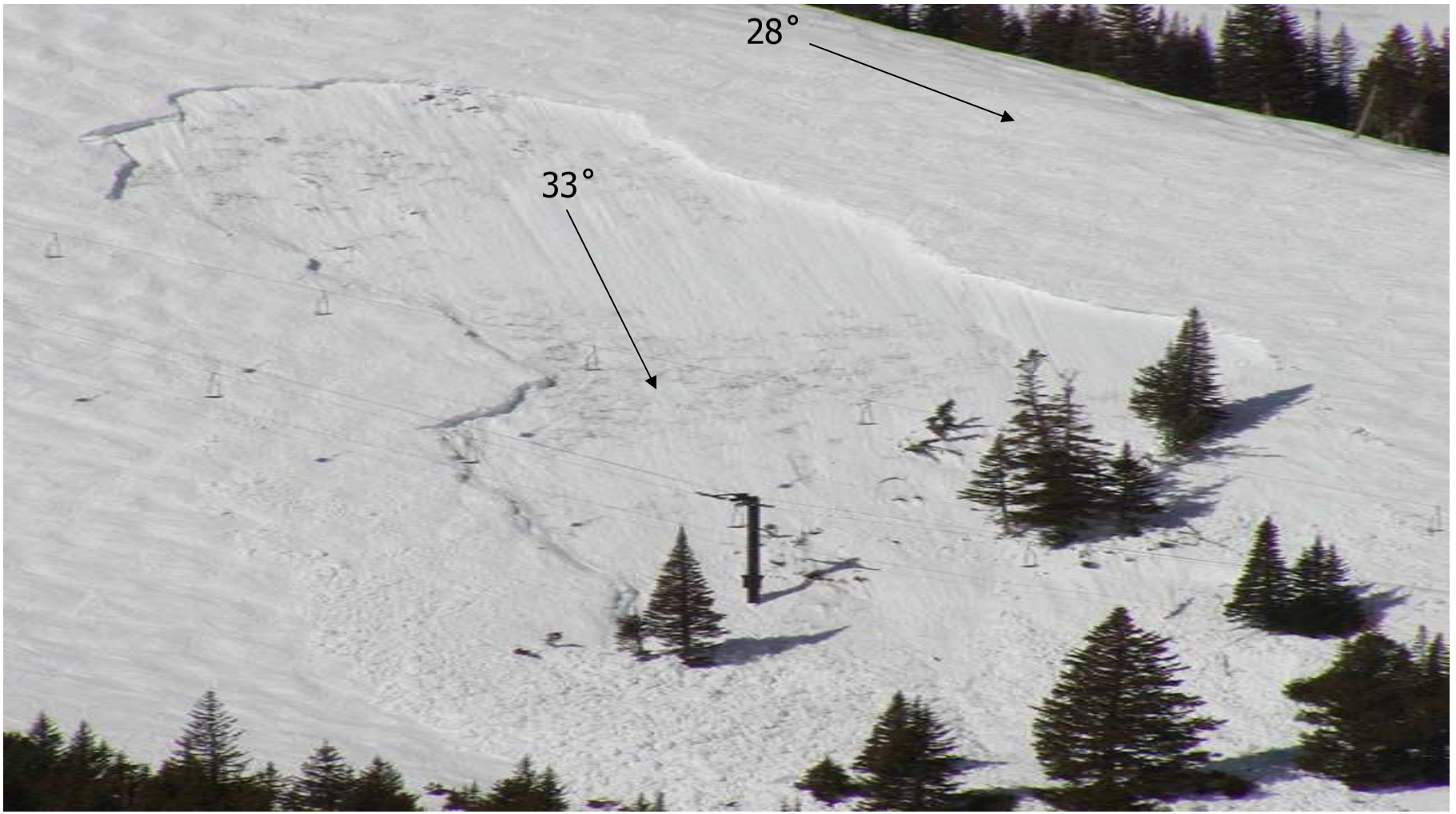
usually a strong layer over a weak layer

- Learn to evaluate the snowpack
- There's no substitute for on-snow avalanche instruction
- Take a Level I avalanche course
- Practice

