A photograph of two skiers ascending a snowy mountain slope. The skier in the foreground is seen from behind, with their large backpack and ski poles visible. The second skier is further up the slope. The sky is a deep blue with wispy white clouds. The overall scene is serene and captures the essence of backcountry skiing.

A skier's backpack

A skiers backpack

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Print year 2019
Work was conducted in 2018 & 2019

ISRN: LUT-DVIDE/ EX--19/50453-SE



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Abstract

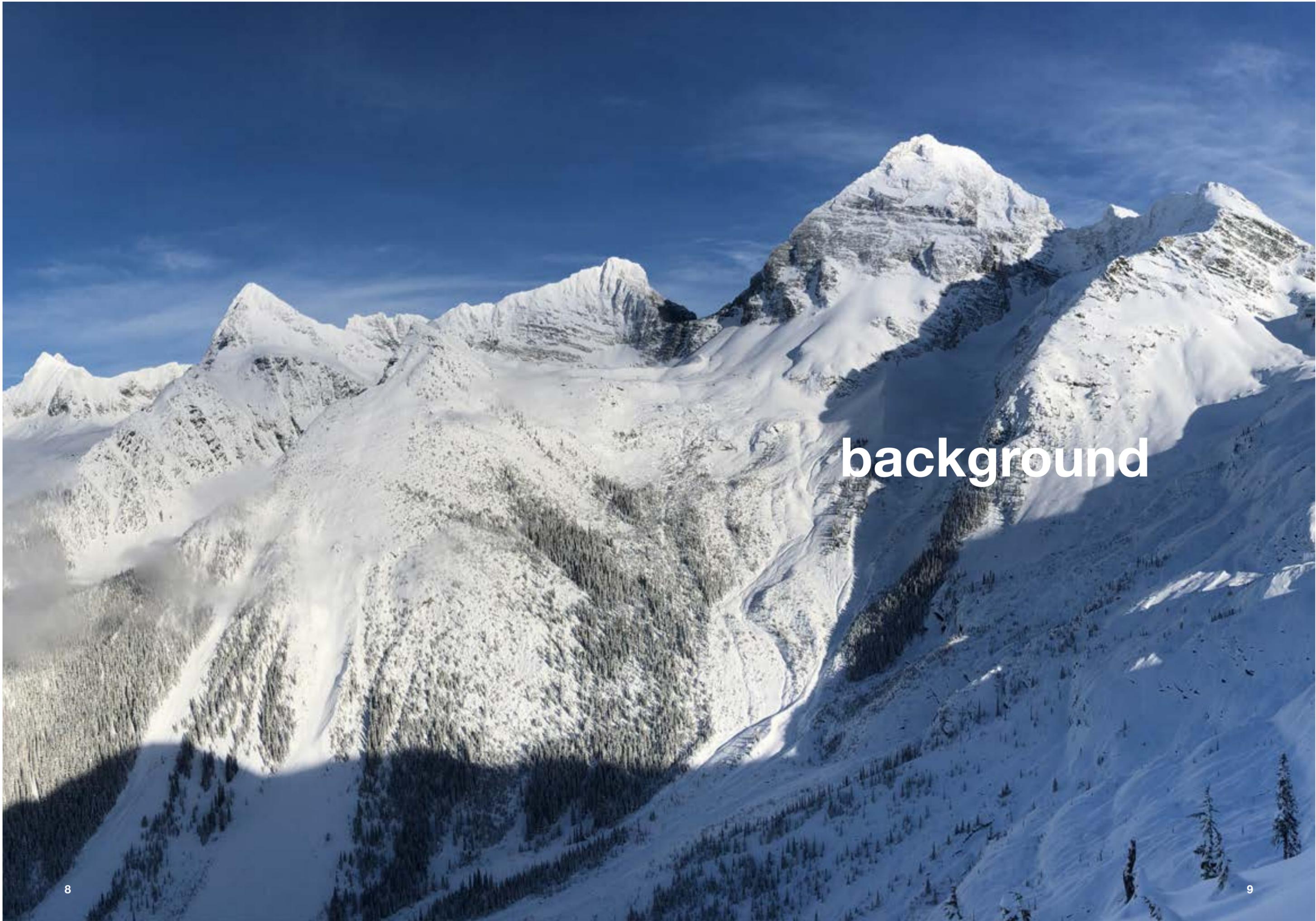
What goes into the development and production of a modern backpack for off-piste skiing? How is a backpack made and what is right now requested on the market?

A skiers backpack is a project about making a new off-piste skiing backpack for the Swedish brand Fjällräven. It combines the values of the Swedish brand with my own thoughts about how a product like this should be and function. The result is a backpack that doesn't have the ambition to please everyone. Instead it tries to fill a specific purpose with very few features and make it all come together through subtle details.

*Please note that this is not a formal cooperation with Fjällräven.

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background

Goals

I have always loved to be in the outdoors. My biggest interest and passion has always been skiing. After high-school all I did was focused towards skiing. I worked the whole year just to be able to take the whole winter-season off for skiing. My interest for skiing took me to so many new places, continents and I met so many new people. It was also through skiing that I got interested and applied in to the school of industrial design. I've always been a nerd when it comes to equipment and always wanted to get the best equipment possible, not the newest, but the best. That was when my interest for product design started. So when it was completely up to me to decide what I wanted to do for my bachelor project I thought I do something in the field where I wanted to work in the future. I was really in to designing outdoor equipment so that was what I wanted to do.

Crossroads

I came up with two different topics related to skiing. One was to somehow work with avalanche security or awareness. I thought this project would include a lot of psychology which could be a little bit to tricky. My (biased)take on avalanche security is that it is a lot about awareness. A lot of people tend to think that physical products can compensate for their lack of knowledge. After consulting a Mountain-guide regarding this subject who agreed with me I decided to move on. Since I thought the project might not end up as a classical industrial design project but more about raising awareness(which is fine) it did not really fit into my plan for designing actual equipment.

The second topic was to explore backpacks made for off-piste skiing. This was a bit more straight forward and fitted better into my demarcations. I thought it could be a good subject since it would include a lot of problem solving, questioning the norms about function and style and a lot of testing. It also included working with a completely new material for me, fabric, and I would also get the opportunity to learn how to make constructions in a soft material.

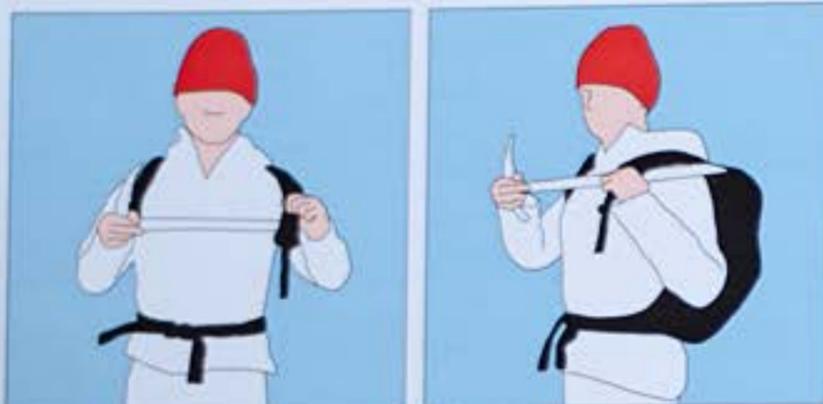
Brief

I've had a tendency to start questioning everything and that have kept myself from being productive in some of my earlier projects. So to keep the brief clear I decided to go for the backpack, this would also let me involve a existing brand. This would also work as a demarcation for the project.

Design a backpack for off-piste skiing for a Scandinavian brand.

To add context and guide the design process I decided to go with the brand Fjällräven. They are a truly Scandinavian brand with a strong heritage that they have continued to develop. If I were to work at a Swedish outdoor-brand I would choose Fjällräven.

Please note that this is not a formal cooperation with Fjällräven. It's for context only.



009-1 When in doubt, keep the ice axe handy under your shoulder strap.

009-2



009-3

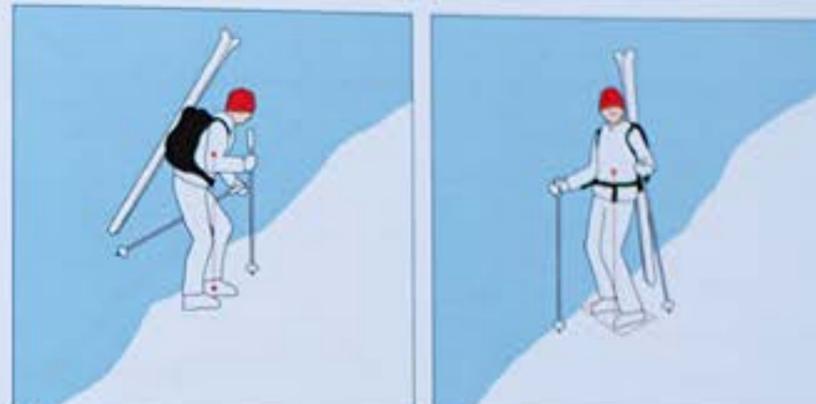
009-4

Transfer your weight onto the step carefully, without breaking the step. If it is fragile, spread your body weight by leaning forward slightly and putting some weight on your knee and hands (holding the poles mid-way). Then start again with the other foot, kicking a new step.

Progress in such conditions needs patience and endurance. There are many different types of snow, so adapt to the snow and try to balance. The aim is to progress as efficiently as possible without wasting all your energy. As always in the mountains, try to move at a steady pace.

HARD SNOW Crampons & ice axe The right time to use crampons is when you only succeed in making a footstep a few centimetres deep with several hard kicks in the snow. Or when more time and energy are expended in kicking steps over longer sections than putting the crampons on.

Walking on flat ground is pretty straightforward, just remember to walk with your feet a bit further apart than usual, to avoid the front point getting caught



010-1 Balance over the feet.

010-2 Balance over the feet.



010-3 Incorrect position on the inner edges.

010-4 Correct "flat foot" position.

in your ski pants and causing you to trip over. On hard snow your body weight is sufficient to drive the points of the crampons into the ground. On ice you have to use more effort. Skiers tend to want to edge the crampons as they do with the skis, but this will cause the crampons to lose grip. Instead you have to strive to keep the crampons flat on the ground so that all the points grip.

When the terrain becomes sloping you need to flex your knee a bit to keep the foot flat and all the crampon points on the ground. This movement doesn't come naturally, so a bit of practise is needed to make it second nature. [See diagram 010:4.]

This is very difficult to do with a stiff ski boot (keeping the top buckles loose makes it easier). When it becomes unstable, switch over and climb on the front points. Lower your heel to prevent your calf aching, and let the second pair of points on the crampons grip the snow as well. [See diagram 011.]

The aim is to establish rhythm between your feet and the ice axe and to keep your balance all the time. The ice axe should always be held in the upper hand so

A brief history lesson

50s, Mountain warfare soldiers returns home after the war and kick-starts the ski-industry in America. In Europe there is a shift from using the mountains as a plateau for looking at the view towards skiing down them.

60s, Plastic starts to find it's way into the boots but is luxurious.

