

ALPINE MOUNTAINEERING

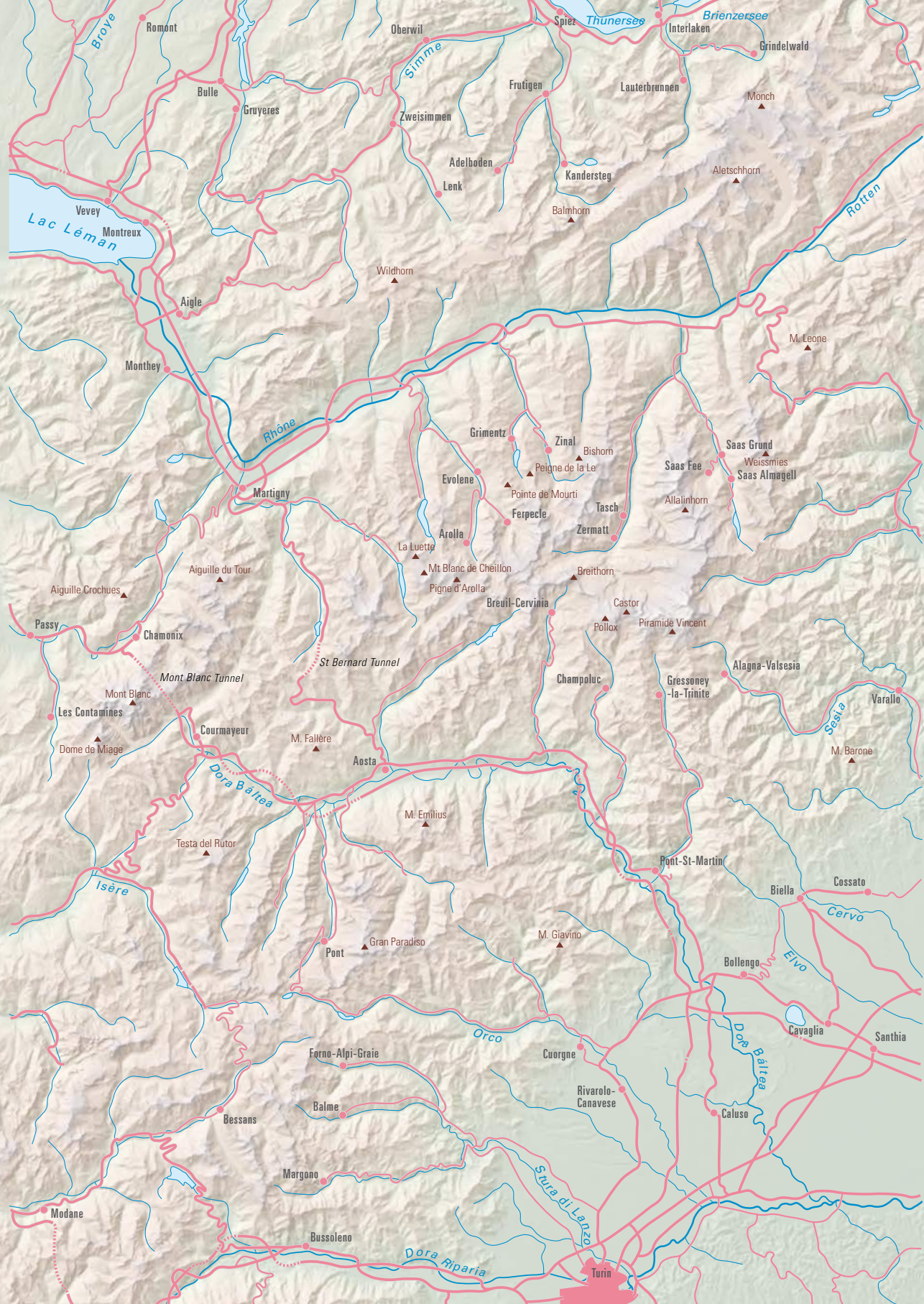
Bruce Goodlad



A PRACTICAL MANUAL

ESSENTIAL KNOWLEDGE FOR BUDDING ALPINISTS





ALPINE MOUNTAINEERING

Bruce Goodlad

First published 2011

Published in Great Britain 2011 by Pesda Press

Tan y Coed Canol

Ceunant

Caernarfon

Gwynedd

LL55 4RN

Reprinted with updates 2016

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ISBN: 978-1-906095-35-2

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Printed and bound in Poland. www.hussarbooks.pl

ACKNOWLEDGEMENTS

Mountaineering is a team sport; experiences shared in the mountains and relived in the valley over a beer or a cup of coffee stay in your mind forever. Writing a book is also a team sport – although it is my name on the cover there has been a team of people helping me along the way. I owe a massive thanks to Kate (my better half) who has taken all the technical photographs, turned my terrible spelling and grammar into English and shared many happy days in the mountains.

