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Mountaineering Risk, Safety and Security

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Abstract

The purpose of this paper is to explore some of the underlying mountaineering risks, safety and security issues found in the traditional activity known as mountaineering. The paper also highlights some of the commonly known and distinguished terms of mountaineering.

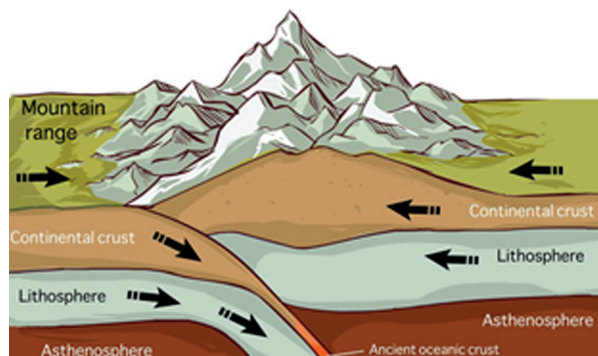
Mountaineering is the art of moving through the mountains using a set of technical 'mountaineering' skills. In Europe, it is often called alpinism when done in the Alps, apart from known as trekking, hiking or even fell walking. It includes traditional outdoor rock climbing in a mountain setting, multi-day rock climbing, skiing, snow-shoeing, a multi-day journey in the mountains, whether camping or in lodges. Mountaineering is not necessarily restricted to the greater mountain ranges as many countries with low altitude mountains have many citizens that go 'mountaineering' inside their borders.

There are no predetermined heights at which a hill becomes a mountain; many geographers state that a mountain is greater than 300m (1,000 feet) above sea level, but the Oxford English Dictionary puts the hill limit at 600m asl. Another consideration is the latitude of the 'hills'. For example, the hills of Scotland, although the highest being Ben Nevis at 1345m asl, are considerably further north than the Pyrenees with its highest mountain, Pic Aneto, at 3404m asl. The arctic winds, the northern European winds and the south-westerly gales are as harsh as any found in the higher ranges.

Keywords: Art of mountaineering, risk, safety, security

Introduction

Many people would agree with the statement that mountains are inherently dangerous. However, I would disagree, or add that mountains are only dangerous when humans get in the way. From a safe distance, when the natural movement of the mountainous environment occurs,



Fold mountains – [HYPERLINK "http://www.Geoengineer.org" www.Geoengineer.org](http://www.Geoengineer.org) illustrating the Indian tectonic plate sliding under the Euroasian plate resulting in the deep surface layer of the Earth's crust being scrapped up to form the Himalaya

people will gaze on in amazement; however, if people or communities are in danger of being engulfed by the mountainside, then the emotion is often one of fear, panic and empathy for those in the path of nature. Mountains are formed basically by three different forces of nature.

Fold mountains occur when the movement of the tectonic plates collide, forcing one plate to buckle under the strain of the collision and consequently forcing the top section of the Earth's



Robwaling - Ian Wall collection - Looking east up the Robwaling Valley and glacier, a valley formed in the folding of the earth's crust as the Indian tectonic Plate to the south slide under the Euroasian Plate to the north

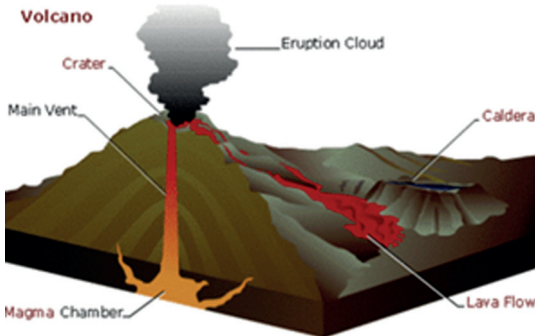
crust to either be lifted or forced down, lifting the opposing plate, thus creating fold mountains. The Himalaya is a good example with the Earth's crust initially staying intact and only folding

Volcanic mountains form when molten rock from deep inside the Earth erupts through the crust and piles upon itself. Undersea volcanoes formed the islands of Hawaii, and the islands seen above the water today are the remaining volcano tops. Well-known volcanoes on land include Mount St. Helens in Washington State and Mount Fuji in Japan. Kilimanjaro, one of the seven summits, the highest mountain on each of the continents is a volcano'



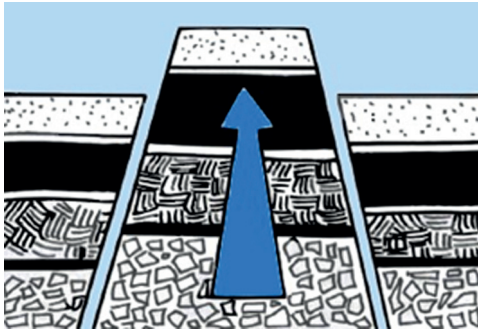
Fault-block mountains form when stresses within and between the tectonic plates lead to cracking and faulting of the Earth's surface, which forces blocks of rock up and down.