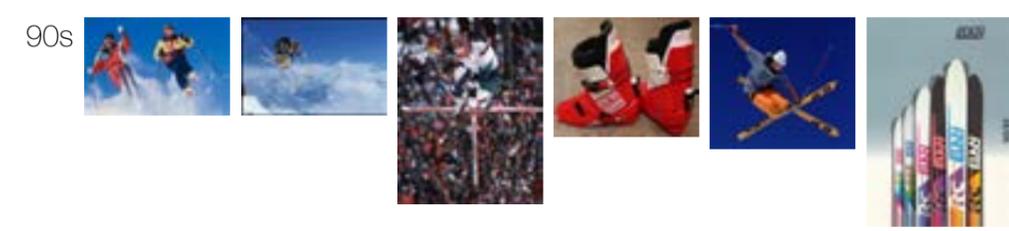
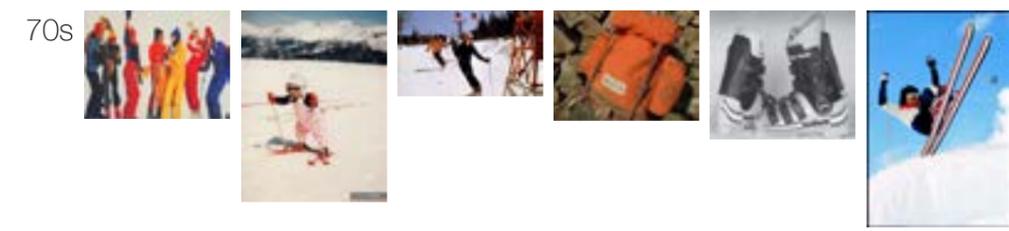
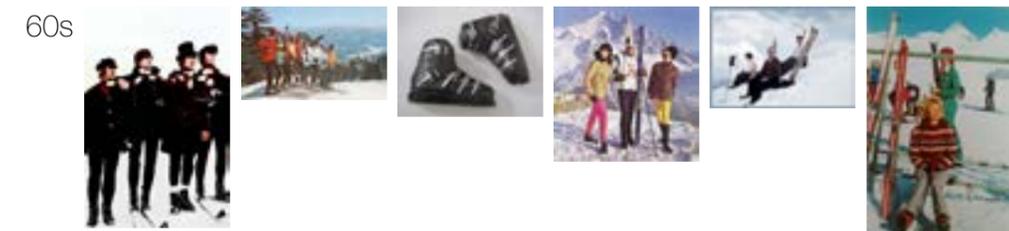
70s, Stenmark makes slalom a sport that people wants to practice overall in Sweden. Farmers opens up ski-areas on their land even if it is just a small hill.

80s, Mogul skiing makes skiing a cool sport. Movies like Blizzard Of Aahhs and License To Thrill can be seen in theatres and people are blown away by the stunts performed by skiing legends such as Glen Plake and Scot Schmidt.

90s, Freestyle starts to be a thing and the big war starts between the old organized competitions and the new freestyle movement who wants to ski and jump however they want.

00s, A lot of technical advances are made in this time period. Skis become shorter and wider, carving skis hits through and turning becomes much easier than on the old 210cm straight skis. There is also a lot of experimentation with skis made for skiing powder. A ski wider than 80mm is laughed off as a water-ski in the beginning of the century and by the end of it you can see skis as wide as 130mm around the resorts.

10s, People want to slow down, everyone starts to ski off-piste, is has gotten much easier with the new wide skis. The technological advances continues and presents lighter and stronger equipment. Ski-touring booms much due to the development in new skis and bindings.



What is being carried

To get an understanding of what is needed for a full day of off-piste skiing I made a list of all the gear. The most important gear is the shovel, probe and transceiver. Their purpose is described on the next page.

Very few people bring everything on this list regularly but it gives a hint on what might go into a skier's backpack. To confirm this I would put one question in a survey I made to see what the "average" skier brought for one day.

Extra clothing:

- Gloves
- Warm layer
- Down jacket
- Hat
- Buff

ICE:

- Headlamp
- Multi-tool
- First aid kit
- Duct-tape
- Map

Security:

- Transceiver
- Shovel
- Probe

Glacier travel:

- Mini traxion
- Tibloc
- Harness
- Pulley

Hiking:

- Skins
- Ski-crampons

Ice axe

- Rope
- Belay-device
- Crampons

Food:

- Water-bladder
- Energy-drink
- Hot drink
- Water
- Sandwich
- Energy-bar

Slings

- Carabiners
- Prussiks
- Ice-screws
- Snowstake
- Abalakov Threading Aid



What's different from other backpacks

Backpacks for off-piste skiing differ a lot from backpacks made for traditional hiking on foot. Generally most people who spend time off-piste on the mountain or in the backcountry have awareness of the risk for avalanches in those areas. However the degree of knowledge varies a lot. However they tend to bring the same equipment, the most important things are a shovel, a collapsible probe for detecting avalanche victims underneath the snow and a transceiver. The transceiver is a device that works both as a transmitter and a receiver, it gives off a magnetic field that can be detected by other transceivers and help to find the person who is buried underneath the snow.

Climbing skins to put underneath the skis are used mainly for hiking up the mountain but are also necessary in a emergency, it saves a lot of time to be able to walk with the skis up on the snow instead of sinking down when you rush to help someone who might be buried a couple of hundreds meters up the slope.

These thing usually goes in a separate compartment in front of the pack, then they are very easy to access as well as keeping the rest of the gear inside the bag separated from the rugged metal of the shovel and probe. The packs also includes some sort of carrying system for skis or snowboard. When on long hikes there is a big relief not to carry the skis on your shoulder, it might also be a situation when you need both hands free, for example climbing. It also puts a even load on the back. The first common way to fasten the skis are the diagonal version when the skis are strapped on the outer panel of the backpack. The other one is the a-frame version when the skis are strapped individually onto the sides of the bag. This also keeps the weight closer to the back.

Usually the bags range from 20-40 litres of volume. The smaller are for skiing closer to the ski areas and the larger for ski-touring in the backcountry or longer trips. The amount of features varies a lot, this is of-course a matter of taste from the users perspective. A lot of specific pockets can be practical if you bring that specific gear. If you don't they tend to limit the usability of the bag in a negative way. A bag with just large compartments can be more flexible and store larger pieces of gear. However they need planning when they are packed so that you can reach the most important gear without taking everything out.



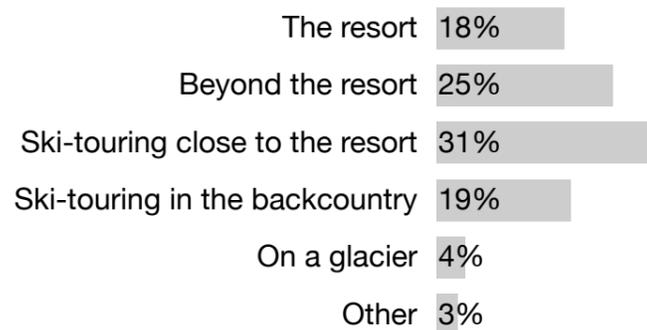
Survey

I made a quick survey with a couple of questions and posted it on Sweden's largest online forum dedicated to skiing, Freeride. It got some 30+ answers from skiers and equipped me with a lot of new data and input. There were also a lot of valuable comments that is presented on the next page.

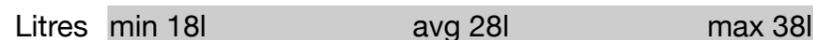
Do you ski or snowboard?



Where on the mountain do you ski the most with a backpack?



How large is the backpack you use the most?



Do you use an avalanche air-bag backpack?



How many days do you ski every winter?



How do you carry your skis on shorter hikes?



How do you carry your skis on your backpack?



What do you bring inside your backpack on a regular day on skis?

- 90% Water-bottle, lunch, shovel, probe
- 65% Skins, warm jacket(down), extra gloves, a hat
- 40% Extra sweater(fleece), first aid kit, Multi-tool
- 20% Headlamp, map, compass, duct tape
- 12% Kamelbak or some sort of water-bladder system

What would be a reason for you to buy a new backpack?

- The old one feels outdated 10%
- The old one is well-worn 39%
- The old one broke 26%
- The old one misses important functions 21%
- Other, please specify 4%
 1. Better features, more and smarter pockets
 2. A need for an other size of bag
 3. Might by an avalanche air-bag backpack
 4. If the new one can be a complement to the old one
 5. Larger volume and a better carrying system that can handle the load

What is the most important aspects when you buy a new backpack?

1. Price
2. Function
3. Volume
4. Fit
5. Low environmental impact
5. Waist-belt that actually makes it stay around the waist
6. Integrated back protection
7. No plastic buckles
8. Separate compartment for avalanche gear
9. Aesthetics, it has to match my clothing, black almost always works, or grey
10. Well thought trough features, no gimmicks
11. Packing-possibilities, rather two big compartments than small specific ones.
12. The quality of the fabric and details
13. Needs to be light, reduce unnecessary weight
14. Adjustable volume so there can be no movement of loose stuff inside
15. Attachment of the skis is everything, a-frame carry that opens all four straps
16. Strong materials that can handle ware and tare
17. The backplate needs to be reinforced to take up the load.
18. A drained avalanche compartment so you can put wet skins there as-well

What about the climate footprint your skiing-equipment purchases do?

I often repair since it's cheaper than to buy new.

I think that a backpack for example is something you use for a long time so I just prioritize the quality so that I can use for as long as possible.

I buy high quality gear and use it for as long as possible. Sell the stuff I don't use.

I usually think about it in my everyday life but when it comes to equipment for skiing I tend to just buy the stuff I want. However I just buy the things I need and have no urge to buy things for status or trends. The things I don't use I try to sell.

Conclusion:

30 litres is average

A-frame is popular

Worn out is number one reason for changing(they say)

Functionality is most important

Split between people who prefer many features and those who prefer more minimal

Easy access to avalanche gear

Interview

Morgan Sahlén is a Swedish skier and a mountain-guide. He lives wherever his work takes him, mostly in Chamonix, France and the Lofoten islands in Norway. He is also deeply involved in the lobby organisation Protect Our Winters who works with raising climate-change awareness among skiers to save the winters. He is also in the process of launching his own vegan power bar. I skied with him a couple of years ago when he was in training to become a mountain-guide so I called him up to hear what he had to say about the backpacks he uses and what problems he sees.



What kind of bags do you use right now?

First of all, I'm a guide so I almost always use a backpack, I feel naked without them. I have a couple of bags for different purposes, one smaller for day-trips about 30l and a bigger one for longer tours about 45l. I also have an ABS(avalanche air-bag). I usually use the large one when I'm working, I used to prefer to have just a large bag with a big opening, it's easy just to shove everything down a big hole. However I have started to like the ones with the zipper in the back that opens up the whole bag. The downside with that is the zipper which is a weak point.

Where do you put the avalanche gear?

The avalanche equipment is the most important thing I bring and they must be where you expect them to be in the bag. I usually put them in the water-bladder pocket, they don't compromise the volume of the bag as much if you have them in the back since it is already a backplate there. I would never use a camelbak, it's crap.

What features do you think is the most important?

The ice-axe attachment is key, would be nice with some sort of quick attachment, however it must be fail-safe. Also need to be able to attach a rope. But with features in general I prefer just one big compartment or 2 maximum.

It's good to have somewhere to store wet skins. Some sort of rope-bag would also be good, but there is always a risk of putting in excess features.

What is the worst thing you know?

Mistake 1A, you always wear gloves! You must be able to use everything with gloves on, also the small plastic-buckles tend to brake if someone steps on them in the lift line. Looks is of-course secondary but all these straps makes it look messy. Integrated back-protection is usually a bad thing.