The majority of avalanches occur on slopes between 30° and 45°

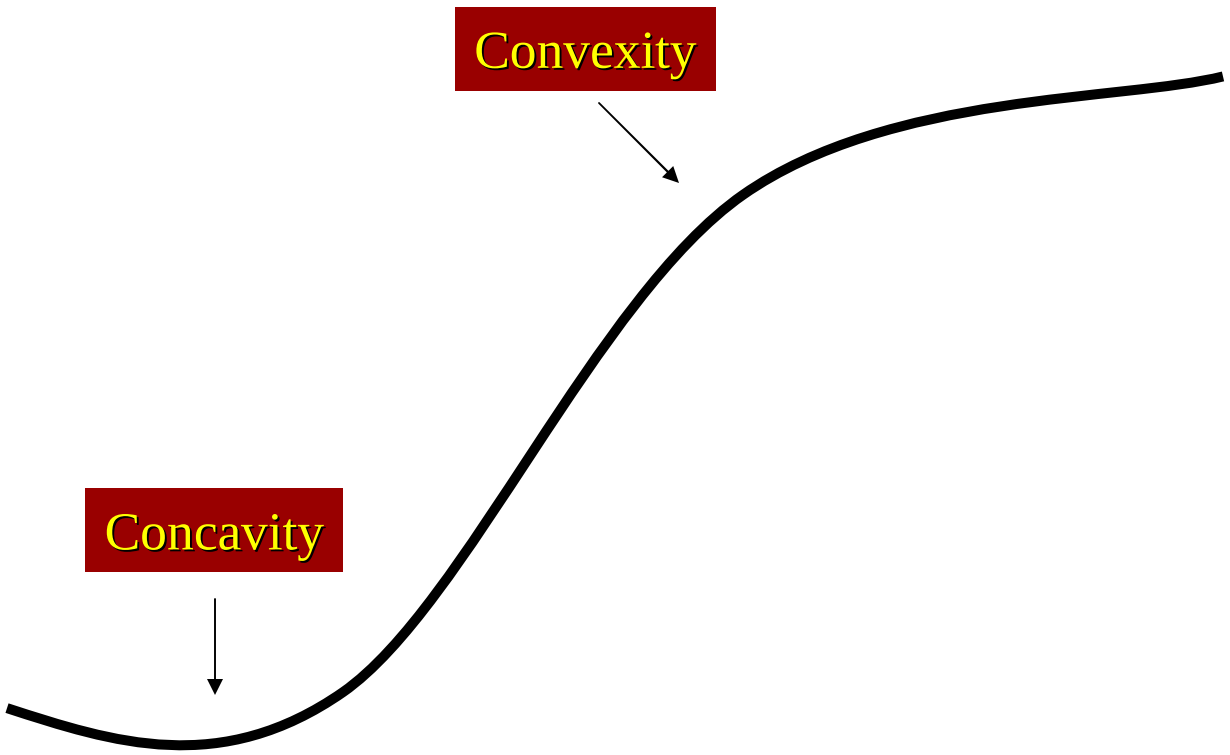


The majority of avalanches occur on slopes between30°and 45°



