FOCUS ON 30

BY MARK STAPLES

In February 2021 four people died in the Wilson Glade avalanche near Mill Creek Canyon outside of Salt Lake City. Three of the victims had been skiing a section that is 31 degrees in steepness. It was an incredibly tragic event in terrain where few thought such a deadly avalanche was possible. In fact, many locals were shocked because they consider that area to be relatively safe during elevated hazard. Many consider it "mellow terrain," but what does that mean? Why do people consider places like Wilson Glade safe? Because it is below treeline where it is sheltered and has less wind? Because it is not considered very steep (**see the photo with point measurements of slope angle**)? Even though slope angles are mostly in the low 30s, the entire area is steep enough to avalanche. Often ski patrollers refer to slopes like these as "stubborn terrain" because triggering avalanches is a bit harder than on steeper slopes. The UAC has recorded ten avalanches on this slope in the last 11 years, and a UAC forecaster was caught in a slide there in the early 90s but was able to grab a tree before being swept away.

People's perception of terrain and slope steepness is very complicated. What is mellow terrain? Is it terrain easier to ride? Is it terrain safe from avalanches? Both can be definitions of mellow terrain, and all too often we see people confuse these two questions with disastrous consequences. Terrain is a complex topic with many factors besides slope steepness, including aspect, elevation, slope shape, tree cover, sun and shade. Despite these complexities, terrain is the simplest part of the avalanche puzzle to evaluate because it never changes. Instead of getting lost in the complexities of terrain, I prefer to focus on the fundamental question: Is it avalanche terrain or not?

Deciding to enter avalanche terrain requires a complicated decision-making process that is easy to screw up. For me, identifying avalanche terrain is like identifying the door to a casino. If I stay outside, I won't lose any money. I want to have fun, so I enter the casino and begin rolling the dice. Entering the door to a casino is just like entering avalanche terrain, but the challenge is that the door is invisible. The great thing about the backcountry is that we can have a great time without going into avalanche terrain, but we have to know where that door exists.

There are many ways to teach recognizing this door. If it looks fun to ride to an advanced skier or boarder, then it is probably avalanche terrain. Another is a lack of vegetation and flagged trees in runout zones. Another is having to engage your highest heel risers when skinning. We have to teach all the parts of avalanche terrain: starting zone, track, and runout zone. Using slope steepness mainly applies to starting zones. Since we want to help people identify the door, let's make sure we focus on 30 degrees, not 38 when we talk about the slope angles.

In the Wilson Glade accident, there were two parties involved. One group of four had skied an area 31 degrees in steepness multiple times and was skinning up through the starting zone when the avalanche happened. A group of three was in the lower-angled runout zone below. Three people in the upper group were caught and buried, all three in the lower group were buried, and four of the six died in the avalanche. One learning lesson in this accident was that being on or underneath slopes steeper than 30 degrees means you are in avalanche terrain. There are many ways to teach the public and students how to identify if terrain above them is avalanche terrain, and these ideas are outside the scope of this article which is focused on slope angles.

The challenge is that there are many different slope angles used to define avalanche terrain. A quick Google search gives a lot of results: 25–50 degrees, 30–45 degrees, 37/38 degrees, 35–38 degrees. All of which are all correct but confusing with so many numbers and ranges of values. The single number we teach at the UAC and pay attention to is 30 degrees, the door to the casino. All my field partners and coworkers pay attention to this number, and we practice measuring slope angles more than we practice with our transceivers. Identifying avalanche terrain is as essential as transceiver practice, and I would argue identifying avalanche terrain is more important because it helps us avoid avalanches in the first place. It's like staying out of the casino except we still have a lot of fun without the gambling.

Can people accurately measure slope angles? I believe they can, but it requires education and practice. Can people build safe climbing anchors? They can, but it requires education and practice. There are many essential skills needed to safely travel in the mountains, and they all require education and practice. As with anything, there is always room for error. This is why we never rely on a single piece of gear in climbing anchors and add redundancy. Are there risks in asking people to measure slope angles? Of course there are, but the risks of not measuring are far greater. If they do measure, the risks of focusing on a number like 38 are also far greater as well. Few can make perfectly accurate measurements, and for that reason, we should all give ourselves some margin to account for that error. Some suggest typical errors of plus/minus three degrees. Let's still focus on 30 but build in margin from that number. In fact, many organizations and individuals already do exactly that.

It's even more important to practice measuring slope angles because it's easy to misjudge visually. A 30-degree slopes feel totally different in various snow conditions and modes of travel. A good example is ice climbing when a 30-degree slope feels nearly flat. An icy 30-degree slope feels steeper than one with soft snow. Mapping apps can have errors too depending on the resolution of data used to create the topo maps. There's no substitute for taking measurements in the field, and I believe we need emphasize this skill to students and the public. It can start with learning how to measure the slope they are on. Ideally, they learn how to measure a slope near them without getting onto it. There are many ways to have errors in measurements, but let's not get distracted the potential problems. People will almost always make better decisions and safer route choices if they pull an inclinometer out of their pocket.

Should we still discuss the meaning and importance of 38 degrees? Yes, but in the right context of understanding how slab avalanches work. Some methods like DCMR by Ben Reuter (see TAR 39.4) incorporate a range of slope angles for decision-making and route selection. These are more advanced topics and great things to learn when we decide to enter avalanche terrain. The basics of safe travel mean being deliberate when we enter avalanche terrain, and 38 degrees is not what people need to commit to memory. Let's stick to a single number where avalanches begin: 30 degrees, the door to avalanche terrain. ⬢

Photo of the Wilson Glade avalanche. The numbers are point measurements of slope angle.

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