How do you usually carry your skis?

A-frame, I like a big loop at the bottom or an open system that can be adjusted. If it's closed it needs to fit different widths well as-well as large tail-rockers, the diagonal system is usually really quick, however a problem is that the skis tend to tip backwards and the tail hits your calf.

Three things I should focus on?

A large handle to grab, no top-lid but still a very large opening, fast to open and close. Buckles that operate easily but no plastic!

Function analysis

Usage/basic functions

Function		Class	Comment
Enable	Carrying	BF	On body
Facilitate	Equipment	N	Gear, clothes, food etc.
Protect	Content	N	
Prohibit	Loss of equipment	N	
Be	Portable	N	
Enable	Ski carrying	N	
Have	Low weight	D	
Allow	Steady standing	D	On ground, in snow.
Have	Low carbon-print	D	
Maximize	Lifetime	D	
Enable	Simple lifestyle	D	
Be	Alternative	U	

Ergonomics

Function		Class	Comment
Be	Ergonomic	N	
Fit	Human Measurements	N	
Prevent	Chafing	N	On skin
Allow	Moveability	N	
Allow	Handling	N	With gloves.
Simplify	Access	N	To gear
Enable	Adjustments	N	To body-type
Minimize	Dislocation of COG.	D	
Reduce	Stress on back	D	
Offer	Protection	D	To body
Enable	Finding of gear	D	
Enable	One hand carrying	D	
Allow	Moisture evaporation	D	From body
Offer	Customization	U	

Production/Material

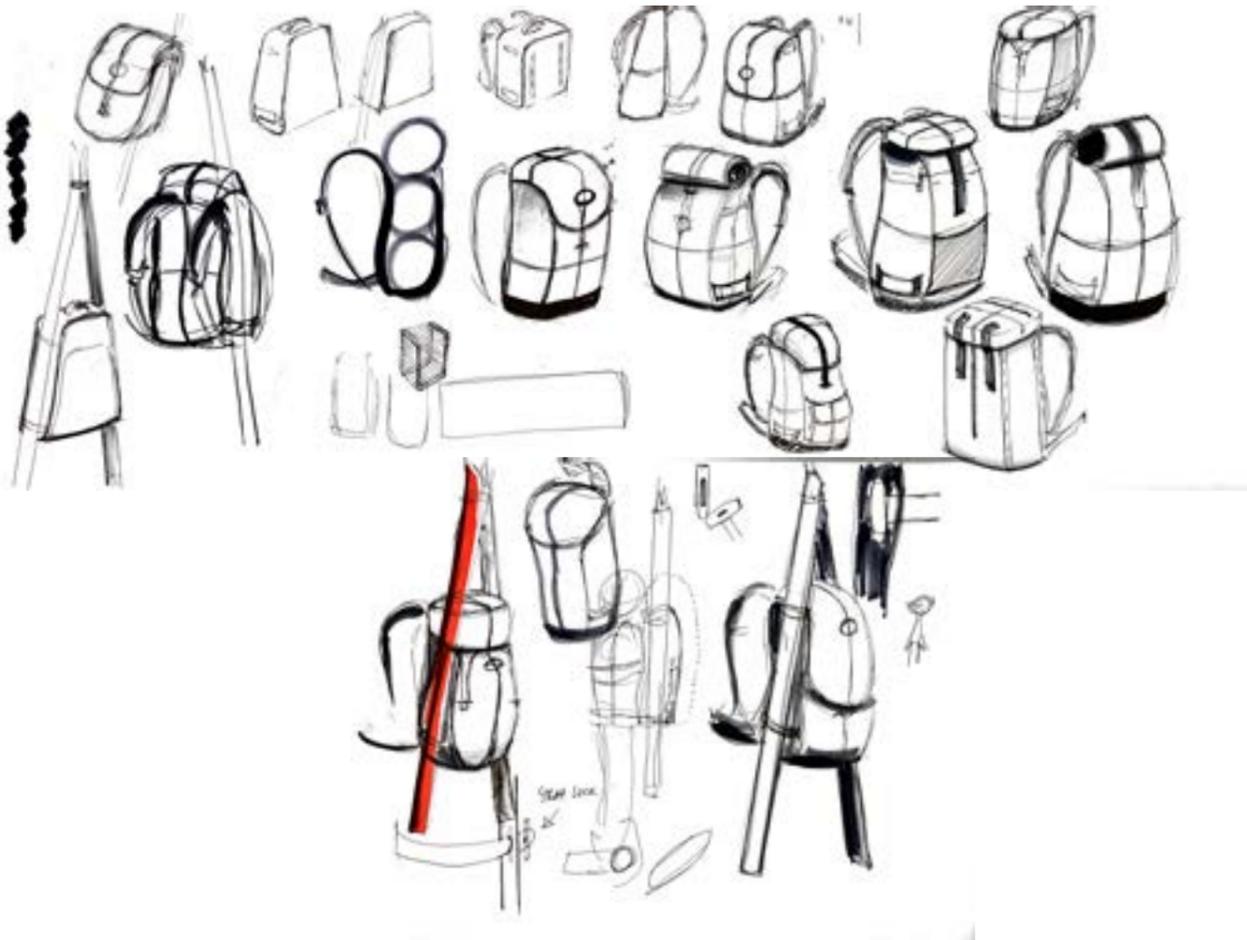
Function		Class	Comment
Simplify	Repairs	N	
Withstand	Rough handling	N	
Be	Durable	N	
Stand	Environment	N	Sun, rain, snow.
Stand	Wear	N	Rocks, gravel, ski edges.
Minimize	Plastic parts	N	
Minimize	Absorption	D	Moisture, dirt etc.
Withstand	Rain	D	
Be	Degradable	D	
Age	Gracefully	D	
Be	Simple	U	

Aesthetics

Function		Class	Comment
Be	Aesthetic	N	
Be	Visible	D	Find it in snow.
Be	Minimal	D	
Express	Reliability	D	
Create	Affection	D	
Tell	A story	D	
Express	Trust	D	
Express	Functionalism	D	Clear functions.
Express	Quality	D	
Convey	Respect	D	
Incorporate	Natural elements	U	

Premature sketches

In every project with a new product it's very good and educational to try to sketch it as soon as possible. It's good to find the right perspectives and proportions as soon as possible, it helps me later on. I also tried some 2D illustrations and sketched on it. This is something I went back to later on in the project at a much higher level.



Early mockups & prototypes

Since I am very novice in sewing and building 3D shapes I fabric I had to start making some early prototypes. I started with paper but quickly changed to cheap lightweight tarpaulin and duct-tape. This worked pretty good and I could proceed into making the first properly sewn fabric prototype.

I later learned to make proper 3D paper mockups from Jacob Von Matern. This can be seen later on in the project. With illustrator and a large printer you can make very complex paper mockups to make sure that the pattern is correct and of-course to get the feel of the proportions of the bag.



This was the first fabric bag that I sewed. It lacked the carrying straps but could be closed with a roll-top. It was good practice but it was not really a backpack and I had to learn how to properly construct the packpanel with all the straps.

The next one was pretty crud but fully functional. It also had a zipper in the front. It is very squarish since I had not yet learned how to make more advanced patterns. The final prototype looks more lively due to all the cuts that are not just straight. With this model I learned the complexity of the construction and that every little piece has to be planned in advance when to be attached so that nothing gets blocked before it can be attached.



Market

This is a comparison of five Scandinavian outdoor brands. They all have specific backpacks for off-piste skiing.

Today most of the relevant brands have a strong commitment to making outdoor activities more sustainable and eco-friendly. In the industry there is less talk about sustainability and more about responsibility. A strong group of consumers within the brands have a very high demand on the level of information these brands display about what they do and how they do it when it comes to their work about environmental issues.

Every year small steps are taken to make the production more sustainable, especially in the higher price segments. If there is a higher demand for high quality products that doesn't go out of style the next fall the products in the lower price segments could benefit from a sustainability aspect. It looks like trend in the outdoor business might be in the beginning of a shift right now. The majority of the brands still make new styles and colors of everything every year, this is also something that the retailers demand. They don't want the last years colors in their stores. This is where I think Fjällräven is doing quite a good job. Their colors also work better year by year and are very well anchored within the perception of the brand.



Classic Swedish outdoor-brand that aims towards being very environment friendly. Also a quite traditional brand with colors that can be called "earthy" and that are close to what is out in nature. A quite expensive brand that is known for high quality products.



Old Swedish brand with an environmental friendly ambition. Have a big focus on backpacks. Can be seen as having a sprawling product range and not as strong direction as Norröna. Outstanding outdoor equipment™



Very strong Norwegian brand with a big following in the free-skiing community. Have had a big focus on strong colours. Known for their high quality products in the upper price segment. Welcome to nature™



Norwegian brand with a strong heritage. Amundsen used Bergans products when he went to Antarctica. Big market in Germany.



Swedish manufacturer of rooftop-boxes and bicycle carriages. Have made a big investment in bag design in recent years. High value for the money but no strong brand identity. Feels like the Opel of outdoor equipment.



Price

Backpacks for skiing have a clear set of functions they have to fulfil. Therefore there is not that much variation in features. The thing that differs is method of construction, materials and the functionality of the features.

Some of these backpacks are above this price-level it is because they have Avalanche Air-bag Technology in them. The construction method and materials are in the mid level segment.

High Level

>1800kr retail price. Often advanced constructions, taped or welded seams and expensive materials.

High water-resistance and durable fabric. Can also be lighter material for demanding climbs etc. Lighter would reduce the durability. Features fastening for skis, ropes, ice axes. Separate pocket for avalanche gear.

Mid Level

1200-1800kr retail price.

Fully featured, with regular construction methods. High quality materials but not technical waterproof with taped seams. Often very general in functionality to fit a lot of purposes, have all the features baked into one backpack. Special pockets for everything.

Low level

<1200kr retail price.

Simpler constructions and standard materials. Has all the necessary features but no extra gimmicks.



Norröna
Lofoten 30
2700kr
Removable avalanche air-bag ready



Thule
Upslope 35
2400kr
Removable Air-bag 3.0 ready*



Bergans
Slingsby 34
1700kr



Norröna
Lyngen 35
1700kr



Haglöfs
Skrå 27
1500kr



Thule
Upslope 20
1200kr



Haglöfs
Skrå 20
1100kr

fjällräven

The brand

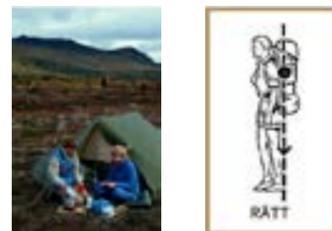
Fjällräven was formed in Örnsköldsvik in 1960 by Åke Nordin. He had invented a frame for a hiking backpack by himself in his cellar. In 1968 he made a tent for an expedition to Greenland using the new durable G-1000 garment. The garment proved to be too heavy to be used in a tent so Åke designed a jacket instead which is called the Greenland jacket. Updated and redesigned versions of this jacket is still in production.

Fjällräven launched their iconic Kånken backpack in 1978. The kids had previously been using shoulder-bags that put the load on one side of the back, causing problems. The Kånken backpack is now a Swedish classic and it's almost impossible to walk the streets of Sweden and not spot anyone carrying it.