The Sierra Nevada in California and Nevada, the Tetons in Wyoming, and the Harz Mountains in Germany are good examples of this type of formation. The mountains of Yosemite are also a good example of Block Mountains with the mighty granite walls still standing proudly above the valley.



Kilimanjaro - Ian Wall collection - Kilimanjaro, the highest point on the African Plate and the largest freestanding volcano in the world

It takes millions of years for mountains to form, except volcanic mountains that can form over a matter of days and weeks. During the evolution of mountain ranges, the raising or valleys, the lowering of the Earth's crust is subjected to millions of years of erosion by the elements. This erosion slowly breaks the surface of the landscape down into the jagged shape of mountains that we



Block mountains and rift valley: HYPERLINK "<http://www.Geoengineer.org>" www.Geoengineer.org These formations are created when the Earth's crust either drops or is raised between two parallel fault lines.

Yosemite Valley - Yosemite National Park Collection HYPERLINK "<https://www.nps.gov/yose/index.htm/images>" <https://www.nps.gov/yose/index.htm/images> Illustrating how a 'block' in the Earth's crust had dropped between two fault lines creating a vertically sided valley.

are more familiar with today.

Mountaineering activities occur in the regions of the Earth's surface (crust) that is subjected to movement. So it should not come as any surprise that any activity in these mountain ranges will be susceptible to further movement of the Earth's crust thus creating a scenario of potential risk which requires skills in mountaineering safety and security to enable mountaineers to make a safe passage through them.

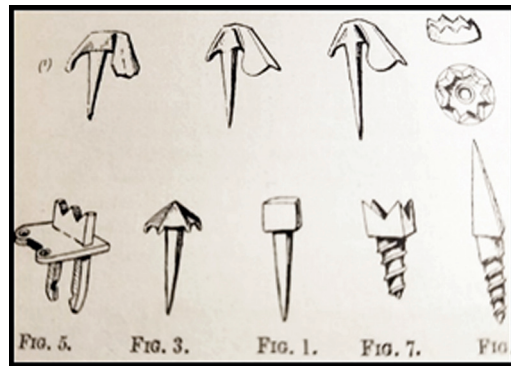
Impact of mountains on habitats and geopolitics

Mountains often serve as geographic features that define the natural borders of countries. Their heights can influence weather patterns, stalling storms that roll off the oceans and squeezing water from the clouds. The other side is often much drier; the rain-shadow formed by the Himalaya of northern Nepal causes the Tibetan Plateau to remain relatively free from precipitation. The rugged landscapes even provide refuge, and protection, for fleeing and invading armies, the European Alps in World War-II.

Mountaineering, risk, safety and security

If we look back into the history of mountaineering, it can easily be seen that humans have always perceived that there was a risk associated with the mountains. From the earliest of times, the sound of avalanches, roaring winds, echoing thunder and lightning all built up images of possible devils, demons and deities living in the high mountains and those theories were backed up by traders who tried crossing high European alpine passes only to witness the anger of the demons; goats and ibex falling from high cliffs reportedly at the hands of those living in these high places who had been upset by 'visitors'. There were tales of misadventure, of getting lost and witnessing unexplained images, possibly broken-specters and of winds roaring like dragons down from the glaciated peaks. Fear and the concept of risk are significant safety factors, and for mortal man, these emotions keep most people safe.

