ENGLISH

ÖSTERREICHISCHER RAFTING LEHRPLAN V2

Arbeitsgruppe „Qualitäts- und Sicherheitskriterien“ des Tiroler Raftingverbands

INTRODUCTION

The whitewater industry has become an indispensable part of the tourism in many regions of our country. With over three decades of experience of this trend sport on the rivers of Austria, we have an adventurous yet safe incredible experience for guests.

Safety is our top priority! This principle has motivated an expert group of regional and international experts to develop this syllabus. It includes fundamental and practice-related specialist knowledge, supplemented by a regional section with regional guidelines and reports. The syllabus provides an excellent foundation of knowledge of international standards both for beginners and experts.

Through a multi-day, practical-oriented basic training, organised by rafting associations in the respective federal states, this curriculum is not only recognised in Austria but also internationally. In cooperation with the International Rafting Federation (IRF), content and standards were reviewed, adopted and incorporated into the curriculum.

The focus of this new edition was an update inline with the IRF standards and certification by the associations. As a result and recognition of our efforts, international recognition has been established in over 50 IRF member states.

Marcel Pachler
Chairman Tiroler Rafting Association

1. LEGAL REQUIREMENTS OF RAFTING

1.1 Introduction

Like every alpine sport, rafting gives rise to potential risks, and despite careful planning and execution accidents often cannot be avoided. The majority of rafting injuries occur as a result of the inherent risks or general dangers of the sport and would therefore have no legal consequences.

Nevertheless, accidents do take place which can be traced back to the raft guide's negligence or corporate liability of the relevant rafting company. What are the consequences which arise as a result?

1.2 The difference between civil and criminal sanctions

Criminal proceedings are an official procedure. The proceedings are automatically initiated as a result of an accident report by the (Alpine) police to the state prosecution service. In relation to the relevant criminal charges, these are known as "Official Offences", and the injured individual cannot therefore decide not to press charges.

Civil proceedings are also available to the injured individual in order to recover damages (for example damages relating to pain and suffering, loss of earnings and equivalent). These can be brought by filing a claim if it is not possible to reach an out of court settlement.

In criminal proceedings the fault of the individual only plays a secondary role, and is only taken into account as a mitigation in relation to the penalty. In the civil process, contributory fault can lead to the injured person being liable for the majority of his/her claims and therefore

have the corresponding costs consequences. In civil proceedings, it is possible to draw a comparison between the claimant and respondent at every stage of the proceedings; in criminal proceedings it is not possible to do so, because the obligation to bring criminal sanctions is a duty which operates between the state and the defendant.

In criminal proceedings, damages or a custodial sentence must always be born personally by the defendant. In contrast, it is possible to insure against damages in civil proceedings. Equally it is possible for damages to be awarded to the victim in criminal proceedings, by means of a concurrent personal claim.

A criminal finding of fault is binding on the civil court, and it is therefore not possible for the accused to later claim in civil proceedings that they are not at fault for the accident.

CRIMINAL LAW	CIVIL LAW
"Official Offence"	Initiated by the Claimant
Automatic prosecution	Claim or out of court settlement
Parties cannot choose not to press charges/ bring the court process to an end	Parties can choose to bring the court process to an end
State prosecution	Parties claims initiated through the courts
Contributory fault not taken into account	Contributory fault affects liability
Waiver of claims is unlawful	Waiver is not effective in relation to personal injury
Damages are not insurable	Potential damages can be insured

1.3 Requirements for Damages

In order for an injured person to be awarded damages in a civil claim, there are various requirements, which are: loss, causation, breach of legal obligation and fault.

Without losses, there can be no liability for damages. The loss can be a financial loss, a breach of rights or a personal injury.

The loss must have been caused by the guide in order to establish causation. Causation would for example not be established, if the loss would have occurred without the relevant act or failure to act on the part of the raft guide, for example if the customer suffered a personal injury solely because of a pre-existing injury/medical condition.

The loss must arise as a result of an act or omission in breach of a legal obligation. A person's conduct is in breach of a legal obligation if it is contrary to something mandated or forbidden by law, or is contrary to public policy.

If there is a contractual relationship between the parties, then conduct which is in breach of that contract is also considered to be a breach of a legal obligation. In relation to a breach of contract, there is also a reversal of the burden of proof. This means that the party who is claiming to have complied with the terms of the contract must prove that he/she has done so.

Finally, there will only be a finding of liability if the loss has been caused as a result of fault on the part of the guide. In the first instance, negligent conduct will pay a role. Negligence arises where a person breaches his/her duty of care to another.

In relation to negligence, the law differentiates between gross negligence and negligence. Conduct will be considered negligent if the breach of the duty of care could have happened to a careful person. Gross negligence arises where the conduct constitutes as such a serious breach of the duty of care, that it would never have happened to a careful person in that particular circumstance. The law assesses this by reference to the level of a competent raft guide. The court will assess how a careful guide, acting lawfully, would have behaved in the same situation.

1.4 Liability of the Guide as a Subject Matter Expert

A raft guide is considered by the law to be a subject matter expert* . The legal definition of the subject matter expert is very widely cast. It encompasses all occupations which require a particular level of skill or specialist knowledge. If someone takes up an occupation classified as a subject matter expert, he holds himself out as having the required knowledge and skill level required for that occupation.

If a person does not possess the required level of skill or knowledge then he/she is responsible in tort. Subject matter experts are held to a higher duty of care and therefore a higher standard.

He/she must therefore possess the typical skill and performance standard of his occupation. Further he/she must undertake continuing professional development and ensure he is up-to-date with the current occupational standards.

* § 1299 ABGB

1.5 Taking Personal Risk

Rafting gives rise to risk, like all outdoor sports. This is generally acknowledged and is usually understood and accepted by the participants of a rafting tour. Nevertheless, (in the author's opinion) the case law does not give enough weight to the participants' taking personal risk.

Taking part at your own risk means that you are taking on board a known or at least foreseeable risk. However, the Supreme Court of Austria has recently increased the duty of care and reduced the scope of a participant taking their own personal risk.

In principle, in order to rely on the participant taking personal risk, the participant must be in a position to identify the relevant risks and therefore be capable of making a decision to take that risk on board. In this context, a raft guide has a duty of disclosure to the participant.

1.6 Duty to provide Information

Disclosure of the relevant dangers is always required when the danger is not obvious or recognisable to the average person. Particularly beginners are rarely in a position to recognise or assess general alpine dangers and especially the dangers of rafting.

The scope of the duty of disclosure depends on the personal circumstances of the participant. The more inexperienced the participant, the wider the scope of the duty of disclosure.

In assessing participants, it is worthwhile being cautious, often participants noticeably over-estimate themselves. The bigger the consequences of an accident, the more comprehensive the disclosure must be.

The duty to provide appropriate disclosure is an implied contractual duty of a raft guide. A breach of the duty of disclosure can give rise to liability.

1.7 Waiver of Liability

Commonly, general terms and conditions set out an exclusion of liability for accidents.

This type of agreement is described as a waiver of liability. The idea is to exclude or at least limit liability for damages. This kind of agreement is agreed between the parties and must have been agreed before the activity has taken place. In principle a waiver can be entered into verbally or in writing, however in practice it is difficult to prove the existence of a verbal agreement.

In relation to the enforceability of a waiver, there is a differentiation between criminal and civil liability.

In relation to criminal liability, the state prosecutes in relation to unlawful conduct, through which a third party has been harmed. The criminal process is designed to fulfil the right of the state to pursue individuals for criminal acts, and is not intended for the compensation of losses as between those involved. For this reason, it is not possible to rely upon a waiver of liability which has been agreed between the parties in criminal proceedings. A waiver of liability is considered to be in breach of public policy and is unenforceable in relation to criminal proceedings.

The aim of civil proceedings is to compensate the parties for the losses which have been incurred. A waiver of liability in relation to personal injury is unlawful and is therefore not enforceable. This is set out in consumer protection legislation, which regulates contracts between consumers and businesses.

1.8 Criminal Liability

In criminal law the state prosecutes in relation to unlawful conduct, through which a third party has been harmed. In contrast to civil proceedings, the claims should not be settled between the parties. The following offences are relevant:

- §80 StGB: manslaughter
- §81 StGB: manslaughter under particularly dangerous circumstances
- §88 StGB: negligent bodily injury
- §89 StGB: endangering personal safety
- §177 StGB: negligent public endangerment

As is evident from the descriptions of the offences, these concern offences of negligence in relation to which personal safety has been endangered, or personal injury or even death has been brought about. These offences require that the wrongdoer is negligent (rather than that he/she intends the harm).

A person is considered to be negligent if he does not observe the proper level of care, which he/she is required to take in the individual circumstances by reference to his/her mental and physical capabilities.

The state prosecutor, as well as the judge, is under an obligation to be impartial. That means, he/she determines the facts and takes all evidence into account which speak for and against the defendant's guilt. It is therefore possible to make a request for evidence from the state

prosecutor, to give a statement to him/her or to apply for the appointment of an expert witness. In the context of criminal prosecution, the injured individual, the defendant, all witnesses, potentially including expert witnesses, will be interviewed. The injured individual can join a civil suit to the criminal proceedings as a claimant and instigate civil claims against the defendant in parallel civil proceedings. Whether the judgment will incur a fine or a custodial sentence depends on the circumstances of the case as well as the defendant's circumstances. The level of fault as assessed by reference to the mitigating and aggravating factors, as well as the consequences of the act, will influence the sentencing, and therefore the type and level of the penalty. The defendant as well as the prosecutor can appeal the judgment, the level of penalty as well as any damages awarded to the injured individual.

If the injured individual has been awarded damages (for example compensation for pain and suffering) in the criminal proceedings, then the defendant is also liable for those damages. Where applicable, contributory negligence on the part of the injured person only has an effect of the type and level of the penalty. Under no circumstances would the contributory negligence of the injured person release the raft guide from criminal liability. A criminal judgment can therefore still be appropriate when, for example, the entire losses have already been made good by liability insurance providers.

Under certain circumstances, criminal proceedings can be waived, which is described as a "Diversion". A prerequisite for this is that the criminal offence carries a maximum three-year custodial sentence and that the facts are undisputed, further that the consequences of the act have been adequately compensated and that the defendant is not at serious fault. Also, the punishment must not be required in order to prevent the defendant or general public from committing similar offences. Finally, no death can have been caused by the relevant act.

The proceedings can be terminated under this waiver process; the defendant can be required to pay damages, serve probation and/or pay damages, or pay a fine or required to perform community service or just be required to serve probation.

In criminal law, the raft guide who commits the negligence has the primary liability. However, the company he/she works for can also be sued in the context of vicarious liability.

1.9 Summary

Ultimately accidents cannot always be avoided. The civil and criminal law consequences can be mitigated or avoided through due care, training, and caution. **It is particularly important to carefully document the raft guide's training, and to properly instruct the participant, for example in the safety talk**. Guides should be capable of giving instructions in multiple languages.

The participant should be informed of the risks of the sport, without minimising or negating them. This is the only way in which the personal risk taking of the participant can become relevant.

1.10 Appendix: Legislative Basis

- Schifffahrtsgesetz, BGBl. I Nr. 62/1997, zuletzt geändert durch das Bundesgesetz BGBl. I Nr. 96/2013
- 98. Verordnung der Bundesministerin für Verkehr, Innovation und Technologie betreffend eine Seen- und Fluss-Verkehrsordnung (SFVO), ausgegeben am 14. April 2013
- The relevant environmental laws of the Austrian states
- Schiffsführerverordnung BGBl. II Nr.298/2013
- Verordnung über Anforderungen an Sportboote BGBl. II Nr. 21/2005
- Schiffstechnikverordnung BGBl. II Nr. 148/2014
- Schiffahrtsanlagenverordnung BGBl. II Nr. 215/2012
- Wasserstraßen-Verkehrsordnung BGBl. II Nr. 60/2013
- Seen- und Fluss-Verkehrsordnung BGBl. II Nr. 258/2013
- Verordnung über Beschränkungen der Schifffahrt auf der Großache LGBl. Nr. 12/1999, auf der Isel LGBl. Nr. 17/1999, auf der Ötztaler Ache LGBl. Nr. 48/2001 und LGBl. Nr. 85/1995
- Verordnung über die Beschränkung der Schifffahrt auf öffentlichen fließenden Gewässern, Änderung LGBl. Nr. 38/2006

Translated by Paula Volkmer, admitted as a solicitor of the Supreme Court of England and Wales.

2. TRIP PLANNING

2.1 Introduction

A professional tour plan should reduce or prevent risks or accidents in advance. In general the tour plan requires a duty of care: consulting numerous sources of information, analysing information (How reliable is the source? How old is the information? Is it still valid?) From which medium (Internet, Radio, TV...) was the information obtained is not important.

Main elements of the tour plan:

GROUP	EQUIPMENT	TOUR / RIVER
Who? How many? Physical and mental condition Responsibility	Check the equipment Emergency equipment	Area Demands Length / difficulty Possibility to avoid it or turn back

WEATHER	SITUATION ACCORDING TO TIME OF YEAR	INFORMATION
Weather report Development Temperatures Rainfall Quality of visibility	Water level Day light Threat of thunderstorm	Map material Guide's material Guidebooks Expert information

Objective conditions on the stretch of water (See **chapter 8 'How to act in case of an accident'**)
Other people's reports and a vague indication from them on arising difficulties are by no means sufficient for a trip on a complex stretch of water. Information on the water level, descriptions of the river and stretch of water are an absolute necessity, key areas particularly should be surveyed on the spot. Finally while scouting the river one should agree on areas for safety and rescue measures, in order to be prepared for an emergency situation.

2.2 In advance – the day before

Make inquiries with the kayak clubs, rafting companies and individuals etc. about this section of the river.

Survey of the stretch of water:

- Survey the stretch personally if it has not been rafted for a long time.
- Confirm evacuation points - where can the river be reached by a road vehicle (possibly an emergency services vehicle etc.)
- Where can a helicopter land?

Weather report + forecasts – TV – radio – Internet - newspapers

Water levels:

- Have they been rising or falling up to the day of the tour?
- Source: tape recorded message of the water level or a website with the water level

Rafting guide:

- Prepare yourself the evening before so that you are fit and ready for action on the day of the tour (sufficient sleep, no alcohol etc.).
- Charge your mobile telephone.

2.3 On the day of the tour

A team talk usually takes place on the rafting base for this purpose (base manager, trip leader, raft guides).

Information on dangerous changes in conditions on the stretch of river:

- Sources: TV, radio, Internet, newspapers; www.alpinesicherheit.com
- Are there new obstacles?
- Enquire at the rafting companies, kayak clubs or with individuals who live locally to the river about current water levels or changes on the river.
- Exchange of information between rafting companies and also other outdoor companies)

Water level:

- Pay attention at a high water level to a change in the character of the river, to the speed of the current – a lack of eddies – which ones are still there?
- To tow-backs in drops and weirs – to possible driftwood
- Portage?

Take account of the weather forecast in the tour plan:

- Sources: TV, radio, internet, newspapers
- For Example the effects or threats from strong rain, hail, short and heavy bursts of rain, sudden falls in air temperature and atmospheric pressure, thunderstorms, cold weather, heat etc.
- http://tirol.com/innsbruck/wetter/
- http://www.zamg.ac.at
- Pay attention to the possibility of local storms http://wetterradar.vorarlberg.at

The duty of obligation and not the source of the information is decisive!

2.4 Equipment Check

Inspect the rafting guide's equipment - see chapter on equipment

- Is the equipment ok and is everything ready for use?

Mobiltelefon:

- Carry mobile telephones on your person in a waterproof box
- check that the battery has been charged
- Save the numbers of the rafting base and of the other rafting guides in the phone

Emergency numbers:

- Euro emergency number 112 – works in the whole of Europe
- Rescue and Water rescue: 144
- Mountain rescue: 140
- Save the numbers and have them mentally at the ready
- Turn the mobile off – turn it on – enter 112 as PIN ➡ Emergency 112 is possible on all networks, not just the home net (See also **chapter 8 How to act in case of an accident** in relation to this)

The raft equipment - Inspect and make sure it is ready for action

- See chapter 5 *'Equipment'*

The Customer's equipment:

- Carry out a safety inspection on this equipment – see chapter 5 'Equipment'

Check the people are fit to go on a rafting tour:

- Alcohol, medicine, medical and psychological conditions etc.

2.5 Final Preparations before the tour

With most rafting companies there is a group talk before the tour, at which all the rafting guides involved in the trip and the responsible manager at the base discuss the planned tour together.

The trip leader determines safety procedure for the trip:

- The assignment of the guides to the boats
- The order of the boats at the launch and at the landing
- Raft order on the river – in convoy – rafting in groups
- Back up from each boat at danger spots. For example after rapids, portage

2.6 Conduct on the water

Conduct on the water must be discussed prior to the trip. Communication on the water is largely only possible through signals and signs. Trips normally take place in convoys of 3 or 4.

The actual river conditions can of course be very different to the expected ones: e.g. due to higher or lower water level, rain/ thunderstorms, driftwood, obstacles, etc. or also due to out of date topographies/maps. The water level of the Inn for example can rise by up to one metre within half an hour.

Show awareness of responsibility and safety – always act with foresight.
Be aware and have an over all picture of the group and the section of the river.

2.7 Feedback and exchange of experience

Exchange of experience is an important part of modern safety management. The same as you talk before you go on a tour you should discuss with other raft guides on their observations, on danger zones, water level and unusual events on the water. Accidents and dangerous sections should be published (e.g. on the internet) so that also other sportsmen get to know it.
This feedback is basis for your next tour plan.

3. SIGNALS

3.1 Whistle Signals

1x Attention – stop
2x Attention in the upstream direction
3x Attention in the downstream direction
3x constantly repeated -
Emergency / Emergency situation

Fig. 3.1: A whistle needs to be loud enough to be heard on the river such as the 115db Fox 40 Whistle

3.2 Hand signals

These are the hand signals used by the International rafting Federation.
A raft guide is required to know all IRF hand signals.
Hand signals should be repeated to show that they have been understood.
Hand signals must be repeated from raft to raft by each guide when in convoy.
If no signal is repeated or responded to is automatically taken to mean Negative / No / emergency Stop.

Positive / Yes / Ok
No problem / All clear

I confirm / Ready / understand

Negative
Stop Immediately / No

Swimmer

Swimmer not in sight

How many swimmers? One arm movement per person

Cover me

Point to indicate position

Last boat?

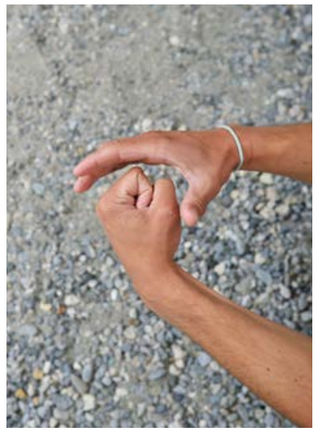
First Aid kit required

Pump required

Go where I am pointing at

Run simple right is shown without movement. Run farther right is pumping with arm or paddle

Wait - don’t move



Wrapped raft

Command canceled / all finished

I need a rope

Carabiner

Speed up

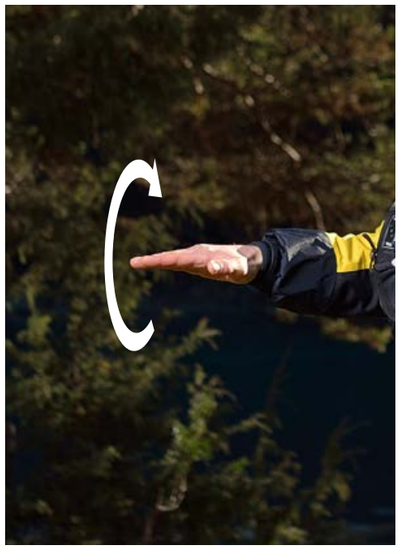
Slow down

No problem - I am personally physically OK

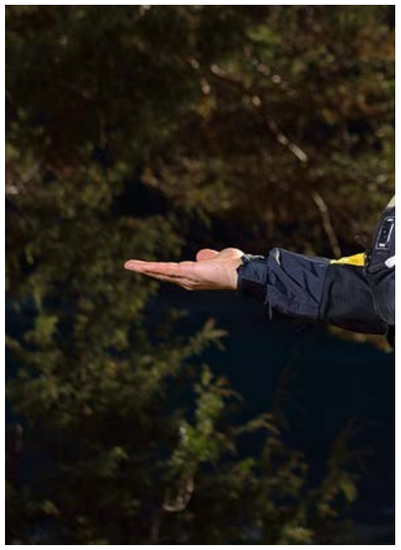
Don’t stop

Stop in the eddy - then point to indicate the place

I need a helicopter



Flip

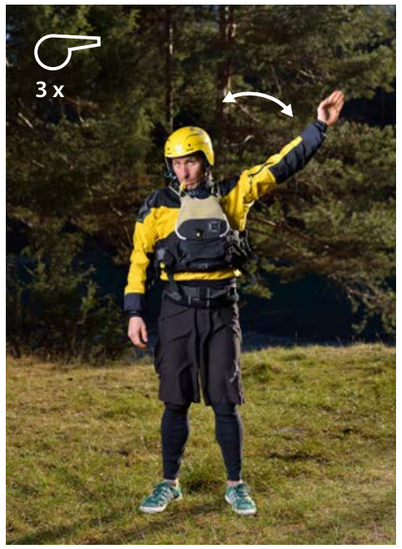


I / me

You

Paddle overboard

Paddle Overboard - indicate position



I NEED HELP using Hand and whistle or paddle and whistle - 3 repeated blasts

Example sentence:
Here is what a sentence would look like if a raft guide had flipped and lost some swimmers and the second raft guide who picked up the swimmers is too far away to just communicate the situation by shouting.

