

Climbing Accidents in Australia

1955 - 2004



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Iain B. Sedgman

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By Iain B Sedgman

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Executive Summary

This paper looks at accidents in Australian climbing, in all its forms, over the past fifty years. An analysis of some of the data is provided. The seriousness of easier climbs is scrutinised and the issue of helmet wearing commended. The continual noting of poor gear placement and pieces ‘pulling’ as well as the issue of rock fall are all reported on. At the end of the day the information presented may assist many to develop a keener interest in minimising climbing accidents and preserving our basic rights to enjoy an adventurous sport that affords so much pleasure to so many.

Introduction

In 1973 after climbing for four years, I started on two projects: the creation of a rock climbing museum and the collection of Australian climbing related accident data. The museum project is still ongoing and includes some interesting items such as early Alcoa carabiners, Ewbank chocks and even Chris Baxter’s bivvy seat from early Mt Buffalo North Wall ascents.

The time has come though to do something with the accident data. The Australian Climbing Accident Database (ACAD) is now large enough, with over three hundred records, to extract some useful information. ACAD holds data about Australians involved in climbing accidents anywhere and foreign climbers involved in accidents in Australia. ACAD has accidents recorded from the nineteen fifties to mid 2004.

Generally speaking the accrual of climbing accident data tends to be an ad hoc affair and this is true in many parts of the world. Indeed sporting accident data has tended to be this way. The Australian Sports Injury Data (ASID) working party makes the point about the sources of sport injury data including ‘individual sport, club or practitioner collections’ (ASID p 5).

Australia, with fewer climbers in earlier years had fewer accidents and these tended to get overlooked, except for the occasional mention when they were more serious. Lesser accidents usually went unreported except for the odd comment in a guidebook or article. I have dutifully endeavoured to glean those incidents and include them going back as early as 1955.

Some people will question the need for this information to be made public. Overseas publication of such information doesn’t seem to cause problems and generally sports injury databases are used to reduce sports injuries and minimise the severity of accidents. Personally factual information should not be hidden away but in the same manner that pilots learn positively from mishaps and are prepared to record them without fear of losing their licence so should we be prepared to learn.

This ridiculous business of Search & Rescue (SAR) undertaking rescues and those same bodies keeping the accident details to themselves is absurd. I know that, for example, if a rope broke during an accident I would like those ‘professional’ bodies to fully investigate the matter and hopefully ensure that any lessons learnt were passed on to climbers at large. Why should we have to wait for a death before we can officially learn about what went wrong and how it might best be prevented? Luckily newsgroups and forums on the Internet are a valuable tool for sharing information about accidents.

Some accidents border on the comical. A case in point, I had a mate Robert on belay 8m up and telling me it was easy as he placed a runner. I decided it was opportune to relocate myself off a sharp log. He fell at that instant and I stopped him just short of the ground. We both were white and I asked how he fell if it was easy. He replied that he had said it was greasy! Luckily we can both now laugh.

Many accidents end tragically and accordingly I commend the reader to carefully studying the information contained with a view to learning lessons and promoting safer climbing. We all share the risks, avalanches, rock fall, but we do need to think about taking proper care, asking ‘what ifs’ more often and being more prepared.

Table 1: ACAD Overview

			Fatal	Severe	Serious	Moderate	Minor	Unknown
Category	%	Entries	5	4	3	2	1	0
Rock Climbing	69.2	204	25	19	76	50	29	5
Mountaineering	21.0	62	46	1	8	6	1	0
Gym Climbing	3.7	11	1	2	6	2	0	0
Bouldering	1.7	5	0	0	0	5	0	0
Abseiling	4.4	13	11	0	2	0	0	0
Climbing Sub-Total	100.0	295	83	22	92	63	30	5
Other		7	5	0	0	1	1	0
Total		302	88	22	92	64	31	5

Sources of Accident Data

I have used every possible source at my disposal. Word of mouth from other climbers, magazines such as Rock, Wild and Mountain, personal witness, newspaper accounts, principally from Victoria, TV news items, climbing journals and guidebooks and my presence at over a dozen rescues. Naturally many, many accidents have not been included but that is the nature of most climbing accident databases. Lastly in extreme cases coroner’s reports offer a sad, but formal review of what has gone wrong.

Overseas climbing journals have often published accident summaries or obituaries. Mountain magazine was widely acknowledged to be fairly unique in the sporting world in having the only permanent obituary column.