The first people who exhibited the most adventurous awareness of mountaineering risk, *Boot nails and boot nail pattern - American Alpine Club collection* HYPERLINK "<https://americanalpineclub.org/library-blog/2017/12/18/the-evolution-of-mountaineering-boots>" <https://americanalpineclub.org/library-blog/2017/12/18/the-evolution-of-mountaineering-boots> Boots were 'nailed' with different varieties / designs of 'nails' depending on the types of conditions expected to be encountered, in general there were different patterns for snow and ice as opposed to rock.



safety and security were the early crystal hunters; they developed a ‘mountain awareness’ and as Guides became the first piece of ‘essential equipment’ used mainly by the British alpinist leading up to the Golden Age of Mountaineering (1854 – 1865) (Engel, 1950). Although rudimentary long-shafted alpine stocks, clinker nailed boots and rather unsafe hemp ropes were used there were little technical skills as to how these could be employed other than for pulling on or pushing on to surmount difficulties. Victorian mountaineers developed different nail patterns using various nail designs for their boots, depending on the sort of terrain they would likely encounter during their mountaineering exploits.

During the Golden Age of Mountaineering, the understanding and perception of risk were vastly different from today. The safety rules of the day were not to fall off and to be able to climb down anything you climbed up! The use of rudimentary equipment did not allow the level of security that we insist on today. However, the early explorers and mountaineers realized that by taking a guide, a rope, an alpine-stock and wearing boots they could considerably reduce the risks of the activities that they undertook (Engel, 1950).



Artist impression of the first ascent of the Matterhorn, Gustave Dore /Wikimedia - [HYPERLINK "https://www.wikiwand.com/en/First_ascent_of_the_Matterhorn"](https://www.wikiwand.com/en/First_ascent_of_the_Matterhorn) https://www.wikiwand.com/en/First_ascent_of_the_Matterhorn

In 1865 on the descent from the first ascent of the Matterhorn by Edward Whymper and team, there was a fatal accident in which Douglas, Hudson, Hadow and Croz were killed. As a result of that accident, Whymper came under not only close scrutiny but also a public outcry for assumed acts of self-preservation; he was accused of cutting the rope between himself and those who fell to their deaths. This has been disproved as the ends of the rope frayed, they would have been clean cut marks should a knife have been used (Whymper, 1871).

Although there had been other deaths in the

mountains before this incident Whymper had a complete novice, Hadow, on his team and part of the scrutiny was related as to whether this person actually understood the risks he was taking and whether Whymper should have actually allowed him to go with the team on the trip that was, at the time, to a mountain that had a 'last great problem of the Alps' label attached to it (Bennet, 1922, 1950).

This episode in mountaineering history, although many decades before the modern approach to risk analysis in the mountains existed, was certainly a foretaste of what was to come over a century later.

Once the major alpine peaks had been climbed, many ambitious alpinists turned their attention to more distant and often loftier ranges, such as the Caucasus, the Andes, the Rockies and, latterly, the Himalaya. Those prominent alpinists and their European guides of the period included Christian Almer, Melchior Andereg, Hermann Von Barth, Alexander Burgener, W. A. B. Coolidge, Henri Cordier, Clinton Thomas Dent, James Eccles, D. W. Freshfield, Pierre Gaspard, Paul Grohmann, Paul Güssfeldt, John Oakley Maund, Thomas Middlemore, A. W. Moore, Albert F. Mummery, Julius Payer and William Penhall (Mason, 1987)

Those with a heightened sense of adventure, fortitude and a passion for exploration ventured further afield and into the Himalaya not only taking their guides with them but also their developing technical skill base.

In Victorian times there was a definite ladder of experience required to 'enable' a potential alpinist to gain progression within the mountaineering world. Initially many aspiring mountaineers gained experience in the mountain regions of the UK; North Wales and Scotland and in particular in winter conditions. This was regarded as good and essential skill training for a safer expedition to the Alps and in turn for the Himalaya (Hansen, July 1995).

By the 1900s there were mountaineers venturing into the Indian Himalaya and the lessons they learned and subsequently wrote up in their expedition reports were the foundations for future Himalaya expeditions. Using these expedition reports to gain additional knowledge and thus minimize the risk and adding an additional level of safety to their expeditions a new generation of mountaineers ventured forth with the confidence in the knowledge gained from previous expeditions. Along with this literary support, equipment was also being developed as was the mental approach to mountaineering. Today there is a proliferation of guide-books, maps and the internet all providing an added level of safety for the modern mountaineer.

The early Himalayan expeditions, especially those mounted by the Germans on Nanga Parbat and the British on Everest were masterminded by people who had survived trench warfare in the 1914-18 world war. They had faced death in the most inhumane of circumstances that to a certain extent numbed their view of 'sacrifice' for the greater cause, thus getting to the summit was a matter of national pride and never mind the cost. Little, at that time, was understood about altitude sickness and mountaineers simply fort their way through it or died in the process but in the knowledge that they had the best and most advanced equipment at the time.

