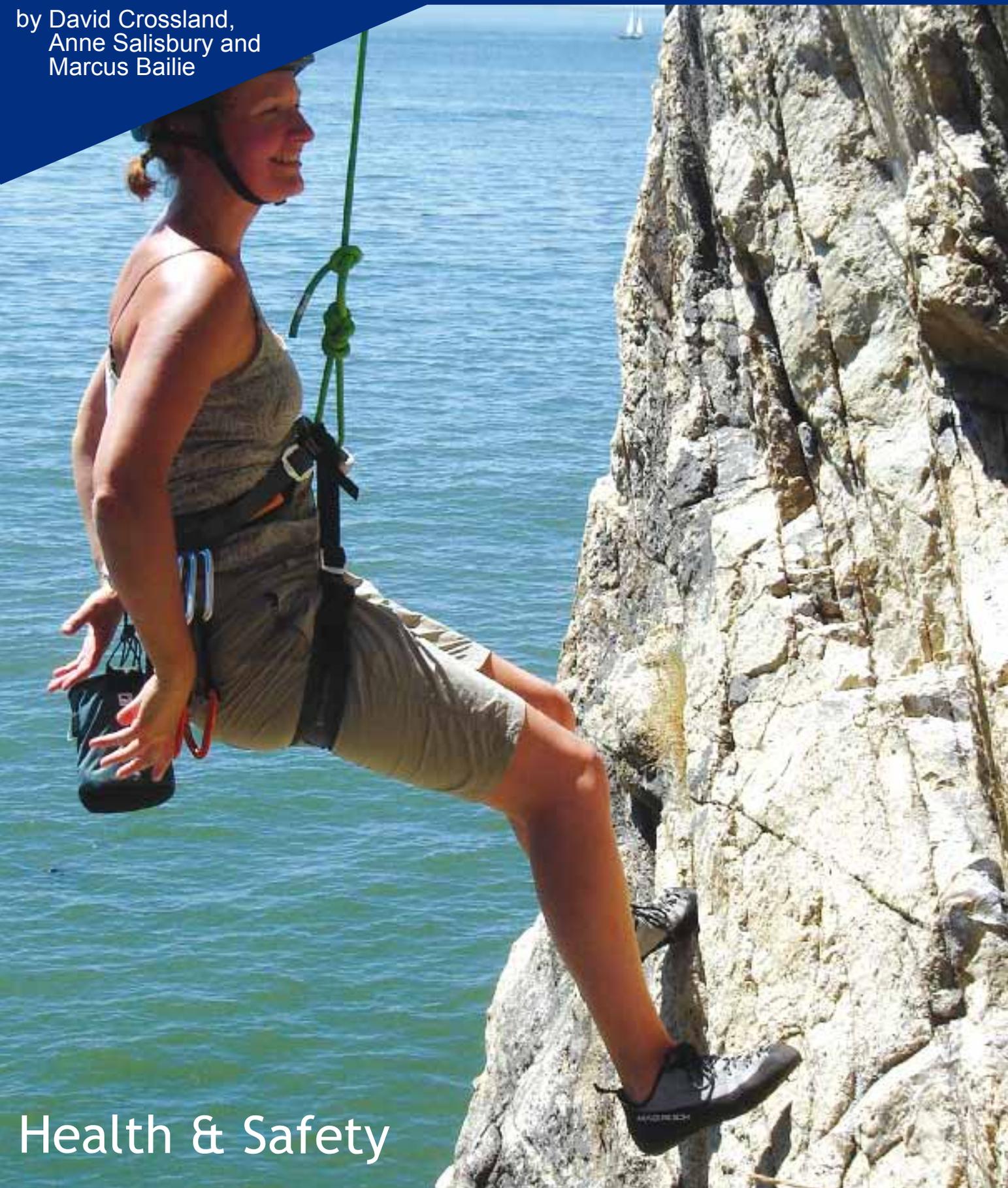


Belay if you will...