Victoria, because of my location, gets a larger emphasis for less serious accidents because these are easier to hear about with the benefit of the local grapevine. The Victorian Climbing Club (VCC) was formed in 1952 and did take an early lead in this field in the late sixties with the creation of an accident report form. The form was popularly used, albeit in a jovial manner at times and lapsed by the late seventies. Interestingly, the VCC constitution expressly charges the committee to investigate serious accidents although this has seldom been done.

About 2001 an Australian website was created to attempt to record climbing accident data but it seemed to fizzle about 2002. I have striven to protect the data in ACAD to ensure confidentiality, when sought, particularly when in climbing accidents the piecemeal nature of events is often only fully understood after several people have provided titbits of information, which they may not have provided if their names were mentioned. I have also endeavoured not to refer specifically to victims by name or to identify their accident specifically. Such records are dutifully maintained in ACAD though.

The Fields

The choice of data items to collect has been based on my initial design with some modification over the years such as the addition of a TIME field. Some of the data fields in ACAD include: Date, Time, Activity, State/Country, Mountain, Cliff, Route, Grade, Name, Age, Gender, Experience, Address, Nationality, Injuries, Seriousness, Type, Additional Info, Helmet, Rescue Group, Source, Comments and Partner.

Worth noting is that the ASID working party has published the Australian Sports Injury Data Dictionary (ASIDD) covering:

'guidelines for injury data collection and classification for the prevention and control of injury in sport and recreation.' (ASID p1)

Classifying the Activity

One area of difficulty in classifying accidents is determining the actual activity. The failure in the press to correctly identify the nature of the activity ensures that from time to time fishermen are referred to under a broad tag; 'cliff man trapped' and rock climbers get the bad press.

If someone is abseiling whilst on a weekend of rock climbing it may be an abseiling incident but it occurred whilst on a rock climbing activity. ACAD records the overall activity and then the type of accident such as 'Fall abseiling'. Lastly every effort is made to also record the cause.

If people canyoning have an accident but are principally involved in abseiling what category should it be? Ignore it as a canyoning accident would mean to lose data on the dangers of long repetitive abseils in wet, cold or adverse conditions. These types of accidents have been classified under the activity of abseiling.

Persons injured on the scramble to a cliff have been treated as a rock climbing accident because the person is only there because of the climbing activity. I have drawn the line, as it must be in such a subjective area, at car accidents getting to the cliffs. However deaths in mountaineering on the approach marches or similar are treated as mountaineering accidents since they are an integral part of the mountaineering activity.

Bouldering and 'Climbing-gym' accidents have become noticeable in the past few years, though the latter are often not widely reported because of commercial/legal considerations.

I have **excluded** further reference to the seven accidents in the ‘Other’ category. These relate to personal tragedies, people trapped on cliffs at quarries and to scrambling deaths in the mountains, such as that of a man at Mt Rosea in 1964 and another at Mt Arapiles in 1968.

Determining Severity

The best approach to classifying injury severity according to ASID is on the ‘threat to life’ concept espoused by Osler in 1997 (ASID p6.) However just what is the threat to life from a 10m fall onto a rocky ledge whilst wearing no helmet? There have been many cases, often on the same route, where one fall has been a fatality and the other has the climber getting up and walking away uninjured, albeit shaken and wiser. Accordingly because of these difficulties other approaches are often used (ASID p6).

Table 2: ACAD Severity Classification System

Severity	Summary	Description
5	Fatal	Died at the scene or within a few weeks
4	Severe	Permanently incapacitated in a major way or life has been extremely at risk or an unusually high level of multiple injuries has occurred
3	Serious	Seriously injured and required hospitalisation and probable rescue/assistance in evacuation. This may include fractures and life threatening incidents.
2	Moderate	Injured requiring first aid or medical attention and rest and may include lacerations, burns, bruising, torn ligaments or shock. A doctor may be visited.
1	Minor	Superficial injuries that probably are only a minor inconvenience and will most likely go away quickly and require no professional medical attention. Small cuts, abrasions, minor bruising and the like.
0	Unknown	The injuries or status have not been obtained.

Selected Findings

Some eighty three **climbing related** fatalities have been recorded since ACAD’s earliest recorded Australian rock climbing fatality in 1955. Mountaineering has accounted for 55.4% of the deaths, rock climbing 30.1%, abseiling 13.3% and gym-climbing 1.2%. These are sobering figures when you realise they are mainly from the mid-seventies. The total of all accidents and injuries will never be known.

This is in stark contrast to some views such as an outdoor adventure activity guide book published in 1995 that claims they could only find records of four deaths in rock climbing. A recent Melbourne, ‘Age’ newspaper article claims ‘Third death at Arapiles fuels helmet debate’ but then they elaborate ‘third death since 1999’.