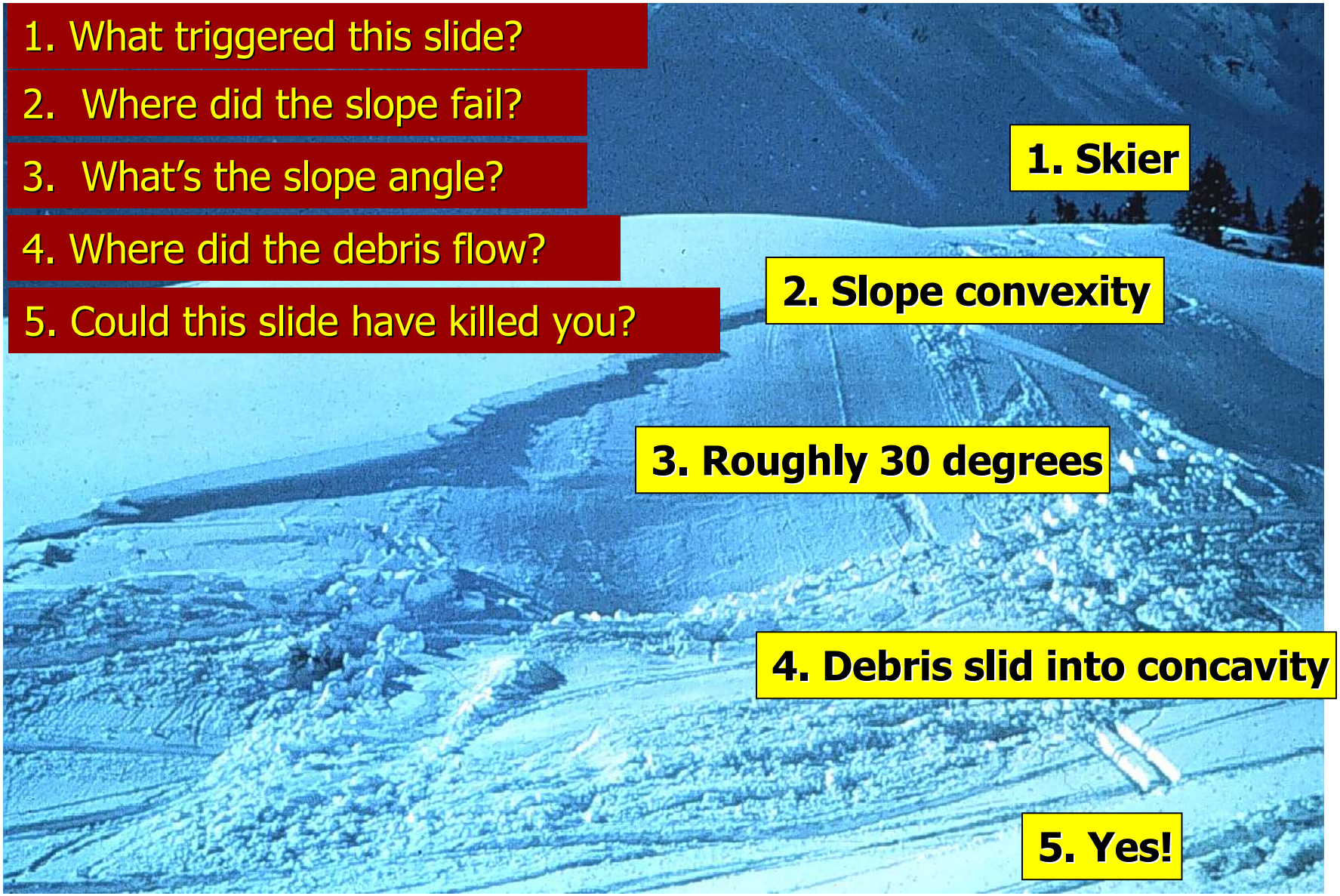
Slope shape also needs to be considered

- Most slabs release on the bulge of convex slopes
- Slabs can be triggered from above and below the slope