After the guide has re-flipped his raft got in and pulled in the clients next to his boat, he will start to look around for the clients he has lost. At this point the guide who has rescued clients will give one whistle blast to get the guides attention and when they have eye contact will give the following 4 signals:

I / me

Swimmer

Number of swimmers

This means I have rescued 1 swimmer. If the guide has rescued more swimmers then he repeated the last two signals the appropriate number of times.

At this point the guide of the flipped raft either gives an All clear signal if he has located all his clients and no one is injured or he communicates that he is still missing clients / needs first aid / needs to stop immediately / has an emergency situation.

At this point all guides who have not flipped and have not rescued clients need to **SHUT UP AND NOT BLOW THEIR WHISTLES**. This is a very important part of communication. They should instead be moving their boats to the place of most usefulness and observing the guide to see if he has the situation under control. Once the all clear is given, equipment such as paddles can be picked up.

4. HYDROLOGY - THE SCIENTIFIC STUDY OF THE MOVEMENT OF WATER

4.1 Introduction

The aim of the following chapter on ‘Reading Water’ is to convey the knowledge of the most important specialist terms and characteristics of water.

River directions

When describing directions on the river we always use the technique of describing them when looking downstream:

- River Right, is always the right side of the river when looking downstream
- River Left, is always the left side of the river when looking downstream

4.2 Types of rivers

Glacial rivers

The largest amount of water in these rivers flows during the summer months between May and September. From November through till April they have an extremely low water level.

On hot summer days during the morning hours the glacial rivers have the lowest water level for the day and then the level will rise as the sunshine and therefore the temperature on the glacier rises. For example on the Ötztaler ache the highest daily water level will be between midday and evening due to the distance of the Rafting section from the catchment areas of the glacier.

Mountain rivers with glacial influence

The flow levels in these rivers is similar to that of glacial rivers, however the low water period is not as pronounced e.g. Inn.

Mountain rivers without glacial influence
The main high water on these rivers is at the time of the snow melt in May and June. On rivers that flow over limestone areas the difference between high and low water months will be more than on river that flows through crystalline rock areas e.g. Salza river

Rivers of the foothills of the alps
On these lower lying rivers the flow is moderated over the whole year, however the highest flow months will still be influenced by the yearly snow melt e.g. Alm, Rodl.

4.3 River characteristics

Whitewater river sections can be defined as having one of two types of characteristic. These differ from each other due to the water behaviour and speed.

Pool-drop sections have a regular alternation between quiet flow areas and steeper sections of rapids. Therefore after each steeper and thus more difficult section of the river there is a quiet section for rest or recovery. This increases the safety on the river section. Pool-drop rivers can be commercially rafted even though the rapids are extremely difficult, something that on a continuous river would be too dangerous. As water levels rise the speed of flow in the pools also rises, at some stage turning it into a continuous river.

In the Alps, pool-drop rivers are rare. Most of our rivers are continuous, and as such we must have suitable rafting & risk management skills.

An example of a pool drop river in the Alps at normal water flows is the: Soca (rafting section).

On **continuous** whitewater sections the gradient is equally steep without interruption. On such rivers the current is unrelenting requiring looking & planning far ahead, as well as prior knowledge of the river section. Not only navigating the river can be difficult, but also stopping the raft can be very challenging for a guide. The whitewater difficulty often varies, sometimes easier or harder, however the speed of the current is always high.If a raft has multiple swimmers, flips or wraps, then the clients will be spread over a large area and may well drift a long way downstream before being rescued.

The knowledge and experience of a guide, as well as their ability to react quickly to changing situations are all important requirements.

The fact that a river is continuous does not say anything about the difficulty of the section to raft, rather that the consequences of a mistake will be higher. There are easy family tours as well as extreme tours to be found on continuous rivers. The most rafting sections in Austria

lay somewhere in the middle at normal water levels.
Examples of continuous rafting rivers are: Inn, Salzach, Enns, Ötztalerache

4.4 Whitewater Features - Terminology and Definitions

Waves
If water is forced to change its direction by rocks or other obstructions, waves are formed. A regular recurring up and down movement of the water surface is characteristic of waves.
The difference between waves in a river and waves in the sea is that river water flows downstream, and the waves remain in the same place. On the sea the waves move inland due to the energy passing through the water towards the land. On a whitewater river a distinction can be made between different types of waves: standing waves, breaking waves, exploding waves (they build up regularly, reach their full height and crash), diagonal and staggered waves.

Fig. 4.1: Waves after a rock

Hydraulics / Holes / Pourovers / Stoppers
Large quantities of water, which flow quickly downwards and come up against sufficiently large resistance, roll at a horizontal axis up river (Tow-back), only the small under current normally flows down river. This is a constant rotation, only changing with water level variation.

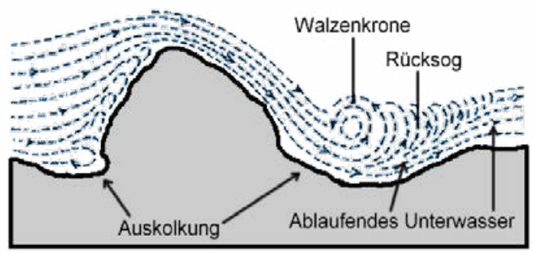


Fig. 4.2: Stopper waves build up after water flows over an obstruction

Eddies / Eddy lines
An eddy is the result of the suction effect, where fast flowing water passes by calm water. The faster the main current, the faster the eddy current. At the same time a line between the two currents is recognisable (this is called the eddy line), this is also where whirlpools form. These are stronger the faster the current flows.

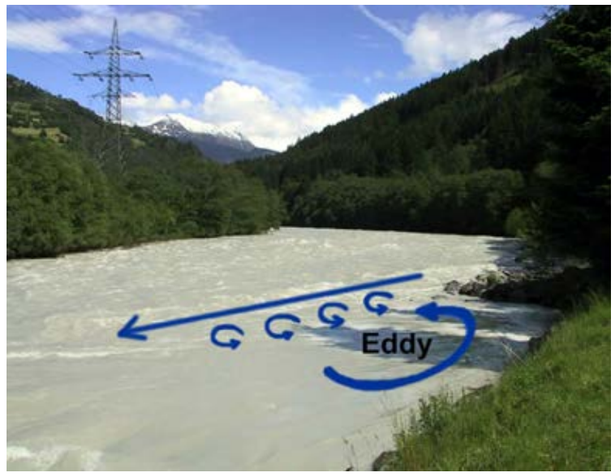


Fig. 4.3: Eddy & Eddy line

Wavetrain
A short river section with both a high gradient and high water speed, accompanied with large waves.

Rapid
A rapid occurs due to the increase in the speed of the current at a narrowing in the river or at the increase in the gradient. The nature of a rapid is determined by the shape and size of the rocks or other obstructions on the riverbed.

Downstream V
The faster flow of current between two obstructions.

Headwall / Rockwall / Cushion wave
A cushion wave is the water ”cushion”, that is caused by water flowing upwards and away from a rock, rock wall or a river bank, by the damming effect of the water hitting it.

A headwall is a rockwall that has a cushion wave on it. Between the upstream current caused by the water hitting the rock w all and the cushion wave on the rockwall an eddy line can form. For this reason a headwall often has a strong downward current that can pull swimmers underwater, even if they are wearing lifejackets. Rafts that are pushed up against the rock or cushion wave of a headwall can easily be caused to flip.
Examples: Aschbach in Ötztal, Tösens

Headwalls can also be undercut. A headwall which does not have a cushion wave is more lightly to be undercut.

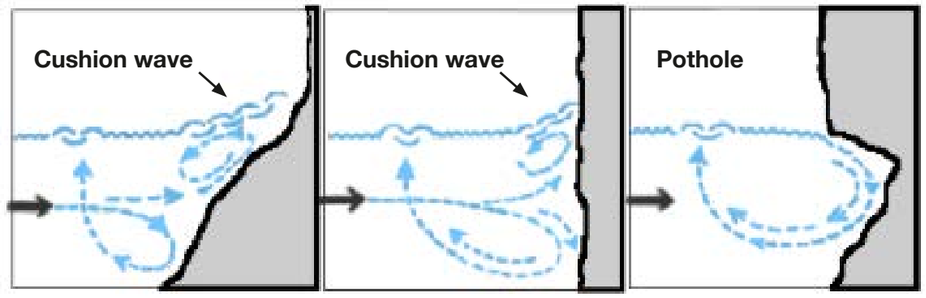


Fig. 4.4: Currents at different Prallwände (Headwalls)

Pothole
An eroded space caused by water.

Boil
A vertically slow rising current, which appears to boil on the surface. Seen after large sinking currents like walls, syphons and weirs.

Drop
A small waterfall.

Boulder Garden
A section of whitewater with a large section of rocks in it.

Whirlpool
A conical quickly rotating mass of water which sucks objects under water.

Cataract
Different whitewater difficulties follow one another along with a distinct gradient making for a very difficult rapid.

Syphon
A space that lets water flow through or underneath rock or boulders.

Variation in the current
Due to the geological conditions, the amount of water and the physical laws of nature, diverse bank and riverbed formations can be produced, which for their part in turn influence the variations in the current.

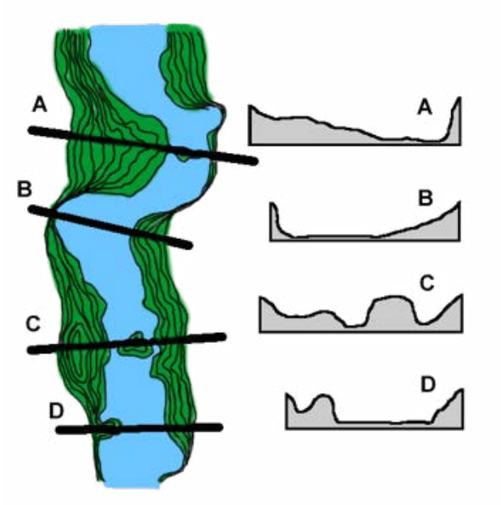


Fig. 4.5: Bank and riverbed formations (Cross-sections und profiles)

4.5 Grading of Difficulty

The river grading system determines the level of difficulty of a section of a river. The classification often changes with changes in the water level. The conditions can alter drastically with high or low water levels.

Stretches of white water are subdivided into different classes of level of difficulty according to their raft ability, from I (easy) to VI (at the limit of navigability/raft ability).

Definitions of Grades of Difficulty
The white water grading scale takes into account the difficulty, danger and consequences from whitewater rapids. Dams and weirs are not included in the definition of white water, as they are man made structures, and so not graded.

White water Grading of Difficulty

LEVEL OF DIFFICULTY		DESCRIPTION	EXAMPLE
I	Easy	Regular currents, regular waves	Inn (from Mötz)
II	Moderately difficult	Irregular currents and waves, medium-sized rapids, stoppers and whirlpools, single obstructions	Inn Landeck - Imst
III	Still clearly navigable / raft able	High irregular waves, large rapids, powerful stoppers, whirlpools and pressure areas, blocked passages, drops, a larger number of obstructions in the current	Inn - Imster Schlucht (at a water level of 330cm at Magerbach Gauge)
IV	Very difficult	Passage not always recognisable, scouting mostly necessary, high continuous rapids, powerful stoppers, whirlpools and pressure areas, shifted obstructions in the current, higher drops with tow- backs	Ötztaler Ache - Wald-schlucht (water level of 250cm at Tumpen Gauge or 120cm at Brunau Gauge; Sanna (water level of 240cm at Landeck/Sanna Gauge)
V	Extremely difficult	Scouting essential, extreme rapids, stoppers and pressure areas, narrow shoots and obstructed passages, higher drops with difficult launching and landing possibilities	Inn Neuer Zoll – Nesselgarten (Obere Landecker Schlucht - „Inn Shoots“)
VI	At the limit of navigability/raft ability	The passage in general is impossible. At certain water levels perhaps navigable. High risk.	No Example

Footnote Grade VI:
For rafting there is no grade VI to raft in this region and therefore there is also no example. Commercial rafting is only permitted on rivers up to class IV.

Water Level
The above-mentioned examples are valid with the above-mentioned water levels and can alter very drastically with differing water levels. Therefore the estimated details of grading can give merely an approximate idea of the difficulty of the river.

Whitewater Classification Criteria

1 - Volume of water

The volume of water in Europe is measured in m3/s whereas in the USA it is measured in Cubic feet per second (CFS). The relevance of the volume of water can be found either from a river guidebook in conjunction with a river gauge or by estimation.
River gauges can be official government water level measuring points or local used points of note, such as bridge piers, stairs, etc.
Important: With all river gauges it should be noted, that it is not the level height of the water but the volume that is decisive.

Water levels on the Internet:
www.4-paddlers.com
https://apps.tirol.gv.at (Hydrographischer Dienst Tirol)
www.alpinesicherheit.com

2 - Water speed

Mean water speed = surface speed x 0.7
(Hint: estimate the water speed compared to walking speed, 4 km / h = 1.1 m / s)

RIVER CHARACTER	WATER SPEED	EXAMPLES
Small highly blocked rivers	2 m/s = 7 km/h	Steyr Oberlauf
Middle Alpine rivers	3 m/s = 11 km/h	Salza, Saalach, Sanna big high-volume rivers
Highwater Rivers	4 m/s = 15 km/h	Inn: Imster Schlucht

3 - Gradient

The gradient for rivers in Europe is given in Promille [‰] or one tenth of a percent. 5 ‰ equals five meters of vertical drop over 1000 meters of horizontal distance.

GRADIENT	GRADIENT	EXAMPLES
Low Gradient	under 5 ‰	Salza
Middle Gradient	5-10 ‰	Enns
High Gradient	über 10 ‰	Ötz

4 - Obstructions

Differentiated between:

- Open riverbed with no obstructions
- Few obstructions
- Highly obstructed

5 - Other difficulties

- Tight passages
- High drops
- Canyons
- Strainers e.g. trees in the current
- Particular dangers due to geology (Syphons, headwalls, …)
- Other (e.g. critical water level,…)

4.6 Obstructions

An obstruction is everything, which disturbs the smooth flow of a river. There is a distinction between natural and artificial obstructions.

- **Natural Obstructions:**
  Rapids, waterfalls, bends on the river, stones and rocks, barriers of rocks, blocked passages, drops, cataracts, lodged trees (strainers).

- **Artificial Obstructions:**
  Weirs of all types, bridge pillars, jetties, bank reinforcements, iron & wooden stakes, piles of concrete, the debris from old bridges, dams, barrier deposits of gravel and scree, ropes and cables (for example steel cables for flow gauges for measuring water speed), rubbish and even sudden man made rises in the water level caused by dams upstream.

Weirs (low head dams)

Weirs are artificial drops in the river which are built to make energy, to divert water or change the river speed. For rafting weirs are especially dangerous, accounting for 42% of all rafting deaths in the accident statistics. This is due to the large tow-back on these weirs.

The tow-back is dependent on the design of the weir and the volume of flow / water level of the river. Even weirs with a minimal vertical drop can have an enormous tow-back formed beneath them! Rescuing people from weirs is often very difficult as well as dangerous for the rescuers. The rafting of artificial obstructions like weirs is not considered in the whitewater grading, as artificial obstructions are not considered natural whitewater.

Rafting over drops and weirs is a high risk activity:

1. The higher the drop the harder the impact, which can lead to a catapult effect for the people in the stern and/or bow of the raft. Swimmers can be re-circulated in the tow-back current, and will be very hard to rescue with a throw bag if the raft moves off downstream, especially if there are multiple swimmers.
2. If the raft is slowed down by the tow-back current, it is very difficult to speed back up again. This could lead to a 90° turn of the raft and a capsize due to the falling water hitting the upstream tube.
3. In contrast to kayaking there are multiple people in the danger zone of the tow-back at the same time.
4. There is a danger of the raft being cut on a sharp section of the weir.

Examples of weirs are:

- Brunau Weir on the Ötztaler Ache
- Weir on the Salzach at Taxenbach
- A Rafting river with lots of weirs on it is the Traun between Hallstätter See and Bad Ischl.

Construction materials
Reinforced concrete, Rocks, Wood

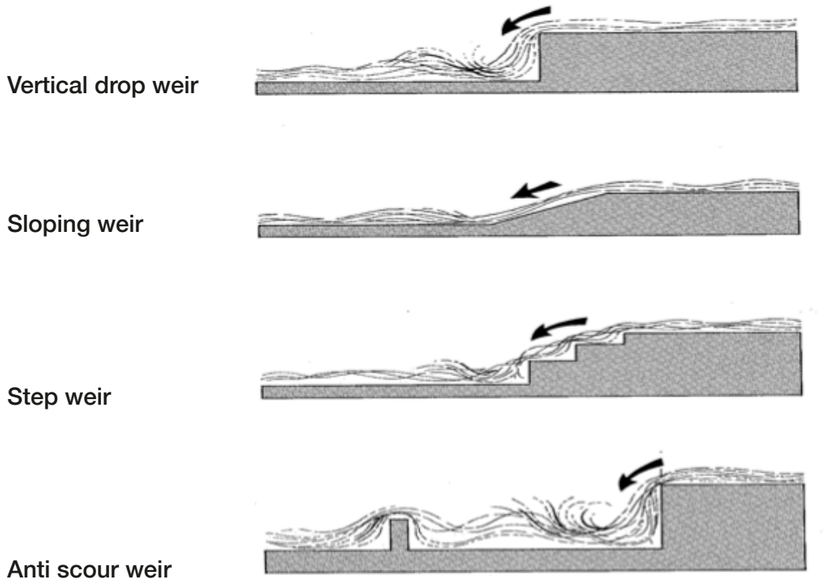
Weir Crown
Can have: sharp pointy edges, Nails or other metal parts such as angle iron or re-bar reinforcement visible.

Hight
This defines the angle of impact of the boat, the acceleration possibilities and the amount of catapult effect

Waterlevel
this defines the amount of tow-back

Stillling basin
Some forms of weir have a stilling basin built at the base. This is so that the water falling over the weir impacts into deep water, thus avoiding erosion at the base of the weir. Weirs with large amounts of deep water below them tend to have large amounts of tow-back with very aerated water which offers less resistance for paddling.

Weir Designs
Vertical drop weir, Step weir, Sloping weir, Ramp etc.



4.7 Rafting Techniques

Moving the raft in the river: Downstream
The downstream speed of the raft depends mostly on the speed of the current. If we wish to move faster downstream, then the raft can be paddled forwards whilst pointing downstream. If we wish to go slower then it can be paddled upstream. However only on the slowest moving rivers can a raft be paddled upstream against the current.

Both these techniques can be used with the crew paddling forwards or backwards. When the crew paddle forwards then it is known as a *forwards manoeuvre*, if they paddle backwards it is known as a *reverse manoeuvre*.