I would like to thank two long-suffering clients Kat Congleton and Mark Dearnley, who read early versions of the manuscript and returned invaluable comments about style and content.

Thanks also to Mark Charlton, who did a great job of technically editing the book. I first met Mark when he was assessing me on my summer guides test in North Wales, and we have shared many great days on the hill since then. A big thank-you goes to the many friends who have contributed photographs and also to Franco at Pesda Press for taking my idea onboard and letting me have a free rein while putting the book together. I hope all these people have enjoyed the process as much as I have.

A final thanks to all those friends who have shared many happy days in the mountains with me; I look forward to many more in the future.

Bruce can be contacted via: www.mountainadventurecompany.com

Photographs

Photos by Pete Benson, Jon Bracey, Mark Dearnley, Rob Jarvis, Richard Lundberg, Andy Perkins, Terry Ralphs, John Taylor, and Andy Teasdale are acknowledged in the captions. All other photos are by Bruce Goodlad or Kate Scott.



Bruce Goodlad

ABOUT THE AUTHORS

Bruce Goodlad

Born in Ayrshire with both parents employed as teachers, Bruce spent most of his childhood in the outdoors. Summer holidays were spent sailing the west coast of Scotland, exploring the coastline and islands. He is quoted by his father as asking, at a young age, “Dad, why do we have to climb every mountain?” He’s been climbing mountains ever since!

After studying geography at Glasgow University, Bruce spent a year at Glenmore Lodge (the national outdoor training centre in the Scottish Highlands) on the Night Watch scheme as a trainee instructor. He has worked in the outdoor industry ever since, guiding and instructing all over the world. Bruce qualified as an IFMGA (International Federation of Mountain Guide Associations) guide in 2001 and is now involved in the training and assessment of British Mountain Guides. He lives in the French Alps where he runs his mountaineering business, sharing his passion for the mountains with his clients in the form of climbing courses in the summer months and skiing and ice climbing in winter.

Away from the mountains, Bruce has been a regular contributor to Climber magazine for many years. This is his first attempt at a book!

Eric Pirie

Brought up in Grantown-on-Spey in the Scottish Highlands, Eric has skied and climbed from a young age. He qualified as an IFMGA guide in 2006 and splits his work time between his home in Scotland and the Alps. He has a particular interest in Mountain Rescue and has been an active member of the Cairngorm Mountain Rescue Team since 1982. Eric is a course director with the Wilderness Emergency Medical Services Institute (WEMSI-Europe) and a qualified Emergency Medical technician. Eric was the obvious choice to write the Alpine rescue chapter for the book.

Introduction

The terms 'climbing' and 'mountaineering' are words which cover a huge spectrum of activities. They encompass an enormous range of skills and techniques that can take us from climbing on small crags close to the road to the giants of the Himalaya. One of the many attractions of mountaineering is that there are so many different things that you can do in the mountains at whatever level feels comfortable for you.

In this book we focus on the European Alps and assume that you have done a bit of walking but nothing more technical in the mountains. We take you through all the skills you will need to enable you to climb independently or with a mountain guide in the Alps.

The book is in two main parts: an instructional manual and a detailed guidebook. In the first part, we begin by looking at the Alps, their geography and the features that you may find there. We then go on to look at the equipment you will need and how to use it. Once you have been shopping, we explain the techniques you will need and how you can put them together so that you can move safely through glaciated terrain, across rocky ridges and climb beautiful peaks. We have also included a chapter about climbing via ferrata, which is an exciting activity if you want a day off from the high peaks.

In the second part, the guidebook section has all you need to know to enable you to get out there and practise what you've learnt in the first chapters. There is a selection of 20 routes in the Western Alps where you can hone your skills on rock, snow and ice. The routes start with glacial training areas, move through increasingly more adventurous climbs and culminate with Mont Blanc.