I do firmly believe that many accidents, once the causes are known, were avoidable. Some though could never be prevented and it is the nature of climbing that there is a danger inherent that cannot be eliminated.

Rock Climbing

Table 3: Rock Climbing Injury Breakdown – Severity 3 and above

Situation	Fatal	Severe	Serious	Percentage
Falls - Leading	10	13	49	60.0
Rock Fall	3	2	8	10.8
Falls - Abseiling¹	1		6	5.8
Unroped – Soloing²	4	1	1	5.0
Unroped – Scrambling³	3		2	4.2
Unroped - Near cliff edge⁴	2			1.7
Second hit by leader		1	2	2.5
Seconding			2	1.7
Belayer fell after anchor failed		1		0.8
Falls - Top-roping		1		0.8
Falls - Prusiking			1	0.8
Lightning strikes climber			1	0.8
Movement damaged knee			1	0.8
Tripped setting up anchors			1	0.8
Belay ledge collapsed			1	0.8
Unknown	2		1	2.7
Total	25	19	76	

Seconding

The good news is that what we have always known is true, seconding is very safe. One fall involved a traverse that the leader failed to protect. The second occurred in 2003 with an experienced party.

Unroped

Add up all the unroped accidents (15%) and you can see that collectively it's a problem. The rope serves a purpose and it should be used whenever there is a risk of falling.

Some years ago I saw 'Joe Cool' soloing with his headphones past me on the Organ Pipes near Diapason and thought how foolish he was. He was dead by the end of the day. Several deaths have occurred where a pattern of soloing had developed, even on routes the person had previously climbed easily, e.g., Hermes at Booroomba. I believe also that 'experts', and I use the term loosely, who solo up Conifer Crack, in full view of beginners, to gain access to Red Wall are doing everybody a disservice.

Leading

Naturally falling whilst leading is the expected and actual primary situation type for fatal, severe and serious injuries. The actual cause can vary and could be slippery rock, pushing beyond one's limit, loose holds and a myriad of other reasons.

¹ Includes only abseiling incidents on Rock Climbing trips. Abseiling also appears as a separate entry and also as a category under Mountaineering and Gym Climbing.

² Soloing is where the climber is actively ascending a usually roped climb.

³ Scrambling is where a climber is accessing or investigating a climbing area in an exposed situation.

⁴ Unroped near cliff edge is where a climber would normally be expected to be roped or exercise extreme care because of the proximity of the cliff edge.

Rockfall

Quite surprisingly rockfall contributes significantly to accidents. There is the objective hazard and the instances of other climbers dislodging them. In ACAD there are eighteen Rock Climbing accidents related to rock fall and in **every** instance the rock was dislodged by party members. The VCC has a policy of helmets on, once at the cliff face on club trips. This is sound practice as there are pockets of 'loose' rocks building up on some routes and I personally have been whacked at the base of the cliff by a loose belay block before I could get my helmet on. The helmet would have been simpler than the stitches.

Other

Worth noting is that the incidence of leaders landing on seconds has taken a small jump in recent times. Two of the accidents were in the last couple of years. These both related to leaders falling before their first good piece was placed. Another issue on the rise is accidents due to poor communication, there have been several with misheard calls.

Time as a Factor

Whilst ACAD only has the time of accident recorded for nineteen rock climbing accidents (almost at random) it is certainly of note that all of these, bar one, occurred after noon. This obviously warrants further research and is an excellent outcome of the inclusion of the time field from the ASID data dictionary. I am inclined to the view that the risk is elevated later in the day. For this reason I never let beginners under instruction lead that 'last' climb of the day but choose something a bit harder and lead them up it myself.