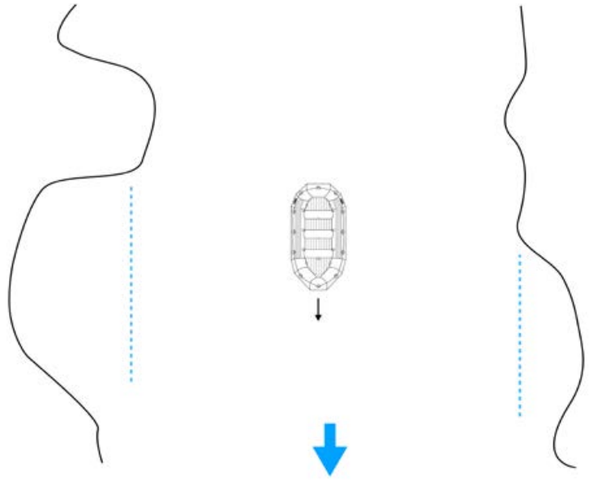


Fig. 4.8.01: Paddling forwards downstream to increase downstream speed of the raft

Moving the raft in the river: Sideways
In order to avoid obstacles or to stay in the main current we often must manoeuvre the raft sideways from left to right, or right to left. There are 4 ways of doing this, each with advantages and disadvantages.

1. Forwards Angled Lane Change
2. Traverse 90° to the main current
3. Forwards Ferry glide
4. Reverse Ferry glide

Before any manoeuvre is carried out, the raft guide needs to know; where they want to move the boat, the direction of the current and which technique they will be using.

Forwards Angled Lane Change
All manoeuvres to move the raft sideways require a change of the angle of the boat to the current first, if the raft is pointing downstream. The simplest of all manoeuvres is to change the angle to about 45° to the current, and then give a forwards command.
Advantages: Easy
Disadvantages: Exposes the side of the raft to obstacles, working against the current, moving downstream faster, slower to cross the current.

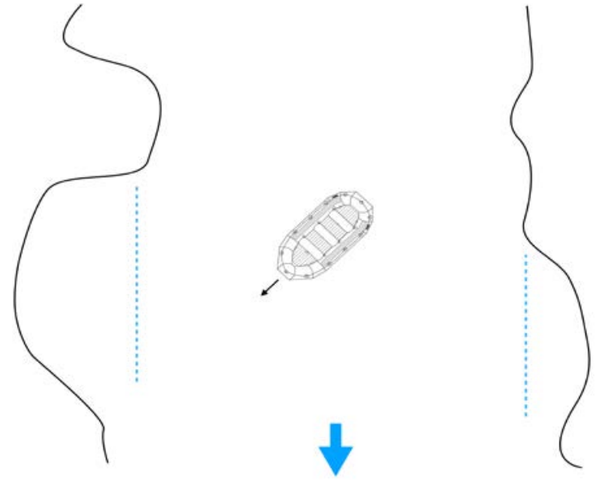


Fig. 4.8.02: Forwards angled lane change towards river right

Traverse 90° to the main current
This is another simple manoeuvre, which requires more turning of the boat to carry out, but less paddling as it is much more effective.
Advantages: Easy, fast, effective, less crew paddling required.
Disadvantages: Greatly exposes the side of the raft to obstacles, large turn may be required.

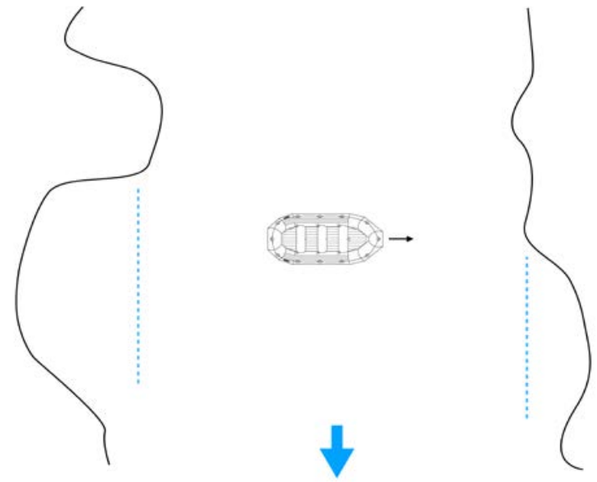


Fig. 4.8.03: Traverse 90° to the main current from river right to river left

Forward Ferry glide
In order to not move downstream and still move our raft sideways we can use the river current to help us. Turning the boat to a 45° upstream angle and holding this angle while the crew paddle forward will (depending on the speed of the water) keep the raft from moving downstream while also moving sideways. For a forward ferry glide the raft is turned towards the direction we want to travel.
Advantages: Working with the current, effective, raft does not move downstream, gives us more time.
Disadvantages: Difficult manoeuvre, takes more time, much more crew paddling required, more turning of the boat required, harder for the guide to see downstream.

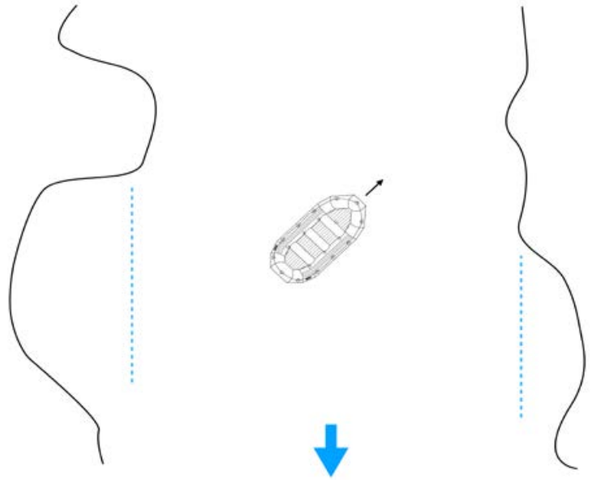


Fig. 4.8.04: Forwards ferry glide from river right to river left

Reverse Ferry glide
Another way to not move downstream and still move our raft sideways is the reverse ferry glide. Here the boat is pointed 45° away from the direction we want to travel and a backwards command is given.
Advantages: Working with the current, fast, safe, effective, raft does not move downstream, less turning required, easy to see downstream,.
Disadvantages: Difficult manoeuvre, much more crew paddling required.

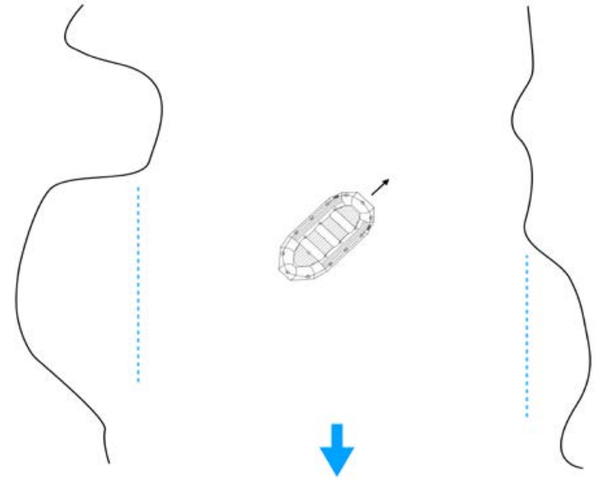


Fig. 4.8.05: Reverse ferry glide from river right to river left

Stopping the raft using eddies
The easiest way to stop a rafts downstream progress on a fast flowing river is to stop it in a suitable eddy. A suitable eddy for a raft is: Large enough, does not have any dangers in it or downstream of it (especially low hanging branches, sharp rocks or metal stakes) and is easily reachable with your crew. Just getting the boat to the bank is not enough, as it will keep floating downstream. Even a raft in an eddy can float off downstream, so it needs to be secured in some way if the guide is going to be leaving it. Three easy ways to do this are; lifting the raft up onto the bank, tying the raft to the bank (a tree or rock) or have someone get out and hold it on the bank.

Eddies can mostly be divided into 2 categories: Large eddies with hard eddy lines & small eddies with soft eddy lines. Different techniques are suitable for the two different types of eddy.

Different Eddy Out Techniques
1. Direct
2. Forward Ferry Glide
3. Reverse Ferry Guide

Direct Eddy Technique
The direct technique is most suitable for large eddies with hard eddy lines. It involves paddling forwards, towards the eddy, from upstream (about 45° to the current). The raft should cross the eddy line as close to the top of the eddy as possible (without actually hitting the rock).
As soon as the raft crosses the eddy line it will be turned quickly by the two currents acting on the raft. The guide must steer against this rotation, to prevent over rotation of the boat. The

crew keeps paddling forward to stay in the eddy and the guide sets the angle to travel across to the bank where the raft can be parked.

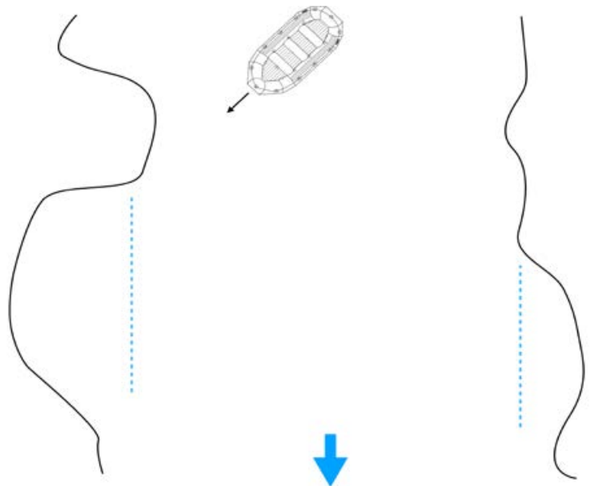


Fig. 4.8.06: Start of the direct technique to stop in a large eddy with a hard eddy line. Raft is pointing towards the eddy (about 45°), crew paddle forwards, raft is still upstream of the eddy.

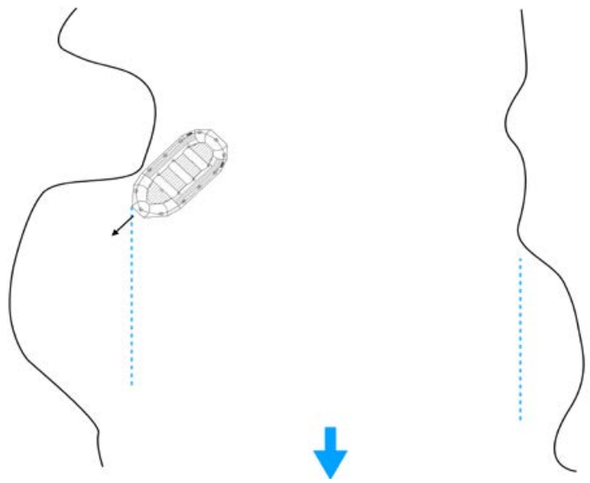


Fig. 4.8.07: Direct technique: just as the raft is about to cross the eddy line, crew is still paddling forwards, guide is ready to steer against the rotation that is about to occur.

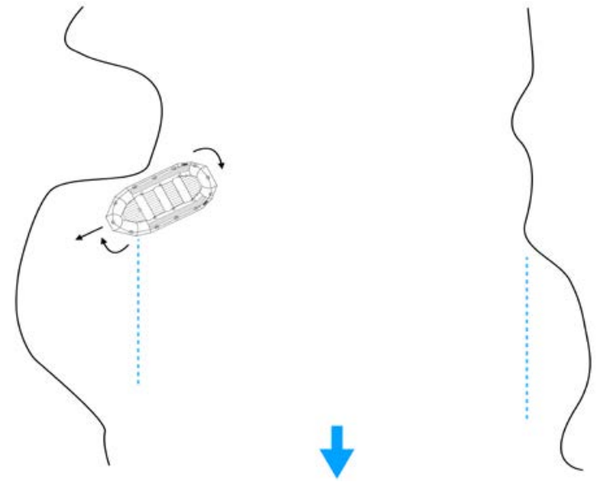


Fig. 4.8.08: Direct technique: raft crossing the eddy line and being turned by the current, crew is still paddling forwards, guide is steering against the rotation but lets the raft turn until pointing upstream.

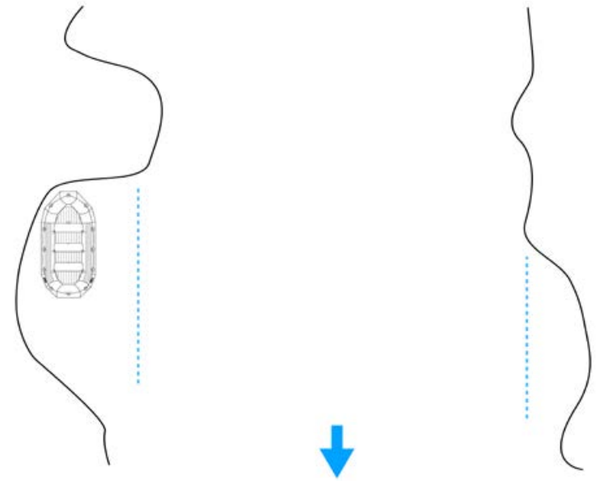


Fig. 4.8.09: Direct technique: crew has paddled until the raft reaches the bank, guide ensures that the boat will stay on the bank. Only then does he call a stop command.

Forward Ferry Glide Eddy Technique

Ferry glide technique is most suitable for small eddies with soft eddy lines. It can be performed either forwards or reverse. It is not suitable for large eddies with hard eddy lines as the raft will not cross the eddy line quickly enough to end up stopping in the eddy. Direct technique is not suitable for small eddies as the raft will tend to hit the bank before the raft is parked in the eddy.

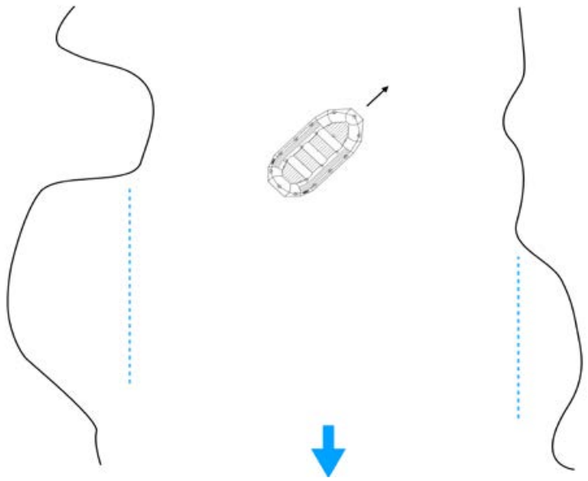


Fig. 4.8.10: Upstream of the eddy the raft is turned for a forwards ferry glide and the crew start to paddle forwards

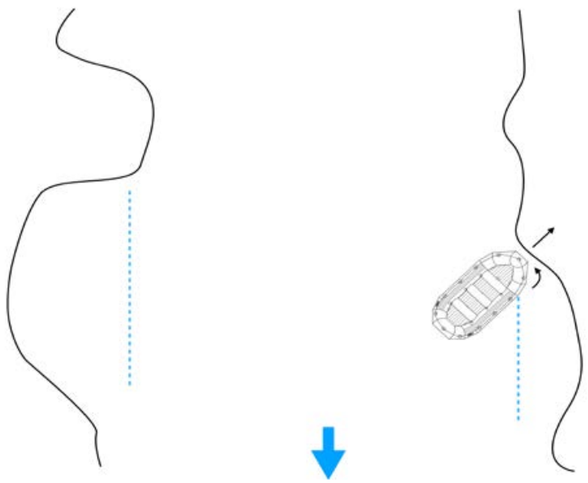


Fig. 4.8.11: Forwards ferry glide technique: The guide holds the angle of the forwards ferry glide as the raft crosses the eddy line (it will be turned by the current), the crew keep paddling forwards

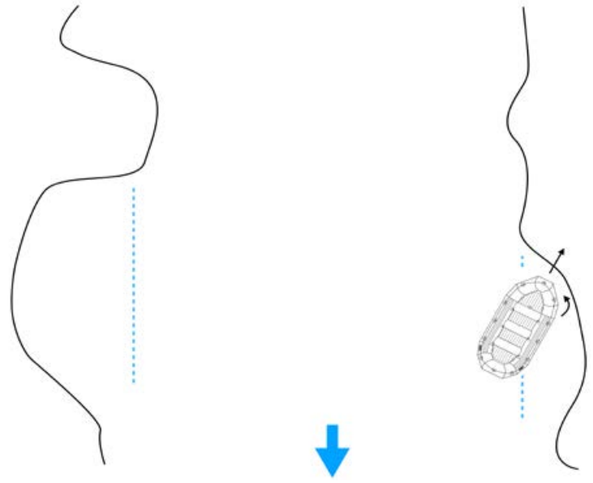


Fig. 4.8.12: Forwards ferry glide technique: The guide continues to hold the angle of the forwards ferry glide as the raft crosses the eddy line, making sure that the raft does not over rotate, but letting it turn upstream a small amount. The crew keep paddling forwards.

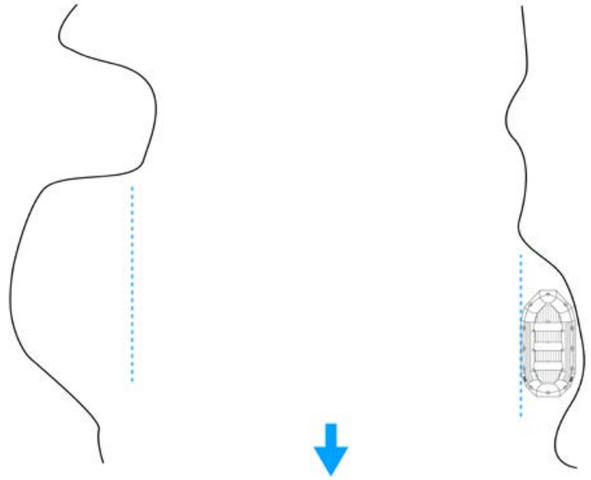


Fig. 4.8.13: Forwards ferry glide technique: Crew has paddled until the raft reaches the bank pointing upstream, the guide ensures that the boat will stay on the bank. Only then does he call a stop command.

Ferry Glide Reverse Eddy Technique

The reverse ferry glide technique is the hardest technique to master, but is the best technique to use for the smallest and hardest eddies on the river. An expert river guide will be able to stop almost anywhere on the river with this technique, even places with no eddy.
It is not suitable for large eddies with hard eddy lines.

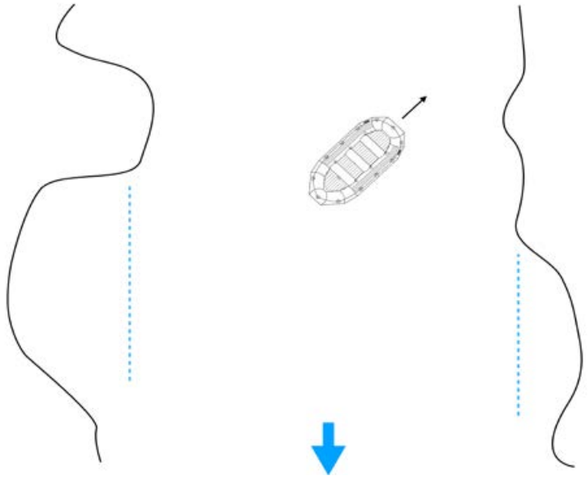


Fig. 4.8.14: Upstream of the eddy the raft is turned for a reverse ferry glide and the crew start to paddle backwards.

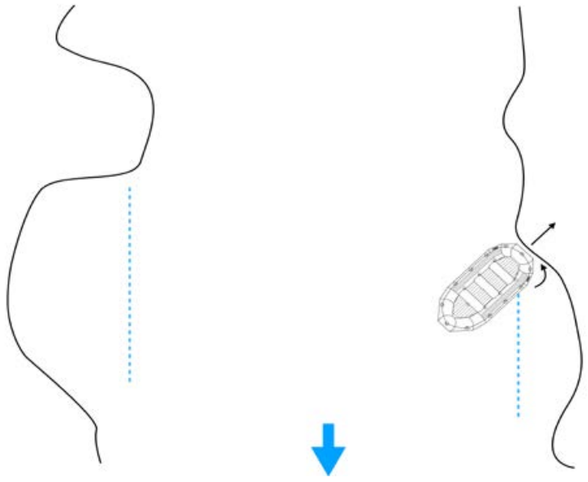


Fig. 4.8.15: Reverse ferry glide technique: The guide holds the angle of the reverse ferry glide as the raft crosses the eddy line (it will be turned by the current), the crew keep paddling backwards.

