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## **An Analysis of British Cave Rescues**

*For the period 1989 to 1998*

This article is prompted by a similar article written by Christian Dodelin of the Spéléo Secours Français analysing the French statistics for the period 1985-1995. I will parallel his article to some extent to allow a comparison.

The number of cave rescue incidents is relatively small and performing a meaningful analysis on these may not yield statistically valid conclusions. I will include actual figures so readers can decide for themselves. Note that the figures are based on the incident reports returned by the member teams of the BCRC. However I will offer some opinions on the figures. Briefly summarising the numbers of incidents, we see a rise in cave rescues at the end of the 1980s followed by a drop to previous levels during the 1990s.

I will apologise in advance for the numbers that are abundant in the following.

### **Disclaimer**

Any opinions passed in this article are those of the author and do not necessarily represent the views of the British Cave Rescue Council or of its member teams.

### **Underground Rescue in the UK.**

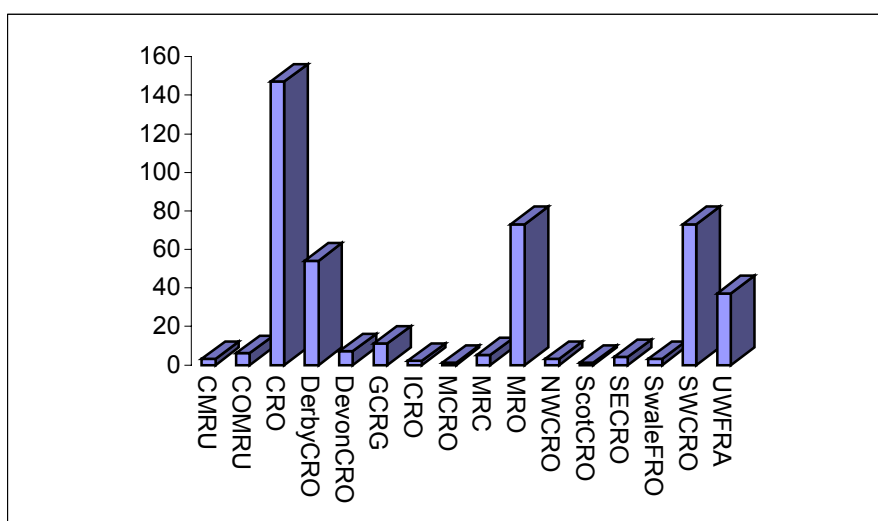
Incidents recorded in the database of rescues held by the BCRC describe those where action has been initiated by at least beginning a callout or investigating the whereabouts of a missing party. Standby incidents where a rescue team is warned of a problem, but only telephone advice was given but no emergency was declared, or no action was taken are not recorded. It should be noted there are a number of the latter.

Over the ten years of this study there were 430 incidents thus averaging 43 a year. Of these, 209 occurred between 1994 and 1998 at an average of over 41 per year. The SSF had 426 recorded incidents over the 11-year period at 39 per year.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total
CMRU			1				1	1			3
COMRU			1				3	2			6
CRO	26	15	14	15	17	14	10	10	11	15	147
DerbyCRO	12	9	4	1	2	4	4	6	7	5	54
DevonCRO		2			1			2	1	1	7
GCRG	2			2		2	1	3	1		11
ICRO							1			1	2
MCRO						1					1
MRC Team						2	1	2			5
MRO	8	4	7	9	8	10	11	4	6	6	73
NWCRO		1				1			1		3
ScotCRO										1	1
SECRO	1	1	1	1							4
SwaleFRO				1		1		1			3
SWCRO	5	16	6	7		10	8	6	6	9	73
UWFRA	7	3	2	3	6	3	5	2	3	3	37
	61	51	36	39	34	48	45	39	36	41	430

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## Breakdown by Type of Casualty.