Or, How to spot Lemons and be a Swan rather than a Turkey in climbing related activities

k

by David Crossland,
Anne Salisbury and
Marcus Bailie



Health & Safety

Reflecting on his climbing career and, perhaps especially, the tragedy on the first ascent of the Matterhorn, Edward Whymper wrote:

A lemon then, is any factor that could lead to an accident, given the presence of other contributory factors (other lemons).

“Climb if you will, but remember that courage and strength are naught without prudence, and that a momentary negligence may destroy the happiness of a lifetime. Do nothing in haste; look well to each step; and from the beginning think what may be the end.”

Given recent accidents and the regular observations of the Adventure Activities Licensing Service this sentiment would seem appropriate to all instructors who work on climbing and high ropes sessions. Anyone engaged in this type of activity should indeed “look well to each step” because the consequences of error or misjudgement may be a near miss but alternatively it may be a seriously injured client and, for the instructor, what Whymper described as “a grief upon which I have not dared to dwell”.

In theory, climbing wall and high ropes sessions should be the safest of all ‘adventurous’ activities. There should be no uncertainty of outcome beyond how far an individual will be able to climb. The environment is artificial and controlled, the equipment is well engineered for the job and there are tried and tested systems available to protect all involved.

In reality this is not the case.

While we would like to stress that accidents on all climbing related outdoor sessions are rare we have observed a ‘cluster’ of similar accidents involving both instructor belayed sessions and peer belayed sessions. Although we believe it is not possible to prevent all accidents we do believe that there is clear benefit in seeking, and implementing, simple measures to stack the odds more in your favour and to deal with the easily preventable ‘silly’ accidents.

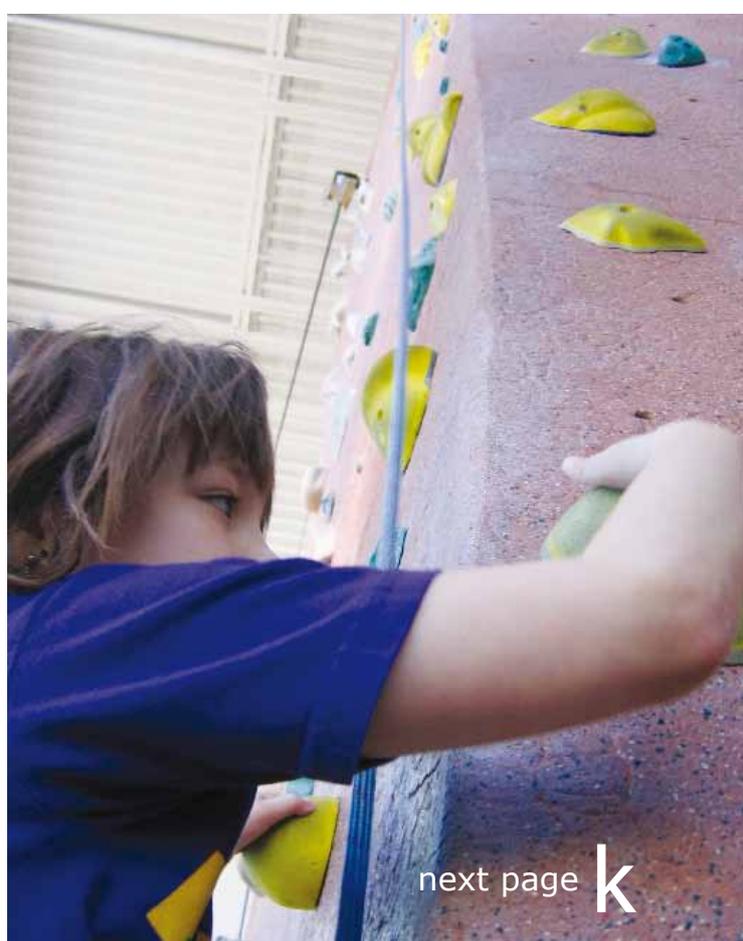
The Lemon Theory

There is a very fine line between near accident and actual accident and often the difference comes down to lemons. The ‘lemon’ theory of accidents has been written about in New Zealand and North America. Marcus Bailie referred to it in Horizons (42). According to the lemon theory, accidents are not necessarily the result of a ‘chain reaction’ or ‘domino effect’ where one thing leads to another, until the accident happens. Rather accidents happen when several unrelated factors occur at the same time or, like a casino style fruit machine, when all the lemons line up.