Fjällräven has an environmentally friendly approach to the designing of their products. They recently quit the use of PFCs (perfluorinated chemicals) to waterproof their garments. Replacing it with PFC-Free Eco Impregnation for their technical shell jackets and pants. For their classic G-1000 garment which is made out of 65% polyester and 35% cotton they have a specific wax. This wax is called "Greenland wax" and is made out of beeswax and paraffin. You simply rub the wax-block on the surface of the garment and apply heat, either from an iron or over the camp-fire. The wax makes the garment more resistant to water and wind.

As of today Fjällräven has a gap in the traditional off-piste/ski-mountaineering segment. However they recently launched a new clothing line called "Bergtagen" that is made for mountaineering purposes. They also recently signed professional free-skier Johan Jonsson.

(Note, Fjällräven released the bergtagen 38 in the spring of 2019)



Best selling products

Kånken.

Kånken is the most iconic Fjällräven product and is probably the backbone of their business. In the last decades it has had a renaissance and reached in popularity and is today sold all over the globe. The construction is very simple with big plain panels. It is a caricature of a backpack and if you were to ask a child to draw a backpack it would probably look a lot like the Kånken.

It's made out of Vinyon F and a new variant has been released that is made purely from recycled polyester, it's called re-Kånken.

Vidda Pro.

The Vidda Pro pants is a classic hiking pant from Fjällräven. It's made out of their iconic G-1000 fabric. The G-1000 fabric is a 65% polyester and 35% cotton mix that is a classic mix in these kind of garments. Fjällräven has made a really good job with the branding of the fabric and if you talk about that specific mix in a fabric a lot of people will associate it with Fjällräven.

Greenland Jacket.

The Greenland Jacket is one of the first commercial successful products from Fjällräven. The original was designed in 1968 by Åke Nordin and has been continually updated for 50 years. It's also made from the G-1000 fabric and gets its weather resistance through waxing of its surfaces.

The Greenland Wax.

The Greenland Wax is a paraffin & beeswax that is used to impregnate fabrics to create water and tear resistance to the garment.



Fjällräven values

“We are convinced that products that last longer are better for the environment than trendy items that only last one season. We make outdoor equipment that you’ll use, love and wear for many years to come.”

Target group

Fjällräven users spans from trend sensitive inner-city consumers to advanced climbers and adventurers. The users generally likes nature but the amount of time they spend there and what they do when they are there is very different. Fjällräven is not an extreme technical brand, instead it has a more humble and environmental friendly approach to the design of their products. Their idea is that you should be able to use their products for a long time, both quality and style wise. However their recent cooperation with ACNE Ahas taken them further into the fashion segment with faster trends. This is something a lot of Scandinavian outdoor brands have been doing later, right now there is a trend with incorporating street fashion into their existing outdoor-brand style.

My target group

The target group I will focus on within Fjällräven is people who would by their new Bergtagen series. The Bergtagen series right now includes technical base and outer layers. Very technical materials and the highest quality of details. There is no backpack for skiing/ski-mountaineering in the series yet so I will make it fit into that. In my categorisation I would put the bergtagen series between the expedition and enthusiast segments.

Product range

Expedition



Enthusiast



Recreational



Urban



Fjällräven backpack range

The bags that I'm focusing on here are the more technical bags in the span of 20-50 litres. Bags for urban use such as commuting or smaller day-packs are not included.



KEB HIKE 20
1 999 kr
Ski compatible zipped day-pack



KAIPAK 28
1 799 kr
Simple top-fed hiking backpack



KEB HIKE 30
2 299 kr
Ski compatible zipped day-pack



BERGEN 30
1 399 kr
Watertight roll-top daysack. Ventilated straps with outlying stretch-pockets.



ABISKO HIKE 35
1 799 kr
Light top-fed hiking-pack



ABISKO FRILUFT 35
1 899 kr
Light top-fed hiking-backpack



LÅNGFÄRD 40
1 999 kr
Skating-backpack with watertight pack-bag with safety features



KEB 52
2 999 kr
4 season backpack for hiking by foot or skis

Fjällräven backpack form-language

- Large panels
- Fabric that gives character
- Craftsmanship
- Nicely executed details
- Effective constructions
- Trims and webbing in different shades



Colour & materials

“We don’t follow trends, we follow nature”. Fjällräven gets inspiration to their colours from nature, the claim is that their colour are timeless that can be worn year after year since they don’t follow trends, they follow nature.

A strong but sensible claim.



Fjällräven details



Bergtagen aesthetics

Bergtagen is the new mountaineering clothing line from Fjällräven developed together with the Swedish Mountain Guides Association.

Bergtagen is Swedish and its meaning derives from folklore. It tells stories about people who get lured in to the caves and abodes of the creatures who reside in on or

in the mountains. When they were released they had a changed mind. This was for a long time a way to describe mental illnesses among people in these areas.

Right now there are only garments in this series so a matching backpack would be a perfect fit.



Bergtagen Eco-Shell outer layer

Key characteristics:

Traditional cuts and lines

Proven constructions

No excess features

Mono color

Large fabric panels

Grip-friendly features

Made for strength and durability (recycled polyester)

Reinforcements in critical locations



Final brief

Conclusion, trend towards simpler backpacks with a single purpose. Focus on high quality materials that lasts and give the bag a long lifespan. Removal of excess straps and gimmicks will lower the cost for the benefit of using high quality materials while keeping an attractive price.

General guidelines:

Dare to make it simple
No compromises with the materials
Few and subtle features

Specific guidelines:

Eliminate plastic buckles
Reduce excess straps
Use a very durable fabric
As few specific pockets as possible



ideation

Fjällräven inspiration

Inspired by the simplicity of the Kånken backpack, it's the pastiche of a backpack. It's been around for 40 years without major changes in the design. You can not make a classic but you can have the guts to believe in the thing you do and not change it due to new trends or seasonal colours.

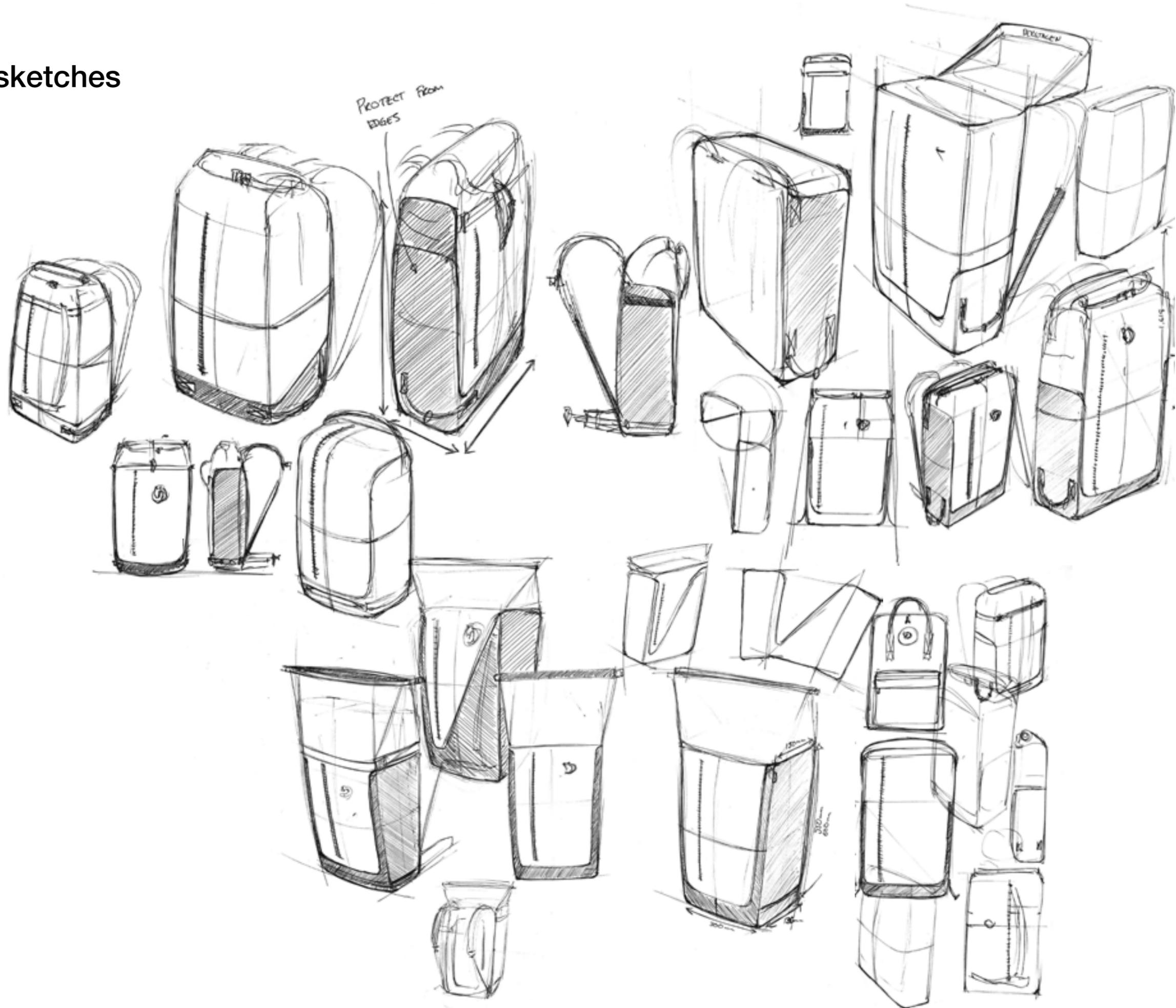
This new backpack shall let the functionality drive the aesthetics. No excess features or gimmicks. There are already plenty of bags out there with specific pockets for everything.