We can see from the table below that there are some 77 incidents where team does not know or has not recorded the club name or type. Of the remainder, 149 incidents involved recognised clubs, noting that most clubs that cave regularly are affiliated to the National Caving Association or a constituent body. This represents some 34½% of the total, compared with 33% of FFS rescues. Of the remainder:

- individuals form some 19% of the total; to what extent these represent members of clubs not willing to reveal their true identity we will probably never know.
- other groups contribute 19% to the total; these are often organised groups under some sort of leadership that for one reason or another get into trouble
- non-caver and non-caving represent 11% of the total. This is the public service aspect of the cave rescue team's workload. It comprises assisting the police often in missing person searches.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total	%-age
adventure training	3	1	2	2	1		4	1	1	1	16	3.7
club (affil'd)	15	18	10	14	7	23	15	12	13	22	149	34.7
club (other)	3	5	2	7	2	5	1	2			27	6.3
individuals	5	9	13	5	17	1	4	7	12	9	82	19.1
non-caver	4	6	2	2	1	3	2	4	2		26	6.0
non-caving incident	4	2		1		2	3	4	3	2	21	4.9
not known	21	4	4	5	1	13	14	7	1	7	77	17.9
scout	4	3	2	2	4	1	2	1	4		23	5.3
shool	2	3	1	1	1			1			9	2.1

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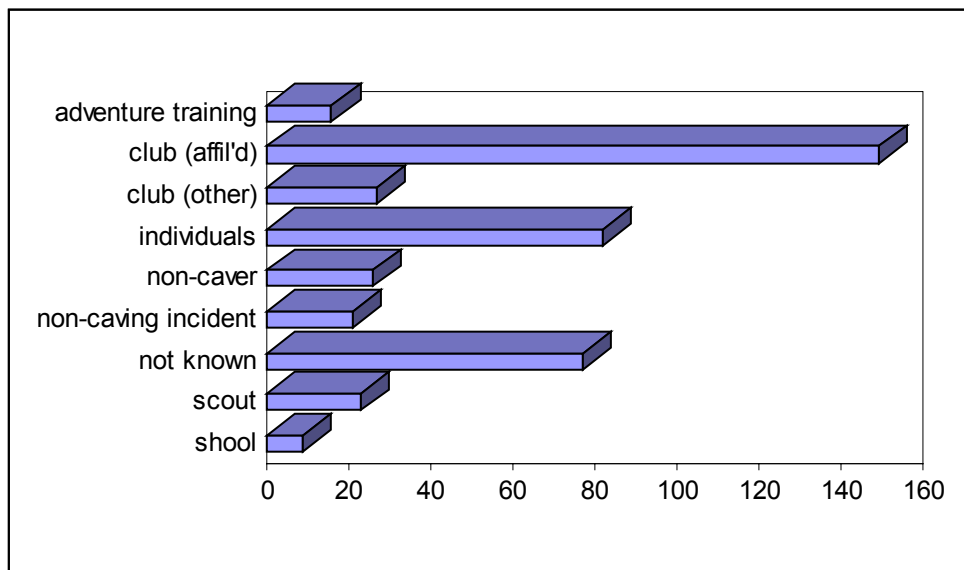
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## ***Breakdown by Causes of Incidents***

When examining the causes of cave rescues, we see immediately that nearly 25% are due to parties becoming lost or overdue and 21% are due to falls of various kinds, thus accounting for 46% of the total. It must be noted that many of the incidents involving parties overdue are quickly resolved but, since the alarm has been raised, form a significant part of the workload. On the other hand, falls almost always require first aid attention to the casualty and rescues of varying difficulties. They accounted for 13% of the fatalities over the period, compared with flooding resulting in a drowning at 27% (excluding cave diving), and rock falls at 9%, based on the fatality count of 22. Other causes of incidents were:

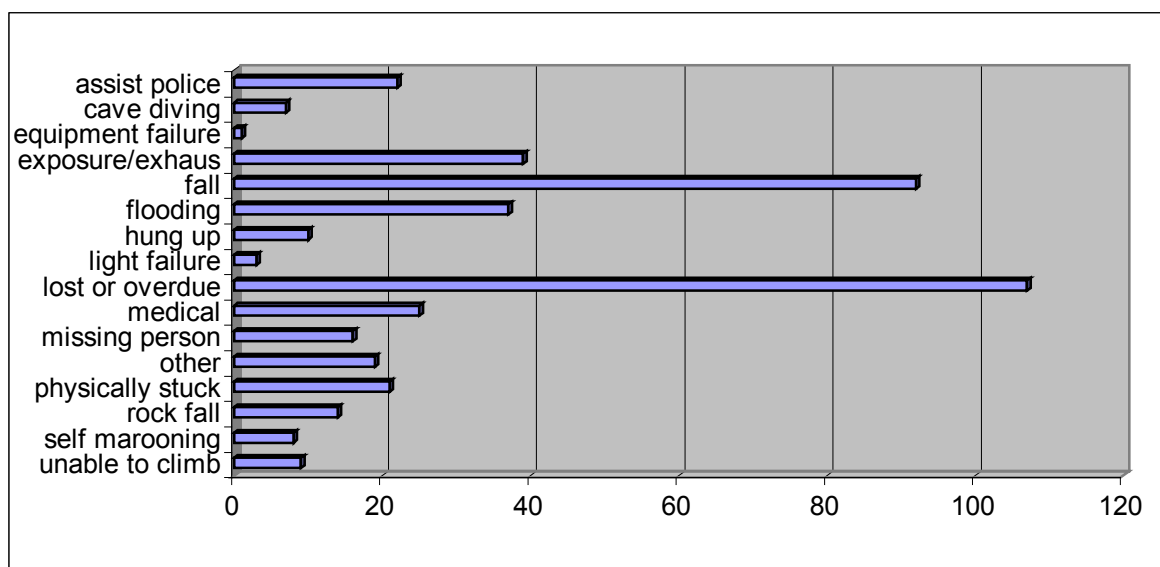
- cavers becoming exhausted, possibly suffering for various degrees of exposure or hypothermia - 9%
- cavers becoming stuck for one reason or another - 5%
- cavers suffering a medical emergency, e.g. asthma, heart attacks another 6%

And providing assistance to the police together with searching for missing persons provide 5% of the total

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	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total	%-age
assist police	5	7	2			1	2	2	3		22	5.1
cave diving	3	1		1		1				1	7	1.6
equipment failure									1		1	0.2
exposure/exhausted	1	6	4	5	5	6		3	3	6	39	9.1
fall	16	9	7	10	10	11	9	11	4	5	92	21.4
flooding	6	7	3	7	1	3	1	1	4	4	37	8.6
hung up	2		1		3		1	1		2	10	2.3
light failure				2				1			3	0.7
lost or overdue	12	12	11	7	8	12	13	8	9	15	107	24.9
medical emergency	3	3	2	1	1	4	3	2	2	4	25	5.8
missing person	2	2	1	1	1	3	3	2		1	16	3.7
other	2	2		3	1	2	2	4	2	1	19	4.4
physically stuck	3	1	3		2	3	4	2	3		21	4.9
rock fall			2	1		2	4	2	2	1	14	3.3
self marooning	1	1		1	1				3	1	8	1.9
unable to climb	5				1		3				9	2.1
	61	51	36	39	34	48	45	39	36	41	430	



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## ***Breakdown by Injuries Incurred***

The definition of injuries in this case means any physical condition causing or contributing to the rescue. The top single cause of 'injury' is hypothermia, and can be coupled to the fact the lost/overdue parties are often found cold and exhausted. Immediately following this are lower leg and associated injuries caused by falls.

It is difficult to record the extent to which injuries sustained are life threatening. When a callout is made after a fall is sustained, the rescue team will assume a severe injury and will mobilise resources to suit. After reaching and examining the casualty, other necessary resources will be called to suit. Notable amongst these are the RAF Search and Rescue helicopters, to which more than a few cavers owe their lives.

One notable change in recent years is the condition of cavers when the rescue team reaches the casualties. With modern caving equipment, they are in better condition and in recent years we have had but 1 probable fatality from this cause. But please do not become complacent here. Only in March of 1998, the CRO assisted a casualty whose core temperature was measured at 26°C - this was an accurate measurement in Airedale Hospital. (See the BCRC Incident Report.)