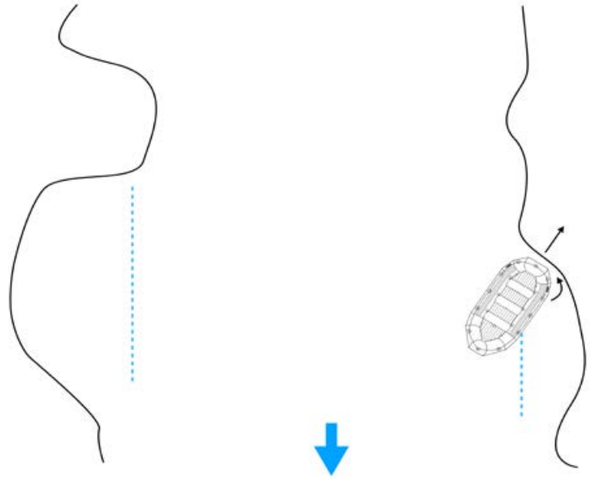


Fig. 4.8.16: Reverse ferry glide technique: The guide continues to hold the angle of the reverse ferry glide as the raft crosses the eddy line making sure that the raft does not over rotate, but letting it turn a small amount upstream. The crew keep paddling backwards.

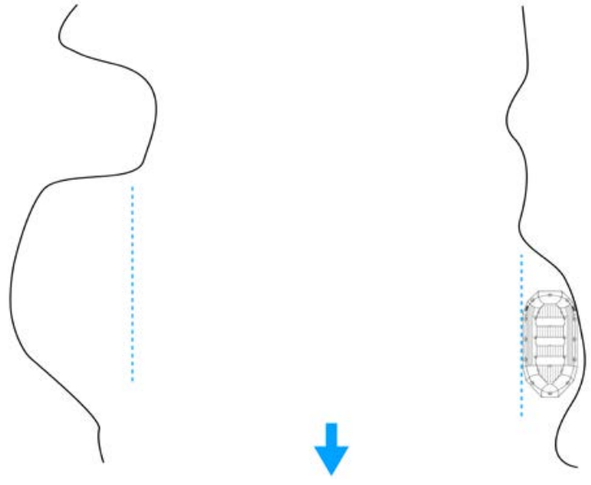


Fig. 4.8.17: Reverse ferry glide technique: The crew has paddled until the raft reaches the bank pointing downstream, the guide ensures that the boat will stay on the bank. Often the guide will get out and hold the raft themselves. Only then does he call a stop command.

Techniques for leaving an eddy safely

A river guide is required to be able to leave an eddy with a hard eddy line without their boat flipping. They also need to be able to leave an eddy, when there is a downstream hazard and be able to avoid that hazard.

Therefore a river guide must be able to leave the eddy and have the raft end up exactly in the position they want, with the minimum of effort from both the guide and crew.

Different Eddy In Techniques

1. Ferry glide forward - Hard eddy line
2. Ferry glide forward - Soft eddy line
3. Ferry glide reverse - Soft eddy line

Ferry glide forward - Hard eddy line

If a guide uses direct technique to eddy out, then the eddy line will be hard enough that it will be difficult to exit without the boat spinning on the eddy line (which can cause a flip).

It is the guide's job to hold the boat's angle as it leaves the eddy and ferry glides across the current in control.

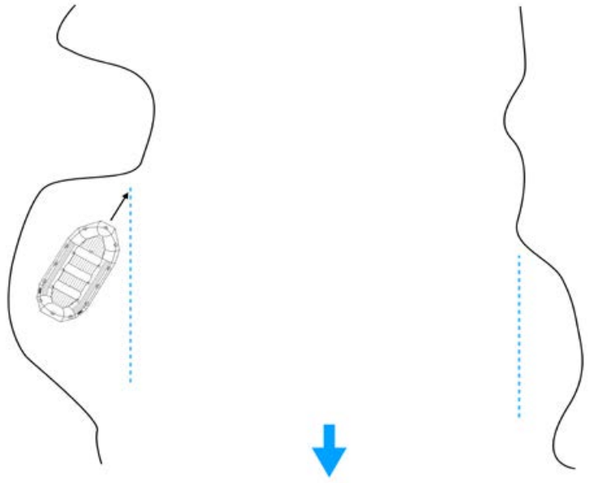


Fig. 4.8.18: The guide positions the raft in the eddy to best leave it. The raft should exit the eddy at an angle of about 30° to the main current (or 1 o'clock if using the clock face method). The crew paddles forwards.The guide is ready to hold the angle of the boat as it crosses the eddy line.

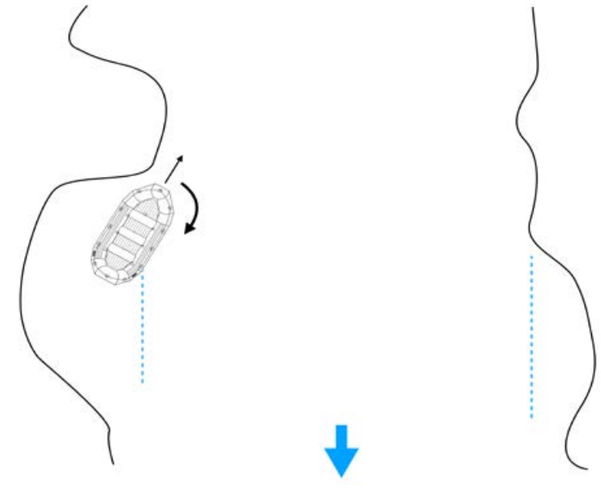


Fig. 4.8.19: Eddy in - Ferry glide forward: The guide holds the angle of the boat as it crosses the eddy line. The river will try to push the front of the raft downstream. The crew paddles forwards, so that the boat crosses the eddy line as quickly as possible.

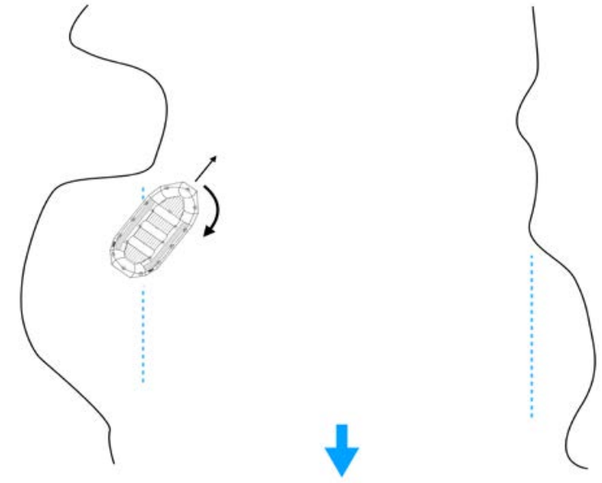


Fig. 4.8.20: Eddy in - Ferry glide forward: The guide continues to hold the angle of the boat as it crosses the eddy line. The river will still be trying to push the front of the raft downstream. The crew paddles forwards, so that the boat continues to cross the eddy line **as quickly as possible.**

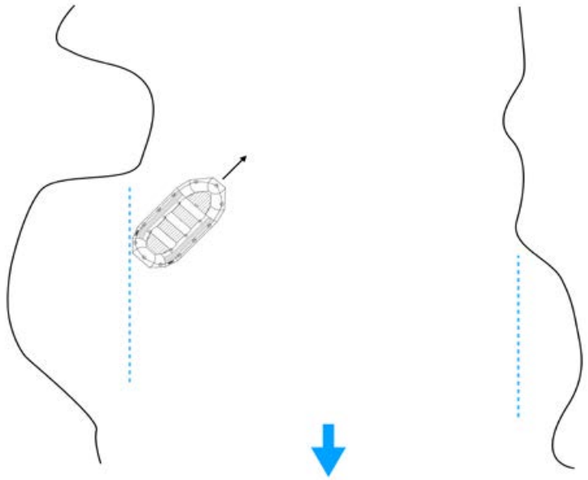


Fig. 4.8.21: Eddy in - Ferry glide forward: The guide continues to hold the angle of the boat, however as soon as the raft has crossed the eddy line the river will no longer be pushing the front of the raft downstream. This makes it much easier to hold the angle of the boat. Which means that we can let the angle of the boat to the current open up to 45°, to make the ferry glide more efficient. The crew paddles forwards, so that the boat continues across the current until it reaches the position that the guide wants it to be in (normally middle of the main current).

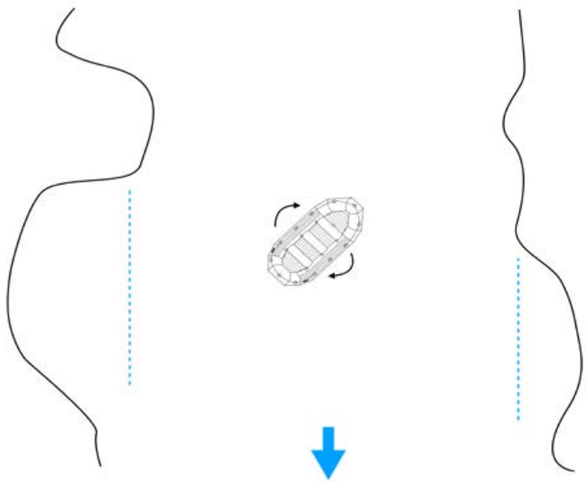


Fig. 4.8.22: Eddy in - Ferry glide forward: The guide calls a stop just before the raft reaches it's position (as it has momentum) and then the raft is turned to point downstream either using the crew or by the guide alone.

Ferry glide forward - Soft eddy line
If the eddy we are leaving has a soft eddy line then the technique will be exactly the same as for a hard eddy line. The good news is that it will be much easier, as the current will not push the raft as hard when we cross the eddy line.

Ferry glide reverse - Soft eddy line
If a guide uses reverse ferry guide technique to eddy out, then there are two options to get back out into the main current. Either the guide turns the raft around in the eddy and then does a normal forwards ferry guide or they do a reverse ferry guide. The reverse ferry glide is quite difficult, even when you are used to it. However most expert guides would use it if they have stopped using a reverse ferry glide, as it is the most efficient & elegant option.

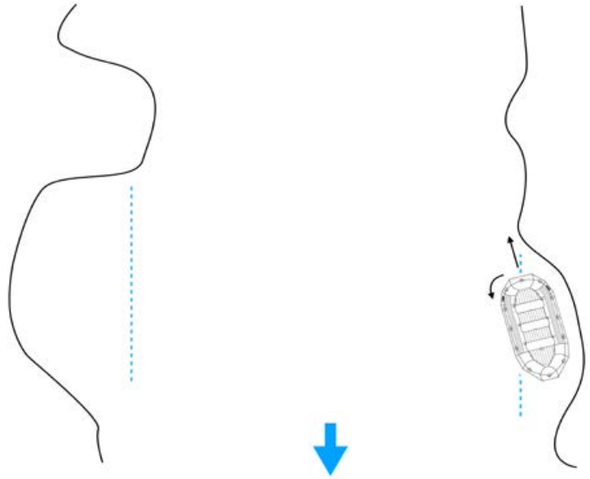


Fig. 4.8.23: The guide pushes off the bank so that the raft has an angle of about 30° (or 1 o'clock if using the clock face method) to the current.
They immediately call an "all back" command and hold the angle of the raft as the current starts to push the stern of the boat downstream.

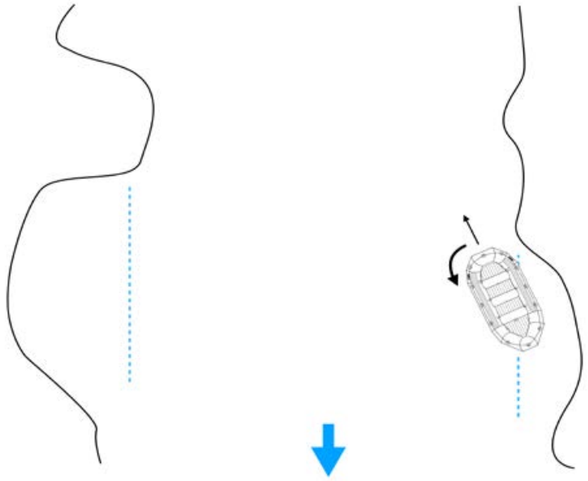


Fig. 4.8.24: Eddy in - Ferry glide reverse: The guide continues to hold the angle of the raft as the current pushes the stern of the boat downstream. If the eddy line is very soft then the angle can now be opened up towards 45°, so that the boat moves quicker across the current.

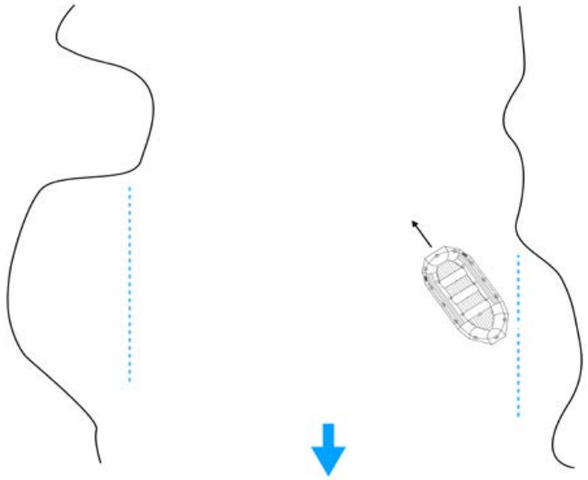


Fig. 4.8.25: Eddy in - Ferry glide reverse: The guide continues to hold the angle of the boat, however as soon as the raft has crossed the eddy line, the river will no longer be pushing the stern of the raft downstream. This makes it much easier to hold the angle. The crew paddles backwards, so that the boat continues across the current until it reaches the position that the guide wants it to be in (normally middle of the main current). A stop command followed by a small change of angle from the guide and the raft is ready to continue downstream.

Dealing with Obstructions

Dangerous rapids should be assessed for:

- General navigability & obstructions present
- Possibilities for placing safety, landing and/or portaging.
- How difficult is the downstream section (accidents, swimmers, safety!)
- Ability of the crew
- Ability of the accompanying rafts in the convoy
- Water level and current

Collision with a rock

In order to prevent a dangerous wrap situation raft guides tend to avoid hitting into rocks. However especially on harder whitewater rivers unavoidable collisions with rocks can occur or rocks can be used to help steer the raft through a particularly challenging rapid.
In this case there are things the raft guide can do to avoid damage to the raft and also protect their crew:

- Reduce speed (e.g. back paddle) in order to reduce the impact.
- Turn the raft towards the obstruction, so that the bow or stern impacts it.
- If the side of the raft collides with the obstruction give the relevant command: ‘high side left’ or ‘high side right’. The crew should move towards the obstruction to raise the upstream tube to avoid the raft flipping and /or wrapping, feet remain inside the raft.
- Cushion waves from rocks can also be used as a steering aid. Experienced guides can use the cushion wave to steer the raft away from the obstruction.
- Deliberate collision should be avoided – the danger of flipping or wrapping with all the resulting consequences is very high

Headwalls

These can represent a particular danger, above all when they are undercut. This is the case at a headwall where there is no clearly visible cushion wave. Pay attention to the situation and to the power at the wall. As always safety here comes first. This means changing direction with time to spare (ferry gliding), or steering with the stern facing the headwall (a forward stroke has more power). If things go wrong then take action as with a sideways collision with a rock.

Bridge Pillars

There is no situation where a raft guide should let their boat touch a bridge pillar. Bridge pillars do not appear suddenly overnight and so river guides know their exact location. Bridge pillars are generally smaller in cross section and positioned in the middle of the river.
This makes the force on them very high and rescue very difficult. In emergency situations take action as with a collision with a rock.

Waves and Hydraulics
When rafting through large waves and hydraulics they need to be approached with speed “wave straight”. That is, at a right angle to the axis of rotation of a hydraulic or at a right angle to the rise of the wave. Hitting the wave or hydraulic off angle often results in a flip.

Hydraulics with a tow-back >1⁄4 of the length of the boat are to be avoided. Small hydraulics can also be used as a steering aid.

5. EQUIPMENT

5.1 Raft - rubber dinghy

Definition of ‘Raft’
‘Raft’: an inflatable man–powered paddle craft which is intended for the navigation of rivers with a high speed current (white water) and due to its design permits a minimum number of four people. (From the ÖNORM – Austrian Standard)

5.1.1 Material
The most frequently used materials for rafts are:

- Hypalon / Rubber coated polyester mesh (reinforced polyester) which is glued together
- Plastic / PVC coated polyester mesh (reinforced polyester) which can either be glued or welded together in a heating process

Necessary qualities:
tear-proof, shock-proof, weather-proof, cold-resistant, air-tight - relatively hard – stiff, torsionally resistant, temperature resistant from – 40 to +80 degrees, ozone- resistant.
Boats are glued - vulcanised - and also moulded in a heat vulcanisation process: Parts made of raw India rubber are glued together and then the finished boat is vulcanised with heat and pressure, this leads to a homogeneous unity in the boat and to the highest level of air tightness.

Rafts in Austria are subject to the so-called **ÖNORM* (Austrian standard)** and must fulfil certain conditions.

* ÖN V5868/2000

Every boat has to be inspected at the technical traffic department test centre and it is then allocated an official **license plate**. This license plate is to be displayed on both sides of the raft (height of the type – 150mm thickness of the type 20mm). The boat also receives a **certificate of registration** and an **inspection card**. The inspection card must always remain with the raft.

5.1.2 Symmetrical and asymmetrical Rafts

The ONORM (Austrian standard) differentiates between symmetrical and asymmetrical rafts:

- **Asymmetrical Raft**
  The bow is raised in comparison to the main tubes and the stern consists of a wall construction, which is connected to the main tubes.
  The main tubes run forward joining in an arrow shape at the front. The stern is provided with a backboard, the stern must be at least as high as the main tubes.
- **Symmetrical Raft**
  The bow and the stern have the same form and in comparison to the long tubes are raised at the ends. Paddle-powered rafts are international. **Rafts with oaring, oar boats, catarafts** and **pontoons** all differ.

There are rafts with and without stern rudders.

5.1.3 General regulations for Rafts

A raft must have at least five independent air chambers. The separation of the chambers may be across the tubes or the length of the tubes (each one according to the manufacturer).
With regard to stability of the raft the ÖNORM (Austrian standard) stipulates that a raft with its highest permitted load which loses all the air in one chamber must remain buoyant, and through its system of power and steering is still able to reach the bank of the river with its payload. The same applies to a raft loaded with the minimum amount of passengers (without luggage).

The **floor** may be inflatable or foam and must be formed (vulcanised, glued or laced together) so that it is steadfast and provides safe usage.
The **main tubes** must be in the dimension corresponding to the over all proportions of the raft and guarantee sufficient freeboard and stability for the planned purpose.
The **Stern** must be at least as high as the main tubes (particularly important for asymmetrical rafts).
The raft can be fitted with cross tubes/thwarts. These can be permanently fixed or removable. (Laced up or hemmed in etc.).
The **Seating** for the passengers must be made out of a non-slip surface material.
A laced up floor must be re-knotted (between the holes) (at least 4 times), and laced up foot straps also (see below).
Each air chamber must be fitted with a check valve system.
The **Valves** must be able to be closed airtight by hand (independent of the check valve system), allow a measured reduction of air pressure and enable measurement of air pressure by means of

a pressure gauge machine (air pressure counter).

The valves must be so positioned

- to allow accessibility (during the rafting trip) and a connection to the inflation device
- so as not to interfere with the positioned passengers in the raft
- so as not to interfere with the navigation of the raft
- So that they cannot be damaged or broken off by other moveable parts of the raft
- so that when they are detached they may only fall inwards into the raft

The raft has four or more carrying handles. A raft must also have a safety line (also called a perimeter or outside line), which is fixed tightly or tied together through at least four D-rings on each side so that it is not possible for people to slip through it or objects (stones, rocks etc.) to get caught on it. The line must have a diameter of at least **12mm** and can be lagged with tubes (garden hose).

The raft must have two suitable foot straps for each passenger, which have to be mounted to prevent the passenger slipping through, or getting caught. Apparatus for holding the feet may be **foot Cups** or **cross tubes**. Foot straps are no longer considered safe in Austria and are no longer fitted to new boats.

5.1.4 Bailing

Entering water must be able to drain out of the raft constantly – this is what is meant by bailing. Rafts must be self-bailing. **Bailing** must take place constantly to enable the emptying of wave and spray water quickly, regardless of the boat's position on the river (For example: bow pointing upriver).