The European mountain guides were certainly considered as the key factor in reducing risks on mountaineering trips, possibly right up to the turn of the 1900s. But, then World War-I put an end to many European relationships, guides and their British clients more often than not finding themselves in opposing armies, the comradery of the rope was broken (Forbes, 1900).

Mountain ranges often dictate national borders. As a result of the World War-II 1939- 1945 a rapid advancement in equipment design and mountaineering techniques was made to basically provide armies, especially the ‘special forces’ with the equipment and skills to fight and move over hostile mountainous terrain and rocky sea-cliffs, this in turn increased the development of new materials, nylon rope, alloy karabiners, nylon material, silk base layer



Evans & Bourdillon back at Camp VIII after ascent of the south summit of Everest [HYPERLINK "https://www.rgsprintstore.com/products/evans-and-bourdillon-back-at-camp-viii-on-the-south-col-after-ascent-of-south-summit-of-everest"](https://www.rgsprintstore.com/products/evans-and-bourdillon-back-at-camp-viii-on-the-south-col-after-ascent-of-south-summit-of-everest) <https://www.rgsprintstore.com/products/evans-and-bourdillon-back-at-camp-viii-on-the-south-col-after-ascent-of-south-summit-of-everest>

clothing, down jackets, the design of tents, Vibram soled boots, all were eventually incorporated into the development of mountaineering equipment. These developments allowed technical mountaineering skills to be pushed to the limit, the Italians were developing artificial climbing and the use of pitons, etriers (short rope ladders) and the mechanics of the use of the rope, endurance improved and mountaineers were prepared to go further, go higher and to push the risks to, and beyond, the levels of safety so far experienced in the mountains (National Army Museum, n.d.).

Corps but’ in the UK, it was to develop outdoor adventure programs and to foster the personal growth and social skills of participants by using challenging expeditions in the outdoors. These expeditions were generally conducted in the mountain regions. In 1950 Plas-y-Brenin was founded in the UK as a major training establishment for developing mountaineering skills (King, 2006).

The Outward Bound (OB) international network of outdoor education organizations was founded in the United Kingdom by Lawrence Holt and Kurt Hahn in 1941. Initially, in America, its aim was to help shape the U.S. Peace Corps but’ in the UK, it was to develop outdoor adventure programs and to foster the personal growth and social skills of participants by using challenging expeditions in the outdoors. These expeditions were generally conducted in the mountain regions. In 1950 Plas-y-Brenin was founded in the UK as a major training establishment for developing mountaineering skills (King, 2006).

With the development of these ‘outdoor training centers’ more people were taking on the responsibility of ‘leading’ groups in the mountains and in some cases into unrealized danger. At the beginning of this new ‘educational’ era, there were many very experienced mountaineers with no qualifications, then as colleges and universities introduced training courses, the balance changed to one where there were many qualified outdoor instructors with little experience. Over the next twenty years, the balance was



Early wrought iron 10-point crampons designed by Oscar Eckenstein: [HYPERLINK "http://www.lstdibs.com"](http://www.lstdibs.com) www.lstdibs.com/equipment-memorabilia/vintage-mountaineering-crampons-design-oscar-eckenstein/id-f_14310651/

restored.

Up to 1950, risk, safety and security in the mountains had basically been a 'test of moral fiber', mountaineers were empowered by the new and the best of equipment for their era, they had knowledge gained from previous expeditions and from maybe their service in national armies and they felt at the peak of physical and mental fitness.

The summits were at hand!

In 1950, the French ventured into the unknown extremes of 8000m asl and survived basically using a supplementary oxygen system tried, tested and modified from the Mallory era on Everest and the development of down clothing and other equipment as a result of world war two. Nailed boots had been surpassed by highly insulated boots and an early design of 10-point crampons. This oxygen system had been originally tested in the mountains of Snowdonia, in Wales, UK (Norton, 1925).

The 1950- 1960s was the golden age of Himalayan climbing, all the 8000m asl peaks had been climbed, reports written, equipment failures had been rectified, new designs were produced, and confidences were inspired. More was understood of the science of mountains and mountaineering, snow conditions were scientifically investigated, and a lot of research was done on human physiology and the effects of altitude on the human body (Mason, 1987).

