SAFE AND CUSTOMER-ORIENTED TRAIL MARKING

ERKKI OLLILA & SINI KESTILÄ



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The Lapland University Consortium LUC is a strategic alliance between the University of Lapland and Lapland University of Applied Sciences. www.luc.fi © Lapland University of Applied Sciences and authors

ISBN 978-952-316-227-3 (nid.) ISSN 2342-2521 (painettu)

ISBN 978-952-316-228-0 (pdf) ISSN 2342-253X (verkkojulkaisu)

Lapland University of Applied Sciences Publications Serie D. Other publications 1/2018

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GLOSSARY

Trail

= Any passage used for outdoor recreation that has been differentiated from other trails with a signage set. A trail has a responsible caretaker who is responsible for its maintenance. A trail may be established through official trail proceedings or with an agreement.

Trail network

= A set of several connected trails.

Snowmobile trail

= A road subject to the Road Traffic Act, an official snowmobile trail established through trail proceedings.

Snowmobile track

= Track marked in the terrain for snowmobiles, agreed on with the landowners.

Signage set

= A set of signboards, signposts and continuous trail markings placed in the terrain for the purpose of informing the trail user.

Guidance

= Refers to using a signage set to guide the trail's users along the trail.

Starting place

= The place where a trail starts. The starting place always features a signboard that provides the necessary preliminary information about the trail.

Continuous markings

= Repeated markings along the trail showing that the marked track is a part of the trail network.

Signpost

= A structure along the trail providing the names of reference points, information about services and the distances to and directions for reference points.

Customer survey

= A customer survey conducted in the REILA project in Lapland in summer 2016.

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FOREWORD

There are thousands of kilometres of different kinds of marked outdoor trails in Finland. Traditionally, people moved on the trails and areas outside the trails by using a map and a compass, and woodcraft was handed down from parents to children. Today, the Finnish woodcraft tradition is rarely anyone's hobby, but less intensive movement in nature is on the rise and there is an increasing need for well-marked low-threshold trails. Finnish nature is also extremely attractive to foreign tourists. Travellers of many different nationalities come to explore our nature, and the growth is accelerating. Just twenty years ago, the marking of outdoor trails was simpler. people hiked in the summer and used skis or snowmobiles in the winter. Today, the same trail network is used by cyclists, walkers, trail runners and snowshoers; moreover, new sports are introduced constantly.

The parties that maintain the trails have done their best in trying to keep up with the development, and various trails have been marked in the terrain according to demand, resources and competence. Earlier, trails and trail signs have been built in various projects, and by now they need maintenance. As a result, the markings, signposts and signs used along trails have very different appearances, are designed and installed under different logic and are at different stages of their life cycle.

These instructions are meant to help respond to the development mentioned above and the challenges it has created. The aim was to compile nationally approved guidelines to be used for making trail markings more customer-friendly and further improving trail safety. The instructions introduce signage sets from a risk management perspective, while integrating the perspective of customer-oriented service design throughout.

According to trail users, a trail marking is customer-oriented and improves the customer experience if people do not need to pay too much attention to it – it is present but does not take the user's attention away from the main thing.

The objective of REILA Safety of Trail Marking, Pilot Area Lapland 2015–2018 project (REILA reittimerkintöjen turvallisuus, pilottialueena Lappi 2015-2018) was to improve the safety and reliability of trails. The project was implemented by Lapland University of Applied Sciences/ Multidimensional Tourism Institute (MTI), Metsähallitus Parks & Wildlife Lapland, Lapland Rescue Department, and 14 Lappish municipalities: Enontekiö, Inari, Kemi, Kemijärvi, Kittilä, Kolari, Muonio, Pello, Posio, Rovaniemi, Salla, Sodankylä, Tornio and Ylitornio. These instructions have been created in cooperation with the implementers of the REILA-project.

For background material for the instructions, the experiences of trail users and operators were collected through interviews, online surveys and voluntary work. Existing guides and recommendations as well as analyses and observations made over the course of the project have also been used in the creation of the instructions.

CONSUMER SAFETY ACT

From a legal perspective, trails are considered consumer services, in which case the operator of the trail must comply with the Consumer Safety Act. Obligations connected to a trail's signage set include:

- 1. Duty to take care: All operators must assess the risks and maintain the trail so that it will not involve any risk to the health or property of any person. (Section 5)
- 2. Providing information to consumers: Trail users must receive information about the trail in a clear and comprehensible manner. Enough information must be provided that the customer can assess the possible risks involved in the trail and its structures and proportion them to their own skills. (Section 9 + Government Decree 613/2004)
- 3. If the trail is not considered low-risk based on the risk assessment, it may also be subject to the requirement to prepare a safety document.