Bailing systems: bailing holes – bailing tubes – laced–in floor

5.1.5 Treatment and maintenance of the rafts

Air pressure 2 - 0,3 bar
Pay attention when inflating the rafts on a hot day, avoid direct sun light, a fully inflated raft can burst its chambers through air expansion.
Close the valves tightly with the valve caps.
Pay attention to sharp edges (particularly when loading fully inflated rafts).
Always carry the boats – do not drag them over sand, gravel etc.
Report any damage – so that the next guide has a fully functional boat.

Boat maintenance

- Pay attention to the manufacturer's advice (maintenance instructions will depend on if the material is rubber or plastic).
- Treat the outer plastic layer with boat plastic protectant (Bootsmilch); treat the inner chambers with talc (Federweiß).

- Keep the rafts in a dry and shady storage place.
- Rafts should be stored in a slightly inflated state.
- All repairs should take place in a dry place and on a dry raft.

5.2 Paddle

The **Paddle** - consists of a T–grip, a shaft and a blade. The material is mainly a plastic - aluminium mixture. Wooden paddles and paddles of other combinations of materials also exist. Length: approx 145cm - 168cm, a guide's paddle can be slightly longer (155cm - 183cm) Each boat must have a reserve paddle on board.

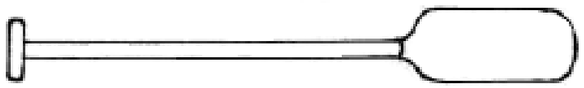


Abb. 5.2: Paddle

5.3 Equipment

5.3.1 Clients's equipment

Neoprene wetsuit – This can be either a full suit or a Long john and neoprene Jacket combined. River wetsuits are often covered in nylon on both sides for better durability. Heavily exposed areas (knees, backside) should be reinforced with patching (supratex). This will also provide a sufficient grip whilst seated.

The thickness of the neoprene depends on weather conditions: at least a 3 to 4 mm long john even on warm days with cold water. In hot weather, wind breakers or paddle jackets are also a possibility for the upper body instead of neoprene Jackets.

Footwear:
Neoprene dive shoes are warm and good to swim in. Or neoprene socks, combined with sports shoes / sandals (Tevas) also work well. All foot wear should fit well enough that clients do not slip out of their shoes in the event of a swim.

Buoyancy Aids / Personal Flotation Devices:
Buoyancy aids must adhere to the EN (European norm) and have a **minimum buoyancy of 7,5 kg**. They must be the right fit for the passenger's body and must be kept in good condition. They consist of buoyancy mass (mainly from foam), which is stitched into a nylon texture material (Cotex). Client PFDs must be checked regularly and should be replaced after 10 years of use.

Helmet:
Client helmets are mostly plastic and need to conform to the EN norm. They should be easily adjusted so that they fit well and do not slide around. Ideally the ears are also covered.

5.3.2 Guide's equipment

Thermal protective clothing: suitable for both the air and water temperature. For example; Neoprene long john with a neoprene jacket or a wind / paddle jacket. In cold conditions a 5mm full wet suit or a Drysuit with fleece under garments.

Stable footwear: Rivershoes or Sandals or neoprene shoes or neoprene socks in canyoning shoes. Some options are better for walking on the bank and some are better for swimming.

Water helmet: This can be made out of either carbon or plastic (or a mix of both). It should fit well and conform to the EN norm for watersports.

Buoyancy aid with QR rescue system: This can be a vest or jacket style that conforms to the EN norm. It should fit very well and enable a guide to get back into the raft easily. It also needs to have suitable pockets for carrying the required guide equipment. Pockets on the back of the PFD are very hard to access when wearing the PFD. Lash-tabs can be used to attach a knife, if they are well situated on the PFD.

Personal Throw-bag: This can be carried with a waist belt or in a pocket on the guides PFD. Whichever system is used it must be quick-releasable and/or completely enclosed in the pocket The floating line must be minimum 15m long and have minimum of 7.5mm diameter.

Flip line: Webbing or rope with a carabiner attached. If the webbing or rope is climbing approved this can also be used as a sling for a Z-drag. Otherwise an extra sling needs to be carried for this use. The length is dependent on the size of the guide and the size of the raft. Recommended is a length of 3.5m before any knots are tied for a 16' NRS raft.

Knife: The blade must be one piece or be able to be locked into place, so that it can penetrate a boat's thick puncture resistant material. It has to be useable with only one hand, also under the water.

Whistle: This needs to be a loud whistle that works in a water environment i.e. it should drain of water. It should not rust or have a pea that can swell and become useless.

3 x Locking Karabiners: Ideally these are pear shape, screw gate and made out of aluminium. Minimum of 22kN breaking strength.

2 x Prussic slings: Suitable for use on the throw bag rope that the guide carries. Normally 5mm is a good minimum, length suitable for the use. Knotted with a double fisherman‘s knot.

1 x Pulley: This should be small and lightweight so that it fits easily into the PFD. Minimum of 22kN breaking strength.

5.3.3 Equipment on the raft:

- Waterproof first aid box or barrel (first aid contents in accordance with ÖNORM V 5101)
- Throw-bag at least 20m long, 8mm in diameter. Bag must be secured to the raft, in a quick release manor
- 2 x Locking Karabiners
- Outside Safety line
- Bow and stern lines
- Spare paddle – in the boat
- Recommendation: drinking water on long tours
- Recommendation: mobile telephone & evacuation plans

5.3.4 The Throwbag Rope

The best rope for the throwbag

Commercial raft guides should pay close attention when considered which „tools“ to use. Items such as the throwbag have their quality decided by the rope inside. When a raft guide uses his throwbag, then he must be able to rely on it 100%!

A good rope to use in a throwbag has the following Qualities:

- High Breaking Strength (both with or without knots)
- High Floatation (in water)
- Fluorescent Colour (to be seen)
- Low Stretch (no dynamic effect under tension)
- Low rate of wear
- Good handling (thickness and form of the rope)

The main material used for throwbag ropes is Polypropylene.

\+ It floats very well!

But...

\- it wears through very quickly...

Braided Rope **Kernmantel Rope**

Sheath (Mantel): Made of polypropylene and serves to protect the core, by absorbing the heat generated in friction.

Core (Kern): Consists either of pure polypropylene or of a mixture with other fibres, for example Polyester, in order to increase either the tensile strength or the wear resistance of the rope.

The melting point of polypropylene is a low 160 degree Celsius. A little friction over a sharp stone whist the rope is under tension can result in a rapid destruction of the rope. For a rope to completely wear through may take, depending on quality and humidity of the rope between 3 and 60 seconds.

	Braided	Kern I	Kern II	Kern III
Construction	PP	PP/PP	PP/PP+ Polyester	PP/PP+ Dynema
max strength (8mm rope)	500 kg	800 kg	1000 kg	2000 kg
Stretch	Very High	High	Low	Low
Wear	Very High	High	Very Low	High
Price	Cheap	Middle	Middle	High

Summary

- A good raft guide never uses a cheap rope in high stress situations.
- wear and long exposure to sunlight are the greatest enemies of the rope.
- In an emergency, a good rope will continue to work, even if the sheath has been destroyed, for a few extra seconds.
- Professional raft guides regularly check their throwbag rope and replace it, if necessary.

Sources:

1. http://rescue-rope.jimdo.com/tests-reviews/rope-types/
2. http://rescue-rope.jimdo.com/tests-reviews/abrasion/
3. http://rescue-rope.jimdo.com/tests-reviews/tensile-strength/
4. http://www.paddle-people.com/service-throwbags.html
5. http://www.swiftwaterrescue.at/content/info/rope-test1.html

5.3.5 Treatment and maintenance of the equipment

Neoprene suits: wash, disinfect and dry regularly
Paddle jackets: wash, disinfect and dry regularly
Shoes: wash, disinfect and dry regularly
Safety check: buoyancy aids, throw-bags, rescue systems, functioning zips, Velcro straps and clips.
Helmet: check the strap, clip and make sure it is a good fit
Paddle: repair or dispose of broken paddles
Pump/ blower: grease it regularly
Throw-bag: always hang it out to dry after the tour (open end facing down)
First Aid box: open due to possible condensation. Replace materials after use
Boat: see above under the heading Raft

6. KNOTS

6.1 Introduction

The mastery of the main knots is not only important in mountaineering, but also in rafting, mainly in rescue Situations. It is therefore essential that a raft guide possess a certain basic knowledge of the individual knots and their applications. The misuse of a knot in the wrong place or in the wrong situation may also end tragically for everyone involved.
For this reason, knots and perhaps even complex mechanical advantage systems need to be practiced over and over again by each rafting guide, so that they can be quickly recalled in stressful situations adequately.
Alexander Riml
Raftingguide, Canyoning-, Berg- und Schiführer

6.2 General Information

It is not enough just to know how to tie a knot, but you also have to note other things if you do not want to run the risk of overlooking something in this area.
For this reason, the points below are also of interest to a raft guide. However, written are only the concepts that are relevant for a raft guide. So some areas (impact force, fall factors, etc.) have been deliberately left out, since they are only relevant to Mountain sports.

Standards
Ropes are generally made for specific areas of application and corresponding tested for these applications. Climbing (dynamic) ropes are checked to EN 892 and ropes for canyoning and for safety at work (semi-static ropes) are tested according to EN 1891. However there are also ropes that are not subjected to a standard, and rafting is one of those areas where the ropes are not classified as personal protective equipment. For this reason, a rafting guide has to decide which rope is suitable for his needs before he uses it.

Strength
The strength of new ropes and tape materials varies and depends mostly on the diameter (ropes) and the width (with tape), but also on the construction used. If a knot is tied in either material,

the strength is significantly reduced. Thus, the strength of a material in conjunction with a knot can be reduced up to 40%. It is therefore imperative that a raft guide knows the strengths of the individual materials in combination with the knot, that he plans to use in certain situations. It can be that the combination of the knot and the rope used can not take the load and that a breakage occurs.
The reason for this is that the individual fibres in the knot are compressed or stretched by the load and thus no longer the entire strength of the material is available. In order to exploit the possible total load limits of the material, you should always use knots where the rope fibres are compressed as little as possible. A figure eight knot in this regard is an ideal knot, because it weakens the rope markedly less, for example than the Larksfoot knot.

Lifetime
The life of all rope materials is very difficult to define in practice. It depends always on the type and duration of use - a rope used in the mountains would see significantly more wear (such as falls, etc.) as one used rafting. However there are recommendations from rope manufacturers, as to when a rope should be replaced, depending on type and duration of use.
These recommendations should be adhered to by each raft guide or well documented why they have a rope longer in use. It is important to mention in this context that a contaminated, dirty or even older rope can have a strength reduction of up to 50%. Considering the factor of „knots“ and „ageing“ together, then loses of up to 70% of the strength of a rope can be expected (residual breaking force 30%).

Cleaning of rope materials
Dirty rope materials should be cleaned only with clear and lukewarm water, and then allow to dry in a shady place. However, if detergent is needed for cleaning, then only those cleaning agents recommended by the manufacturer should be used. Ropes that come in contact with acids or alkalis must be replaced immediately. Here it is recommended that the affected ropes are destroyed immediately, so that they can not accidentally be used by another person.

Loosening knots
Knots that are wetted over and over again, and then left in the sun, can be difficult to untie. Such a knot may need to be repeatedly moved back and forth while trying to bend them until it loosens. Under no circumstances may such a knot be processed mechanically (hit with a hammer, rocks, etc.), since one thereby destroys the individual fibres of the material.

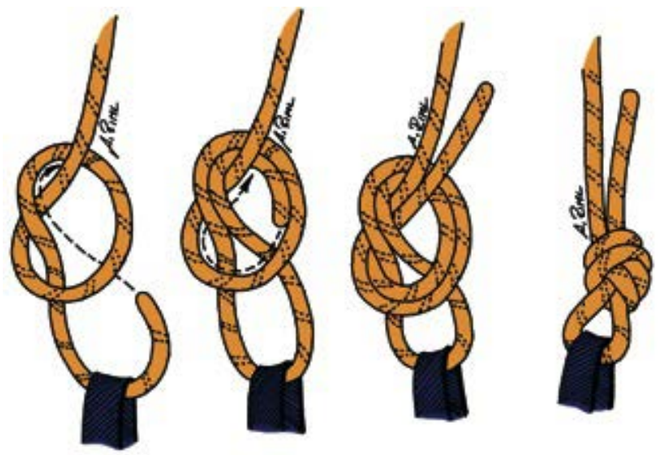
Control
Each rope should be checked for damage after use. Here a raft guide unfortunately only has the visual control available. This should therefore be carried out very carefully. Areas where knots where tied, should be checked especially carefully, if changes in the rope material have occurred. Damaged rope materials should be disposed of, so that they can not accidentally come back into use.

6.3 Basic knots

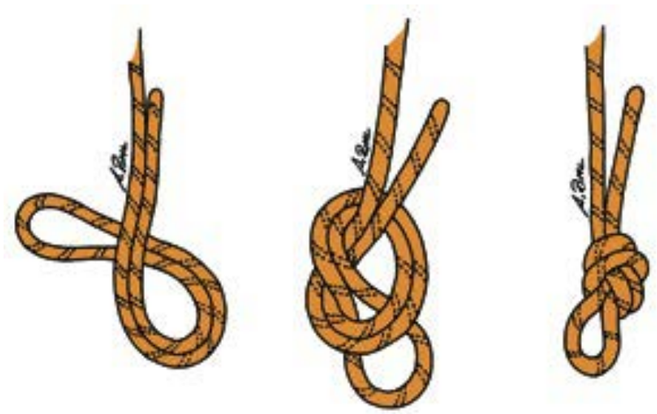
As a raft guide we need knots to for the following applications:
- a knot to make a loop in the end of the rope, e.g. Figure of 8
- a knot to make a loop in the middle of the rope, e.g. Clove hitch or Alpine butterfly
- a knot to join ropes together to make a longer rope, e.g. Overhand
- a belay knot, e.g. Italian (Munter) hitch
- a clamping knot, e.g. Prussic
- a knot to secure a raft to the river bank, e.g. Bowline
- a knot that can be released under tension, e.g. Italian (Munter) hitch or “No-knot”

With all knots it should be noted:
- you must use the correct knot for the use
- each end of the knot must be tightened before it is loaded
- the tail of the knot must be a minimum of 10 times the diameter of the rope, with tape this is a minimum of 3 times the width of the tape
- knots should be undone after they have been used

6.3.1 Overhand
The overhand is a universal knot used in mountaineering. It can be used to join ropes together, join a person to a rope, as a stopper knot, used in tape and tied both laid or re-threaded. The Overhand as a rope connection knot is preferable to the fisherman‘s knot when canyoning as it turns under load against edges, so that the knot is guided over the edge and thus snagging is hardly possible, despite the fisherman‘s knot actually being stronger.



Overhand re-threaded



Overhand laid

Overhand used to join two ropes together

6.3.2 Figure of Eight

The figure eight knot has the great advantage over the Overhand that it can be untied even after a high load. We mostly use it to tie into the rope climbing or to make a loop in the end of the rope for rescue. It can be tied laid or re-threaded.

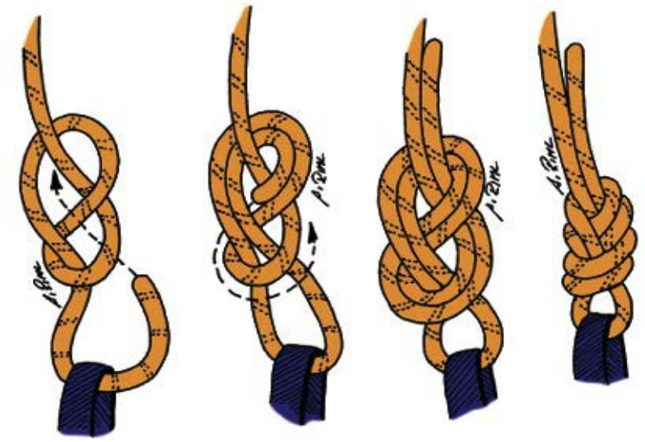


Figure of 8 re-threaded

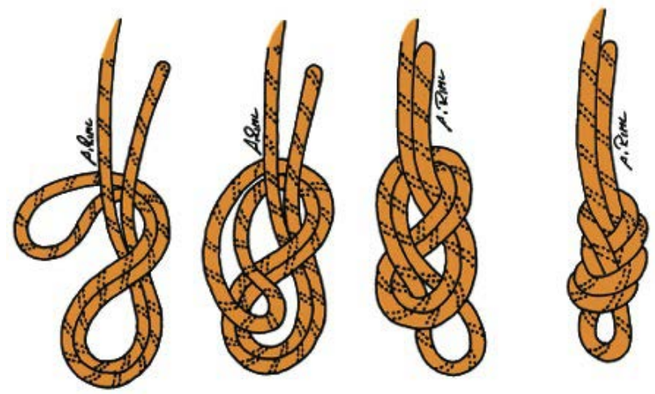
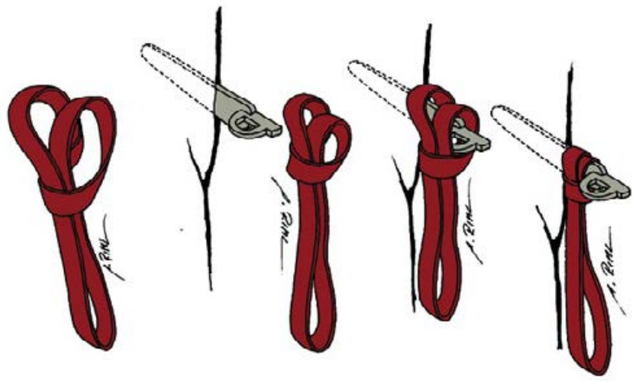


Figure of 8 laid

6.3.3 Larksfoot (Girth hitch)

The larksfoot (also know as a girth hitch in the USA) is one of the clamping knots. It is also the first part of tying a Prussik knot. It can be used for fixing a loop on to your foot for ascending ropes, or for extending protection over a ledge. It is also used as an anchor around trees to grip the trunk of the tree.

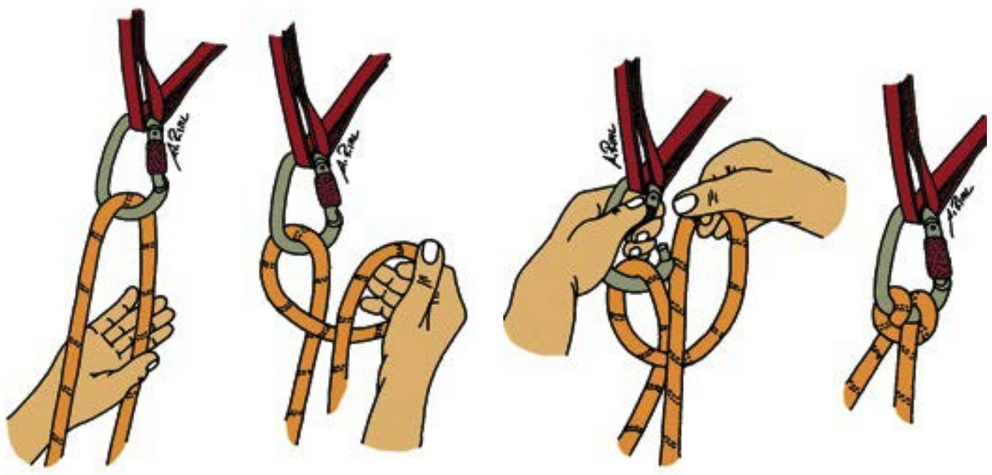


Larksfoot

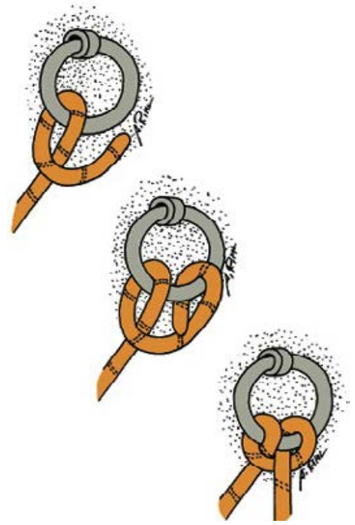
6.3.4 Clove hitch

The clove hitch is often used in mountaineering because of its ease of adjustability and ease of removal from the rope. It is defined as a hitch, rather than a real a knot.