	Total	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total	%-age
Arm lower/wrist	9	2	1			1	1	3			1	9	5.0
Arm/humerous shoulder	13	3		3			1	4	2			13	7.3
Chest Injuries	7		1		1	1		1	1		2	7	3.9
Drowned	11		1		3	1	2	3			1	11	6.1
Exhaustion/hypothermia	45	4	9	3	5	5	4	3	1	2	9	45	25.1
Femur - pelvic injuries	9				2	3	1	1	1	1		9	5.0
Head Injuries	13	1	1	1	1	2	2	1	2	1	1	13	7.3
Leg - lower/ankle	21	4	4	1	2	2	3	1	2		2	21	11.7
Medical condition	13	1	2	1	1	1	1	2	1	1	2	13	7.3
Multiple Serious	9			1	1		2	2	1	2		9	5.0
Spine/back injuries	19	5	3	1		2	4		1	2	1	19	10.6
Knee Injuries	10	1		1	1	1	2		1	1	2	8	4.5
	179	21	22	12	17	19	23	21	13	10	21	179	

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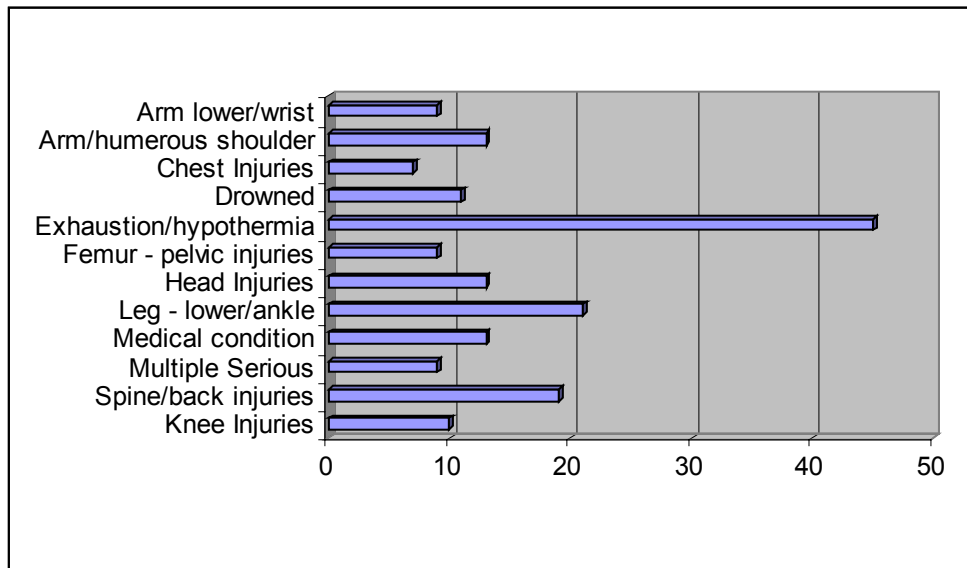
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When relating injuries incurred to the corresponding cause, we observe that all 5 multiple serious injuries incurred through rock falls were fatal, as were 3 of the 7 due to falls. A major factor in these matters is the ability to render assistance to a seriously injured caver within *the golden hour*. Even for casualties close to the surface, it is likely to be longer than that before the first members of a rescue team can arrive with a measure of first aid equipment, and a further period will elapse before arrival at a fully equipped hospital. However, it is possible to survive such trauma and the records show a number of survivors; however the figures do not record long-term injuries.

Of other serious injuries incurred, all 9 of the femur/pelvic injuries were due to falls as were 12 of the 18 spinal/back injuries and 8 of the 13 head injuries. Thus falls contribute the majority of the serious injuries to which rescue teams are called.

And just to put rescue injuries into contrast, the records show that during the period we are reviewing, member teams recorded some 827 persons assisted, thus some 21% of casualties require medical help – or put another way 79% surface with, perhaps, only their pride disturbed.