BACKGROUND MATERIALS

Customer surveys

The central theme of the instructions is customer orientation. Customer feedback on the signs of Lapland's hiking trails was collected for background material in summer and autumn 2016. Ninety-four respondents replied in outdoor locations, and 106 respondents answered the survey online. Feedback was also received from 28 volunteer "mystery hikers". The material was used to compile a summary report: Customer-oriented and safe trail markings – summer-autumn 2016. The material collected was utilised in the preparation of these instructions.

Experiences and views of operators and entrepreneurs

The opinions and experiences of operators were surveyed in workshops and meetings held in the municipalities participating in the project. The current condition of existing signage sets was mapped in the workshops and through personal observations in terrain.

Entrepreneurs may be trail operators as well as trail users. Entrepreneurs use their own trails and those maintained by others to produce programme services. They also advise their customers to use marked trails independently. For this reason, we also asked 113 companies about their views on the signage sets of the trails they use. Twenty-eight companies completed the survey.

Key findings from customer and operator feedback

- People's ability to locate starting places and preliminary information about the trail is a problem with the trails of municipal centres and travel resorts. The starting place exists but is difficult to find, both on the website and on site. Getting from one's hotel room to the start of the trail might become a challenge.
- Marketing materials or maps often lack a clear indication of the official starting places of the trail. The importance of advance information is emphasised by the fact that according to the customer survey 67 % of customers sought information about the trail beforehand for example from websites or maps.
- Based on the surveys, people prefer a signage set to be logical, uniform, unambiguous, clear, easily legible, consistent and easy to spot.
- It was hoped that the various signs would make determining one's location and choosing a trail easier. The respondents wished for "You are here" markings and maps at intersections.
- From the perspective of travel, outdoor trails are one of the customers' most important motivations for travelling to a destination. According to the survey, for 90 % of trail users, the trail was the most important destination or among the most important destinations for their trip. For this reason, travel resorts should invest in the outdoor recreation trails they offer and realise that they are one of the area's most important attractions.
- Based on customer feedback, the most important characteristics of signposts are their visibility under various weather and lighting conditions as well as the legibility and clarity of their contents. The material used or how well the sign blends into the landscape were considered as less important.
- The logic of signs must be uniform throughout the trail network. An unexplained or inconsistent way of showing kilometres confuse the user. Trails and places must be named in a logical manner.
- Old and new markings on same trails are detrimental to the sense of safety; old markings create doubt and lead to personal conclusions about where the trail actually goes.
- It should be possible make signs on a low budget and by using traditional methods.

Previous instructions and guides

Instructions, guides and reports on signage sets have been written over the years, but comprehensive instructions have not been drawn up before.

Metsähallitus has compiled its own sign manual for harmonising its own use of signs. The sign manual focuses on the logic of using signs.

Outdoors Finland projects have produced manuals for trail planning from the perspective of various activities. The manuals also discuss the principles of guidance from the perspective of the activity.

Ulkoliikuntapaikkojen turvallisuus -tietopaketti ulkoliikuntapaikkojen turvallisesta suunnittelusta ja ylläpidosta (Safety of outdoor exercise locations – an information pack on the safe planning and maintenance of outdoor exercise locations) was compiled in 2011 during a project funded by the Ministry of Education and Culture. The information pack includes some information on the signing of cross-country ski trails and jogging trails.

The Finnish Standards Association maintains standard SFS 4424 Ulkoilun ja liikunnan merkit (Signage for outdoor recreation and exercise), which is a collection compiled by experts of signs and symbols used on outdoor recreation trails. The standard is updated when needed under the lead of the Finnish Standards Association. These instructions often refer to the standard signs and symbols and recommend their use.

These instructions take into account the Consumer Safety Act and the obligations laid down therein, which are presented in more detail in a separate section.



DESIGNING A SIGNAGE SET

At travel resorts and municipal centres, in particular, trails are looked after by many different actors and operators. Trail operators in a single area may include, for example, Metsähallitus, the municipality, the village association and ski trail or snowmobile pool. From the customer's perspective, however, it is unimportant as to who is responsible for the trail and its signs it is more important that the area's trails and their signs have been designed as a functional whole. A typical example is a travel resort and an adjacent national park, the combined trails of which make up the trail network of the whole area. Parts of the trail network may have been built for different needs or during different projects and marked in different ways. The result is muddled and confusing with markings that may change when crossing from one operator's area to the next.