A useful practical aspect of the Lemon Theory is that you can encourage your students and staff to “look for lemons” without being accused of being a scaremonger.

We could categorise lemons into three main types:

- a. Unavoidable and, given the adventurous and educational nature of our activities, bound to happen: e.g. a climber falling off; a novice belayer making a mistake; an instructor being distracted. If ALL these happen at the same time an accident is likely. Hopefully, however, the supervision system ensures that they do not.
- b. Avoidable and unnecessary: e.g. belayer not being taught properly, or allowed enough time to learn the technique; equipment not correctly checked before someone climbs; inappropriate technique or incorrect use of belay devices (i.e. belay plates used in a way that cannot be correctly locked off).
- c. Rare and unusual but serious if they happen: e.g. uncharacteristic error by an experienced instructor; equipment malfunction or failure; environmental (e.g. bough of tree falls off, bolt of lightning); sudden medical emergency (student collapses).



next page **k**

Let us look at an example: on a peer belayed climbing session we could identify the following lemons:

- the climber falling off
- the belayers fumbling the rope so as to be unable to hold a fall
- the instructor looking up at the climber, not at the belayers
- no-one tailing the rope for an inexperienced belayer.

We see all of these happening frequently on climbing and high ropes sessions but they rarely result in accidents. This is because an accident requires all the lemons to line up – all four of the above need to happen at the same time. Thankfully this is rare but, like the winning jackpot payout on the fruit machine, it is inevitable sooner or later– it will (and does) happen.

Human Factors

Human factors are of major importance in effective outdoor leadership, in risk management and in accidents. Two factors in particular stand out, which are relevant here. It is our view that the rarity of accidents has led to a culture where the following appear too often to play a role:

Peer, client, time pressure

Sessions are often of extremely short duration so you are under time pressure from the start. All the clients want to complete the activity and you are keen to achieve this. Moreover, other instructors seem to manage to get all the clients through in the time allowed so you feel you have to do it as well. In this heady mix, the safety of the clients needs to remain paramount.

Incorrect assumptions (often based on negative reinforcement).

All too often instructors appear to act as if they assume the belay system is 'safe'. They appear to act as though the age, maturity and competence of the clients is not a factor and do the same thing with every group. The most common assumption seems to be that it is normal for one instructor to supervise numerous ropes with peer belaying.

Likewise, many systems appear to assume that the instructor is infallible, i.e. 'if we get the instructor to clip clients on there is no need for a double check because the instructor won't make a mistake'.

These are examples of dangerous 'learned behaviour through negative reinforcement'. In other words you haven't had an accident doing things this way, and because you haven't had an accident it reinforces your behaviour and the behaviour becomes the norm – this is an incorrect assumption because it falls into the 'turkey trap'.

How to Misinterpret Prior Experience - The Turkey Trap

The turkey bases its understanding of the way the world behaves on its own past experience. It has shelter, warmth, and everyday it gets food and water at around the same time. Day after day, nothing happens to threaten an interruption of peaceful existence, or even warns of it. Using this experience to look forward to what any given new day will bring, leaves the turkey sadly unprepared for the moment when, dramatically, everything changes and it becomes someone's Sunday roast. Just because things have always worked in a particular way in the past does not necessarily provide confidence that they always will. It is important to temper past experience with critical thinking and awareness of the possible if we are to avoid being the turkey!

Instructors are not Infallible

In addition to accidents where the client(s) made a mistake with peer belaying the following have all occurred in the past two years:

- a. a teacher seriously injured because an instructor didn't connect the safety rope before the client jumped from a high ropes course.
- b. an 11 year old girl seriously hurt because an instructor didn't correctly screw up a maillon and the safety rope came out when the child fell.
- c. A year four primary pupil fell from a wall and was injured because the instructor had not connected the safety rope properly.
- d. An instructor threaded a grigri the wrong way; the climber fell from the top of the wall and was injured.
- e. A client injured when they hit a lower element on a ropes course because the instructor belaying them lowered too quickly.