Caution: the clove hitch, in very stiff ropes easily loosens! Always hold the rope end or additionally fix it with an additional stopper knot!



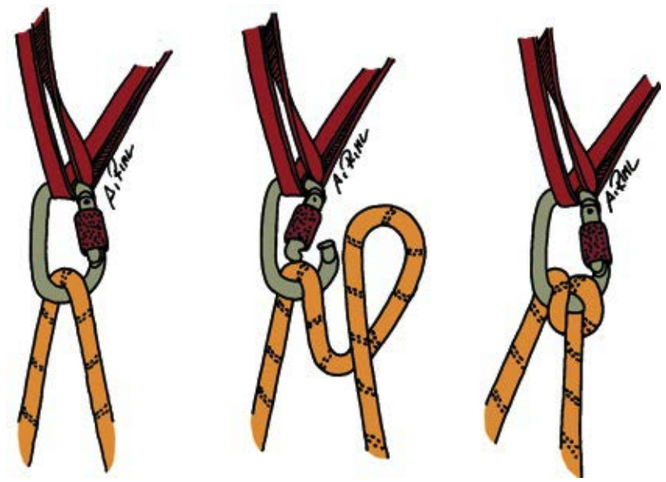
Clove hitch



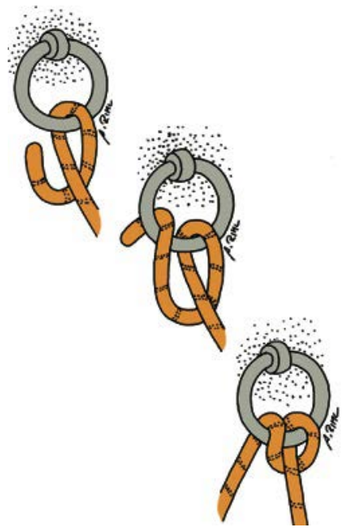
Clove hitch threaded

6.3.5 Italian Hitch (Munter hitch)

The Italian hitch is basically not a proper knot at all, but a universal belay hitch. This hitch is used in all mountain sports areas for belaying a lead climber, seconding climber and for rappelling. For this type of hitch you need a special carabiner, which is pear shaped also known as a HMS carabiner.



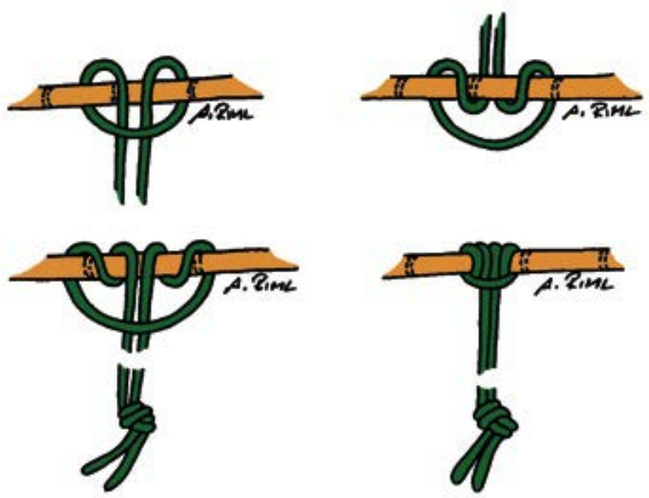
Italian hitch



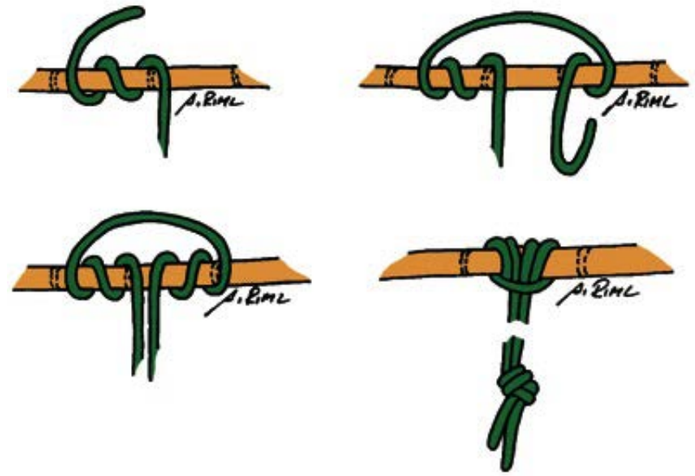
Italian hitch threaded

6.3.6 Prussik knot

The Prussik knot in Mountaineering is made by two simple rotations around the main line. It is the most important clamping knot of its kind. If a higher clamping action is required (with wet ropes, etc.) a third wrap can be added. The crucial point of the clamping capability is also the ratio of the rope diameter and cord diameter.
(8 - 10 mm Throwbag rope, 5 mm Cord and 3 wraps)



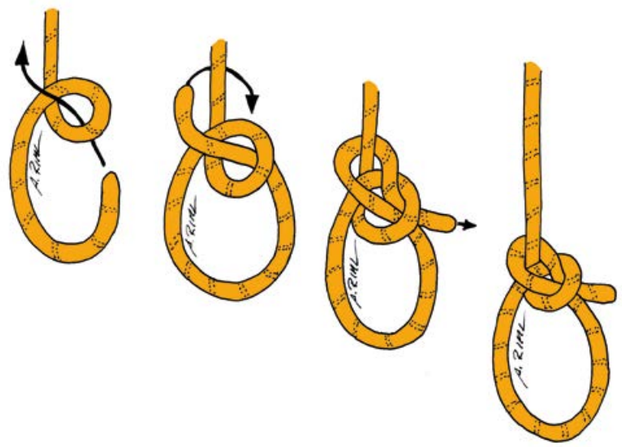
Prussik knot laid



Prussik knot threaded

6.3.7 Bowline

The bowline is for making a fixed loop in the end of a rope. It is very easy to make, keeps well and is easy to untie even after a high loading. The bowline must not be used in the ring form as it can come undone (transverse to the loop).
The bowline can be used almost anywhere a rope must be connected to an object. For raft guides especially useful to tie a raft to a tree.



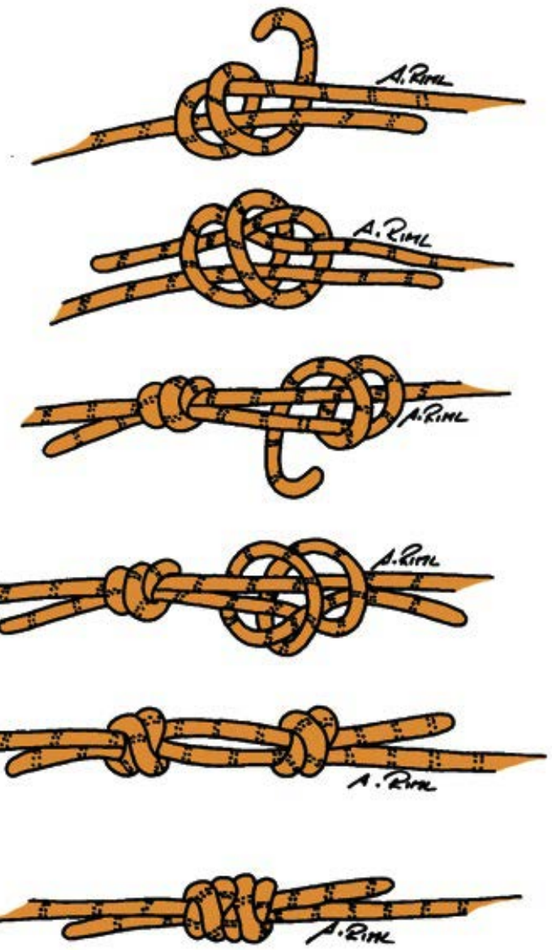
Bowline

6.4 Advanced Knots

A raft guide needs to be able to recognise if these knots are correctly tied, and should ideally be able to tie them if required to.

6.4.1 Double fisherman‘s knot

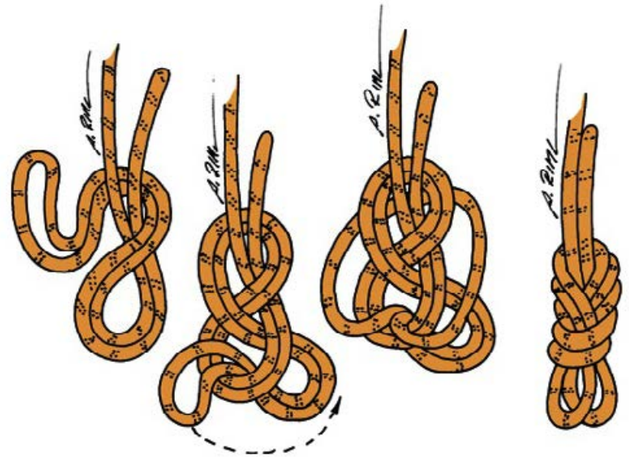
The single or double fisherman‘s knot serves primarily as a connecting knot for ropes and also as a tie-in knot. It can however, be difficult to pull over edges when used to tie ropes together. This knot is often used to produce rope loops in a ring shape (prussic loops). The double is preferable to the simple fisherman‘s knot, since it achieves a higher knot strength.



Double fisherman‘s knot

6.4.2 Double figure of Eight

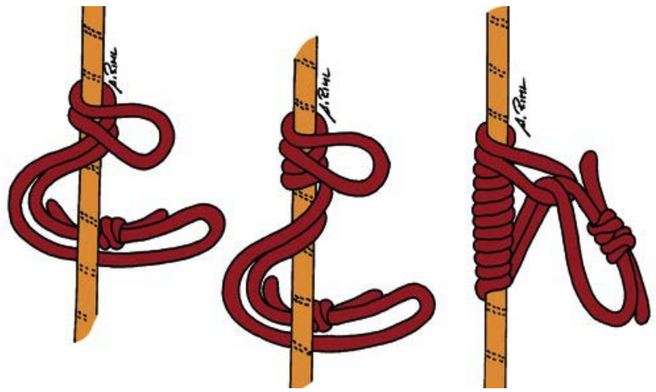
The double figure eight knot has many names in professional circles. One example, is the bunny knot. It is used for making two loops in the end of the rope for abseiling or for an anchor point. It can be opened easily after use.



Double figure of Eight

6.4.3 Klemmheist

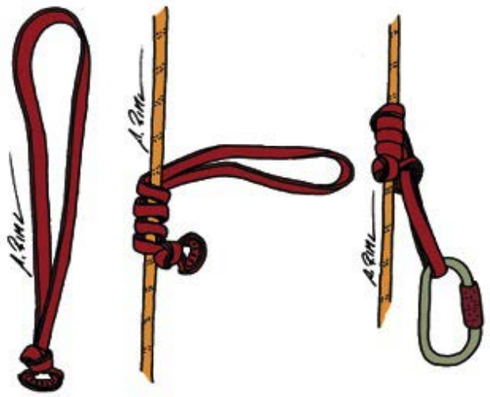
This clamping knot, works like the Prussik knot. Usually used it in conjunction with tape material.



Klemmheist

6.4.4 Bandklemmknoten

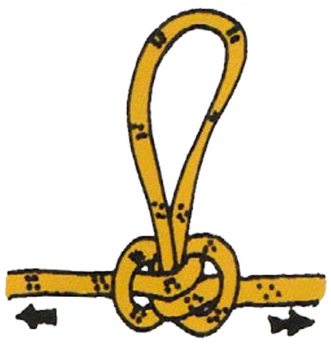
A veriation of the Klemheist knot. Using the Bandklemmknoten very narrow climbing slings can be used as a clamping knots very well. First a so-called „eye“ is made in one end of the sling using a figure of eight or even better with an overhand knot. This is so knotted that the seam from the sling is in the middle (of the eye). When this step is completed, you can start the turns around the rope. The thinner and smoother the rope is, the more turns must be made. Normally three to four turns around the rope are needed before the sling is threaded through the „eye“. Due to its good holding force this knot can also be used on steel cables.



Bandklemmknoten

6.4.5 Alpine Butterfly Knot

This knot can be used instead of the clove hitch to make a loop in the middle of a rope.For example when building a multi-point anchor system on a raft.



Alpine Butterfly Knot

7. SAFETY TALK

The following chapter contains the procedure and further basic knowledge for the safety talk – the guiding instructions (safety talk) for the rafting guide.

7.1 Conduct and rules in the raft

7.1.1 Introduction

- Short introduction of yourself
- Explanation of the sitting positions (before the actual introduction)
- Show the guests how to sit in the raft
- Show how to place the feet in the foot cups
- Show how to paddle
- Then everyone in the boat

Only now can the actual introduction take place.

Question: Can everyone swim? – Is anyone ill or has anyone any weaknesses?
Question: Does anyone take drugs? – Prescription drugs? – Does anyone have circulatory problems or a weak heart? – Has anyone consumed alcohol?

A rafting tour may not take place if the rafting guide shows signs of fear, fatigue or weaknesses or if there is a pressure to perform, as is so with high water.

Check that no one has valuables on them for example rings, watches...

Footnote: Checking that each guest has signed the forms (Insurance form, rules of liability among others) does not take place with every rafting company.

The guide must be seated in the boat for the safety talk so that every guest has a good view and can hear everything (keep eye contact!) That is to say sit yourself at the highest point at the front of the raft.

7.1.2 Sitting positions

Launching and landing

- Explain launching and landing of the boat
- Before the trip while boarding the raft: The riverside paddlers board first, then the bank side paddlers board. The front paddler on the bank side holds the raft. He boards the raft when I say.
- Landing: The bank side paddlers get out first. The front paddler holds the boat on the riverside until everyone is out. The riverside crew continues to paddle – until I say: get out!

Note: If there are children among the guests, an adult has to get into the boat first.

Explanation of the various positions in the raft

- A symmetrical raft, explain which is the front and back end of the raft (main features: foot cups, where the throw-bag is connected, floor valves)
- Bailing system – bailing holes in the floor
- For what purpose are the foot cups and thwarts?
- Each leg has a place where it is secured
- Both legs always remain inside the raft!
- Paddlers are seated on the slip-proof padding in the middle of the tubes; do not slip too far inside the raft!
- Positions at the front – for the leading paddlers – they are responsible for setting the rhythm – it is wet and there is lots of action!
- Positions towards the back are not so wet
- Scared or nervous guests should be seated next to the guide
- Overweight guests should be seated in the middle of the raft so as to maintain the balance

Two rafting guides

The position of the guide if there are two guides is dependant on the stretch of river and on the water level and is normally decided by the company itself. It is possible that both are at the back or one at the back and one at the front.

7.1.3 Paddling technique

The paddle consists of three parts: The T-grip, the shaft and the blade. It is the most important piece of equipment that we need.

One hand takes the grip, the other the shaft. The hands should be as wide apart as possible so that if the paddle is held above the head, the lower and upper arms form a right angle.

It is important that the grip is always held – there is a danger of injury to the paddler seated next to you. The guests should be made aware of this risk of injury, which occurs when pushing off an obstruction (rocks).

We have two types of paddle strokes:

1. The basic forwards stroke

The upper body bends far forwards; the paddle is placed in the water vertically in front of the body and with the help of the body pulled backwards – to the height of the sitting position. The use of the upper body saves strength, you can paddle for longer and the paddle strokes are more effective.

2. Basic backwards stroke

The paddle sits on the hips (at the hip bone). This serves as a pivot. Lean the upper body forwards and turn outwards. Through leaning the upper body backwards and pulling/ pushing the arms, the paddle's blade will be pressed forwards in the water. The paddle remains fixed to the hip the whole time.

The paddlers in the front positions (leading paddlers) set the rhythm.

7.1.4 Commands

While rafting a river it is important that everyone works together as a team. Commands should be clearly and precisely given. In order that everyone works well together it is necessary that everyone paddles in sync according to the commands, which the guide gives.

The following commands are:

All forward – All back – right back – left back

Commands are clearly announced, for example: left back, right forward (if there is no automatic opposite paddling for the other side expected).

On higher grade rivers or sections the following commands could be useful, as fast reactions are essential:

- ***Draw stroke*** left and ***right***
- ***Right back*** and automatically left forward (To be arranged in advance)
- ***Left back*** and automatically right forward (To be arranged in advance)

Footnote for the draw stroke: too complex and not useful for the guests. It could be taught if the rafting company so wishes.

Stop
All commands are ended with the command stop. Only at the stop command should the team stop paddling.

Safety commands
There are further commands, which must be adhered to for safety reasons. These will only be used on rare occasions. If I am to call a safety command it is important that they are carried out quickly.
There are the following safety commands:
'Over left!' or ***'highside left!'***
'Over right!' or ***'highside right!'***

Summary of the commands:

GERMAN	ENGLISH
Alle vorwärts	*All forward*
Alle rückwärts	*All back*
Links rückwärts	*Left back*
Links vorwärts	*Left forward*
Rechts rückwärts	*Right back*
Rechts vorwärts	*Right forward*
Stopp	*Stop*
Alle nach links	*Over left or Highside left*
Alle nach rechts	*Over right or Highside right*
Alle ins Boot	*Get down*
Position	*Position*

Note on ***„Get down"***: The guests are to get out of the foot cups (danger of injury).

7.1.5 Environmental aspects
Ecological awareness in such a sport as rafting, which is in such close contact to nature, should be self-evident. The most important rules of conduct:

- No polluting the river or river banks
- No littering
- Keep the landing and launching sites clean
- Use the public toilets provided
- Avoid making unnecessary noise
- When an encounter with fishermen takes place remain calm and float by – if possible on the opposite side of the river

7.2 Conduct and rules outside of the raft

7.2.1 How to act as a swimmer
It may be that during the trip passengers voluntarily or involuntarily swim. This is not a problem as you are equipped for the water with a buoyancy aid and a neoprene suit, which protect you. There are however a few points to watch out for.

The water is very cold (between 6 and 10° C); this means that if you fall into the water, it is a shock for the body. The first reaction to the cold is that you may struggle for breath. Therefore it is very important that as soon as you come up again, you continue to breath calmly.

Orientate yourself immediately towards the boat. This means that as soon as you surface, watch for the raft and try to actively swim to it. Should you not find the boat immediately, do not panic, but turn yourself around one time. More often than not the boat is directly behind you. Grab the line as soon as possible and hold on tight. You will then be helped into the boat.
Very important! Never try to stand up in the water. Always lift the feet up, lie down flat in the water. Rocks or fallen trees could be lying on the riverbed, under which you could get your feet stuck. The water would then press you down under the surface (demonstrate with the thwart!).
If you do swim – keep eye contact with the rafting guide and watch out for his/her instructions (Signals).

7.2.2 Swimming in white water
There are different techniques for 'swimming in white water': active and passive. You should always try, first of all, to reach the boat yourself by **actively swimming**. Active swimming means: on the stomach and front crawl! Should you find yourself in the position where you cannot actively swim back to the boat or you are in a cataract, then take up the passive swimming position, this is lying on your back, feet downstream, legs slightly bent. This position allows you to see what you are heading towards and allows you to push yourself off the obstructions with your feet. You can use your arms to stabilise your body. Important: try to lift your toes out of the water. I can then see that you are lying well in the water.

7.2.3 How to act as the boat's crew – rescue
The team is there to help to rescue a swimmer.

Pulling the swimmer into the boat: If the swimmer is at the boat and hanging onto the line a member of the crew pulls him/her back into the boat.
Important: Only one person helps to pull the swimmer back into the boat, not the whole crew. The rest of the team continues to follow the guide's commands. Hauling in technique: The helper wedges his/her feet under the outer tube. The swimmer is seized with both hands by the buoyancy aid (by the shoulder straps). By leaning the whole body back the swimmer can be pulled with one powerful tug back into the boat (demonstrate!).

Dragging the swimmer back to the boat: If the swimmer is not gripping the line on the boat, we will paddle to the swimmer as he/she is trying to actively swim to the boat. When the swimmer is within reaching distance a paddle can be stretched out – grip first, to him/her (the only case in which the grip can be let go of!) and he/she can be pulled back to the boat.

Throw bag: Should a swimmer be too far away from the boat and is no longer able to reach the boat by actively swimming, (for example: swimming against the current) ideally we would try to come to him with the boat. Otherwise there is the throw bag, in order to pull the swimmer back to the boat.