Therefore, different trails should be viewed as larger entities comprising the whole trail network of the area thus forming the area's trail product. Such an operating model can only be achieved by working together and, if necessary, making a joint trail network plan that analyses among other things the entire area's customer profile, current state, offering and future needs. Items that should be mutually agreed on include the appearance and logic of the signposts and trail markings, the placement of the starting places of trails and consideration of trails in re-



Image 1. Desing a signage set

lation to town and country planning. When we look at the entire service path of a customer, issues connected to town and country planning, such as the placement of the starting place and the progression of trails in the town and country plan area, are emphasised. For example, convenient access from the hotel door to the trail's starting place is important. during the trail planning phase. If trails have been planned with care, the trail network can be easily finished with a signage set to make it ready for use. These instructions do not go through everything related to trail planning but rather summarise the essential underlying factors of guidance that facilitate planning. Sources that can be used in the planning of trail productisation and experience production include the following manuals Retkeilymatkailun suunnitteluopas (Camping travel planning guide) and Vaellusreitin suunnitteluopas (Hiking trail planning guide) produced by Outdoors Finland projects.

Trail planning

The quality of the signage and guidance of a trail or trail network is already influenced



Image 2. Spontaneously formed and simplified track network

Simplicity

TFrom the perspective of a safe and customer-oriented signage set, the trail network should be as simple as possible. Each tiny stretch of trail should not be included; every section of a trail must have a purpose. In some cases, old tracks must be closed off to achieve a functional result. The trail planner needs to think on behalf of the customer how they should move towards the destination. If there are too many options, the destination may become difficult to find.



Target group

When planning a trail network and its signage set, it is especially important to be aware of the target group, in other words, for what kind of users the trails are intended. In addition to different modes of travel on the trail, the planning of the trail and its signage set is also influenced by cultural differences, age groups as well as the users' possible mobility impairments and aids.

Difficulty levels of trails

An essential preliminary piece of information communicated to the user is the trail difficulty level. When a trail is being planned, it must be considered who will use it and how difficult it will be. Trail difficulty level can be mentioned in trail descriptions as text and, if needed, shown on maps with different trail line colours. To avoid misunderstandings, symbols indicating difficulty should not be used in signposts or continuous markings, with a few exceptions: for example, an easier detour around a difficult stretch of terrain should be marked on the trail with a map and symbol.

Trail classification generally uses the following colours:

- blue easy
- red medium difficulty
- black difficult

The classification may vary depending on the way of moving on the trail. To make the colour classification understandable, the difficulty should also be described with text.

Risk assessment

Risk assessment or risk survey refers to mapping the probability and severity of various risks. Risk assessment is a part of trail planning and the trail marking plan as well as one of the cornerstones of the duty to take care laid down in the Consumer Safety Act. Risk assessment should be conducted with rescue authorities, meaning that their preconditions for operating in the area should be surveyed already during the planning phase. There are many different tools for risk assessment. However, it is important that the trail operator has determined and is aware of the risks along the trail and has worked to account for the risks and reduce them to an acceptable level.

Multipurpose use

Multipurpose use of trails poses challenges for signage sets. A trail is often used for cross-country skiing during the snowy season and for other activities in the summer. Summer and winter trails may run along the same track or partly diverge. Trails used only in the winter and marked for use solely in the snowy season are a becoming more common.

If a trail network has a lot of multipurpose use, it is clearest to use separate maps for the summer and winter season. In some cases, separate starting places can be made for summer and winter trails.

A signage set alone cannot solve all the challenges of multipurpose use, good trail planning and leaving room for later developments during the planning process are important. In many cases, the starting point could be to plan the trail network or some of its trails with for yearround multipurpose use. There could also be separate trails for winter use only.

Customer orientation

A customer-oriented approach means analysing customer needs comprehensively and in depth, and acting accordingly. The signage set of a trail is primarily there for the user or in other words the customer of the trail. That is why it has been important to also consider the customer's perspective in the preparation of these instructions. A customer-oriented approach considers the customer's entire service path and the customer's experience of the service they receive.

Customer experience

Customer experience is created by interaction,

which is influenced by customer encounters, ideas and emotions. The customer experience of a trail user starts with advance marketing before they even enter the actual trail.

It is possible to influence the experience of the customer on cross-country trails in many ways, for example, by lining the trail through different biotypes and landscapes, by positioning of resting areas well and using the right type of trail markings. A well-planned signage set enables the customer to focus on the items listed above instead of having to pay attention to staying on the trail. A positive experience does not usually involve extra navigating or straying to a wrong trail, not to mention getting completely lost and running out of energy, which may have serious consequences.

Trail users and their needs vary greatly, but they usually have at least one thing in common: seeking some kind of experience in nature. The experience may involve lovely views, a sports performance, a nature experience, the thrill of speed or a combination of these.

Service path

The path of the trail user starts before the trip, for example, when he or she sees a TV advertise-



ment of the destination or visits its website. Users often also seek advance information about the destination before going to the trail. Printed and digital maps of trails are also an essential part of the service path.

After arriving to the destination, the user's service path may include, for example, interaction with service providers or just going to the trail starting place. The trail's signage set plays an important role at this stage because it also influences the user's progression on the service path.