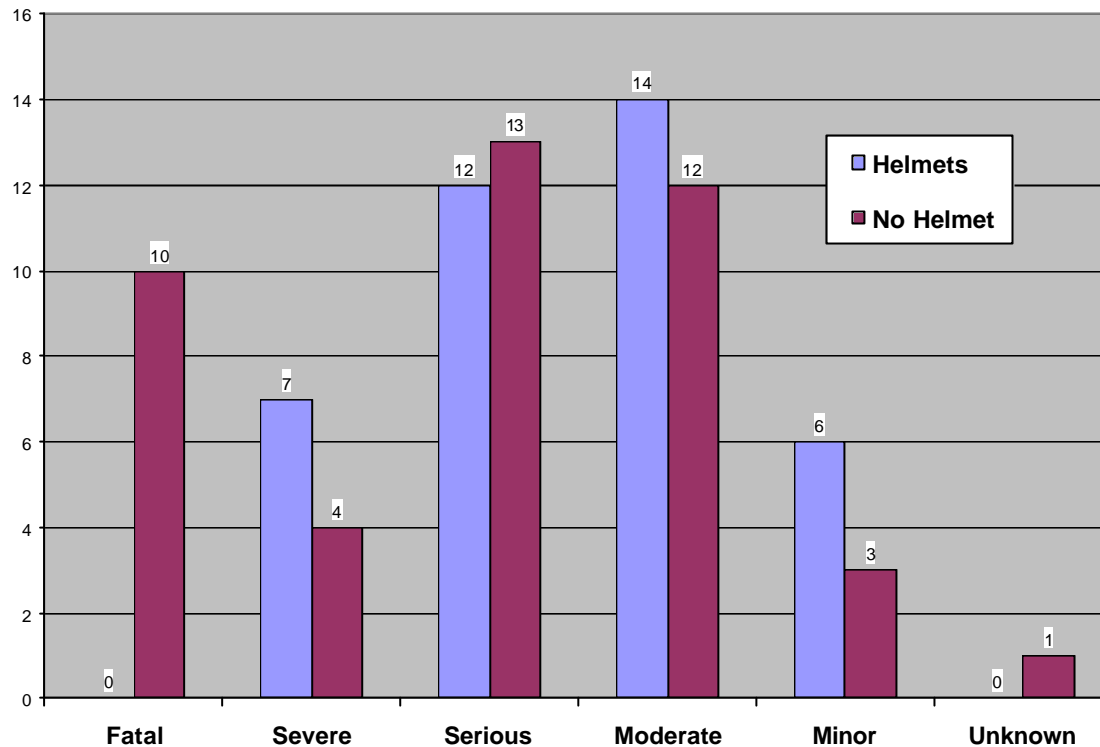
Injuries

The following percentages will provide the reader with an approximation to some of the key areas of damage and the prevalence. Keep in mind that most of the accidents cover several areas of damage. Shock is obviously present in most.

- Ankle & Foot injuries >25%
- Head, Spinal and Trauma > 25%
- Bruising > 11%
- Rope burn > 5%
- Fractured legs > 10%
- Hand injuries > 6%
- Dislocations > 3%
- Other = c. 15%

Helmet

Chart 1: Known Helmet Wearing in Rock Climbing Accidents



What is of interest is that in 40.2% of rock climbing accidents the status of helmet wearing is known and the results strongly suggest helmet wearers are less likely to die. Interestingly though they are overly represented in the severe category which may be a consequence of the former point. More research is required in this area and wider community data collection is needed. There is also a larger incidence of fractures and the like and fewer references to head injuries in cases where helmets were worn.

This is **NOT** to say that in the accidents where helmet wearing has not been ascertained, that there were not cases of serious or fatal injuries where a helmet may have been worn. I am always grateful for corrections.

Background Information

In rock climbing there was a time in the late nineteen-sixties to early nineteen-seventies where the use of helmets was widespread. Alas, by the late seventies it had become unfashionable. I was concerned enough by about 1980 to write a short and succinct editorial: *Climbers with brains wear helmets* in the Victorian Climbing Club journal 'Argus'. Chris Baxter, about a decade later, in an editorial in 'Rock', also addressed this issue. His magazine promoted and sponsored a generous rebate scheme for helmet purchasers.

The classic instruction guide by Alan Blackshaw, *Mountaineering: From Hill Walking to Alpine Climbing* attributed a 50% reduction in fatalities in the European Alps following the introduction of helmets.

✧ Climbing Accidents in Australia (1955 – 2004)

The issue of wearing a helmet is clouded by flowery idealism and in my opinion became increasingly fashionable after early 1975. In his book, *Learning to Rock Climb*, Michael Loughman says:

'...the American Alpine Club is wont to attribute head injuries to the absence of a safety helmet. Undeniably, a helmet may save a climber from serious head injury. I rarely use a helmet, but there are places where I want it – for example, the Canadian Rockies, where rock fall is commonplace, or the Northwest Face of Half Dome in Yosemite, where there is loose rock and all too many climbers to knock it down.

You should examine the question and decide for yourself. However, let me say this: A helmet guarantees nothing. It is still better to avoid loose rock and overcrowded routes. Even with a helmet there are falls that can break your neck. Your first line of defense should be the thoughtful use of your head, not the covering of it. On clean rock helmets do tend to be associated with climbers who are prone to knock stones down and take nasty falls. Safety lies in recognizing the limitations of your equipment.' (pp.129-130)

I strongly disagree with this dated (1981) advice and the attitude and approach to helmets. Helmeted climbers don't fall any more or less than anyone else. Modern helmets and even some back in 1981 are ventilated, lightweight and the facts in this database speak for themselves. Many accident victims have also commented that they would have had less injury if they had been wearing a helmet or that their helmet saved them from worse injuries. My local climbing shop has reported that following many accidents they experience a boost in helmet sales from people who have seen the consequences of not wearing a helmet.