Mountaineering risks were being reduced and the awareness of safety and security were increasing. In the drive to do steeper and harder ascents mountaineers were taking equipment design into their own hands and many subsequently established retail outlets.



Petzel, Ergo Ice Tool

Cassin Alpinist Crampons

DMM Mithril harness

Illustrations from the brand on-line catalogue



DMM wire torque nuts, Wild Country Technical Friends, Sportiva Olympic Mon high altitude boots, Mountain Hardwear Ravi Everest Down Suit, A selection of mountain dome tents Illustrations from the brand on-line catalogues

The basic design changes that have come into the market over the last three decades have greatly increased the safety and security margins of mountaineers as well as reducing the risk factors. This applies to other mountain-based sports as well.

However, another issue was surfacing in the Himalayan climbing especially in Nepal- a lack of trained human resources. The mountain people of Nepal, specifically the Sherpa community, took the place of the Victorian Age Mountain Guides of Europe although they were not mountain guides; they certainly knew the valleys and many possible approach routes. It is a well-known fact that all the formative expeditions would not have succeeded if it were not for the mountain workers but being equipped with all the new technology, equipment and mountaineering skills and techniques foreign mountaineers were taking on more challenging and riskier routes. To raise the safety margins of the Nepalese mountain workers and to enable expedition members to continue to use them to support foreign expeditions a greater level of training was required. One of the first people to recognize this was Aleš Kunaver in the early 1970s and he embarked on a massive, state-supported project (Slovenia was still part of Yugoslavia in 1970) and built the first mountaineering training school in Manang in the Annapurna range in 1979 (Slovenian Climbing Portal, 2020).



IFMGA badge - The Union Internationale des Associations de Guides de Montagnes is the International Federation of Mountain Guides Associations, known alternatively by its French, German and English abbreviations: in Nepal the NNMGA [HYPERLINK "http://www.FMGA.com"](http://www.FMGA.com)

The profession of a mountain guide was by now well established in Europe and other mountainous regions of the world but the guides all operated at different standards and with different skill sets, meaning that there was no ‘guiding’ standard regarding safety and security, not only for the guides but also for their clients.

In the UK, there was an increased interest in using the outdoors for developing life-skills for school children. However, in 1971 a fatal situation occurred in the Cairngorm Mountains of Scotland, now known as the Cairngorm Plateau Disaster. This occurred in November 1971 when six fifteen-year-old school students and their two leaders were on a navigational expedition in a remote area, the weather deteriorated and the group adopted their emergency plan and headed for a mountain shelter, but they failed to reach it and became stranded for two nights on the high plateau in a blizzard. Five children and the leader's assistant died of exposure. A sixth student and the group's leader survived the ordeal with severe hypothermia and frostbite. The tragedy is regarded as Britain's worst mountaineering accident (UK Parliament, 1972).

A ‘fatal accident’ inquiry led to formal requirements being placed on leaders for school expeditions and a national training program was devised and made compulsory for all leaders who wanted to take groups into the UK mountains (UK Parliament, 1972).

In 1973, the Nepal Mountaineering Association was formed with the goal of, among other activities, to provide safety awareness and mountaineering skills to Nepali mountaineers.

The International Federation of Mountain Guides Associations (IFMGA), was founded in 1965 by guides from Austria, France, Switzerland and Italy. The aim of the Association is to:

- regulate the mountain guide profession at a global scale;
- represent the interests of the mountain guiding profession to governments;

- support standardized laws and regulations for the mountain guide profession;
- determine mandatory international training standards;
- implement reciprocal acceptance of IFMGA qualification;
- support free professional activity for mountain guides;
- support existing national mountain guides associations and develop new ones; and
- provide services and assistance for mountain guides (IFMGA administration, 2018).

With the development of training and qualification schemes in mountaineering and the concern that trained leaders and guides would be held responsible for the safety of their charges the areas of safety and security are continually being redefined to provide legal protection for both the 'client' and the 'guide' (IFMGA administration, 2018).

Over the last two or three decades the development in technical equipment has surpassed such development of the last century, not only has the equipment developed but so have the skills required to use it, including rescue techniques. All this new and technical equipment is not only backed up by a myriad of training programs on how to use it but there are also many technical manuals and of course the internet giving advice.