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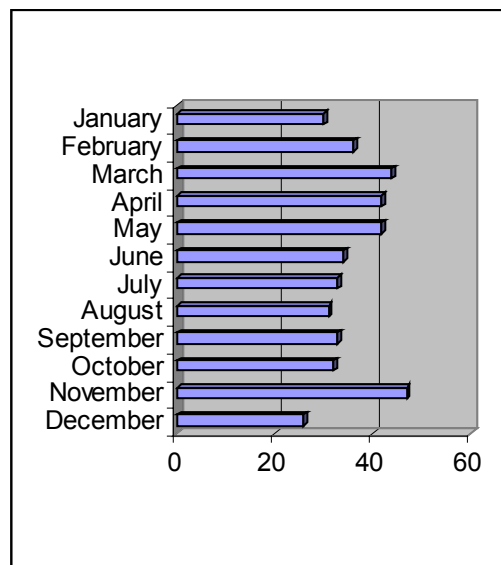
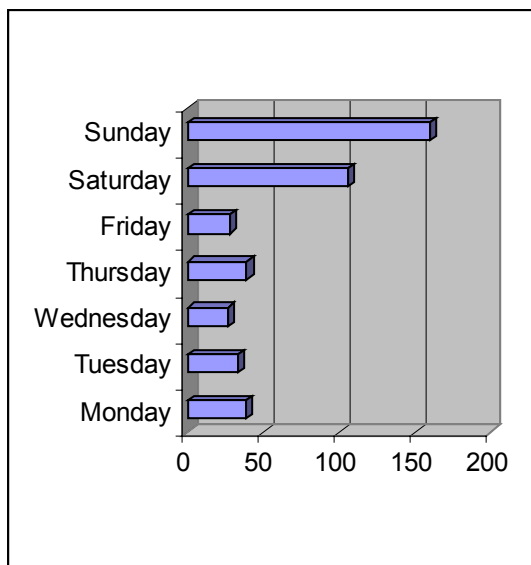
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## When They Occur

There will be no surprises here. Most rescues occur at the weekend and are distributed reasonably evenly through the year:

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total	%-age
<b>Sunday</b>	24	18	17	15	13	14	15	14	13	17	160	37.2
<b>Monday</b>	6	5	4	3	2	5	2	4	3	4	38	8.8
<b>Tuesday</b>	5	3	3	3	2	5	4	4	1	3	33	7.7
<b>Wednesday</b>	3	4	2	4	3	1	5	1	1	2	26	6.0
<b>Thursday</b>	6	2	5	3	2	5	5	6	3	2	39	9.1
<b>Friday</b>	5	3	1	5	2	3	3	3	2	1	28	6.5
<b>Saturday</b>	12	16	4	6	10	15	11	7	13	12	106	24.7
	61	51	36	39	34	48	45	39	36	41	430	

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total	%-age
<b>January</b>	5	2	2	3	4	4	3	4		3	30	7.0
<b>February</b>	9	7	2	3	4	2	4		3	2	36	8.4
<b>March</b>	9	4	2	2	4	4	4	6	3	6	44	10.2
<b>April</b>	6	6	1	4	1	4	5	5	6	4	42	9.8
<b>May</b>	5	4	3	3	3	6	7	1	5	5	42	9.8
<b>June</b>	9	5		5	2	2	3	3	2	3	34	7.9
<b>July</b>	4	5	1	2	4	3	5	5	3	1	33	7.7
<b>August</b>	4	3	3	3	1	3	5	1	6	2	31	7.2
<b>September</b>	1	5	6	2	2	3	5	5	2	2	33	7.7
<b>October</b>	4	2	3	3	3	6	2	4	1	4	32	7.4
<b>November</b>	1	3	9	6	4	8	1	3	5	7	47	10.9
<b>December</b>	4	5	4	3	2	3	1	2		2	26	6.0
<b>Total</b>	61	51	36	39	34	48	45	39	36	41	430	



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## ***Where Do Rescues Occur***

So where does your favourite cave appear in the league of cave rescues.