With regret it does seem that the press and officialdom do seem to equate safety or misadventure with helmets and focus on that instead of why the fall occurred. A common description would be 'Climber falls 25m and dies and he had no helmet on'. It probably wouldn't have saved him in this case but it was not the cause. Questions and comments about why they fell so far, why did several pieces of gear fail or was there a communication breakdown may be better questions. Never-the-less I do believe research on ACAD records shows helmets save lives. Numerous anecdotal evidence recorded in the database claims definite injury reduction would have been probably with a helmet.

You can still have fun with a helmet on too!



The author at
Flinders Island in
1983

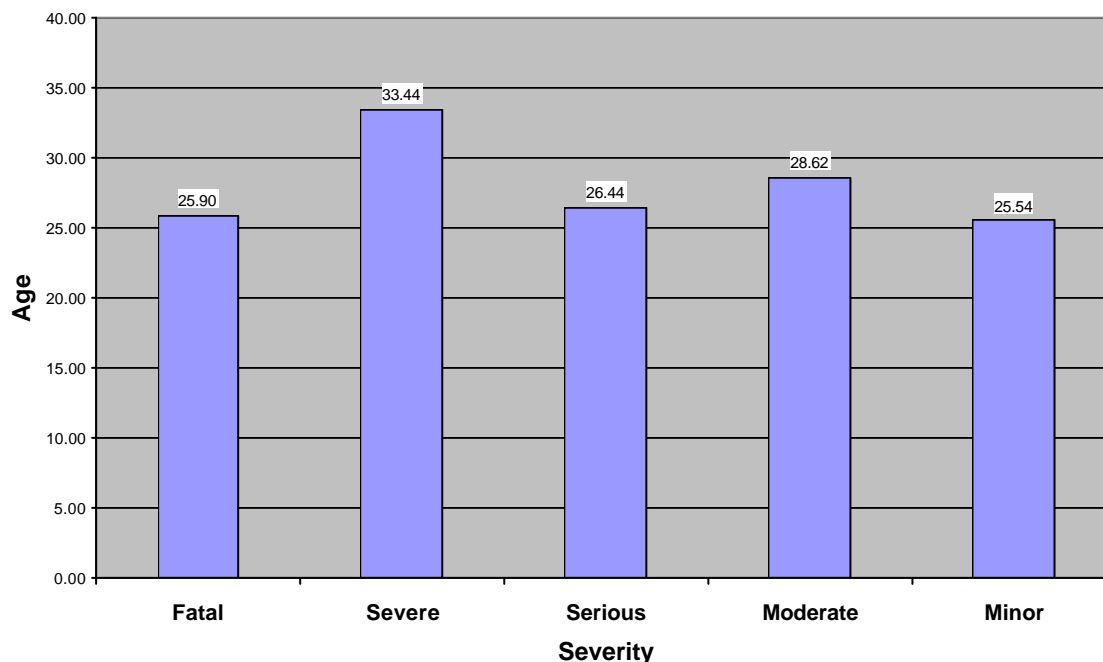
Age

To what extent does age affect accidents? Well there are many factors at work. As I recall when I first conducted a survey for the Victorian Climbing Club newsletter ‘Argus’, around 1980, only about 10% of climbers had climbed for more than about 4 years. Older and more experienced climbers are now more common. In the early seventies a climber of late thirties or more was a rarity. Table 4 may simply to a larger extent reflect the climbing population age demographics. Interestingly the older climbers seem to be overly represented in the severe category. More research is needed in this area.

Table 4: Age in Rock Climbing Accidents

Age Group	# Accidents	%
5-9	0	0.00
10-14	3	3.5
15-19	14	16.3
20-24	31	36.0
25-29	10	11.6
30-34	9	10.5
35-39	6	7.0
40-44	2	2.3
45-49	7	8.1
50-54	2	2.3
55-59	1	1.2
60-64	0	0.0
65-69	1	1.2
70-74	0	0.0
Total	86	