Inspiration from the Bergtagen collection

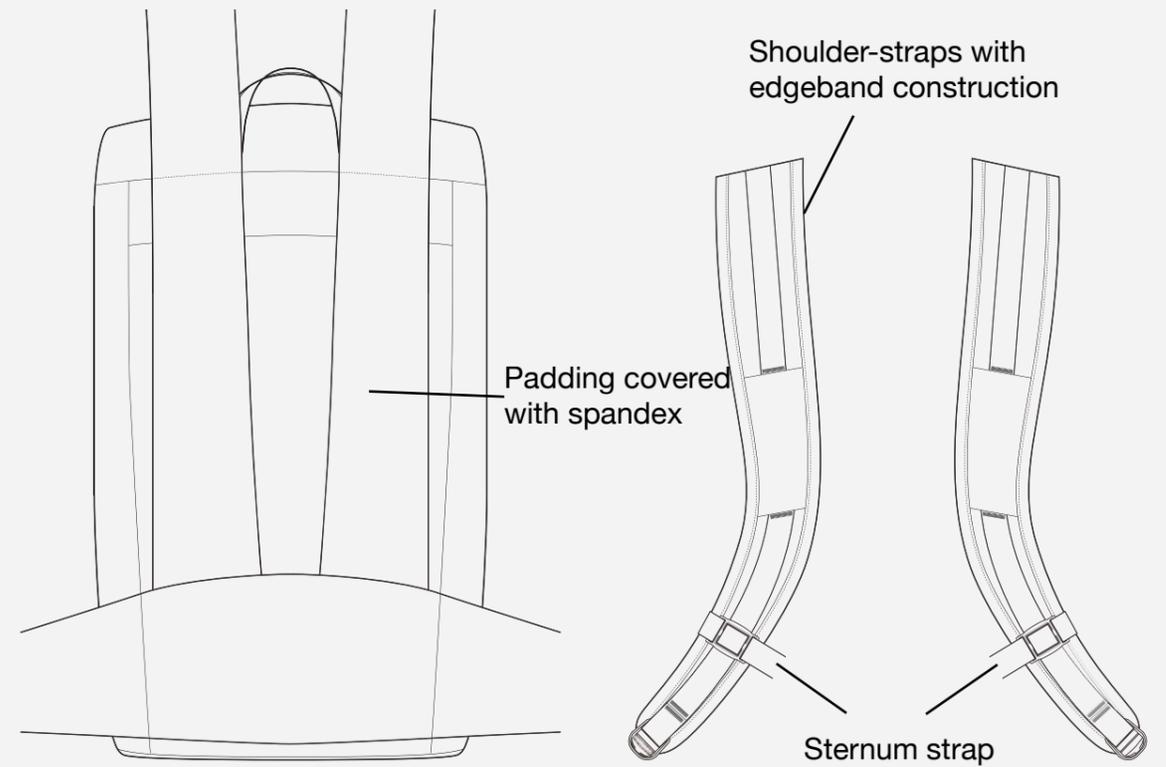
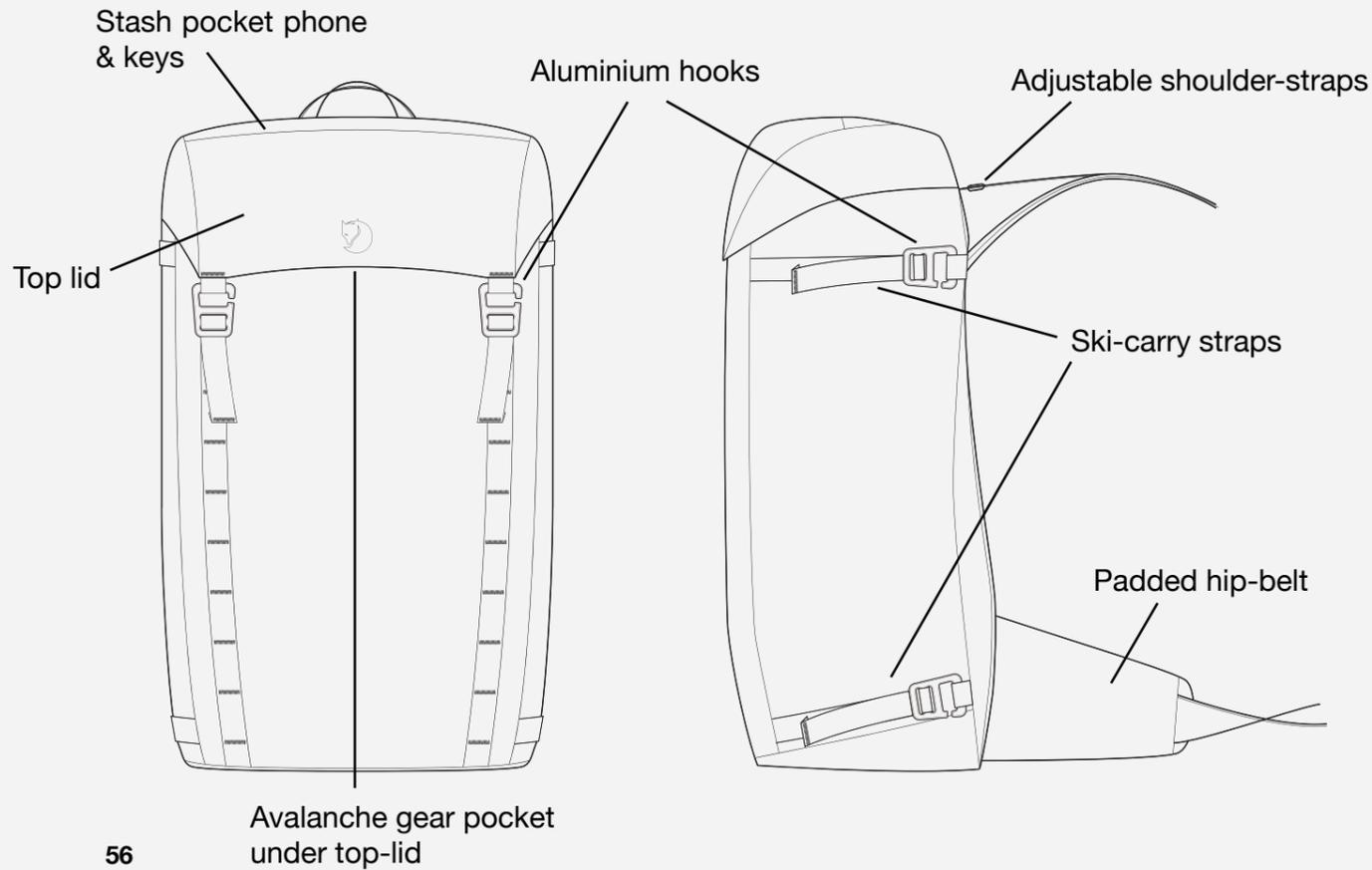
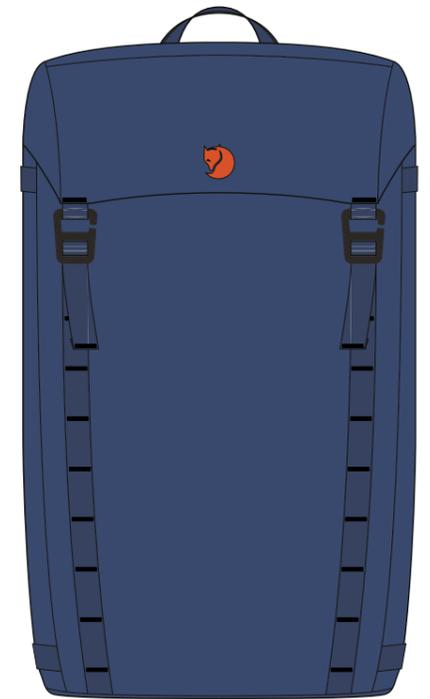
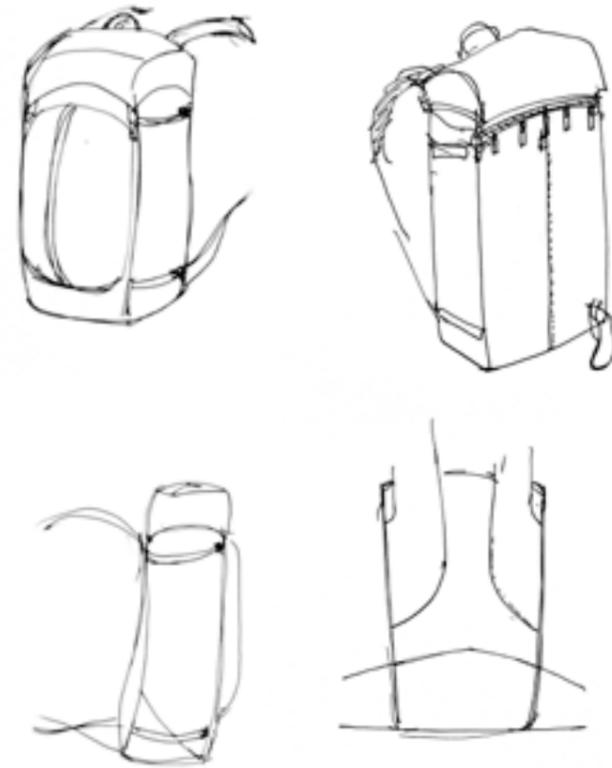
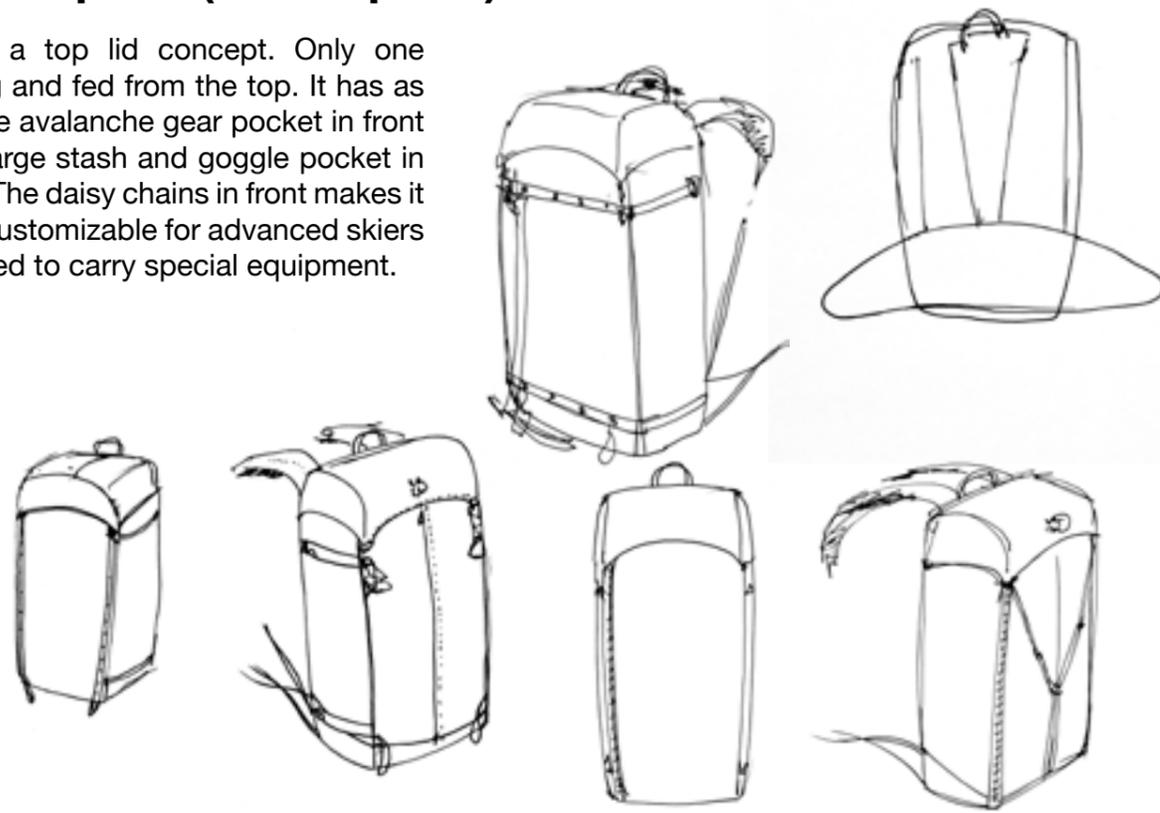