The common denominator in the vast majority of these is 'the instructor didn't...' We really must dispel the myth of instructor infallibility and accept that qualifications and experience do not remove human frailty and that instructors **WILL** make mistakes. This is true for all instructors



irrespective of experience and qualification. We are all human and, therefore, capable of error – especially when engaged in routine and repetitive tasks which do not provide sufficient stimulation to keep us alert. Consider how many outstanding climbers have died doing simple things, well within their capabilities. The secret is to ensure that these mistakes do not lead inevitably and irretrievably to an accident.

In addition to serious accidents (which we have already stressed are rare) we regularly see easily avoidable lemons including:

- Instructors focusing their attention in the wrong place (usually up at the climbers who are safely tied on).
- Instructors standing where they cannot see all the belayers at all times.
- Large amounts of slack on the 'live' side of bell-ringing belay systems
- Instructors not using their voice well to control individuals or groups or using confusing words / phrases. (An example would be the instruction to 'keep the rope tight' when bell ringing. The child pulling down on the live rope pulls for all they're worth to keep the rope tight but does not realise they are creating slack between them and the belay device. What you want is no loop of slack rope in the belay system.
- Instructors appearing to trust that the 'system' is safe – misplaced faith in 'self-locking' belay devices for instance.
- Instructors automatically supervising three or four ropes - because this is 'normal' regardless of the age and ability of the clients or the experience of the instructor.
- Systems reliant totally on instructors always doing the right thing and not involving clients in creating a 'double check system'. The 'Principle of Duality' is not the same as duplication. For example having TWO instructors checking every karabiner would be disproportionate to the scale of the problem, but having the young person doing it up and the instructor then checking is simple and proportionate. It is also more educational!
- An overly narrow focus on the causes of accidents. For example, there sometimes appears to be an assumption that mechanical or technical failure is more common and more serious than human error. The opposite is in fact true – accidents in adventure activities are far more likely to be due to human error than mechanical failure. Therefore, in designing systems or choosing equipment, we need to focus primarily on reducing possible negative impacts of human factors rather than making our prime focus the risks due to potential mechanical failure.

A Way Forward

We do not pretend to have all the answers to these problems but here are some suggested pointers and trigger questions to provoke your thinking, whether you are a manager, a technical advisor or an instructor.

Some key issues to consider or have a view on:

▼ **At what age / stage of development can a young person understand what they are doing when they are asked to belay in a conventional way?**

We believe somewhere in the secondary school, which tends to suggest that children younger than this can only belay with direct supervision (i.e. a competent person tailing the rope) or with a failsafe system (NB we do not consider that a grigri is a failsafe system).

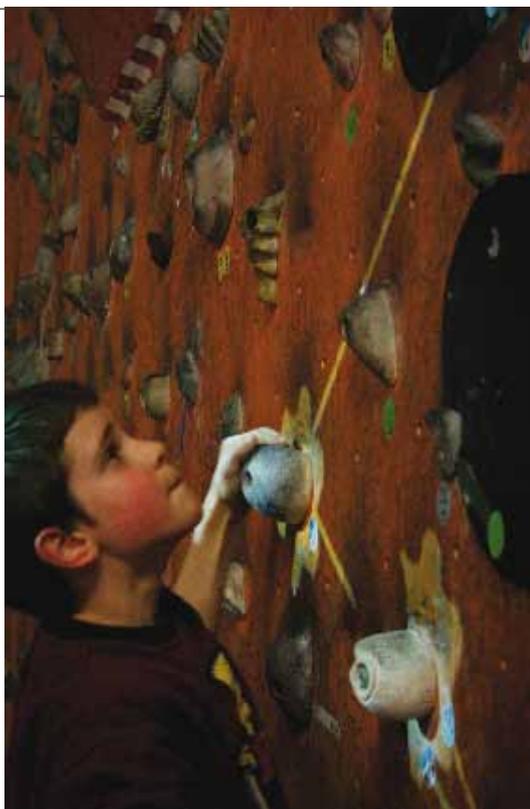
▼ **What is the default number of ropes an instructor can supervise?** *We would suggest one. One instructor can coach one belayer or belay team at a time. Each additional rope requires a positive decision by the instructor that the previous team is competent. Which in turn requires a level of instructor experience, which is likely to be beyond the abilities of a newly assessed climbing instructor.*