The service path also continues after the trip. The user often shares photos, experiences and feedback in the social media or with acquaintances. At this point, the trail operator must take care that feedback about, for example, the trail's condition can be obtained. The operator must ensure that it is possible to give feedback.

Starting places

When analysing the customer's overall service path, one important item to be considered comes before the signage set and the start of the trail. A good starting place location and guidance to the starting place play a key role in the pursuit of a good overall result. Key information connected to the trails in terms of smooth and safe use of the trail should be available at the starting place.

Starting place location

The placement of starting places is influenced by the target groups using the trails and the location of the services they use. A customer who uses public transport and stays at a hotel might rent a pair of skis or a cross-country bike at a rental shop, in which case the starting place should be within a reasonable distance of the services, with clear guidance. A cross-country skier who has a car and is renting a cottage a bit



Image 5. Starting place

further away can access the ski trail using another starting place next to a parking area. Of course, a customer who is already familiar with the trail network might access the trail without first going to a starting place.

Another factor influencing placement is the location of trails; it is natural to have the starting place at a point where different trails diverge into different directions. If possible, guidance to the starting place can be done with just the starting place symbol – the symbols for the way of moving on the trail (hiker, skier, cyclist, etc.) can be used from the starting place onwards.

There may be different levels of starting places. The main place can be in a central location near services, with minor starting places in parking areas close to trails or, for example, ski trails from cottage areas that connect to the trail network. Regardless of their size or priority, each starting place must have the minimum information of a starting place sign and directional signs.



Guidance to a starting place

The symbol used to indicate the starting place can be the symbol i, which can be used to mark the starting place itself and the guidance to it. Users' ability to locate the starting place is ensured by marking the route to it as follows:

- Signs: direction, distance, starting place symbol and possibly symbols indicating ways of moving on the trail.
- Depending on the destination, trail markings can also be used to guide users in the right direction.
- The shaping of terrain is done such that the features of the terrain guide people to the right place. A clear path made of gravel or rock flour that stands out from the surroundings leads people clearly to the right place. Clearing trees and other landscaping can also improve the appearance of the starting place and users' ability to locate it.
- In addition to the parking area sign, the trail starting place sign is added to the road and street signs in the area.

Image 4. Guidance to the starting place

Naming trails and destinations

Naming trails and destinations helps the customer find their bearing and navigate. One safety goal of a signage set is to make the trail users at least somewhat aware of where they are even when they are not standing in front of a map. When people remember the trail's name and where they are coming from and where they are going, it is easier to locate them in a case of emergency. Large trail networks may have several trails between two resting areas, in which case different names point people to the right trail.

When naming the trails, care must be taken to ensure the use of exact same names in distance signs, place name signs, signboards and maps. The names must also be taken into account in other communications.

Names must be chosen with care to ensure that they are easy to understand and stand the test of time. Old company names that have become part the local vernacular often live on even if the company changes its name or closes down. From the customer's perspective, the names of essential services, regardless whether they are private companies or not, should be included in the names selection as comprehensively as possible.

Named trails

From the customer's perspective, trails should be designed as loops with their own name. For example, there may be several trails between two resting areas, so a named trail make it possible to locate users more accurately in case of an emergency. Named trails facilitate safe and customer-oriented guidance and also help market the area: each trail can have its own product description and theme. Furthermore, a trail is designed to provide the customer with a positive experience. Productisation also gives the customer the motive and interest to try out a new trail.

A trail network's signage set comprises of signboards, continuous trail markings and direction-

SIGNAGE SET

al signs. At the starting place, the customer obtains preliminary information about the trail and instructions for how to move on the trail from the signboard. Continuous trail markings keep hikers on a trail that is part of the trail network, and directional signs at intersections guide them to the right direction. Map boards at intersections help trail users to locate themselves and make it easier to choose a trail.

The signage set should be appropriate and logical. During the planning phase, the method of marking and signage must be given a lot of thought – in the end, the more detailed contents of the guidance in the starting place is determined by the choices made in marking and signage. Because the signage set is an essential part of managing the risks along the trail, the trail's risks must also be considered when determining the various features of the signage set.

The following section lists factors that influence the planning of a signage set; they can be used in the planning of its appearance, content, placement and material selection, for example.

At this stage, the planner must first consider, for example, the following questions:

- Does the track stand out well from the surrounding terrain and does it have intersecting paths?
- Is the trail used year-round or should it be marked for only summer/winter use?
- Should the signage also be visible in twilight and in the dark?
- Could changes in weather affect the visibility of the signs and markings?
- What kind of users will use the trail?
- What modes of travel will be used on the trail?
- What demands do the facts above impose on the signage set?