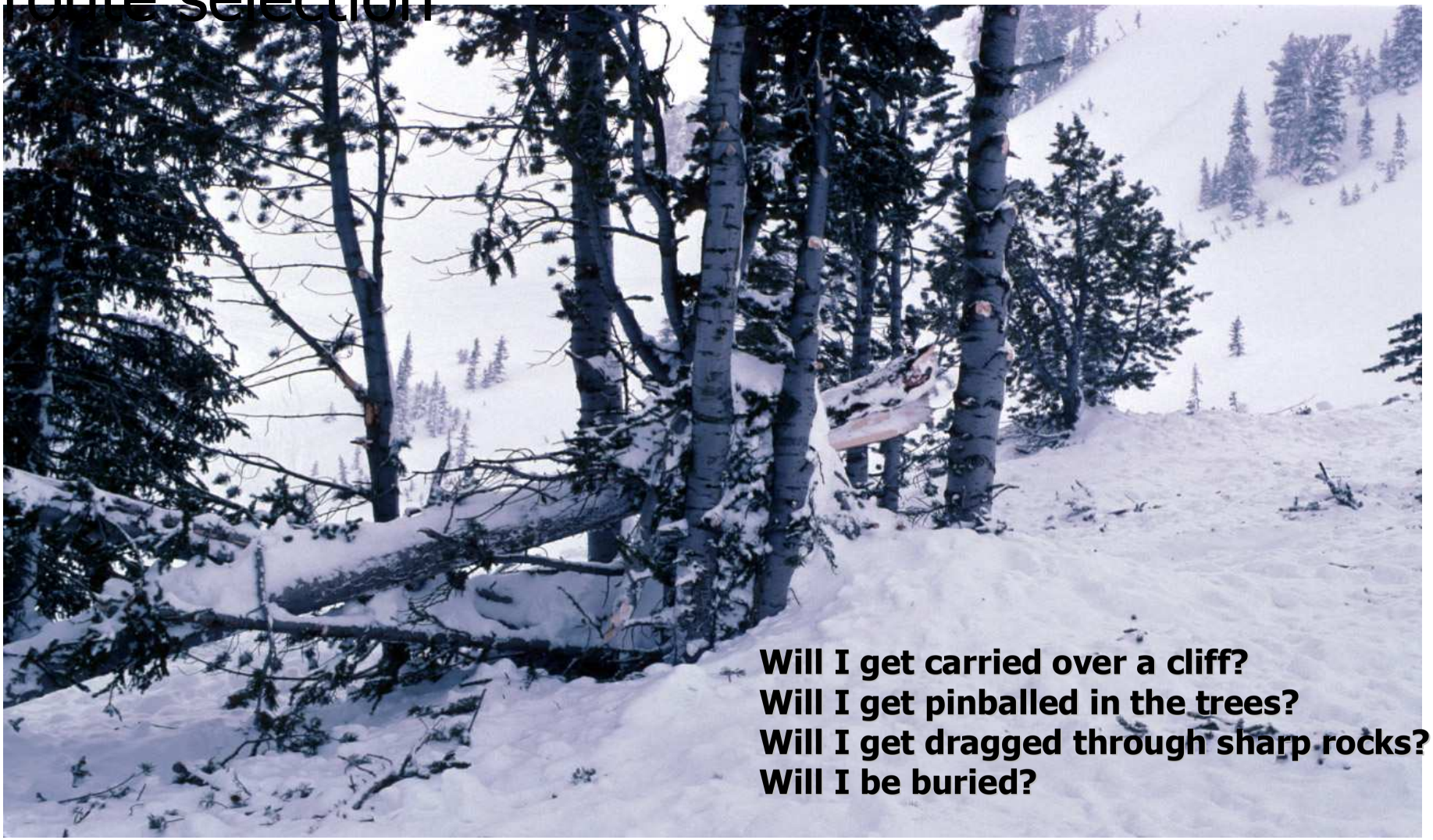


Most killer avalanches are small and human triggered

1. What triggered this slide?
2. Where did the slope fail?
3. What's the slope angle?
4. Where did the debris flow?
5. Could this slide have killed you?