▼ **What is an appropriate staff student ratio for climbing sessions?** *Perhaps the ideal is 1:2 and go climbing! In the real world careful decisions need to be made about what is viable. When did you last give serious thought to the aims and structure of your climbing sessions and the appropriate ratios for these?*

▼ **How long should a climbing session be or what can you realistically include in the time available? (e.g. how much time is spent learning how to belay compared with learning how to climb?)**

▼ **The teaching of peer belaying is a learned skill, which takes time and expertise.** *How much training do you give your climbing instructors, especially those who are trained and assessed in-house?*

▼ **In our experience most children are visual or kinaesthetic learners.** *Do you give them sufficient time to 'see' what they are being asked to do and to practice with the system before they start for real?*



▼ **Is there a difference between deploying an experienced climber, trained to teach climbing, and an 'instructor' with no experience of the activity beyond being trained how to run a high ropes course session?**

▼ **How do instructors maintain freshness?** *Things to consider are: keeping variety in the job (instruct different activities, different types of group etc); limit the time any instructor spends on one element of a ropes course or one job on the wall; frequent monitoring by management.*

Being a Swan

Supervising climbing-related sessions should be stressful; the consequences of a momentary slip are appalling. Your aim must be to appear calm to clients but alert, focused and concentrating hard with 360° awareness. Aim to be a Swan – serene on the surface but legs paddling madly underneath. The moment you find yourself relaxing should be an alarm call to stop.

A Golden Rule and Trigger Question for Instructors

If you want to know if a belayer or belay team needs your direct supervision ask yourself this: **'do I trust this person/group of people to belay me while I climb up and jump off?'** If the answer is 'no' then you should not let go of the tail of the rope.

NEVER take your attention away from a novice belayer (or group of belayers) FOR EVEN A MOMENT unless:

- you are holding the tail of the rope
- you have 'tied off' the ropes, or similarly locked the system, to allow the belayers to let go
- you have total confidence in the competence, maturity and experience of the belayer(s) to belay unsupervised

A Golden Rule for Managers

Wherever possible ensure your operating procedure takes account of human factors and do not rely SOLELY on one instructor's ability to carry out routine and repetitive tasks.

In truly adventurous settings in the natural environment there are many occasions when safety relies purely on the instructor's ability and judgement, but working on climbing walls, high ropes courses, and similar is to operate in an artificial, man-made environment carrying out routine and repetitive tasks. In such cases human beings are more prone to make mistakes and so it is important that wherever possible, at every crucial point in the system, there is some form of a double check. At its simplest this may mean the young person does the action and the instructor checks, or the other way round. Either way clients need to be involved and, therefore, given sufficient information to be involved in checking and confirming their own safety.

Perhaps a sign should be placed at the bottom of every climbing wall and high ropes course reading something like:

NOTICE TO CLIENTS
Your instructor is human and can, therefore, make mistakes. You should be wary of devolving all responsibility for your own safety but should stay alert and, if in doubt, stop and check with the instructor.

Remember that accidents are rare but on climbing walls and ropes courses they should not really happen at all. Look out for lemons, be wary of turkeys and take account of human factors and instructor error. Involve clients in decisions, don't remove all responsibility from them and build double checks into your systems. Most important, remember Whympner and "look well to each step..." ■



Author's Notes

David Crossland, Anne Salisbury, Marcus Bailie
- April 2009

The authors are 'mature' Mountain Instructors with a variety of experience. With a combined working life of over seventy-five years they have seen their fair share of lemons and have been reminded on several occasions of their own fallibility! At the present time they all work for the Adventure Activities Licensing Service.

Photos: Used under Creative Commons License: by iwona_kellie, liquene, skpy, georgio and Karen Stuart.