Factors influencing the planning of a signage set

Terrain



Trail usage period



External circumstances



Trail user characteristics



Trail user's ability to observe his/her surroundings



Signs

The purpose of signs is to guide the customer in the right direction at trail intersections, to the right trail and give the name of the destination when they arrive there

Most common sign types and contents

In order to preserve legibility and clarity, sign contents should be as simple as possible. Destinations are named in a single language, and services, modes of travel, etc., are depicted with symbols. The signboard and map boards at the starting place include the symbol key. Factors that affect appearance and legibility include the presentation of contents on a single sign and the clarity of the set of signs.

Trail name sign

- Name of the trail, mode of travel symbol(s)
- Directional arrow
- Continuous trail marking method if the named trail uses a specific colour or code



Image 6. Trail name sign giving the trail's total length in parentheses, and the trail marking method

Distance sign

- Name of reference point
- Directional arrow
- Distance from reference point
- Distances under 1 km are given in hundreds of metres (m), and distances of over 1 km are given without the km abbreviation.
- Distances of 1-5 km are given to one decimal point = 1.0 4.9
- Distances of 5 km and more are given in full kilometres = 5
- Services at the reference point in symbols
- Possible mode of travel symbols

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Image 7. Distance sign

Directional sign

- Directional arrow
- No text
- Mode of travel symbol
- Used at intersections to indicate trail direction or, for example, a cycling trail diverging from a multipurpose trail.



Place name sign

- Destination name
- Services at the destination, as needed
- Operator logo



Image 9. Place name sign

Symbols used

Signboards, maps and signs use various visual symbols to indicate, for example, the services available at the destination and the recommended mode of travel on the trail. To make the meaning of symbols in the terrain clear to the user, the same symbols should also be used in other materials: website, brochures, maps and in the terrain.

The recommended symbols can be found in standard SFS 4424, Ulkoilun ja liikunnan merkit (Signage of outdoor recreation and exercise). The standard and layout information are available at the online shop of the Finnish Standards Association. It is often enough that the subscriber of print products has access to the standard and the producer of the printed materials has the files of the symbols needed for the layout design.

Logic of signs

The basic principle of signs is to have only one trail option at an intersection to one guided destination. Having the same place names pointed in several different directions causes extra headaches for trail users, this the sign designer can solve in advance. In some cases, it is not possible to use the "one direction approach", in which case a map at the intersection helps with trail selection. Such situations may occur, for example, when a trail branches off because of different modes of travel or levels of difficulty.

Trails usually have a more distant main destination and several other destinations along the way, such as resting areas or sights. Distance signs are done such that the nearest destination and the distant main destination are given in the sign. The main destination may be, for example, the best-known sight of a loop trail, after which the user starts moving closer the starting place again. It may be necessary to install signs for several destinations at starting places and intersections of large trail networks. Intersection maps reduce the need for several signs.



Image 10. Symbols. The most common service symbols and mode of travel symbols

Grouping of signs

Even a simple trail network may easily develop intersections where many signs are attached to the same structure or an intersection has several sign structures.

Intersections may be junctions of many trails or simpler intersections. Junctions easily collect a large number of signs, making it sensible to divide the signs into groups. Signs pointing in the same direction should be collected into the same group to improve legibility. There are a few different methods that can be used for sign placement and grouping. The most workable solution depends on the number of signs and the requirements of the trail network. A clear and legible method is to use same length signs for each grouping, dividing their contents with "tabs" so that the same information can always be found in the same place or at least in the same order.

At intersections of several trails, indicating direction is easier when the signs are mounted on the same signpost.



Image 11. Clearly installed signs where signs pointing in the same direction are on top of each other. Pallas-Yllästunturi National Park. Photo: Metsähallitus/Joel Kauppinen

Jatkuva reittimerkintä

The key purpose of continuous trail marking is to indicate the location of the track in the terrain and keep the trail user in the marked trail network. The choice of marking method is influenced by the characteristics of the trail and its users as well as external requirements, for example weather. When users stay on the marked trail, they stay on the trail network. When they see a sign and/or map, they get information about the direction and distance to the destination.

Trail markings also assist the trail operator, for example, in finding the correct location of a cross-country ski trail in the snow after heavy snowfall.

Logic of marking

There are roughly two different logics that can be used in continuous trail marking. The simplest method in terms of implementation is to mark all the trails in the network with continuous marking and ensure guidance to different destinations with signs and maps at intersections. This method has been found feasible in most places, and it keeps the user alert in reading signs, place names and maps. When the same marking is used, the trails of the network can be differentiated by naming them and by using trail name signs at intersections to guide users to the right trail.

Another way of implementing continuous marking is colour or symbol coding. For this method, the different trails of the network must be designed as named trails. Each named trail is marked in the terrain with its own colour or symbol. The most positive experiences with colour coding have been received from trail networks that have clear individual trails. It may be clearer to mark more complex and extensive trail networks with a single colour. The operator must evaluate the best option for maintenance and for the customers.