We have selected routes that will allow you to develop at your own pace; you can start on shorter climbs moving onto longer and more difficult itineraries as you feel comfortable. The author has climbed all the routes, many of them with budding Alpinists, so the information is current and accurate. We hope you will enjoy them as much as we did.

Before you head for the hills, the author and Pesda Press would like to remind you that climbing, hill walking and mountaineering are activities with a danger of personal injury or death. Participants in these activities should be aware of and accept these risks and be responsible for their own actions.

Contents

ACKNOWLEDGEMENTS	4
ABOUT THE AUTHORS	5
INTRODUCTION	6
CONTENTS	7

Going Alpine 9

THE SKILLS BLEND	12
EASE OF ACCESS	13
ALPINE INFRASTRUCTURE	13
ALPINE SCALE	15
ALPINE FEATURES	16

About the Alps 17

GEOGRAPHY AND GEOLOGY	17
ALPINE HUTS	19
ACCLIMATISATION	20
ALTITUDE SICKNESS	21
ALPINE TERRAIN	23
ALPINE GRADES	29

Objective Dangers 33

ROCK FALL	33
ICE FALL	34
CREVASSES	34
CORNICE	35
STORMS AND LIGHTNING	36
AVALANCHE	37
HUMAN PSYCHOLOGY	40

Alpine Weather 41

HIGHS AND LOWS	41
FRONTS	42
EFFECT OF MOUNTAINS ON WEATHER	43
SUMMARY	44

Kit for the Alps 45

CLOTHING	45
OTHER PERSONAL KIT	52
FOOD AND HYDRATION	56

Technical Equipment 59

PERSONAL TECHNICAL EQUIPMENT	59
CREVASSE RESCUE KIT	64
GROUP EQUIPMENT	66
SUGGESTED KIT LISTS	69
CHOOSING TECHNICAL KIT	72

Alpine Movement 77

MOVING ON ROCK	77
MOVING ON SNOW	79
MOVING ON ICE	94
MOVING ON MIXED TERRAIN	95

Protecting Yourself 97

KNOTS	97
BELAYING	105
PRUSIKING	112
CREATING ANCHORS IN SNOW	114
CREATING ANCHORS IN ICE	116
CREATING ROCK ANCHORS	120
BUILDING A BELAY	123
ABSEILING	128

Glacier Travel 133

SPACING ON THE ROPE	133
TAKING COILS	135
MOVING ON THE GLACIER	137
CREVASSE RESCUE	138
ONE-TO-ONE RESCUE	139

Speed versus Security 147

PROTECTION ON SNOW	147
MOVING TOGETHER ON ROCK AND MIXED GROUND	150
PROTECTION ON ICE	153

Navigation in the Alps 155

NAVIGATION TOOLS	156
HOW TO USE YOUR NAVIGATIONAL TOOLS	159
USING A GPS	160

Alpine Rescue by Eric Pirie 161

ORGANISATION OF MOUNTAIN RESCUE IN THE ALPS	161
HOW TO GET HELP	163
HELICOPTERS	164
MANAGING AN EMERGENCY	166

Via Ferrata 169

VIA FERRATA KIT	169
GRADING VIA FERRATA	172
WHERE TO FIND GOOD VIA FERRATA	174
CHAMONIX	175
ZERMATT	175
SAAS GRUND	175
EVOLENE	176
VAL D'ANNIVIERS	176

Planning an Alpine Trip 177

PICK THE RIGHT TEAM	177
QUESTIONS TO ASK YOURSELF	179
VALLEY BASES	180
USING HUTS	186
BIVOUACS	188
USING MAPS AND GUIDEBOOKS	191

Am I Ready? 193

YOUR FIRST ROUTE IN THE ALPS	194
------------------------------	-----

Guidebook 199

GLACIAL TRAINING AREAS	199
MOUNTAIN ROUTES	203
APPENDIX 1 – KIT LIST	258
APPENDIX 2 – FIRST AID KIT	260
APPENDIX 3 – BIBLIOGRAPHY	261
APPENDIX 4 – INDEX	262

The Author and Publisher of this book agree with the British Mountaineering Council (BMC) Participation Statement that:

“The BMC recognises that climbing and mountaineering are activities with a danger of personal injury or death. Participants in these activities should be aware of and accept these risks and be responsible for their own actions.”