Chart 2: How Age and Severity Relate in Rock Climbing Accidents



Grading As A Factor In Rock Climbing Accidents

Table 5: Average Severity versus Grading

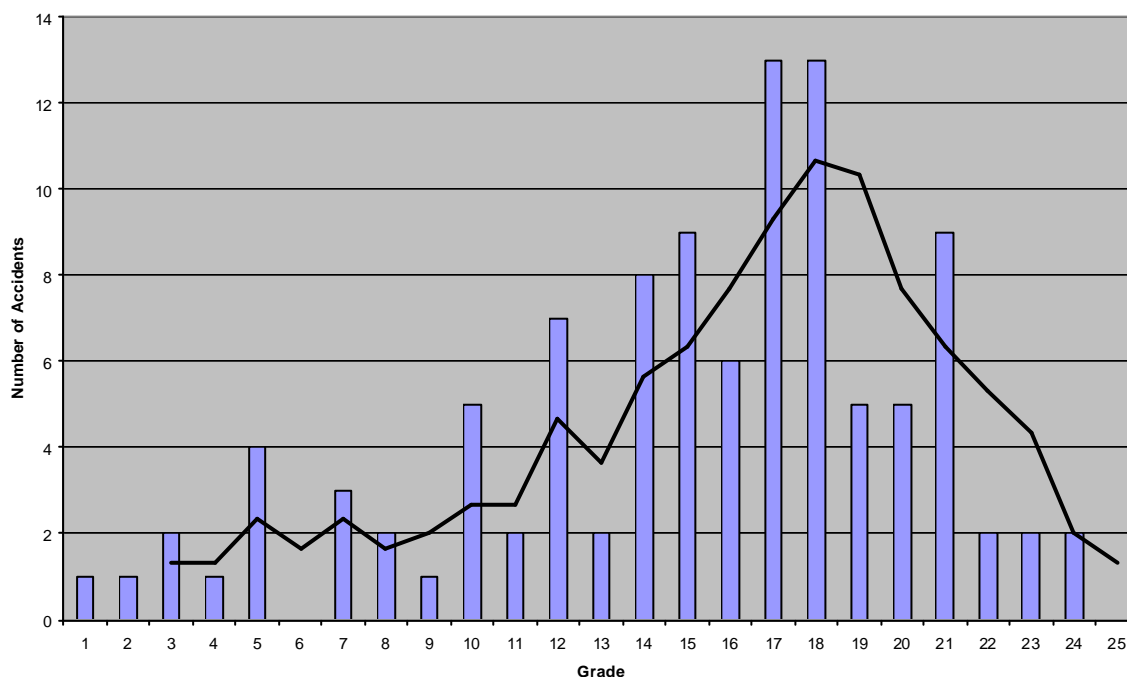
Grade	Severity
1 to 5	3.3
6 to 10	2.6
11 to 15	2.5
16 to 20	2.6
21 to 25	2.6

Firstly the higher grades of 26 to 30 have been excluded from Table 5 because of the small sample size. What this chart shows is that the average severity of accidents is consistent across all grades excepting for the routes between grades 1 to 5 inclusive. The severity of this 'easier' group is noticeably higher than for all other grades and is the only grade grouping that averages into the serious (level 3) category of severity.

This may suggest that accidents on the easiest of routes are more costly possibly because of the more broken nature of easier routes or perhaps because climbers treat them with less regard and often don't clip as much protection. Certainly the climbing community should take heed of this information and rethink behaviour on these routes. They are not just 'only grade 4'.

The number of accidents for given grades increases slowly through to about grade 12 and then climbs to a peak at about grade 18 and then drops off again.

Chart 3: Three Grade Moving Average Trendline Where Climb Grades are Known



Causes

In relation to the easier grades (1-5) the cause of the accidents was principally that the rope was either not in use or was in use but without protection placed. Other common causes were dislodged rocks.

Height vs Severity in Rock Climbing Accidents

Table 6: Average Severity versus Height of Fall

Height	Severity
<= 5m	2.7
<= 10m	2.1
<=15m	2.8
<= 20m	2.7
> 20m	4.0

The height of the fall is recorded in 85 instances for rock climbing falls. This is often an estimated or best guess. Never-the-less it seems reasonable to look at the distance fallen and see if any patterns emerge. Clearly 20m falls or greater have the potential to be extremely dangerous. The rest seem not too far apart and surprisingly have an average result of less than Severity 3 (Serious). From what I see on many of the entries in ACAD the issue if a fall is occurring is to avoid hitting ledges and the deck. The very high instances of ankle injuries (about 25%) is one of the surprising results for the rock

climbing injury statistics. Indeed if all foot, ankle and leg injuries are combined its 35%

Gym-climbing

Table 7: Gym-climbing Injury Breakdown – Severity 3 and above

Type	Fatalities	Severe	Serious	Percentage
Top-roping/Lowering		1	4	55.6
Soloing	1		1	22.2
Abseiling		1		11.1
Leading			1	11.1
Total	1	2	6	

Gym-climbing has inspired many climbers and non-climbers alike. I believe because of my lack of contact with gym climbers and commercial factors the sample size for the period is probably a bit light on. The use of Internet forums is helping to disseminate information about the more serious accidents. I am surprised at the number injuries from the **top-roping/lowering** category, when compared with the similar practice on rock cliffs.