In 1990 the first commercial expeditions took place on Everest and slowly over the years the number of people attempting the mountain has increased dramatically. These people have access to all the modern technology, they are supported by well trained and qualified guides and leaders but what many don't necessarily have is on the ground experience that will enable them to meet risk, safety and security situations intuitively (Crockett, 2020).

Modern mountaineer modern equipment - Nirmal Purja Magar collection [HYPERLINK "http://www.Nimsdai.com"](http://www.Nimsdai.com)
www.Nimsdai.com

The development of modern mountaineering equipment provides many inexperienced mountaineers with a false sense of security, basic steps in safety protocol are ignored and the presumed level of risk is disproportional with the actual risk that may be encountered during the intended activity. There is no guarantee that with all the latest and most up to date equipment that a mountaineer today will be any safer than Whymper in 1865 if the practitioner does not have experience of physically challenging situations and using the appropriate equipment correctly under pressure. Training is key to success. Today not only can the extreme mountaineer use the latest equipment but he/she can have a personal diet plan, a training plan and even in low countries there are now high-altitude training chambers meaning a mountaineer can reduce the time he or she spends passing through dangerous environments.

In January 2021, the world witnessed an historic event in mountaineering that has eluded many top mountaineers for two and a half decades, reaching the summit of K2 in winter, the last of the 8000m asl peaks to have such an ascent.

This was achieved with a well-organized plan, a very fit, well trained and unified team of Nepali mountaineers. They had the latest equipment, a determined spirit, they worked as a team plus they also had an extraordinary amount of good luck by having a perfect weather window.

This paper has now virtually joined the loop with the issue that was probably first recognized by the public back in 1865 with Whymper and the accident on the Matterhorn.

There is a real risk of going into the mountains with inexperienced people. What are the safety and security issues that should be considered?

Conclusion

In terms of mountaineering activities risk can be identified in three ways:

Objective risk– these are risks that are inherent in mountaineering, rock fall, avalanches, lightning strikes, earthquakes etc. Although mountaineers are not capable of controlling such events it is possible through thorough training and experience to learn to minimize some of the risks in certain situations. The development of the appropriate skills is paramount to being a good safe mountaineer both in understanding the potential risk and recognizing the conditions that could result in such natural events (with the exception of earthquakes) and then the skill in being able to deal with the fallout from such events. For example, recognizing the snow conditions and a mountain side that might be a potential avalanche risk and then being trained and aware of how to use an avalanche transceiver and what to do if caught in an avalanche.

Subjective risk – risks that a mountaineer has direct control over, human-caused incidents. To follow the line of the example given above. A mountaineer goes into an area where they fully recognize that there is a high risk of an avalanche, but the individual is prepared to take that risk, as opposed to finding a different route.

Legal risk – this sector is a newly encountered risk where professional guides and leaders are taken to court with a legal issue pending against them. This could be as a result of a ski guide taking a client ‘off-piste’ when the client falls and breaks a leg as a result of not listening to the guide or as the result of the client’s technical ability not being as high as maybe they claimed. The risk is that the client might sue the guide for negligence.

Risk vs comfort zones



Everybody has a level of acceptable risk and this places them in a specific comfort zone, these zones vary from person to person and usually depends on the level of experience an individual has in certain adventure situations.

1. **Play zone** – there is no technical challenge and the client is happy with the risks they are faced with.
2. **Adventure zone** – the client is moving towards their skill limit but is still just within their risk acceptability area.

Mortlock C. 1984. Four stages of adventure

3. Frontier adventure – the client is now on the verge of being out of control and at the limit of their skill set.
4. Misadventure – the client is completely outside their skill set and beyond their level of acceptable risk

Risks never stay static, for example, what essentially begins as a low-risk activity can quickly change into a high-risk situation as a result of unforeseen circumstances. For example, trekking below a glacial lake on a nice sunny day when all of a sudden, the dam bursts.

On the other hand, a guide or leader who does not fully understand their client’s expectations runs ‘the risk’ of having a dissatisfied client. Although it might not result in any injury it could damage the guide’s or leader’s reputation and work prospects.

The leader’s/ guide’s ability to quickly and decisively complete a risk assessment is critical to the safety of the party.

	10
	5
Safety	0

5

Assessment of RISK – what are the chances of something happening during this specific activity – for example crossing a bridge on a scale of 1 : 10?