Every effort has been made to ensure that the content and instructions in this book cover all aspects of personal safety skills and techniques required in Alpine mountaineering at beginner and up to intermediate level. The Author and Publisher cannot accept any responsibility for any accident, injury, loss or damage sustained whilst following any of the techniques described within.

If you feel that you need additional instruction in order to use this book then it is advised that you employ a suitably qualified and experienced mountain guide.



Glacier Travel

A well-spaced party using a rope correctly on the Altipiano di Fellaria below the Piz Palu, Bernina.

Photo: Andy Perkins

Glaciers are described as wet or dry glaciers. Dry glaciers have no snow on them, so you can see all the crevasse danger. A wet glacier is covered in snow so you cannot see the crevasses; if you are on a wet glacier you should always use a rope.

Spacing on the rope

When measuring out the space between each person, I find it really difficult to visualise a number of metres when the rope is lying in a pile; it is much easier to think about arm spans. I am an average-sized adult male so my arm spans are about a metre and a half. If you have super-long arms or really short arms, you may need to adjust a bit but I wouldn't worry too much.

Two people on the rope

With two people on the rope a spacing of 12–15 arm spans works well in most situations. To measure this out, find the middle of the rope, measure out six or more arm spans in each direction and tie a little knot in the rope to mark the point. You both tie into the end of the rope and take coils (described in detail below) until you reach the knot, then tie off the coils.

Two climbers moving
together on a rope
12–15 arm spans apart.



With two people it is worth considering tying some knots in the rope; if someone does fall into a crevasse, the rope will cut into the crevasse lip until it comes up against a knot where it will hopefully jam. This is especially useful on heavily crevassed glaciers or when going downhill on a steep glacier where holding a fall will be difficult. It is also very useful when there is a big difference in weight between the two climbers. Four or five knots spaced along the rope will do the job; figure-of-eight knots are good as they are quite bulky.

Two climbers travelling
on a rope with knots.



Knots on the rope make the standard crevasse rescue system impossible, however, so you will have to drop the victim the end of the rope and work from there. If you don't have enough rope you will need to pass each knot as you come to it when you are pulling out your partner; alternatively, your partner could use the knot loops to clip into as they climb out. If you do use knots, remember they will take up some of the rope length so have to be included in your calculation. The most important thing in any situation is to hold the fall then worry about everything else; if you can't hold the fall, everything else is irrelevant.

Three people on the rope

With three on the rope you have more stopping power so you don't need such a large gap between each person. The middle person doesn't carry coils; they tie into the middle of the rope then measure seven arm spans in each direction and mark the point with a knot. The other two tie in and take coils to this point, where they tie their coils off.

Three people on a rope
seven arm spans apart.



More than three people on the rope

You can operate with more than three on the rope, but you just need to spread people out. I wouldn't suggest coming any closer together than five arm spans. With more than five people on the rope, the whole thing becomes a bit unwieldy.

Taking coils

In most Alpine situations you are unlikely to have all the rope out in use, so you will need to use some method of storing the unused rope. This is usually done by taking coils around the upper body. Some people prefer to store the excess in their rucksack so they don't have the bulk of the rope round their body. Taking coils makes it easier to change the length of rope when you need to, so this is what I recommend. Carrying extra rope in coils isn't unique to glacier travel; it is an essential Alpine technique which you will use on most Alpine terrain (unless you are climbing long pitches).

Tie into the rope as normal with your rucksack on. (If the coils are under your sack they will be difficult to adjust and can also be really uncomfortable.) There are two basic ways of making the coils: one with a wrist flick and one with a static hand.

ALPINE MOUNTAINEERING

Putting on coils with a flick of the rope.



Simon Abrahams
using his hand as a
spacer to take coils.

Starting at your harness, take the rope up your front and round the back of your neck; you will find this easier and more comfortable with your hood up. Bring the rope behind your head, down around under your armpit then back up the front to make a loop. The bottom of the loop should be about halfway between your waist and your armpit. If it is much longer the coils will slip off your shoulder; if any shorter you will end up with a big pile of rope under your armpit which is really uncomfortable. To take in the rest of the coils I use my right hand and flick a loop of rope over my head and round behind my arm. With each flick I put a tiny twist in the rope so that it sits nicely in a coil.

Alternatively, once you have decided on the length of your coil, you can use your other hand as a spacer and wrap the rope between your neck and hand. I don't think this gives such neat coils, but it is much easier to learn.