Advantages of well-implemented colour or symbol coding:

- The trail is easy to follow in the terrain: After selecting, for example, the "red trail", one can follow the red markings from start to finish. Maps along the trail, at intersections and in resting areas provide "You are here" information.
- A trail description can be made for each trail, making it easy for the customer to select a suitable trail.
- The same colour coding can also be used for the trail map. On the map, different trails can be differentiated so that even a person with little experience with reading maps can visualise them.
- Guidance through symbols or colours is also feasible with less experienced users.
- Trails designed with various themes also serve as content of marketing materials and thereby support marketing activities.

Challenges of colour and symbol coding:

- Presenting different colours on the map requires a little more effort from the layout designer of the map.
- The number of markings along the trail and the number of trail lines on the map increase if different trails use the same track part of the way.
- Ability of colour-blind or visually impaired persons to distinguish markings
- Risk of the "navigator phenomenon" where the user only follows the colour without knowing where he/she is going
- Ensuring the feasibility of the colour coding when the trail network is expanded



Image 12. Signs on top of each other with the information in the same place. Place name sign, trail name sign and distance signs. It has not been necessary to use symbols indicating modes of travel along the trail. Sastamala. Image: kyltti.fi/Jani Hanhijärvi



Image 13. Signs mounted on a single signpost, with signs indicating the direction of the trail. Pallas-Yllästunturi National Park. Photo: Metsähallitus/Joel Kauppinen

Characteristics of marking

The conventional method of implementing continuous trail marking involves painting markings on trees, posts and rocks. This method is affordable and works well under favourable conditions as long as the marking stands out sufficiently from the colour of the background. A dark green marking on a dark tree trunk will not stand out well enough, especially in twilight or in the dark, and people with poor eyesight may even have difficulties seeing it in daylight. However, paint markings often do not stand out well, their edges are not clear and the paint drips before drying.

The visibility of markings can be improved by creating clear edges and using bright colours that stand out from the background. An even better result can be achieved by using a white border in addition to colour; the bright centre and white border create a highly visible contrast. The shape of the marking also matters: a hand-drawn shape may blend into other natural shapes, but a sharp-edged triangle or circle, for example, stands out better from its surroundings.

Trails may also be used in the dark, which makes visibility even more important. A high-contrast marking and white background stand out well in the light of a headlamp. Visibility in lamp light can also be improved with even a small amount of reflective material.

In the winter, continuous trail markings can easily become covered by snow and frost. The visibility of markings is improved when separate marking posts are used, their shape distinguishes them from nature even when frosted or covered with snow. Markings higher in the terrain, for example on trails that rise high up a fell, accumulate heavy frost in mid-winter and, in the end, it may be hard to distinguish the post from vegetation. Piling snow may also cover even a tall post. This problem has been resolved with a reasonable degree of success by placing markings frequently enough, so that they form a line that is easier to distinguish from the terrain.



Image 13. The trail marking has a clear contrast and good visibility even in the dark. Fiskars. Photo: Marko Halttunen

Problems caused by tall snow drifts have been resolved by adding long extensions to marking posts for the winter.

People prefer to follow the clearest and most logical path. For example, a gravel trail that stands out clearly from the terrain is a good trail marking in itself. Near the starting place of trails, in particular, a path reinforced with gravel leads people clearly to the beginning of the trail. In case of trail changes, the visible start of an old path can be covered, for example by landscaping it with shrubs. This way, the old trail does not lure people to the wrong direction.

Recommendations:

- Terrain, varying conditions and trail users impose their own requirements for the signage set.
- Continuous trail markings must be the same throughout the entire trail, but the placement and frequency of markings may vary according to the terrain.
- The shapes of rolling ground, the twists of the trail and shadows must also be taken into account in the placement of individual markings.
- Distinguishable markings are achieved through high-contrast markings that stand out from the shapes and colours of the background and are visible in the dark and, if necessary, reflective.
- Near starting places, shaping the path with, for example, gravel and building a clear track leads users to the starting place and onwards to the trails.
- In most cases, however, continuous marking should be frequent enough so that the next marking is always in sight. This helps the user retain a sense of safety throughout the trail.



Image 15. A gravel path guides users to the signboards of the starting place. Sport Resort Ylläs, Ylläsjärvi. Photo: Metsähallitus/Joel Kauppinen

Signboards and maps

Trails often feature signs that give information about the trail and safety matters as well as signboards that provide information about nature or other experiences offered by the trail. These instructions only cover signs that provide information connected to the trail and their features. Various signboards featuring trail information are placed in the trail starting place, at intersections and resting areas.

Starting place signboard

The contents of the starting place signboard should meet the requirements of the obligation to provide information as laid down in the Consumer Safety Act. From a safety perspective, the purpose of the board is to provide trail users the necessary preliminary information about the trail. Based on the information, customers should be able judge whether the trail is suitable for them and know how to move independently and safely on the trail.