Initial sketches



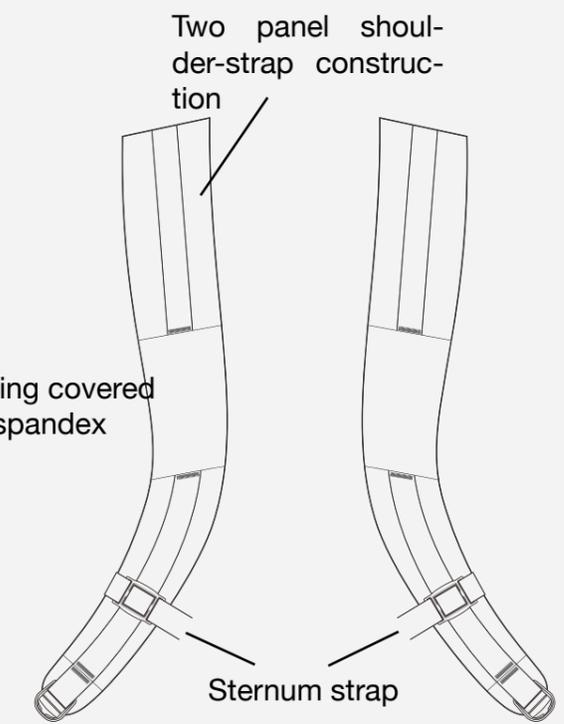
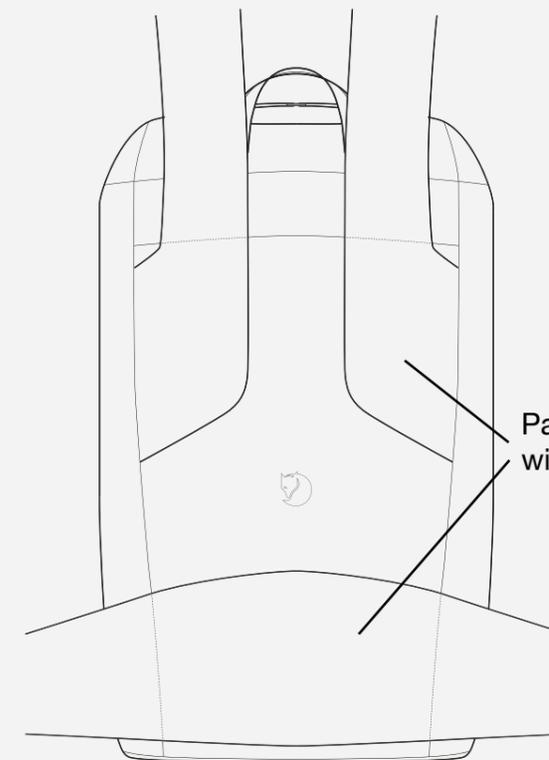
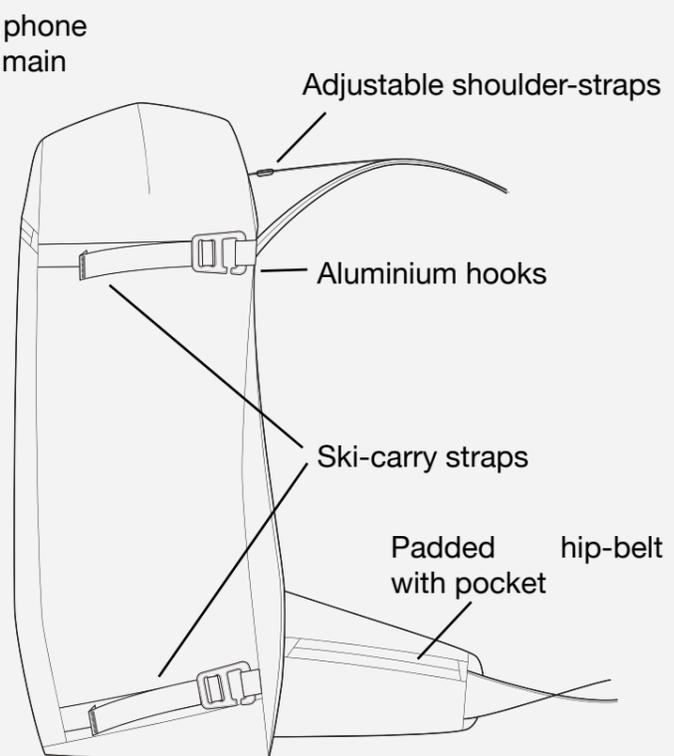
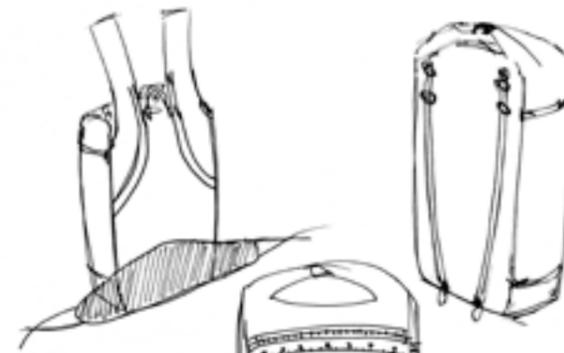
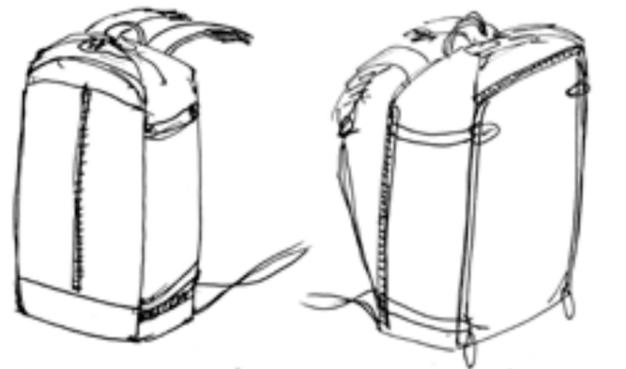
Concept 1 (30l top lid)

This is a top lid concept. Only one opening and fed from the top. It has a separate avalanche gear pocket in front and a large stash and goggle pocket in the lid. The daisy chains in front makes it highly customizable for advanced skiers who need to carry special equipment.



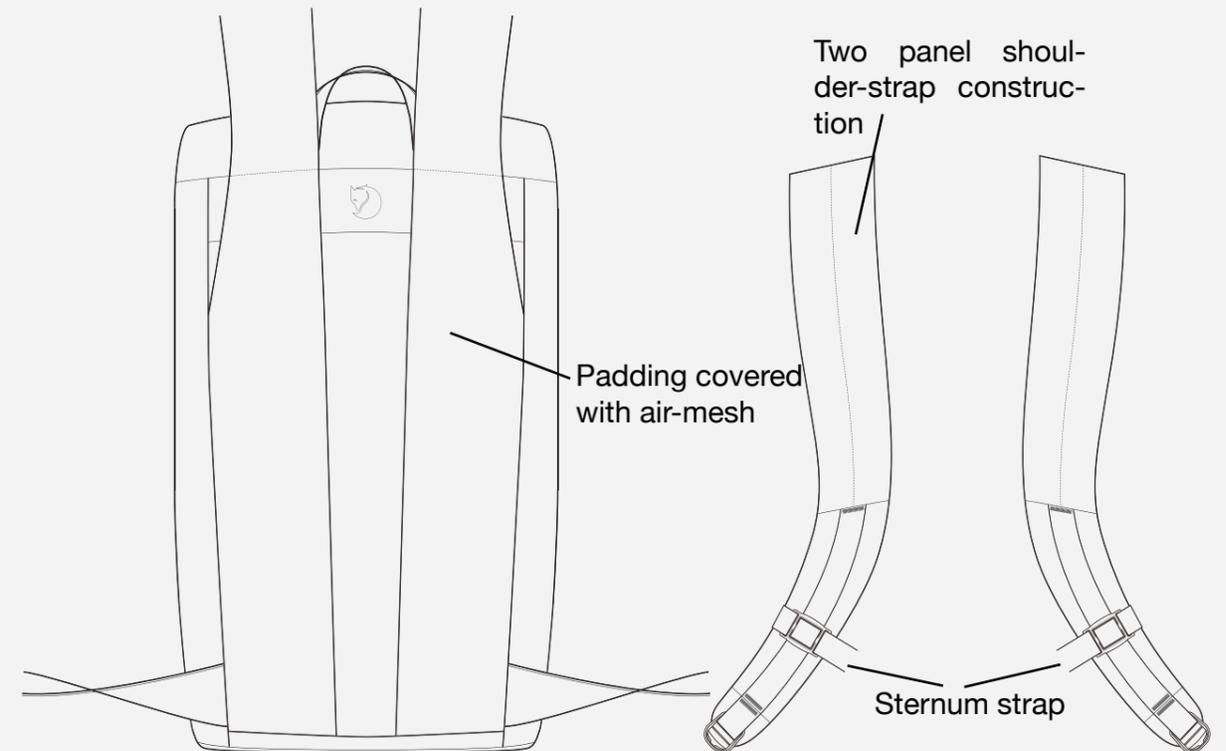
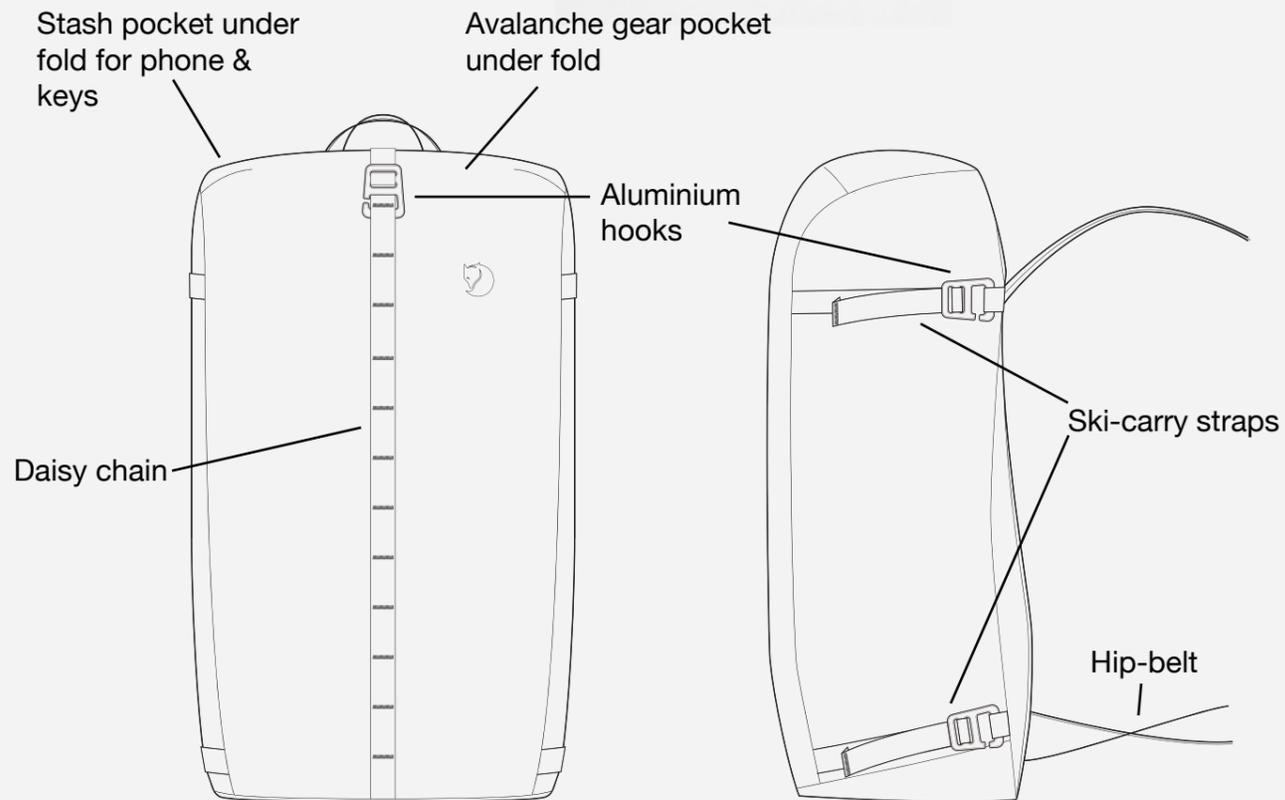
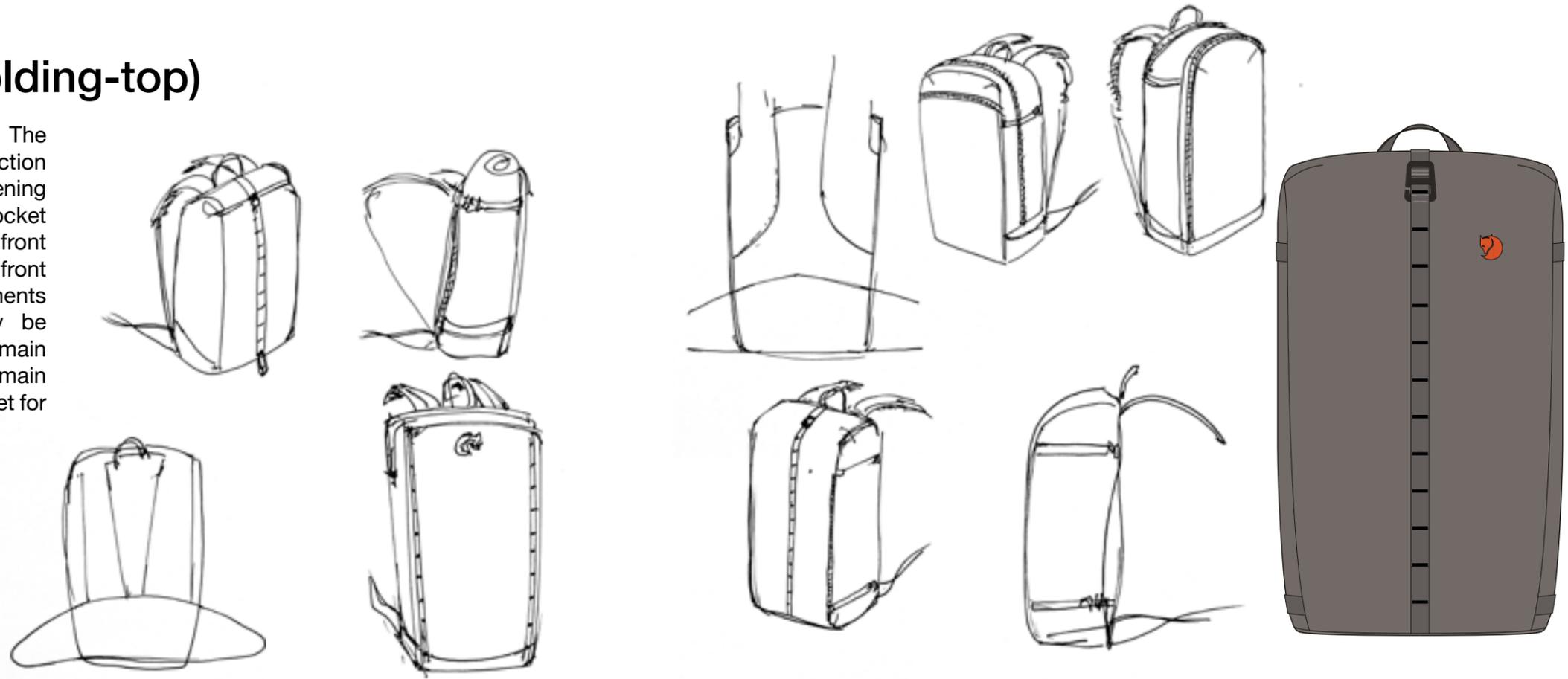
Concept 2 (30l roll-top)