Well, the ***Ogof Fynnon Ddu*** system and ***Dow Cave/Dowbergill Passage*** jointly top the list each with some 31 incidents over the 10 year period.

***Swildons Hole*** follows these closely with 30 incidents. The other chief culprits in the Dales then follow – the ***Kingsdale system*** (Rowten, Swinsto, Simpsons, KMC) with 27, the ***Easegill caves*** (26), the ***Alum Pot system*** (21) and ***Gaping Ghyll*** (19).

The only other cave to have double figures is ***Eastwater Swallet*** with 11 incidents. In Derbyshire, the busy caves are ***Giants/Oxlow*** (8) and ***P8*** (7).

These incidents form some 45% of all the incidents. What we do not know, however, is what proportion of overall caving trips is undertaken in these systems.

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## **Caves, Causes and Results**

Now lets take this analysis one step further and try to tie caves, causes and results together.

	Flood	Falls	Lost/Overdue	Exposure/Exhaustion	Unable to climb	Hung Up	Physically Stuck	Medical emergency	Others	
<b>OFD System</b>	1	2	22	1				2	3	31
<b>Swildons Cave</b>	1	10	7	5			2	3	2	30
<b>Eastwater Cavern</b>	1	2	7				1			11
<b>Dow Cave/Dowbergill</b>	1	1	10	14			4	1		31
<b>Alum Pot</b>	7	5	1	3	2	3				21
<b>Easegill System</b>	2	8	11			1		1	3	26
<b>Gaping Ghyll</b>	3	5	5	2		1		1	2	19
<b>Kingsdale System</b>	6	10			1	3	1	1	5	27
	<b>22</b>	<b>43</b>	<b>63</b>	<b>25</b>	<b>3</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>15</b>	<b>196</b>

Nearly 25% of incidents are due to parties reported overdue. To what extent casualties exposed or exhausted is due to having been lost is not recorded, so this figure could arguably be higher. When we examine these in greater depth we find that in 33 incidents, the missing party was found making their way back on the surface and thus did not require a rescue team to be deployed underground. A further 31 incidents found the party close to the entrance. Thus well over half of the overdue incidents are dealt with quickly and with but minor inconvenience to the rescue team.

Of the rest, a small number result from the party becoming lost on the surface. Of those genuinely lost, in 14 of the incidents (13%) the party was found on a trade route or in classical places for being lost. A further 13 incidents required additional searching to take place, and in 8 incidents a major search was required. There has been no major trauma recorded against these incidents, although varying degrees of exposure and hypothermia are observed. In all cases, the missing party were able to make their own way out albeit with assistance.

Some 21% of incidents are the result of falls of varying degrees. Looking at these in more depth, about 1/3rd are the result of a slip or trip (30). Lower leg (5) and dislocated knees (5) are as expected high on the resulting injury list. However more serious injuries are recorded – head, spinal chest and pelvic injuries are reported (7 in all), although it is difficult to distinguish their severity. Poor footwear contributed to 4 of these slips.

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Falls from a climb of one form or another contribute 15 incidents and have resulted in 5 seriously injured cavers, involving chest, spinal and pelvic injuries. The remainder have resulted in wrist, leg or ankle injuries or in bruising.

Falls resulting from abseiling errors of one form or another contribute 20% (18) of incidents. This we must consider a rather high proportion, especially as the resultant injuries are considered. There were two incidents involving significant falls of about 30 metres resulting in one fatality and one paraplegic casualty. Other falls have resulted in spinal injuries (4), pelvic injuries (3), and leg injuries (3), which resulted in difficult rescues but from which the casualties have fully recovered. At least one of these involved a fall of over 25 metres.

There have been three incidents in the period involving a fall from a ladder where no lifeline was deployed; one of these resulted in serious head injuries when the casualty died. In the others a fractured wrist and bruising was the result; one of these involved a caver with hook-eye boots. There have been 4 falls where a lifelining error was recorded as the cause, sometimes through a stitch plate. And there have been three incidents of a belay failure – one where a bolt failed and two where the party made a poor choice of boulder belays, all resulting in injuries of various degrees.