Implementation: as a swimmer you should try to hold eye contact with me in the boat. When I have eye contact, I will shout 'Rope'. I then throw you the throw -bag line so that, ideally, it lands over your shoulder or close by to you. You get a grip on the line with both hands (not the bag).

Never wrap the line around the wrist, the arm or throat: when the line becomes taut you are no longer able to let go and the wrist, arm or throat is strangled. Allow yourself to be pulled back to the boat. In fast current ideally lie on your back so that water splashes onto the back of your head and your face is clear for you to breath easily. You hold the line in front of the chest and let it run over your shoulder out behind you towards the boat.

Important: hold the line tight until you have reached the boat, you will then be helped back into the boat as described earlier (Demonstrate!)

7.2.4 Flip

1. Explain when and how a flip happens!

A flip is capsizing of the raft. A flip may happen at any time.

2. How to act after a flip: if the raft flips we are all, myself included as a guide, in the water.

Important: Here too - do not panic! Continue to breath calmly, orientate yourselves and swim to the boat! Spread yourselves between bow and stern and hold the line tightly! It is possible, when the boat flips, that you will surface again under the boat! Here too - do not panic! There is air and light under the raft. Orientate yourselves and go under to come out from the boat. Because you have buoyancy aids on you will have to actively push on the tubes above to go under them. Use your hands to walk along the tube and you are then out from under the boat! In order to upright the raft I climb onto the raft and turn it back over with the help of the flip line. In this moment there is the command: 'all let go'. This means that everyone must let go of the line for a short moment, even if you feel a lot safer holding onto the boat. This is so that I am able to upright the boat, because otherwise I will not be able to flip it back over. I then climb back into the raft and help you to get in.

Summary of how to act after a flip:

- No panic
- Passengers are left for a short moment on their own
- Hold on to your paddles
- The guide re-flips the raft (let go of the line)
- Swim to the upstream side of the raft if possible
- All passengers back in the raft
- Count the crew – check for full attendance

7.3 Summary of the safety talk

1. Introduction
2. Sitting positions
3. Paddling technique
4. Commands
5. Conduct in white water (What is expected of the crew, inclusive: rescue)
6. Flip

Conclusion:

In conclusion you, as the rafting guide, are responsible for everything. Therefore make sure you are familiar with every point, which must be given attention in the safety talk. You must be sure that all the guests are paying full attention. Make sure that every point has been understood before you deal with the next one. Remember - every guide is only as good as the weakest and least experienced member of the team.

8. HOW TO ACT IN CASE OF AN ACCIDENT

8.1 Introduction

An incident on the water does not necessarily always mean injury or death, it can also just as easily be a foreseeable or unforeseeable mishap.

There are different conditions, which, in their combination, can either guarantee or impair safety. These are: material conditions, objective water conditions and personal conditions.

Material Conditions - are linked closely to the equipment. The equipment must be complete and in working order, in preparation for the navigation of a planned stretch of water. If the equipment is not prepared for the trip, the person who was responsible is guilty of negligence. It is also worth pointing out that safety cannot be bought! The most expensive or best equipment alone does not, as it were, automatically guarantee safety.

Objective water conditions – Other people's reports and their vague advice about difficulties, are by no means sufficient preparation for the rafting of a difficult stretch of water. Guides are required to obtain information on the water level, descriptions of the river and difficulties, and key areas must be inspected. Finally while running the river everyone should agree on evacuation points and rescue measures, in order to be prepared for a possible emergency situation.

Personal Conditions – every raft guide must have a whole series of techniques and rafting manoeuvres at the ready, to the best of their ability. If somebody wants to guide white water, they must be able to swim well over long distances and be able to get back into the raft even in the midst of a rapid. A raft guide lacking in these skills is not only putting themselves in danger but also all of their passengers, who have placed their confidence in them for the white water tour.

An emergency situation can happen at any moment. How the passengers without prior experience on white water react cannot be assessed in advance. In addition one can be certain that on longer trips the passengers will become tired, requiring the raft guide to work more. An inexperienced raft guide becomes tired sooner when their steering and paddling

techniques are inefficient and they may lose focus with time due to tiredness.

8.2 Types of incidents

Examples of rafting incidents increasing in seriousness:

- Loss of paddles
- One or more passengers swim
- In a relatively calm stretch of water
- In rapids
- In a stopper
- In an eddy behind a natural or artificial obstruction
- In a weir
- Rafting guide swims
- Raft capsizes (flip)
- Boat is wrapped (obstruction, bridge pillar, tree, rock, etc.)
- Boat gets stuck in a hydraulic
- Boat has a hole in one compartment
- Boat loses multiple compartments at once
- Loss of the boat and paddles
- Loss, injured guests or even guests without vital signs

How can I successfully help at an incident?
In order to be able to successfully help, I must first be able to keep calm and estimate my own strengths, as well as the power of the water. There are accidents where a rescue is questionable or even impossible, so the safety of the other guests is of paramount importance. In order to be able to systematically comprehend incidents in white water, we can break the situation up into sections:

- How can I help?
- Where can I help?
- What can I use to help?
- Do we need more help for this incident?

Question: How can I help?
If you are alone? (Self help)
Rescue with helpers?
Which rescue methods do I apply?
What is the victim's situation?
How can I get close to the victim?
How much time do I still have?

Question: Where can I help?
Position of most usefulness. Firstly one must decide quickly if you will stay in the current or stop. Where can you eddy out/land the boat and where can you direct any following boats (in convoy) to? The best looking eddy is of no use if it is on the wrong side of the river. Consider whether it would be better to direct a following raft straight to the other bank or whether it should wait in the next eddy without disembarking. Additional embarking and eddying out requires precious time.

Question: What can I use to help?
Which rescue materials do you have with you or can you prepare? What can you use/deploy most efficiently and quickly to help things effectively?

Question: Do we need more help for this incident than we have available?
In order to avoid panic and chaos, the most experienced guide should take over the command of the rescue. Rescue people first and then the equipment. Guests helping, who have no idea about white water, should not be used for tasks requiring trained personnel.

For simple incidents with enough trained personnel available, everything can be handled quickly and easily. However as the seriousness of the incident increases, especially when people are injured or missing, help needs to be called for. In this case the first call is always to the emergency services.

Rescue techniques need to be practiced regularly for them to work in a real situation. Just reading a manual or to see an example of a technique is not enough.

8.3 Emergency call – How to use your Mobile Phone

Emergency numbers:

112 European - Emergency services number
- European Coverage
- This also functions without a SIM card
- No fees
- Call will get highest priority within the network
- The number is attainable from all networks: Turn off your mobile phone, switch it on, dial 112 as PIN and press the call button

140 Alpine emergency Nationwide coverage
- No fees

144 Medical emergency
- Nationwide coverage
- No fees

Notfall App Bergrettung Tirol:
Operated by Leitstelle Tirol GmbH.
If you have a smartphone then this app can be downloaded to easily give your GPS co-ordinates through to the emergency services when you call them.
Available on iTunes and Google Play store, as well as the Leitstelle Tirol website (www.leitstelle-tirol.at/leistungen/zusatzleistungen) for free.

Checklist emergency call with your mobile phone:
1. **What** happened (rafting accident)?
2. **How** many injured persons are there? Are all of your guests accounted for?
3. **Where** are you (location on emergency river plan)?
4. **Who** is the caller?
5. **When** did it happen?
6. **Weather** conditions at the site of the accident?

Do not end the conversation with the emergency services operator until he/she has all the necessary information and has indicated the end of the call to you.
Do not suppress your number. Tell them your own number to enable call back of emergency service.

8.4 Correct behaviour by a helicopter deployment

When a rescue helicopter is deployed there are often problems with bystanders who are not involved in the accident due to them waving/signalling and therefore giving the impression that help is needed. On a busy weekend there will be lots of rafting groups on the river. Therefore if a helicopter is flying above you or your group, show very clearly if you need assistance or not:

Signalling a clear NO:

NO

We do not need help

Signalling a clear YES:

YES

We need help

Signal rockets, smoke signals or a bright coloured towel enable the marking of the area for deployment, **but should only be used if absolutely necessary**. Landing signals for the helicopter should be so that the helicopter approaches into the wind. At the landing site all loose objects (including rafts & paddles) should be secured, in case they get caught in the downdraft.

9. RESCUE

9.1 Introduction

White water rescue is a very big subject, so on your guides course you will only cover the very basics. Specialist three-day Whitewater Rescue Technician courses (previously know as Swiftwater rescue courses) are available to guides wanting to work on harder rivers where advanced rescue skills are required. Like all skills, rescue training, if not practiced will be forgotten and useless when you really need it. Therefore all skills should be refreshed before the start of a new season, including re-flipping of rafts and swimming in a current.

Fig. 9.1: A “wrapped” raft

9.2 Basic Rescue Techniques

9.2.1 15 guidelines for Whitewater rafting

Here are the 15 guidelines that Rescue 3 International have draw up to improve rescuers safety and the likelihood of a successful rescue:

1. Keep it simple using low risk techniques first. Simple rescue options are quicker and easier for everybody to understand. Low risk means more safety for the rescuers.

2. Always try and stop an accident before it happens. Experienced guides can see accidents coming in advance. For this reason an experienced guide can be used as a trip leader, and experienced guides only should be working on harder rivers. There are many rules in place that govern rafting in Austria. Most of them are for the safety of our guests and to ensure good practice in rafting companies. For example: the minimum guest equipment, minimum guide equipment and the banning of rafting on flooded rivers with excessive driftwood.

3. Your priorities are always the safety of yourself, then your crew and fellow guides & guests before that of the victim.The rescue of equipment comes last. Creating more victims only means fewer rescuers for the original victim. If your rafts flips trying to rescue one person you have not made the situation better!

4. Always wear a lifejacket (PFD, Buoyancy aid) at a rescue. Even if you are only standing on the bank, as rescuers can quickly end up in the water. All lifejackets should be well fitted and in suitable condition to be used on the river. Ripped fabric, broken buckles or old foam have no place being used on the water. Guides are recommended to change their PFD at least every 5 years.

5. Always use the right equipment. Using the wrong equipment leads to failed rescues and injuries. Always check that you have at least the minimum guide equipment on your raft/person and check that it is in a good condition.

6. Always use suitable personal protective equipment. This includes helmets and footwear as well as cold water protection. Check that it is designed for white water use and wear enough cold-water protection in case you go for an unexpected long swim in a cold water river.

During a Rescue think about…

7. Always deploy upstream spotters at a rescue site with whistles to warn of hazards or downstream traffic when using lines across the river or in foot entrapment / boat pin situations.

8. Always have multiple downstream back up. What will happen if someone floats off downstream? Either bank-based rescuers equipped with throw bags (who can throw them) on narrow rivers and/or chase boats (rafts or kayaks).

9. Have a backup plan, as this saves valuable time if your first plan does not work.

10. Never tie a rope directly to a rescuer. Chest harnesses are a safer way to attach a rescuer to a floating rope, but entering moving water attached to a rope is always dangerous. Never tie anybody to a raft and be careful of any open karabiners that could inadvertently connect someone's PFD to the raft. For this reason only use locking karabiners on a raft.

11. Never tension in water ropes at right angles to the current to transport people in whitewater. Water pressure will cause the line to "V" up under load, keeping the load (person) in the middle of the river.

12. When tensioning ropes stand on the upstream side when unpinning boats. To prevent injuries from ropes or d-rings snapping use a change of directional pulley whenever possible and stand outside of the rope loops.

13. Never put your feet down when swimming in moving water. Raft guides can also get foot entrapments!

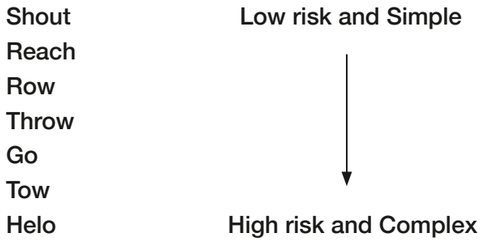
14. Never expect a victim to assist in their own rescue. Ask yourself if the victim will be able to hold onto a thrown rope?

15. Once you contact the victim do not loose them. For example when thrown a rope most people stop swimming and hold onto the rope. If you then let go of the rope, the victim is worse off than if you had done nothing.

Like all guidelines they should not be seen as absolute rules but rather as recommendations to think about during a rescue situation. Judge for yourself if they apply in each situation and if they would increase the safety of yourself and your guests.

9.2.2 Low to High Risk

As it is always best to use a low risk & simple rescue option if possible, rather than a high risk complex one. Learn to think of rescuing somebody as you would a swimmer from a raft.



First we shout to the client to attract their attention and ask for them to swim back to the boat. We can assist them easily by reaching to them with the t-grip of the paddle. If they are not within reach then we can paddle the raft to them. If that is not possible (if we have lost all the paddles or clients) we can use a throw bag, if they are close enough. If we have lost our raft then swimming over to the client might be suitable or even towing them back to the bank. However both of these options are much higher risk. If we have failed at all these rescue attempts, or the situation is very serious then we had better call for a helicopter to assist.

9.3 Required Skills

In order to assist a more experienced guide in a rescue situation a river guide must be able to tie all the basic knots shown in the Knots chapter of this manual. However as rescues are stress situations, they should be able to tie them in less than ten seconds and from any direction.

- All guides must be able to actively swim in whitewater. For example across the river.
- All guides must be able to throw a throw bag to a swimmer the full length of the rope accurately (within 1 m either side of a target at 15 m), twice within 20 seconds.
- All guides must be able to set up a mechanical advantage system and make a multi-point anchor on a raft.
- All guides must be able to quickly re-flip a raft and assist all clients back into the boat.
- All guides must be up to date with first aid and CPR procedures.
  For this reason all guides must have a upto date first aid certificate (not older than 3 years).
- All guides should be fit enough to assist in a rescue. For example: run to help someone, rescue them out of strong current, lift them out of the water and carry out CRP for 15 minutes alone.

9.4 Whitewater Rescue Situations

Swimmers
Clients fall out of the boat often. In a rapid they should be rescued back into the boat as soon as possible to avoid injuries. If rafting on colder rivers, the longer the client is in the water the

higher is the risk of hyperthermia occurring. Indeed just falling out of the raft suddenly can cause a cold shock in a client.

When rafting in convoy, another raft can also assist in the rescue of a swimmer who is far away from their own raft, when the trip spacing is ideal.

Order of rescue attempts for a swimmer:

- Self-rescue
- shout
- rescue with a paddle
- rescue from the boat
- throw-bag
- rescue from other boat
- rescuer without safety rope
- rescuer secured by safety rope
- safety rope across the river
- emergency call.

Flips
Guides must be trained to deal with flipped boats and the rescue of their crew. The more serious the river or rapid the quicker a guide must be at rescuing their crew out of the water.
The swimmers can be rescued either back into the re- righted boat, onto the floor of the upturned boat or into another raft. Sometimes people must be rescued to the bank or rescue themselves by swimming to the bank. If one or more of the other boats in the group flip the first priority is the safety of one's own boat. If a rescuer's raft flips as well, everything will become a lot harder.

If the first raft of a convoy flips, the second boat should move downstream of it, so any swimmer that gets washed downstream can be picked up. People who are hanging on the side of an upturned raft should not be rescued first. As soon as their guide re-rights the raft they will be quickly rescued anyway. Unless of course the guide is nowhere to be seen!

Guests who float off downstream of the raft will be carried further away from the raft by the current and their rescue becomes more difficult the longer they are in the water. Especially as the crew from the flipped boat will be exhausted from the long swim and may have lost most of their paddles (even when told to hold on to them). For this reason it is considered safer to raft with more than one boat on the river.

Order of rescue for a flip:

- clients and guide swim back to the raft and hold on, guide climbs onto boat
- Head count
- guide re-flips,
- guide climbs into raft & pulls all clients into raft that can not self rescue or be pulled in by other clients
- 2nd head count
- All ok signal to other boats

Other rescue techniques that can also be used depending on the situation:

- guide climbs onto raft with clients & waits until rapid is over for re-flip
- guide climbs onto raft with clients & paddles the boat to the bank.
- some of the clients / everyone and raft rescued by other rafts
- some of the clients / everyone swims to the bank & emergency call (lost boat / lost clients).

Wrap

Either on rocks or on the various bridge pillars, boats can be caught by the current and held in place because the pressure acting on both sides of the raft is the same. The downstream tube can quickly be pushed upwards and the upstream tube pushed underwater by the current. Then the raft will end up vertically stuck by the water current pouring constantly onto the raft from upstream. Although with various rope systems the raft can be freed it is better to avoid such situations in the first place by avoiding rocks and bridge pillars. There is always the danger of crew being entrapped when the boat wraps! If a person is trapped between the boat and the rock or in a foot strap, then the raft material can be cut in order to free them. In order to cut a raft a good river knife is needed, which the guide has to carry in a way that is accessible with one hand and will not get lost even, when swimming in whitewater.

Order of rescue for a wrapped boat with trapped people:

- head count
- how many people trapped in the raft? how many floating off down stream?
- are they subsurface? Then try to cut the raft to free them!
- at the same time - downstream containment of any swimmers
- at the same time - upstream spotters to warm downstream traffic of stuck boat
- at the same time - possible emergency call situation?
- new head count

Order of rescue for a wrapped boat without trapped people:

- head count
- no trapped clients! how many floating off down stream?
- downstream containment of any swimmers & upstream spotters to warm downstream traffic of stuck boat

- move clients in boat
- move clients to bank
- self-rescue using flip line
- rescue with throw-bags
- rescue with a static rope
- let air out of parts of raft
- if all else fails then emergency call.

Foot entrapments

When the river is a certain depth if people try to stand up in the river their feet can get stuck between rocks. If there is any current they will then be pushed downstream and under the surface of the river.

Order of rescue for a foot entrapment:

- contact the victim using; wading, boat based rescue, rope based rescue, or helicopter.
- at the same time - place upstream & downstream safety
- at the same time - emergency call

Weirs

Weirs are dangerous, unfortunately often a lot more dangerous than they look. The most notable weir in the west of Northern Tyrol is the Brunau weir in the middle of the rafting section on the Lower Ötz. In Salzberg it is the Eschenau weir on the Salzach river near Taxenbach.

For a dangerous weir the guide must check to make sure he knows where the get out point above the weir is and that he has a back up eddy in case he misses the first one. Not wanting to walk the extra ten metres is no excuse for six dead guests!

Dangerous weirs are dangerous because they are very hard to rescue someone out of. Unless the victim is close to the bank and rescuers are already there, it can be impossible to safety rescue an conscious person from the weir, let alone an unconscious one.

Order of rescue for a weir accident:

- contact the victim using; throw-bag, rescue with line & rescue ring, rescue with boat (4 point system), Highline system, paddle hooks, rescuer secured by a rope (very high risk), Helicopter.
- at the same time - place upstream & downstream safety
- at the same time - emergency call

9.5 Whitewater Rescue Techniques

Knowledge of the following rope systems can help in the tensioning of ropes in low angle haul systems either to un-pin a boat or for tensioning a line across a river.

Mechanical Advantage systems
The 3:1 Z-Drag is the standard hauling system for white water rafters. It requires only a minimal amount of equipment and is very quick to set up.

Fig. 9.2: Basic Z-Drag using throw bag and 1pulley

Fig. 9.3: Basic Z-Drag using throw bag and 2 pulleys

Most throw bag ropes have a maximum breaking strain of 1000 kg, which makes them of limited use for the unpinning of rafts in whitewater. 11mm static ropes with a maximum breaking strain of 3000 kg are superior for larger boats in high current.

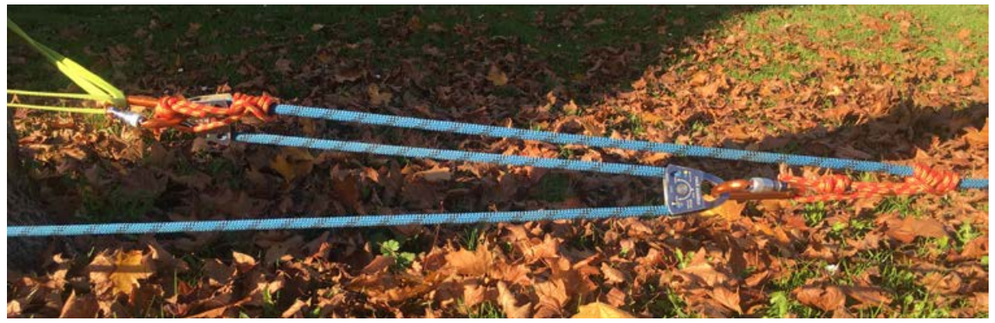


Fig. 9.4: Basic Z-Drag using 11mm static rope and 2 pulleys

Multi-point Anchors
In order not to rip off the d-rings from a raft the load from a Z-Drag must be distributed between at least 3 D-rings. There are several ways to do this so that the load is constantly distributed regardless of the direction of pull.