Consider the terrain consequences in route selection



Good route selection can limit exposure to hazardous terrain

Good route selection can limit exposure to hazardous terrain

With good bc habits, you can avoid avalanche danger

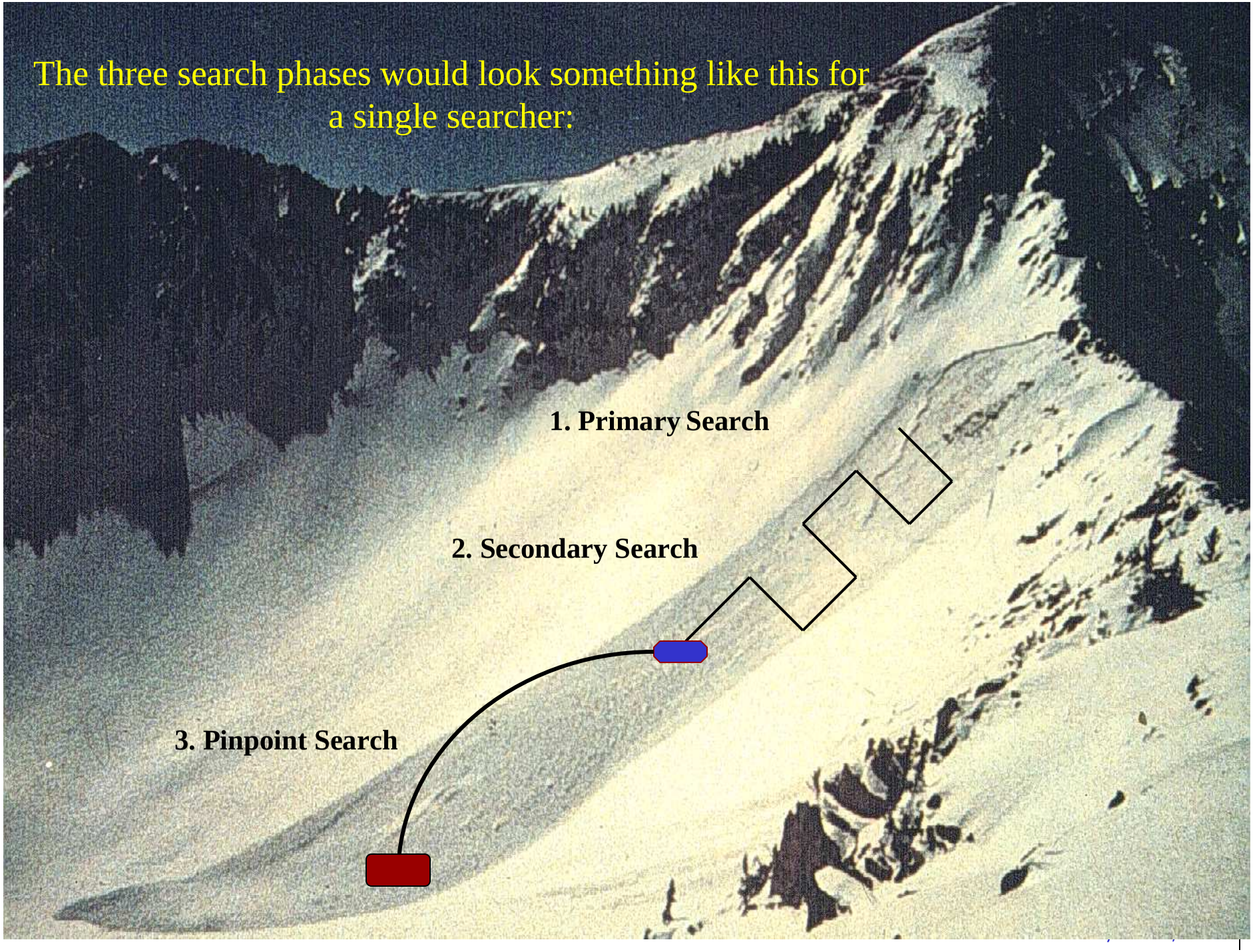
1. Expose only one person at a time
2. Get out of the way at the bottom
3. Never cross above your partner
4. Have an escape route planned
5. Remove pole straps and safety straps
6. Travel in the same route when possible
7. Keep your partner in sight
8. Travel to points of safety