Assessing the safety situation of a group is a skill that comes out of performing a good risk assessment. For example, if the risk facing a group appears to be accepted by the group then the guide or leader should still put a safety plan in place, just in case. For example, a group has to do a river crossing; all clients are within their comfort zone A. However, there is always the ‘what if’ question. Safety measures should be put in place just in case; all rucksack straps should be released in case the situation develops into one where the rucksack has to be shed, a small rescue team should be placed downstream ready to collect any items of equipment or even a client that floats downstream, cameras should be stored correctly ‘just in case’. Obviously, there are degrees of safety measures that can/ can’t be put in place and these impacts on the risk. If there is a big waterfall downstream from the assumed safe crossing point and if there are not the staff to provide a back-up rescue plan, then the risk goes into the zone of too dangerous B.

Security

Security also comes out of a good risk assessment. This is the skill that after identifying a potential risk the guide or leader puts in place a system to ‘secure’ a client ‘just in case’. For

example, if a client is walking along the edge of a crevasse it might not be possible to have a back-up rescue team below the client, ‘just in case’, so to secure the client the guide or leader might attach a rope just to provide additional security for the client.

A lot has been documented in the Journals of the Himalayan Database covering the deaths on Everest and the circumstances surrounding the events. Mark Horrell (September 2020) considered the executive summary of an investigation into the recent history of fatalities on Everest. He concluded:

Overcrowding does not have a significant effect on either success or death rate?

This is perhaps the most surprising finding from this study, and a strong argument against much of the media rage about Everest expeditions, which has focused on overcrowding more recently.

Are photographs of climbers queuing on the Hillary Step evidence that Everest is becoming more dangerous?

It’s certainly true that spending an additional hour or two in queuing traffic over 8,000m increases the risk of altitude sickness and frostbite. It’s therefore reasonable to assume that crowding like this, increases death rates and lowers success rates.

However, the data suggest that it doesn’t?

In 2019, 65.9% of all summit bids were made in just two days, 22 and 23 May. Neither the probability of summiting (92.4% on these two days vs. 90.5% on less crowded days) nor the probability of dying (1% on these two days vs. 1.2% on less crowded days) was significantly different.

It was a similar story in 2018. In that year, 58.2% of all summit bids were made on four days, 16–19 May. In this case the probability of summiting was slightly less on these four more-crowded days (91.1% vs. 95.3% on less crowded days) but not significantly so. In 2018 there were no deaths during summit bids on either crowded or uncrowded days.

This may seem counter-intuitive, but what this tells us is that although Everest is becoming more crowded, it is not yet so crowded that climbing Everest is becoming more dangerous. If you think about it another way, there’s a reason everybody climbs on these more crowded days – because the weather is much better, and the mountain is consequently safer (Horrell, September, 2020).

The critical point

On Everest, weather still poses a much greater risk than people, and as long as operators are able to manage the risk, such as by taking more oxygen and preparing climbers for a longer day, then it’s still better to climb during more crowded days than during marginal weather windows.

Taking more oxygen will also require an increase in human sources (cost), an increase in oxygen (cost), an increase in technical guides to manage exhausted and possibly stressed clients (cost) and possibly additional training at altitude pre-Everest for clients (cost). The questions are, are the Everest operators prepared to take the risk to operate as they are now,

with possible consequences of additional deaths, are they prepared to take the risk of increasing client support at the cost of losing clients due to expeditions becoming more expensive and are clients prepared to pay the extra for a less risky option?

Whenever I do a risk assessment, I always add a postscript – What would I tell a board of inquiry if something happened!

Recommendation

- Develop a good risk assessment strategy, base it on practical personal experience developed over years not months.
- If leading a group of inexperienced clients never works to your limitations, if something happens you always need to think the problem through without having to worry about your own safety and security.
- If you are working with more experienced people and you are all at your limitations, accept the risk that you might have to sort your own situation out without the support of others if something goes wrong.
- Do not cut safety margins for the sake of profit.
- If you are getting paid to do the guiding or leading, remember one of the clients' expectations is to be looked after and that is your responsibility that is what you are getting paid for.
- Do not over-extend your limitations but rather extend your limitations with appropriate skill-based training.
- It should also be part of your risk management skills to develop a good working knowledge of the most important downloadable smartphone applications that are relevant to the mountaineering sector in which you operate.
- Continual Professional Development (CPD) will become increasingly important and so it is important to keep a record of all training programs that you attend to prove you are up to date with all the new methods and skills required to be a safe guide and leader.

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