This is roll-top concept. The opening also works as an adjustment for the size of the whole bag. It has a separate avalanche gear pocket in the front. Inside the main compartment there is a stash-pocket for goggles, a wallet and keys etc. It has a highly customizable daisy-chain that covers the whole front, this would enable carrying of special equipment using only para-chord (could be sold separately). It has hidden loops for ice-axes in the drainage holes for the avalanche compartment.



Concept 3 (30l folding-top)

This is a folding-top concept. The opening is a very simple construction with a adjustable bulge-opening underneath. The avalanche gear pocket is just underneath the lid in the front of the bag. The daisy-chain in front can be used for various attachments and a climbing-rope can easily be fastened over the bag using the main opening sling and hook. Inside the main compartment there is a stash-pocket for keys, phone etc.



Evaluation

A quick paper mock-up of the concepts is the easiest way to evaluate form and proportions. Paper is an excellent material to make mock-ups of bags in. It has similar properties as fabric and I've learned that if it works in paper it will work in fabric. It also gives you very valuable information about the feel and volume of the bag in a way that a 3D rendering would not.

Jacob taught me how to take a 2D illustrator sketch into 3D with the use of a large printer. It's a bit tricky at first but gets useful very quickly. It's like using a 3D software but you have to do it in your own head, as long as all the edges match in length you are good to go and with a bit of practice you can shape the bag the way you want it to look.

I choose to continue with concept number two, the roll-top. The roll top is a simpler construction and practically fail safe, it is also easy to adjust the volume of the bag with the amount of rolls you do before you close it. It also gives you the opportunity to have it almost open if you want to take off your helmet during a hike or just store some clothes if it gets too hot.

1:1 scale paper mockup

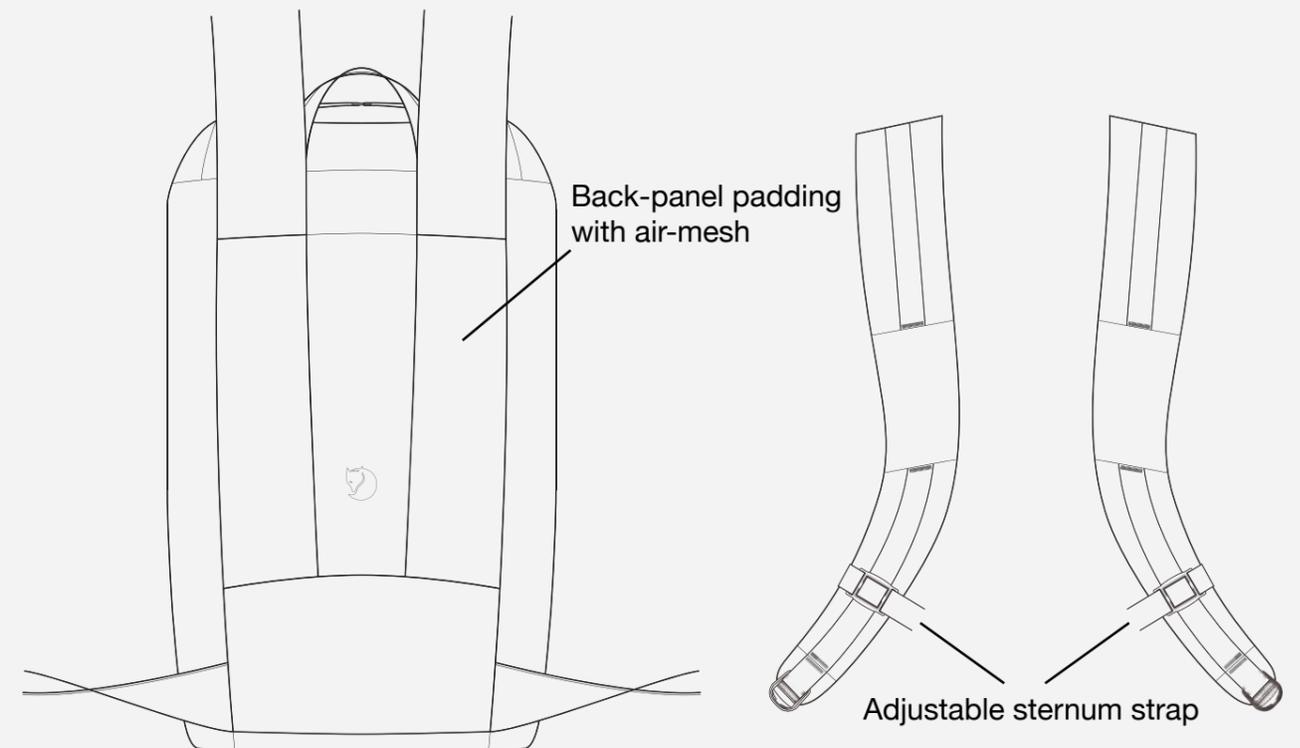
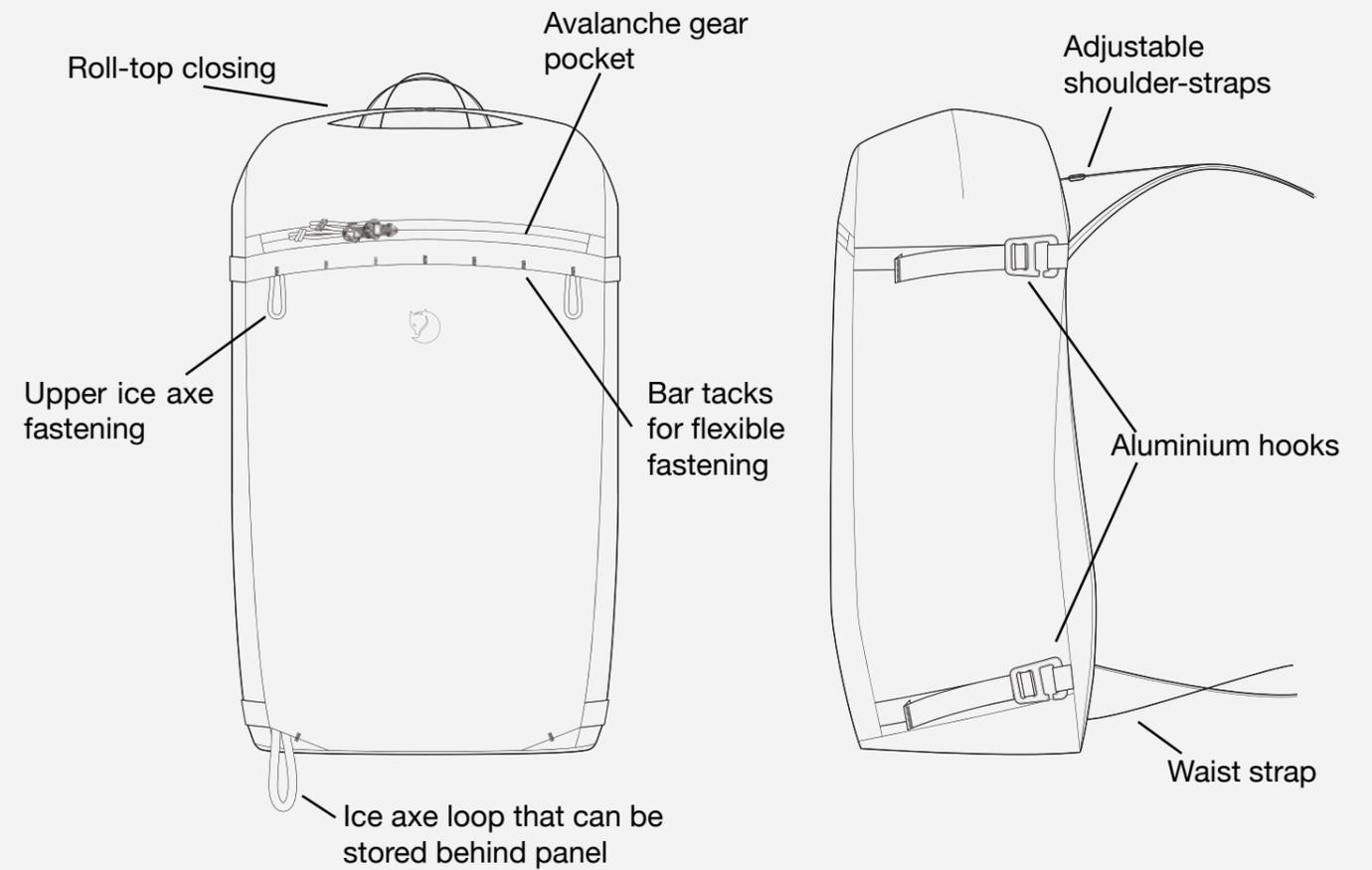