Causes

These vary but include belayers stuffing up when unexpected falls occur, not using lowering devices correctly, incorrect placement of mats and soloing at height (3m falls can kill) and allegedly a single instance of a tape running over a metal edge fatiguing. The abseiling one was caused by letting go of the descender device in use.

Abseiling

Table 8: Abseiling Injury Breakdown – Severity 3 and above

Cause	Fatalities	Severe	Serious	Percentage
Falls abseiling	2	0	2	30.8
Flood	3	0	0	23.1
Exposure	3	0	0	23.1
Scrambling unroped	3	0	0	23.1
Total	11	0	2	

Note: Just a reminder that the above table **excludes** abseil accidents resulting from rock climbing, gym-climbing and mountaineering trips.

Causes

The main reason for serious injury whilst on abseiling trips was falling / loosing control of the abseil. However the presence of cold and water whilst canyoning or engaging in multiple abseil descents has caused at least 6 fatalities and if these were tallied together would be the prime cause. The scrambling falls were all by non-participants not directly involved in the abseiling at the time.

I will not let my children participate on school abseil trips, and the like, because of the danger present for those not involved in the activity. There is a tendency, in my view, for the supervision of those not engaged in the adventure activity to be more relaxed, yet the participants are still all hyped up and in a cliff environment. I have personally seen accidents originate in this way and ACAD has records of several similar injuries/fatalities in the rock climbing activity area as well.

Mountaineering

Table 9: Mountaineering Injury Breakdown – Severity 3 and Greater

Type	Fatalities	Severe	Serious	Percentage	Cause(s)
Fall mountaineering	13		4	30.9	
Avalanche	16			29.1	
Exposure	2	1		5.5	
Illness	2			3.6	One on walk out.
Ice fall	2		1	5.5	
Altitude Illnesses	3			5.5	One case was pulmonary oedema
Helicopter crash	1			1.8	In Canada
Fall abseiling	1			1.8	
Rock Fall			1	1.8	Hit by rock whilst on own
Lightning	1			1.8	
Cornice collapse			1	1.8	Person was on the cornice
Blown off by wind	1		1	3.6	One presumed, one actual.
Unknown	4			7.3	
Total	46	1	8		

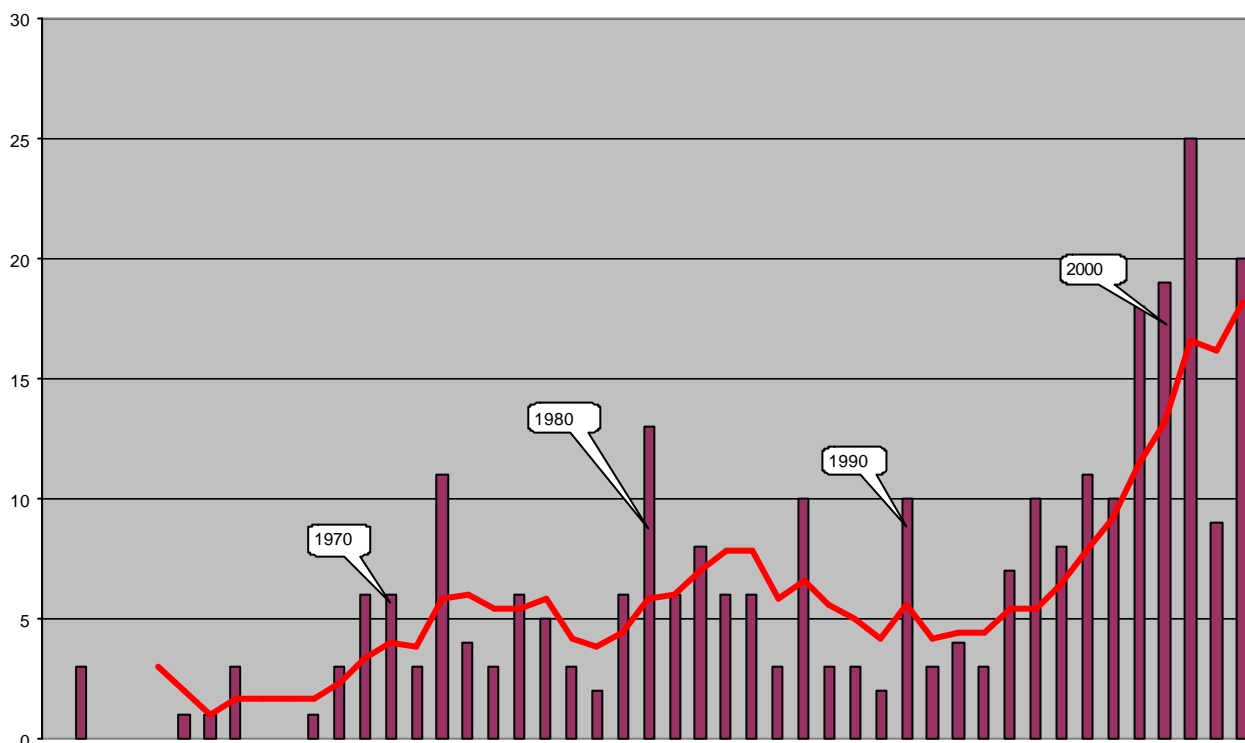
I'm not at all inclined to offer much comment about the above results as they are consistent with the generally known risks in mountaineering. One curious point is the relative low number of severe and serious accidents when compared with the number of fatalities. This may be a consequence of mountaineering accidents being more extreme. Another explanation may be that less serious accidents are reported less widely.