The basic starting place signboard information is always provided, regardless of the trail. In addition to this, the amount of information and its mode of presentation can be increased or adjusted depending on the trail network. The amount of information is influenced by the trail's risk assessment, various user groups and modes of travel. Some of the information may also be available online, for example topical information bulletins on a mobile device through URL, QR code or NFC tag.

Depending on the scale and versatility of the trail network, the contents should be distributed over one or several signboards. The information can be presented through images, text, symbols and map illustrations

Basic information of a signboard:

- Name of trail or trail network
- Length and estimated travel time
- Difficulty of the trail with symbols and/ or a trail description indicating the difficulty
- Modes of travel, if necessary to specify
- Map of the trail network
- Symbol key
- The trail's marking and sign system
- Emergency instructions
- Location/address of the starting place
- Operator's name and contact information for feedback

Additional information of a signboard, examples

- Analysis through risk assessment: how can the observed risks be reduced with additional information?
- Brief description of the trail or trail network
- Necessary equipment to bring
- Introduction of the different trails if there are several
- Space should be left on the board or next to it for topical information bulletins.
- A description of the trail's signs and markings with drawings or photos:
 - How the trail marked is in the terrain
 - What kind of signs there are along the trail
- Trail usage period: seasons, lighting
- Shadow areas of mobile phone reception



Image 16. Winter trails starting place, Ylläsjärvi, Äkäslompolo. Image: Metsähallitus/Erkki Ollila

Map boards

The purpose of map boards is to support signs, help with locating and provide trail users with an overview of the trail network. The information of the map board helps customers identify their location for smooth navigation and in case of emergencies. Map boards are placed in the starting place, at intersections, at main destinations and in resting areas. If the trail network is used differently in winter and summer, it may be necessary to create separate maps for summer and winter trails for the sake of clarity. In some cases, busy multipurpose use of the trail network may also necessitate separate maps for different activities.

Information of a map board:

- Place name or name of intersection
- Trail name, if applicable
- A map covering the nearby areas and main destinations
- Trail lines
- Symbols: mode of travel, services
- "You are here" marking
- Distances
- Names of destinations congruent with the signs
- Index map, where appropriate
- Map scale and scale bar
- Symbol key
- In starting places, some of the information may be given combined on other boards.

Placement, frequency

- Most important intersections
- Resting areas
- Main destinations



Image 17. Intersection maps of summer and winter trails, installed on a signpost at an intersection with quick-release fasteners. Pallas-Yllästunturi National Park. Photo: Metsähallitus/Erkki Ollila

Location sign

Location information helps with locating in an emergency, sending help to the right location and facilitates advance planning of evacuation. Location sign placement is based on risk assessment, for example:

- Starting places
- Resting areas
- Intersections: road and trail intersections
- Other high-risk places recognised in risk assessment
- Additions to long stretches, where appropriate
- Dimensions, contents and colours: According to standard SFS 4424.



Image 18. A location sign in a trail starting place installed on a signpost with quick-release fasteners. Pallas-Yllästunturi National Park. Photo: Metsähallitus/Erkki Ollila.

Other markings

Other markings, such as warning and prohibition signs, should be used where appropriate, for example to warn of the need to pay special attention along a trail, recommend a specific mode of travel for the trail or indicate a prohibition based on regulatory requirements. The warning, prohibition, instruction and guidance signs and the relevant instructions can be found in standard SFS 4424.

The use and placement of warning signs is based on risk assessment. The usual place for warning signs is at trail intersections. Trails and roads crossing with a cross-country ski trail, snowmobile trail or snowmobile track usually require a warning sign, especially if speeds and the risk of injury in case of collisions are higher. An additional sign with text can be used under the warning sign, but it is recommended to use unambiguous and internationally understood symbols.

Sign placement must be considered from the trail user's perspective: for example, markings for mandatory or prohibited skiing direction must be visible to skiers well in advance. If necessary, trees or other obstacles can be removed to ensure visibility.

Despite the use of warning signs, the primary way of reducing risks is to design the trail to be safe.

Applications of other signs include:

- Dangerous spot on a ski trail: rapid descent, sheet ice or another issue that requires attention
- Mandatory or prohibited travel direction: for example, a steep descent on a ski trail where users are instructed to move in one direction only
- ski trail



Image 19. Other signs to guide users to winter trails, for permanent or seasonal installation. Installation method: quick-release fastener and plastic composite post. Ylläs. Photo: Metsähallitus/Joel Kauppinen



Image 20. Signs at the top of a steep hill. Traffic in one direction only: The track on the left is only for skiers com-Intersection of a snowmobile trail and ing uphill. The mandatory travel direction is on the right. The ski trails converge under the hill with corresponding signs. East side of the top of Keskinen, Pallas-Yllästunturi National Park, Kolari. Photo: Metsähallitus/Henri Arponen

SIGN MATERIALS

The material used should enable the appearance and functional properties required from signs and meet the maintenance requirements in terms of their service life, updatability and other maintenance needs. Below is an overview of various solutions and their properties.