Fig. 9.5: Load distributing 3 point Anchor using the raft's Bow line

Fig. 9.6: Load distributing “Boatman’s” 3 point Anchor using main line

Fig. 9.7: Load distributing “Boatman’s” 3 point Anchor using main line (close up)

Fig. 9.8: Overview Z-drag using throwbag and raft’s Bowline

Fig. 9.9: Overview Z-drag using Static line for both the main line and anchor

Chest Harnesses
All raft guides in Austria are required to have a chest harness fitted to their PFD. The main use of the chest harness is as a safer way of attaching a rescuer to a floating rope.
Many 'would be rescuers' have already died attached to ropes in moving water when they were directly attached around their waist with a knot.

Fig. 9.10: PFD with integrated quick release chest harness

The problem of tying directly to the rope in an un-releasable way is that if the rope snags on the river bottom the rescuer will be pulled under water and held there.

Instead, attaching to the chest harness means that a rescuer should be able to release the rope in a critical situation, and swim free. Using a floating rope also means that it is less lightly to snag on the river bottom.

Attaching to a rope in whitewater is never without risk. Ropes can wrap around the rescuer's legs or body and then no longer be releasable.

A river knife (which can be used with one hand) can also possibly be used in order to free ones self by cutting the rope. However this is often much harder than one would think, and is much easier for another river guide to carry out.

The chest harness can also be used to protect a rescuer who is on the bank and does not want to get pulled into the river (useful on wet slippery rocks or concrete). The rescuer can tie himself to a solid object (tree or rock) that does not move in case the rescuer is pulled off his feet. The rescuer can still quick- release and move down stream quickly if necessary.

Sometimes, people think that the chest harness is strong enough to abseil with. Since the chest harness is not designed for vertical rescues it should not be used for this. For vertical rescues a climbing sit harness should be used or can be improvised out of a standard climbing sling.

10. SHIPPING SIGNS

10.1 Introduction

The shipping signs for the sea and river traffic system in this chapter have been divided into categories. Supplementary signs have also been included. If a shipping sign is not portrayed on both sides, the reverse side of the sign must remain white.

Footnote:
Since the guiding of rafts falls under the shipping law in Austria, it is necessary that a guide knows all of the signs shown below. This also includes signs that have little to do with rafting, however they can still be placed on a river where a guide is rafting.

Austrian Shipping Law: Schifffahrtsgesetz SchFG (Bundesgesetzblatt Nr. 62/1997)
Austrian Shipping Signs: § 25 ff Schifffahrtszeichen

The currently valid version can be found in the RIS legal information system:
http://www.ris.bka.gv.at/bundesrecht/

10.2 Signs of Prohibition

Prohibited passage or water way

	No vessels permitted on the following stretch of water	Rectangular red sign with a horizontal white stripe

Shipping ban on rowing vessels

No rowing vessels permitted on the following stretch of water

A square white sign with a red border, red slash and a black rowing boat

Shipping ban on sports vessel

No sports vessels permitted on the following stretch of water

A square white sign with a red border, a red slash and black wording „SPORT“

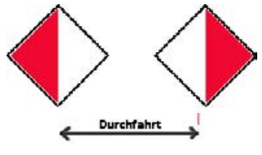
Mooring prohibited

Mooring of all vessels prohibited at this point

A square white sign with a red border, a red slash and a black „P“

For Example, at Ötzschlag where there is a pumping/suction station

Prohibited passage in the red zone area



Passage must be completed through the white zone area

Two red and white square signs standing on their ends

Beispiel: Mühlauer Eisenbahnbrücke

Producing wave or slipstream prohibited

At this point or in the following stretch of water speed must be restricted in case of dangers caused by waves or slipstream

Square white sign with a red border, a red slash and two horizontal black waves

Overtaking prohibited

No overtaking at this point or on the following stretch of water

Square white sign with a red border, a red slash and two short black arrows

Oncoming traffic and overtaking prohibited

No oncoming traffic or overtaking at this point or on the following stretch of water

Square white sign with a red border, a red slash and two long black arrows

Comment: Only relevant with oncoming traffic: Non applicable in upper Tyrol

10.3 Signs of Requirement

Prescribed direction of transit

The set directions, indicated by the arrows, must be followed (This is often supplemented with a blue sign as with road traffic signs)

Rectangular sign with a red border and horizontal black arrow.

Requirement for particular attention /warning sign

Exercise particular attention at this point and in the following stretch of water

Square white sign with a red border and a vertical black slash

Requirement to stop under specific circumstances

Obligation to stop before the sign unless the signal has been given to continue. The main sign is often supplemented with an explanatory sign

Square white sign with a red border and a black horizontal slash
(with explanatory text below))

For example, for customs clearance, e.g. on the Inn at Finstermünz

Requirement to sound the horn / or a blast on the whistle

'Sounding the horn' can mean a short burst on the pea-whistle or a high- pitched cry. A short sound (usually about one second)

Square white sign with a red border and a black dot

Mooring Points

Mooring or Parking allowed

Square blue sign with a white "P"

10.4 Indication Signs

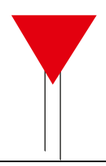
Additional Signs

Additional information to a Shipping sign

White extra sign with text

For example: "in 50m"

Shipping obstruction



Sign of danger ahead

Red Triangle with the point downwards mounted on a post

For example: Suction hose by the tunnel building site in Roppen

Annulment

The end of a regulated or a prohibited area in one direction (a general sign)

Square blue sign with a white diagonal line from the top left to the bottom right corners

10.5 Supplementary Signs

Under this heading all traffic signs are included, which are used on the waterways. For example, General no go areas for water traffic, directional arrows, launching and landing points or general notices.

Prohibited stretch of water

Illus. 10.1: An example of a prohibited stretch of water

Announcement

Illus. 10.2: An example of a notice

Launching point sign

Launching point right

Launching point left

For Example:
Ötztaler Ache, launching point in Ötz

Abb 10.3: Example of a launching point

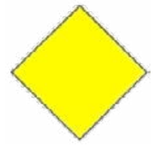
Landing point sign

Landing point right

Landing point left

10.6 Signs of Recommendation

Recommended water way/ passage under bridges in both directions

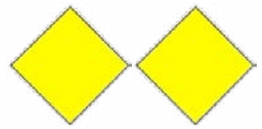


The sign marks the recommended passage under bridges for traffic in both directions

Square yellow sign standing on it's end

Comment: Only relevant with oncoming traffic. Non-applicable in Upper Tyrol

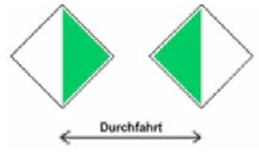
Recommended passage under bridges in one direction



The sign marks the recommended passage under bridges for traffic in one

Two square yellow signs, standing on their ends

Recommended Passage (Fairway/channel)



The green area marks the recommended channel

Two square green and white signs, standing on their ends

Recommended area to pass through

The green area marks the recommended channel

Square green and white signs standing on their ends

10.7 Signs of Restriction

Restricted height

The height of vessels passing through is restricted. This sign is often supplemented with information on the exact height restriction

Square white sign with a red border and a black triangle pointing downwards from above

Restricted width

The width of vessels passing through is restricted.
This is often supplemented with information on the exact width restriction

Square white sign with a red border and with a black triangle on the left and right sides

Distance requirement

The waterway/passage is limited—the given distance (in metres) from the bank must be kept on the following stretch of water

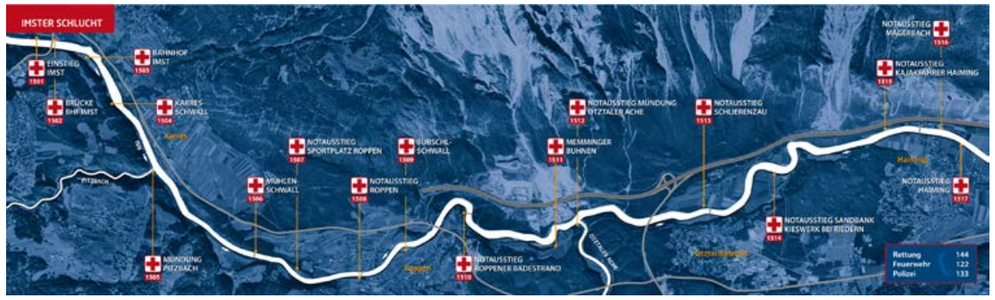
Rectangular white sign with a red border. A black background with the given figure in white shows the distance that must be kept.

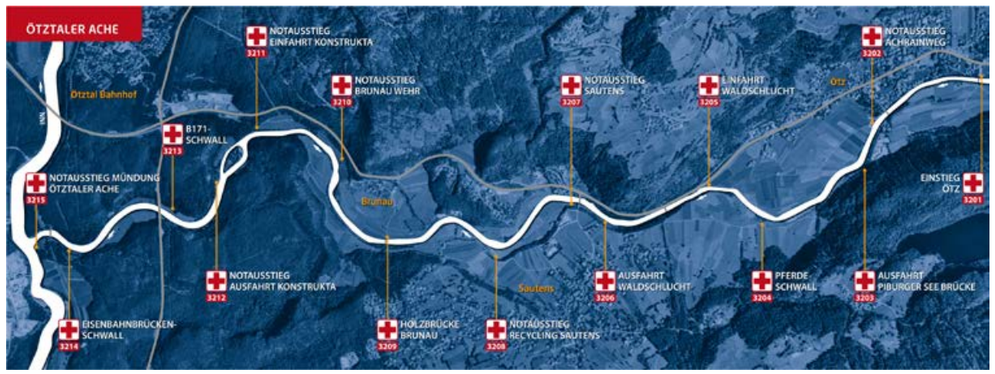
For example: 40 m from the right hand side in the direction of travel

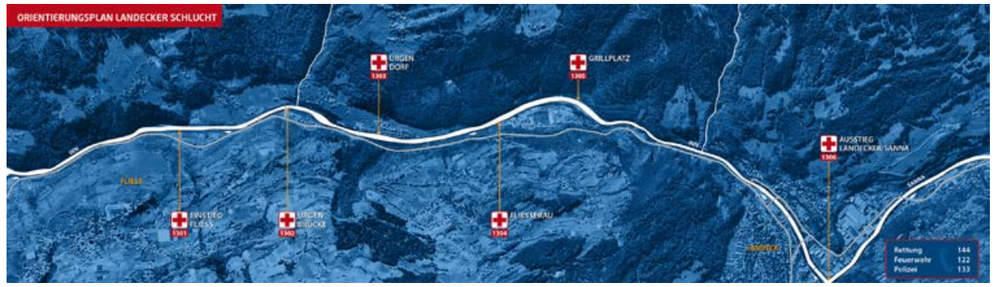
11. EMERGENCY EVACUATION PLANS

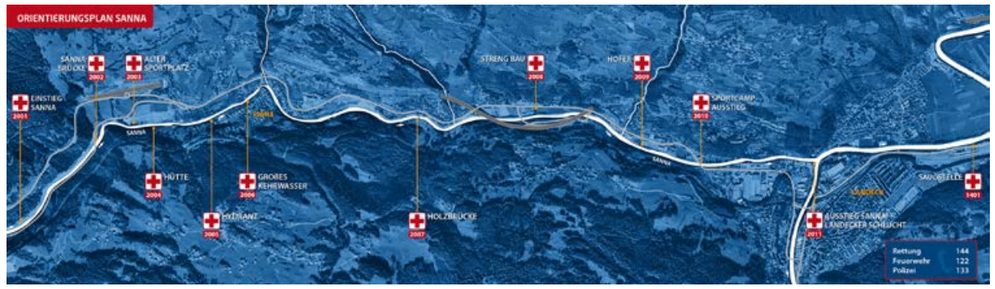
Download Emergency Evacuation Plans:

http://www.tiroler-raftingverband.at/orientierungs-plaene.html









ii. APPENDIX

ii.1 Authors

Josef Edinger aus Schwaz ist gerichtlich zertifizierter Sachverständiger für Rafting. Er ist Prüfer der obersten Schifffahrtsbehörde für Rafting.

Mag. Ariane Guem war Geschäftsführerin des Vereins Regionalentwicklung Bezirk Imst, die mit der „Plattform Wasser Tiroler Oberland“ Projekte zum Thema Wasser im Tiroler Oberland unterstützten.

Klaus Hausl ist Geschäftsführer der FREELIFE Outdoorsport GmbH; staatl. geprüfter Berg-, Höhlen- und Skiführer, dipl. Outdoortrainer, dipl. Coach, staatl. geprüfter Raftguide, staatl. geprüfter Canyoningguide, geprüfter Kajaklehrer und High Ropes Course Trainer. Ausbildungsleiter für Rafting und Hochseiltrainer.

Dr. Norbert Hofer ist Richter am Landesgericht Innsbruck und spezialisiert auf alpines Recht.

Mag. Friedrich-Karl „Fuzzi“ Huber war Obmann des Tiroler Raftingverbands und arbeitet seit dem Start des Raftingsports im Tiroler Oberland in den frühen 80er Jahren immer wieder an dessen Weiterentwickung mit.
Er gründete das Outdoorzentrum „Sport Camp Tirol“ in Landeck.

DI Christian Klingler hat in dieser und der letzten Ausgabe die Beiträge der verschiedenen Autoren in einem Dokument zusammengeführt. Er zeichnet für die Endredaktion des Lehrplans verantwortlich. Er ist Mitarbeiter der Tirol Werbung, war beim Alpinen Sicherheits- und Informationszentrum ASI-Tirol in Landeck verantwortlich für die Bereiche Technologie und Kommunikation und konzipiert für das Österreichische Kuratorium für Alpine Sicherheit die Alpinunfalldatenbank.

Andy Leaney ist General Manager der Raftbasis Haiming bei Feelfree Touristik und ist ebenfalls seit dem Start des Raftingsports im Tiroler Oberland mit dabei. Weiters nimmt er für das Land Tirol den praktischen Teil der Bootsführerprüfung ab.

Manfred Leiter unterrichtet an der FH Gesundheit und am Ausbildungszentrum West (AZW) und ist Sanitäter beim Roten Kreuz. Er hat sich auf Outdoor-Erste Hilfe spezialisiert, coacht Unternehmen und Organisationen und erarbeitet Outdoor-Ausbildungsunterlagen, u.a. auch für die Tiroler Canyoningführer.

Marcel Pachler ist Obmann des Tiroler Raftingverbands und Initiator der Neuauflage des Österreichischen Rafting Lehrplan. Geschäftsführer von faszinatour Adventure & Sports Österreich. Er ist seit Beginn des Raftingsports mit dabei, durch seine langjährige Erfahrung ist er ein ständiger Mitstreiter zum Thema Sicherheit und Weiterentwicklung im Wildwasserbereich in Tirol.

Alexander Riml ist Raft-, Schluchten-, IVBV-Canyoning-, Berg- und Schiführer sowie Allgemein beeideter und gerichtlich zertifizierter Sachverständiger für Alpinistik, Canyoning, Schluchtenführer, Bergrettung, Lawinenkunde und Lawinenunfälle.
Durch diese fachlichen Qualifikationen wird er häufig als Ausbildner und Referent für die Tiroler Bergrettung und den Bergführerverband eingeladen und leitet auch seit vielen Jahren die Tiroler Schluchtenführerausbildung und IVBV-Canyoningführerausbildung des Österreichischen Bergführerverbandes. Er ist auch Inhaber von activsport alpin.

Mag. Wolfgang Schiffermayer ist Sportwissenschafter und Ausbildungsleiter des Steirischen Raftingverbandes.

Mag. Werner Senn ist Jurist und Leiter der Abteilung II/7 Flugrettung im Innenministerium. Er war Geschäftsführer des Alpinen Sicherheits- und Informationszentrum ASI-Tirol in Landeck, mehrfacher Tiroler Kanumeister und ist Autor des Fachbuchs „Ratgeber Skirecht“.

Neil Newton Taylor ist Instructor trainer für Rescue3 International und veranstaltet im Tiroler Oberland immer wieder Ausbildungskurse bei seiner Firma „Swiftwater Rescue“. Er ist IRF Ausbilder, BCU Kajak / Kanulehrer und Safety Director für das jährlich stattfindende Adidas-Sickline-Rennen.

ii.2 List of Illustrations

Titelbild: Photo: Christof Nendwich
Chapter 3: Photos: Christof Nendwich; chapter. 3.1: Hersteller
Chapter 4: Illustrations Christian Klingler nach Baur/Hahn/Holz und Bennett
Chapter 4.7: Illustrations Neil Newton Taylor
Chapter 5: Illustrations Christian Klingler, ASI-Tirol
Chapter 6: Illustrations Alexander Riml, activsport alpin
Chapter 8: Photos: Thomas Kracker (Faszinatour)
Chapter 9: Photos: Neil Newton Taylor / Rescue3 International, P. 102 Hersteller
Chapter 10: Photos: Josef Edinger, Christian Klingler; Illustrations Christian Klingler
Chapter 11: Graphiks Christof Nendwich
Graphik Design: Christof Nendwich - www.christofnendwich.at

ii.3 Contents

Georg Fernsebner, Wolfgang Huber
Faszination Wildwasser, Lehrbuch der der Österreichischen Wasser-Rettung Tirol
Wildwasserschwimmen · Rafting · Canyoning / Gefahren – Sicherheit - Rettung
Tyrolia-Verlag 1998, ISBN 3-7022-2154-9

Holger Machatschek
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BLV Verlagsgesellschaft, 2. Auflage 1993, ISBN 3-4051-4494-9

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Bruckmannverlag München 1987, ISBN 3-7654-2085-9

William Nealy
Lustige Kajakschule
Pollner Verlag 2000, ISBN 3-9256-6012-7

ii.4 Work Group

Aktive Mitarbeit in der Arbeitsgruppe:

- Mag. Friedrich-Karl Huber, Obmann des Tiroler Raftingverbands, Sport Camp Tirol, Landeck
- Josef Edinger, Gerichtlich zertifizierter Sachverständiger für Rafting, Schwaz
- Andy Leaney, Feelfree Outdoor, Haiming/Ötz
- Marcel Pachler, Faszinatour Outdoor, Haiming/Pfunds
- Neil Newton Taylor, Rescue3 International
- Mag. Ariane Guem, Regionentwicklung Bezirk Imst
- DI Christian Klingler, Alpines Sicherheits- und Informationszentrum ASI-Tirol, Landeck
- Mag. Werner Senn, Alpines Sicherheits- und Informationszentrum ASI-Tirol, Landeck (siehe dazu auch Anhang ii.1 Autoren)

Support der Arbeitsgruppe:

- DI Hartwig Röck, Regionalentwicklung Bezirk Imst
- Mag. Marius Massimo, Regionalentwicklungverein MIAR, Landeck
- Dr. Alois Amprosi, Obmann-Stv des Tiroler Raftingverbands, Feelfree Outdoor, Ötz
- Christian Zweibrot, Amt der Tiroler Landesregierung Abteilung Verkehr
- Ing. Marcel Innerkofler, Leiter der Landeswarnzentrale Tirol
- Robert Veider, Vacancia Outdoor, Sölden
- Harald Wolf, h2o Outdoor, Ried i.O.
- Oswald Stock, Sport Ossi, Kramsach
- Michael Paul, Natur Pur, Sautens
- Hans Neuner, Bruno Pezzey Rafting, Silz
- Alex Schuchter, Liquid Bliss Adventures, Pfunds
- Anton Auer, Obmann des Vereins Regionalentwicklung Bezirk Imst
- Mag. Werner Kräutler, Regionentwicklung Bezirk Imst
- Alois Thurner, Tirol Werbung, Innsbruck

ii.5 Note on Liability

The large amounts of information in the Tyrolean rafting course book may be used as the foundations in order to prepare for the Tyrolean rafting guide examination and for white water rafting in general. One is not however to blind oneself to the fact that responsibility and decision-making lies in the hands of each individual. The course book claims neither to be exhaustive nor may it be used to create a legal precedent. Use of this document in legal proceedings is ruled out.