Once you have an appropriate amount of coils you need to lock the coils off (if you don't and you fall into a crevasse, the coils will tighten and strangle you). There are lots of different ways of locking off your coils. I once came out of the Cosmiques hut with two other guides and we all locked our coils off differently. As long as they can't slip, the method you use doesn't matter.

Locking off coils.





The method I prefer is as follows. Once you have finished putting on an appropriate number of coils – in my case over my left shoulder – put your right hand across your chest behind the coils coming down your front. Take hold of a bight of rope of about 30cm in length from the tail of the rope, and pull it back through so it is now in the centre of the loop of coils. Using the bight tie a hitch round the rope leading to your partner. Take the small loop that is left as a tail and clip it with a screw-gate krab into your knot loop at your waist.

Moving on the glacier

Once you have all tied on, you can start moving. You need to be spread out with the rope tight enough between you so that if someone falls into a crevasse, the next person on the rope will not be jerked (shock loaded). If they are shock loaded and pulled off their feet, they are unlikely to be able to hold the fall. However, if you are moving with the rope really tight between you it will be very annoying and you will not enjoy your day out. A happy medium is to have the rope coming from your harness touching the snow and then coming back up to the next person (as depicted in the photos). This makes it comfortable to walk, but tight enough to hold the fall. If you are in an area of crevasses you can tighten the rope so you are ready in case of a fall.





Lowering the pull point using a French prusik on the rope clipped into your knot loop.

Prusiks on the rope?

You will often see people travelling on the glacier with one prusik on the rope clipped into their harness, so that they are ready to set up a crevasse rescue system or climb out of a crevasse unaided. This also has the advantage of lowering the pull point from the tie-off loop on your chest coils to the waist belt on your harness, making it easier to hold a fall. The disadvantage is that it is difficult to change the rope length as you have to remove the prusik each time. This is particularly the case when you are moving from glacier travel onto more technical ground.

The issue of lowering the pull point is a valid one, but it can be solved by tying a small overhand knot in the rope and clipping it to your knot loop. This has the same effect and is easier to change than a prusik.

If you are heading off on a long glacier travel section, I would consider a prusik or a knot on the rope. If it is just a short section before moving into more technical terrain, I probably wouldn't bother.

Lowering the pull point using an overhand knot.



Crevasse rescue

If it all goes horribly wrong and someone does fall into a crevasse, you have a number of options as long as the person left on the surface has held the fall. If the person on the surface doesn't know what to do, they will have to become the anchor while the person in the crevasse prusiks up the rope as described in the previous chapter. This may also be the case if the person on the surface is not strong enough or heavy enough to set up an anchor (but they will almost certainly be able to act as an anchor). The bottom of a crevasse may be full of water, so if you do land in water you will need to prusik clear of the water no matter what happens next in the rescue.

If there are a few people on the rope they may be able to pull the victim out of the crevasse by just walking back on the rope. If there is another team close by, they may be able to help pull the victim out. This is the quickest and simplest rescue, but if there are a number of people involved remember to ensure that someone is keeping an eye on the victim as they approach the lip of the crevasse. There have been some very nasty accidents (a number of fatalities, in fact) where people have been crushed into the underside of the crevasse lip. Chop away as much of the lip as possible to make it easier to climb out, and have someone positioned close to the edge so they can communicate and coordinate the pull. Place something under the rope near the edge of the crevasse to stop the rope cutting deeper into the snow.

One-to-one rescue

This is the worst-case scenario, but possibly the most likely situation where you will have to perform a crevasse rescue.



Holding the fall

If someone falls in a crevasse get low to the ground. You may have to self arrest to stop sliding; when you have stopped, dig your feet in.

The most important part of any crevasse rescue is holding the fall; if you can't do this and you both end up in the crevasse, any other techniques are irrelevant. With good rope management so you are not shock loaded and catapulted off your feet when your partner falls in a hole, then it is possible to hold falls even when there is a big disparity in weight. Having a low tie-in point as described above will help, and getting your body low as quickly as possible and using your ice axe in the self arrest position works well. As soon as you have come to a stop, kick your feet in as deep as you can to reinforce your stance. If you are the only person on the surface and there is no one else around, you will need to set up a haul system to pull your climbing partner out of the crevasse.



Creating an anchor

Create an anchor –

Once you are stable, you can start digging your buried axe belay; this is as awkward as it looks.