There have been other incidents recorded as falls. On the serious side, a scout, one of a group on a walking trip, fell some 104 metres down Gaping Ghyll Jib Tunnel when he slipped down a narrow rift suffering fatal multiple injuries. On the other side, a caver suffered a dislocated shoulder when his rope of dubious origins and history broke.

## ***Discussion***

From the raw figures discussed above, we can see that the major causes of rescues in Great Britain are parties becoming overdue together with cavers falling, either during negotiation of cave passage or when ascending or descending a pitch.

Consider that overdue caving parties form nearly  $\frac{1}{4}$  of incidents and that a number of these incidents are due to an under-estimation of the length and difficulty of the trip. Remember when we looked at the details of these, we found that over half of the parties underestimating the trip are found either on or close to the surface. Thus when planning you should account for the length of the trip and experience of the party and take full account of the weather conditions. Remember getting people up long pitches on one rope takes time – a long time!

Consider leaving until another day a trip that is perhaps beyond the experience and competence of the team. A quote oft heard amongst us old fogies is the cave will still be there tomorrow – you may not be!

What happens should a trip be overdue? Do not misinterpret what I am saying here. If you believe that a party is in trouble then you must initiate a callout. The rescue controllers and wardens are experienced in these matters and will discuss the problem with you then take appropriate action. It is better to be safe – we would rather turn out to a non-event earlier than have a much more serious incident later.

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From the injuries table above we can see that from 1989 through to 1995 injuries remained in the high teens or low twenties but have dropped in the past two years, with, until 1998, a significant drop in exhaustion/hypothermia. Is it because the weather has been kinder of recent winters as shown in the reduction of flooding incidents?

Injuries often result from slips and falls. A simple slip a fall whilst negotiating a passage can have serious consequences. Even an ankle injury a long way from the surface is serious. So negotiating a cave passage requires care – and the proper footwear!

But perhaps we should look at abseiling errors – and errors by the caver they must be - which contribute 20% of all falls and always result in injury of some degree and often very serious injury. We should all consider whether we are caving as safely as possible. Has the training been adequate? Could the rigging be better? Even should we be using a lifeline for novice abseilers? We know that accidents will happen, but because of the difficulty of underground rescue we must take appropriate measures - even more care underground should be the order of the day.

We now await your views with interest.

Oh – and by the way, happy caving and sleep tight!

## **Appendix**

Member teams of the BCRC are:

<i>Cave Rescue Organisation</i>	<i>CRO</i>
<i>Cornwall Mineshaft Rescue Unit</i>	<i>CMRU</i>
<i>Cumbria Ore Mines Rescue Unit</i>	<i>COMRU</i>
<i>Derbyshire Cave Rescue Organisation</i>	<i>DerbyCRO</i>
<i>Devon Cave Rescue Organisation</i>	<i>DevonCRO</i>
<i>Gloucestershire Cave Rescue Group</i>	<i>GCRG</i>
<i>Irish Cave Rescue Organisation</i>	<i>ICRO</i>
<i>Mendip Rescue Organization</i>	<i>MRO</i>
<i>Midlands Cave Rescue Organisation</i>	<i>MCRO</i>
<i>North Wales Cave Rescue Organisation</i>	<i>NWCRO</i>
<i>Scottish Cave Rescue Organisation</i>	<i>ScotCRO</i>
<i>South East Cave Rescue Organisation</i>	<i>SECRO</i>
<i>South Wales Cave Rescue Organisation</i>	<i>SWCRO (Gwent &amp; West Brecon)</i>
<i>Swaledale Fell Rescue Organisation</i>	<i>SFRO</i>
<i>Upper Wharfedale Fell Rescue Organisation</i>	<i>UWFRA</i>
<i>West Cornwall Mines Rescue Group</i>	<i>WCMRG</i>
<i>Member teams of the Mountain Rescue Council</i>	<i>MRC team</i>

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