The numbers of illness incidents are too few to construe much from, but are of interest although not unexpected considering the nature of Himalayan expeditions, where they both occurred. The occurrence of a lightning related accident is interesting and there is also one record of a rock climbing misadventure at Arapiles with lightning.

Accidents by Year

There has been a regular increase in the number of serious accidents over the past fifty years. The following chart has a 5-year moving average trendline to show this. Without accurate figures on the number of climbers per year it may well be the increase simply matches the climbing population. The total for 2003 has been estimated at eight based on four accidents by mid-May 2003.

Chart 4: 5 year Moving Average Trendline of All 'Climbing' Accidents



Further Research

I would be grateful to receive E-mails about accidents to sedgman@gmail.com or send a note to your state climbing club about what happened and whether a helmet was used, why it happened and when. Include the following information:

Date, location, cliff, route, names, time, description, gear, injuries, cause (if known), helmet, contact details.

Important I have tried not to release details of specific accidents and have jealously guarded confidential information about some accidents in order to ascertain an understanding of what took place. Please do not write requesting copies of the raw data as I am not prepared to release it to anyone, other than a properly constituted climbing safety body. I am also hoping to have an improved statistical analysis of the data done in the future.

Recommendations

1. That there is a need for the establishment of a national body solely dedicated to climbing safety with major clubs and training organisations represented. As president of the VCC in 1980 I instigated a safety sub-committee but it lapsed soon after my term of office finished. Such bodies should be established in major clubs and a national body established. The precedent exists overseas with the BMC and MSR.
2. All clubs should promote the distribution and use of accident report forms, or an E-mail system for reporting accidents.
3. Clubs and officialdom should do more to investigate serious accidents and report their findings.⁵
4. The wearing of helmets should be promoted and encouraged. Particularly in view of the higher than expected number of accidents relating to rock fall and the apparent and significant reduction in fatalities in rock climbing when a helmet is worn.
5. Safety sessions for novices and interested climbers should be provided by clubs and training organisations on a regular basis. This should include more instruction on the secure placement of nuts and cams.
6. That soloing rock climbs not be encouraged, particularly in sight of beginners.
7. That greater emphasis on the safety of non-climbers at cliffs be considered.

Iain B. Sedgman
Arapiles
June 2004

Acknowledgements

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⁵ The Victorian State Emergency Service (SES) is allegedly, not permitted to report or speculate on accidents.

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Appendix 1

Severity 3, 4 & 5 Rock Climbing Data Summary

The following tables simply show the commonest and most frequently found entries that are to be found in ACAD in the Rock Climbing injury records. The left and right cells in the tables below are not necessarily related but just typical of the data.

Severity 5

General Causes	Injury Types
Soloing	Head injuries
Unroped falls	Massive trauma
Long falls	
Failed to use gear correctly	
Decked out	
Pulled gear	

Severity 4

General Causes	Injury Types
Decked out	Spine injuries more prevalent
Dislodged rocks	About 50% head injuries
Fell and pro failed	Leg injuries
Bolt pulled out	
Pulled two runners and decked out	

Severity 3

General Causes	Injury Types
Abseiled off rope	Leg and ankle injuries
Loose block	Cracked ribs
Nut pulled	Lacerations
Tree anchor failed	