When someone falls into a crevasse, there is very rarely any ice close to the surface which would allow you to build an ice-screw anchor so you will have to build a snow anchor. As you dig into the snow, you may be lucky enough to find some ice but it is unlikely. The only real option is to use a horizontal ice axe as described in the previous chapter (Buried-axe belay); if you have two tools you can reinforce this.

Digging the anchor and transferring the victim's weight to the anchor is probably the hardest part of the rescue. Once you have held the fall and stabilised yourself, you will need to dig the horizontal slot for your buried axe. Dig this level with your waist or slightly in front; if you dig it too far back you will struggle to transfer the load from yourself on to the anchor. Prepare the anchor as described in the previous chapter; digging the slot for the sling can be really awkward. It will feel really hard work but everything depends



Transfer the weight –

Attach a French prusik to your anchor, slide it down the rope then slowly transfer the load to the anchor.





Lock off –

Clip the rope through the HMS krab then lock off with a slippery hitch and a half hitch.

on the quality of the anchor. Some people carry a stainless steel cable with an eye at each end to use instead of a sling, as this cuts into the snow more easily so you don't need such a good slot.

Transferring the weight

Once you are happy with the anchor, tie a French prusik around the rope to the victim and clip it into the anchor using a pear-shaped (HMS) krab. If you were travelling with a prusik on the rope, release the tension, unclip it from your harness and clip it into the anchor with an HMS krab. Orientate the krab so the narrow end points towards the crevasse; this helps the French prusik to work more efficiently.

Slide the prusik as far down the rope as possible, then slowly shuffle forwards so the load is gently transferred to the anchor. When the weight is on the anchor, the victim will be hanging from the prusik. Clip the rope through the HMS krab and tie it off using a slippery hitch and a half hitch (this will catch the victim if the prusik slips).

The rope between the anchor and the victim is referred to as the live rope; the rope on the other side of the anchor is called the dead rope.

Improve the anchor

You can now untie your coils and improve the anchor if possible; drop your coils but stay tied in just in case of other crevasses. You could pack snow into the slot as described in the previous chapter. You may want to back up the anchor by burying horizontal ski poles or a rucksack behind the main anchor, and connect it using a sling.

Protect yourself as you approach the edge.

Prepare the edge –
Slide a ski pole under the rope to stop it cutting in, then kick or cut a ramp to make it easier for the victim to climb out. Communicate to let them know what is happening.



Check the victim and prepare the edge

Use an 8ft sling tied into the live rope with a Klemheist knot, with the other end clipped into the belay loop on your harness to protect yourself as you



approach the edge of the crevasse. You can now slide it down the rope to protect yourself in case of other crevasses or in case the edge collapses while you are getting ready to rescue your partner.

Slide a trekking pole or rucksack under the rope to stop it from cutting any further into the crevasse edge. Shout to the victim and let them know what you are doing. Find out if they are injured; if they are you may have to use the dead rope to abseil into the crevasse and administer first aid. If they are hanging upside down, it is imperative that you get them upright so they don't asphyxiate. You can fashion a chest harness from a sling to do this or use the chest strap on their rucksack.

Once you have communicated with them you will have to prepare the edge of the crevasse. Crevasses are often overhanging at their edges, so you will have a lip to negotiate. Kick or cut away as much of the snow as possible from the edge around the rope. Be careful not to damage the rope with your crampons, as it will be easily cut under tension. Warn the victim you are going to do this as the snow will land on them.

Tie a Klemheist round the live rope, clip in the dead rope and untie the half hitches. Tie the rope to your harness and pull using your legs. Have a rest and push the Klemheist back towards the edge to reset the system.

Setting up a hauling system

Move back from the edge, take your second prusik and tie it round the live rope using a French prusik or a Klemheist. Clip your DMM Revolver krab into the prusik to reduce friction. You could use a small pulley here instead to reduce friction. Clip the rope that is on the dead side of the anchor into the Revolver and untie the half hitches that were backing up the French prusik;



you now have a 3:1 pulley system. You will not be able to pull the victim out hand-over-hand, so tie the rope next to the Revolver into your harness.