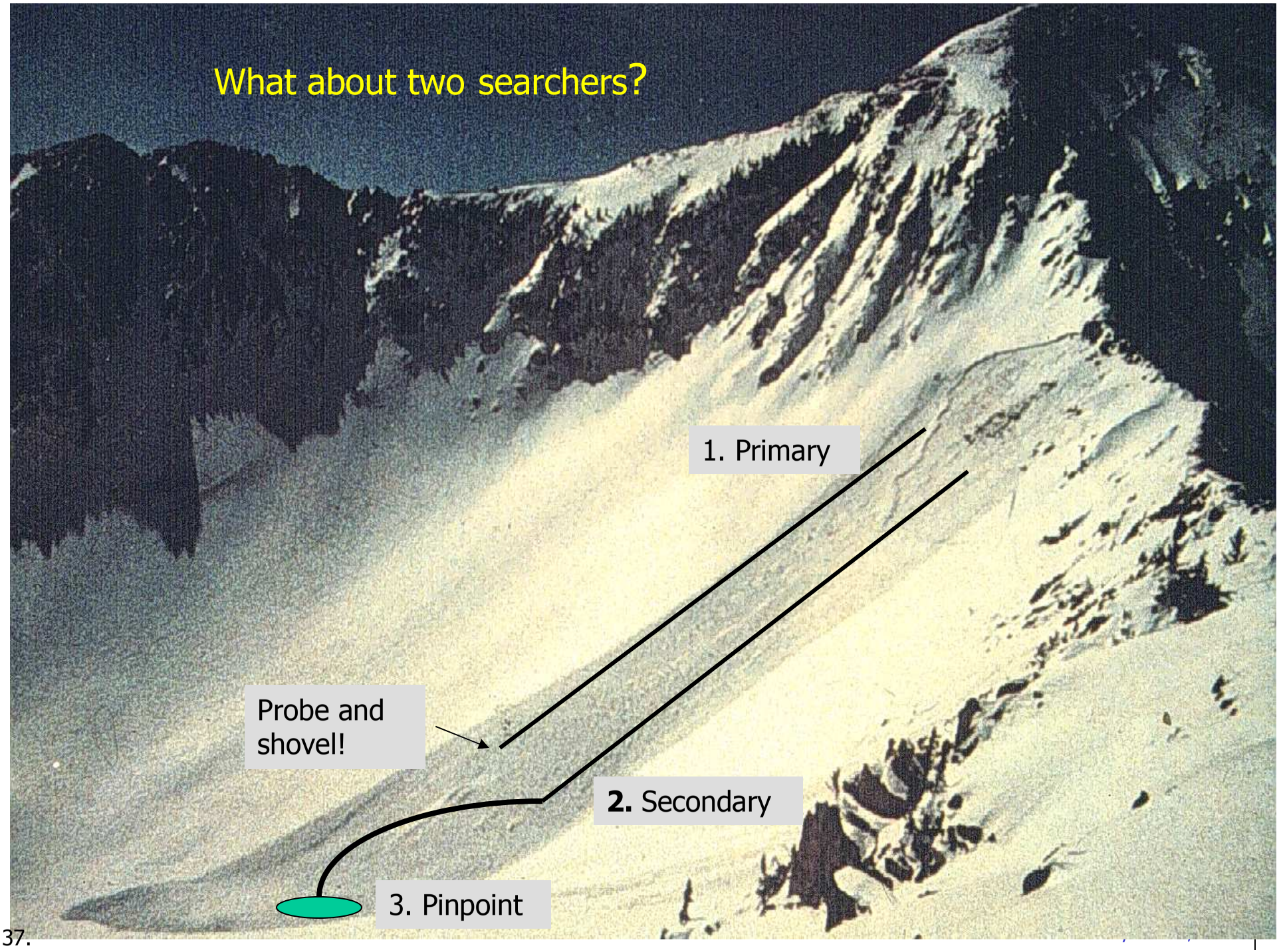
More safe travel rituals

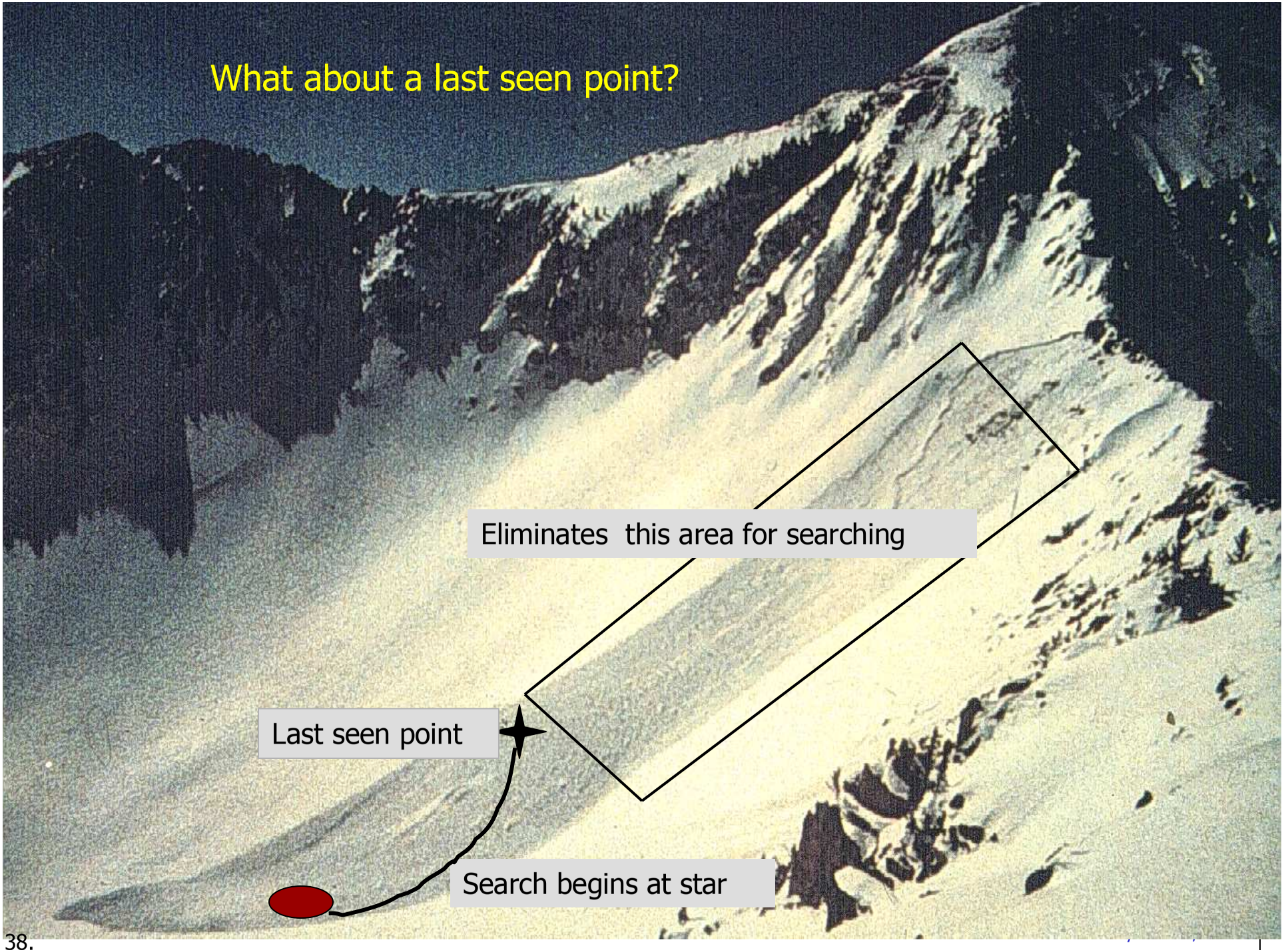
9. Cross high on the avalanche path
10. Carry a belay rope
11. Be wary of cornices
12. Travel gently
13. Turn around or go underground

(Bruce Tremper – staying alive in Avalanche Terrain Ch 8)

What would happen to these two if an avalanche occurred?


The three search phases would look something like this for a single searcher:
1. Primary Search
2. Secondary Search
3. Pinpoint Search


What about two searchers?
1. Primary
Probe and shovel!
2. Secondary
3. Pinpoint


What about a last seen point?
Eliminates this area for searching
Last seen point
Search begins at star

Beacon practice

- Meet Saturday at about 8:45AM at Hoyt Arboretum parking lot (near the shelter) for ½ day of practice with the beacons
- Be sure to check out a BCA Tracker beacon tonight if you do not own your own avalanche beacon. **Check it back in Saturday!**
- Try to get the mechanics down Saturday, especially pinpointing. We'll use them in more realistic settings Sunday.

Sunday session Cancelled