Image 21. Wooden signs. Carved and painted text stands out well from the background. Noitatunturi fell, Pyhä-Luosto National Park. Photo: Metsähallitus/Linda Finneman.

Signs

Sign materials can be roughly divided into wood and metal. The practical differences of trail sign materials arise from the lengths of their service life, appearance properties and maintenance needs. Experiences of various materials and their differences in practice are presented below.

Wooden signs

- Wood is a traditional material that is often used for its traditional appearance.
- When a wooden sign darkens, however, the visibility of its text decreases.
- Visibility can be improved by painting carved text with a light colour for better contrast.
- Natural material
- Short service life
- Difficult to update

Metal sign with reflective film

The metal sign model familiar from urban cycling and pedestrian routes is popular also on cross-country trails. Metal signs are widely used, for example on the outdoor recreation trails at Ylläs and the trails of Pallas-Yllästunturi and Pyhä-Luosto national parks.

Product development of traffic signs has been conducted for a long time, and their properties are highly comparable for use on cross-country trails. Using materials in compliance with the Finnish Transport Agency's instructions 20/2013 offers certainty that the materials are resistant to cold, sunlight and the wind. Metal signs are fastened to steel posts, which are erected on, for example, concrete foundations.

- It is easy to achieve a clear and easily legible result.
- The signs are easy to update.
- However, storms in the fells may stress sign fastenings. In the most difficult locations, alternative fastening placement or smaller signs could be considered.



Image 22. Aluminium signs, reflective film. Gaps have been left between the signs to reduce the wind load. The longest distance is at the top, the shortest at the bottom. Nature trails/loop trails are indicated with green signs. Pallas-Yllästunturi National Park. Photo: Metsähallitus/Joel Kauppinen

Metal sign of rusted steel

Durable metal signs have been made in the style of traditional wooden signs, with the texts and symbols flame-cut into rusted steel. The indisputable advantage of metal signs fastened at both ends is their long service life.



Image 23. Metal signs of rusted steel. Tornio. Photo: Metsähallitus/Sini Kestilä



Image 24. Sign group and intersection map. The signs do not have symbols for modes of travel: the same signs are suitable for hikers, cyclists and skiers. Saariselkä. Photo: Metsähallitus/Sini Kestilä

Continuous trail marking



Image 25. Clearly painted marking: sharp edge, white background, also visible on the pine trunk in twilight. Estonia. Photo: RMK



Image 26. A plastic composite post with a reflective tape marking in a bare fell. A trail marking has been painted on a rock below. Pallas-Yllästunturi National Park, Kolari. Photo: Metsähallitus/Joel Kauppinen



Image 27. Colour coded marking and total trail lengths shown on trail name signs. The symbols for a cross-country cycling trail are missing. Photo: Metsähallitus/Joel Kauppinen



Image 28. Colour coded marking. Three trails in the same place. Pyhä-Luosto National Park. Photo: Metsähallitus/Linda Finneman



Image 29. A rope guard guiding passage through easily eroding terrain. Auttiköngäs. Photo: Metsähallitus/Erkki Ollila.

Signboards



Images 30 ja 31. Starting place signboards and signs for winter trails: trail information, map and trail "etiquette". The ski trail and winter trail pass between the boards and the signs. Sport Resort Ylläs, Äkäslompolo. Photos: Erkki Ollila/ Metsähallitus



These instructions are one of the outputs of the REILA Safety of Trail Marking, Pilot Area Lapland 2015–2018 project (REILA reittimerkintöjen turvallisuus, pilottialueena Lappi 2015–2018). The purpose of the project was to create instructions for safe and customer-oriented trail markings for the use of all trail operators in Finland. The instructions were created in cooperation with the implementers of the project. The instructions are written by Erkki Ollila of Metsähallitus Parks & Wildlife Lapland and Sini Kestilä of Lapland University of Applied Sciences. In addition, a number of trail experts have given their contribution to creating these instructions.

The REILA project was implemented in 2015–2018 by Lapland University of Applied Sciences, Metsähallitus and the Regional Rescue Services of Lapland. The ERDF and the Government provided 70% of the funding. The self-financing of 30% was provided by Lapland UAS/Multidimensional Tourism Institute, Metsähallitus, Regional Rescue Services and the municipalities. The development objective of the REILA project was to further improve the safety of cross-country trails and outdoor recreation trails.

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ISBN 978-952-316-228-0