Get down on all fours, pull the dead rope from the anchor and push with your legs. You will now be using all your big muscles and should be able to pull the victim out. As they approach the surface, be careful they don't get pulled up against the lip. If you need to lower them down a bit you can just release the French prusik on the anchor (you will be able to control the lower using the pulley system). When you have pulled the victim up a bit, you can let the tension out of the pulley and the French prusik will tighten up on the rope holding them in place. You can then slide the Revolver back down the live rope towards the edge, and repeat until they reach the surface.

Improving efficiency

You can reduce the friction and increase efficiency by replacing the French prusik with a Petzl Micro Traction. These have to be put into the system right at the start when you are connecting the live rope to the anchor.

Micro Traction
in a Z Pulley.



If you are still struggling, you can increase the pulley from a 3:1 to a 6:1. Take the end of the rope that you are not using and clip this into the anchor (you can use any knot). Lead this rope down to the Revolver, tie an overhand knot in the rope that comes through the Revolver and clip a krab into the overhand knot. Now clip the rope that comes from the anchor into the new krab. Pull on this rope as before; you will have to pull a lot of rope through the system to get the victim to move, but it is easier than the 3:1.

We have demonstrated the 6:1 using a piece of red cord so it is easy to see the system.



In reality, you can use the end of the rope and pull using your legs as described earlier.

Scoop the snow out from under the French prusik; this stops the snow from catching on the knot, which would prevent it from locking off.



What to do if you are the victim

If you are the victim, once your heart rate has stabilised a bit see if you can reach one of the walls of the crevasse. If you can, take an ice screw from your harness, screw it into the wall and clip yourself into it using an 8ft sling. You are now safe if your partner makes a mess of creating the anchor; the situation will not get any worse. Even if you can't communicate with those on the surface, when you feel your partner beginning to pull you out you can unclip and remove the screw.

If you are near the walls during the rescue phase, you can push up wherever possible as your partner pulls you. As you approach the surface, you will need to push away from the lip and scramble out.

Crevasse rescue with knots on the rope

If you have been travelling with knots in the rope it will be easier to hold a fall, but the rescue system described above will not work. Set up the anchor as described and transfer the weight to the anchor. You don't need to use a French prusik as you will not haul on the rope between you and your partner. Once everything is stabilised and you are happy with the anchor, approach the edge of the crevasse (remember to protect yourself using a sling on the live rope) and lower the end of the rope to the victim. You can tie an over-hand or figure-of-eight knot with a screw-gate on the end to make it easier to clip in. You can now set up a 3:1 hauling system using this new live rope as before, and you can do it without the stress of having the weight on the rope. If you don't have enough rope, you will have to pull on the knotted rope and bypass the knots. Play with this one at a hut on a sunny afternoon.

Assisted rescue

If the victim isn't too deep into the crevasse and you have plenty of spare rope, instead of attaching the Revolver to the live rope you can drop a loop of dead rope to the victim; they can then clip this to their harness. To climb out, the victim pulls down on one side of the rope and the rescuer on the surface pulls on the other. This has created a 3:1 system, but has the advantage that two people are pulling on it. In reality, it is very rare that you would have enough rope to construct this type of rescue.

Crevasse rescue key points

- Hold the fall – dig heels in, drop to the ground.
- Dig the anchor – cut it next to you or slightly in front of you.
- Transfer the weight gently – don't shock load the anchor.
- Prepare the edge – pad and remove overhang.
- Set up the haul system – make sure you lock it off during prep.
- Pull out the victim – communication is the key here.

Common problems

- Rushing – results in poor anchor and inefficient system.
- Anchor cut in the wrong place – difficult to transfer the weight.
- Anchor not good enough = disaster.
- Not taking time to prepare the edge so the rope or the victim get stuck.
- Poor communication with victim.

ALPINE MOUNTAINEERING



A PRACTICAL MANUAL

A complete introduction to Alpine mountaineering.

If you are planning your first trip to the Alps or anxious to improve on your performance on previous trips, you need this book. Even seasoned alpinists will benefit from Bruce's clarity and depth of experience.

Everything you need to know is here and none of the issues are ducked. From dealing with hut guardians to moving roped together.

The first part of the book deals with the knowledge and techniques you will need. The second part consists of a choice of good routes to help you gain experience, presented in guidebook style.

GLACIER TRAVEL

SPEED VS. SECURITY

MOVEMENT ON ROCK

MOVEMENT ON SNOW & ICE

ALPINE WEATHER

ALPINE ROUTES

YOUR FIRST ROUTE