Final concept

This one is a further development of concept number two, the roll top. It features a large main compartment with a small pocket inside for loose items such as phone and keys. It closes with a roll-top that is practically fail-safe and has the possibility to adjust the size of the bag. In the front there is drained compartment for avalanche gear (shovel and probe). The front panel features a set of bar tacks (reinforced seams) that can be used for various attachments using small pieces of bungee or parachute. The upper part of an ice-axe can be used using this method. The lower slings for the ice-axe can be hidden behind the panel through the drainage-holes. The side panels have two aluminium hooks for attaching skis. The shoulder-straps can be adjusted and feature a sternum-strap. The back is well padded and reinforced with a backplate to keep its shape even under heavier loads. There is also an adjustable hip-belt.

Colours

Colours follow the same as the clothing line in the bergtagen series, there are also three other colour options that are well in line with the classic style of Fjällräven. The webbing and trims are slightly toned down compared to the main fabric.



Granite grey



Ruby red



Mountain blue



Dark forest



Hokkaido orange



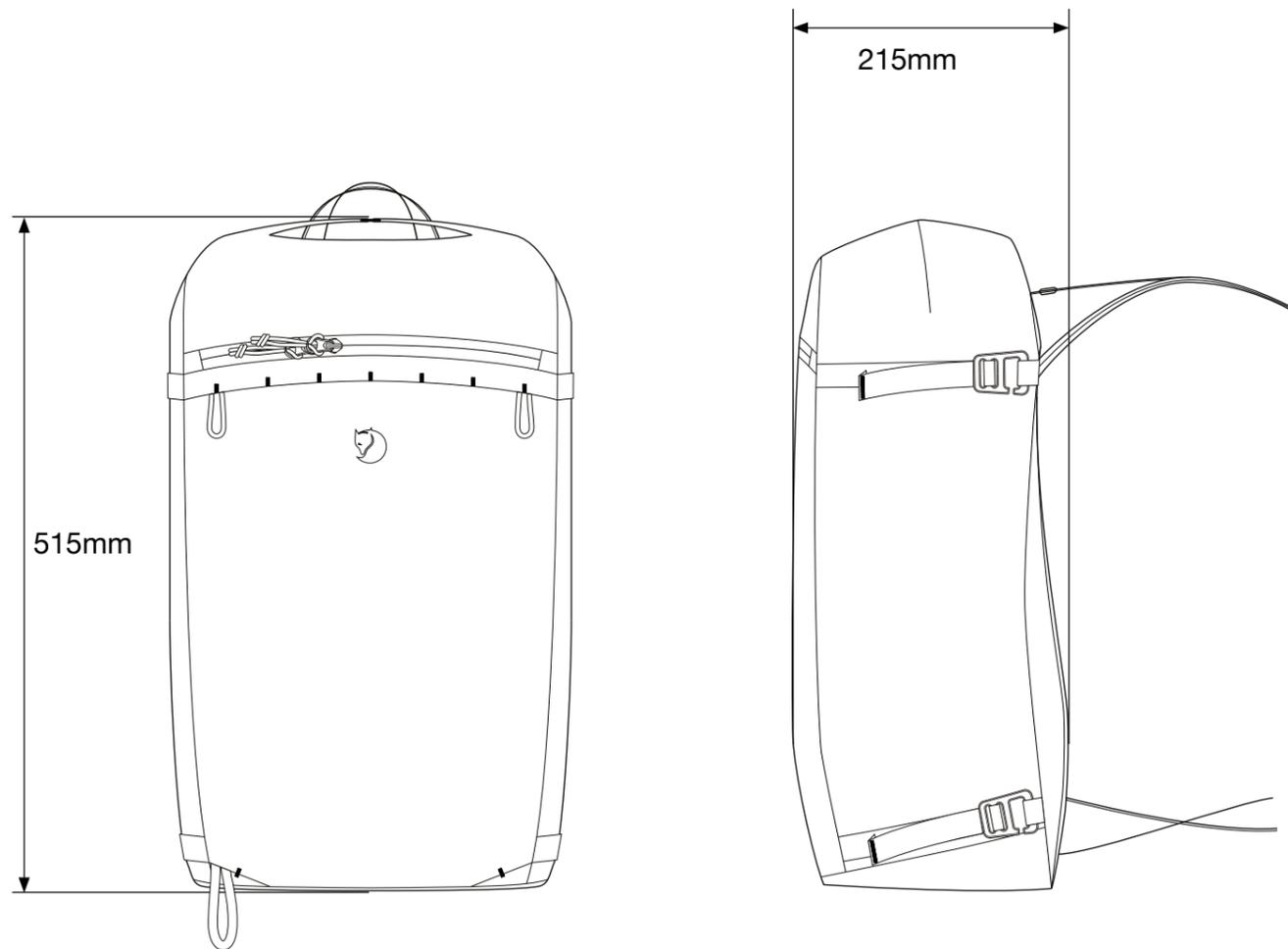
Olive green



Construction

For this backpack I will use a 1000denier Cordura fabric made from nylon. This is a extremely durable fabric that also has a lot of character. The fabric is coated and has a very good resistance to water.

Aluminium trims are the most durable and will brake long after the backback does. However there was a hard time to find these specific ones in the right colour and quantity so I will use plastic ones for the final prototype.



Materials

For this backpack I will use a 1000denier Cordura fabric made from nylon. This is a extremely durable fabric that also has a lot of character. The fabric is coated and has a very good resistance to water. If it were to be produced by Fjällräven it would probably be a 600denier fabric made from polyester. The pieces that covers the padding is a spandex material, on the real model it would be a airmesh made from polyester. The airmesh would provide good circulation of air in the areas that are right aigainst the body.

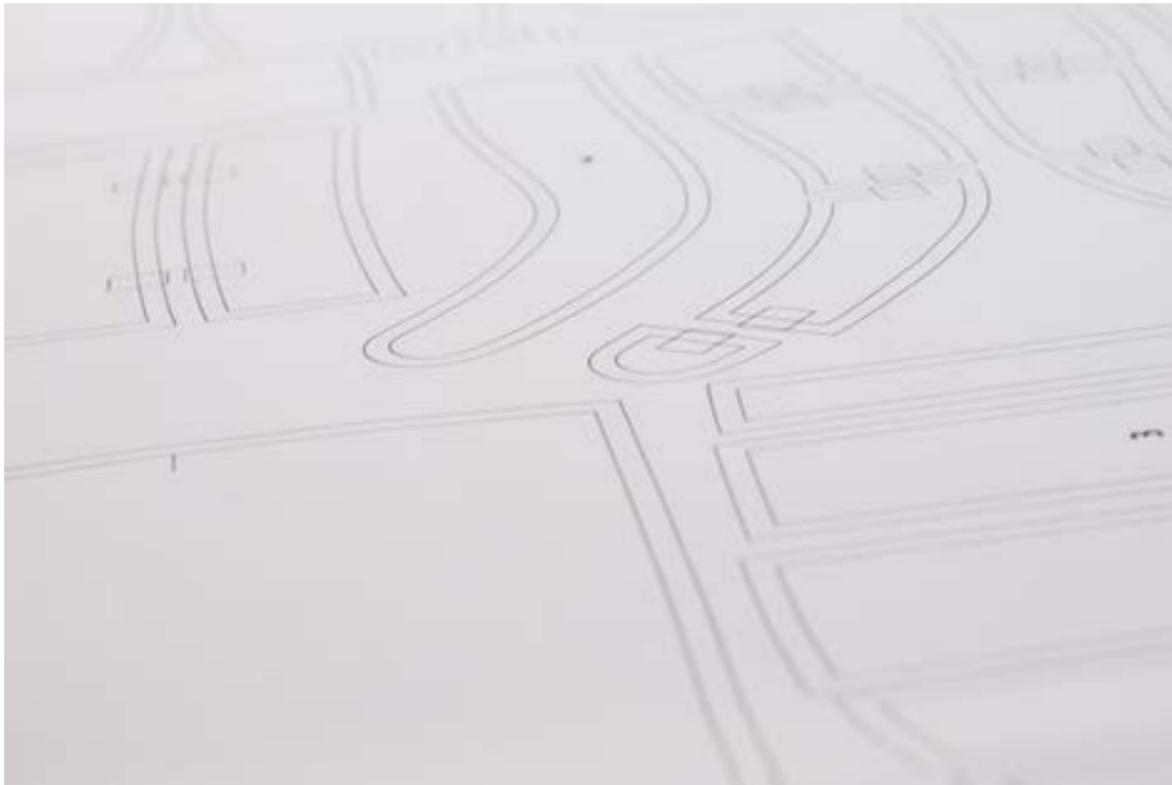
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A close-up photograph of a sewing machine's needle and foot stitching a piece of light-colored fabric. The needle is positioned vertically, and the foot is pressing down on the fabric. The thread is visible as it passes through the needle and forms a stitch. The background is blurred, showing the rest of the sewing machine and the fabric being sewn.

realisation

Cutting out the pattern



Cutting the fabric



Sewing the shoulder-straps



Sewing the shoulder-straps



The attachment of the straps



Last trimming of the details



final prototype

front view



side view



back view



front pocket



shovel + probe



roll-top



straps for skis



bar tack for various attachments



removeable ice axe-loop



**lower
ice axe-loop**

**hides in front pocket
through drainage hole**



**adjustable
shoulder-straps**



**adjustable
sternum-straps**



padded backplate



**cordura 1000d
nylon fabric**



Evaluation

Unfortunately I did not have the proper machinery to do all the reinforcements on the backpack. The reinforced seams are called bar-tacks and are put in sensitive areas where there is high load on the seams. This is why it can not be tested properly with heavy loads and while skiing.

It can still be tested without loads to evaluate the proportions and measurements.

1. The lower sling for the ice-axe is too long, a shorter one would hold the ice-axe closer to the bag so it would be totally fixed.

2. The upper strap for attachment of the skis could be moved up a couple of centimetres so that it could go above the front part of the binding. It would make it impossible for the ski to go upwards. This would change the appearance and the proportions.

3. Thicker padding in the shoulderstraps would be desirable.

4. The proportions and size makes it fit really good. A smaller version could be made to fit shorter and/or female skiers.

5. The bag is accessible even when the skis are being carried due to the roll-top.

6. The front pocket for the avalanche equipment could be slightly deeper. This would mean raising the whole frontpanel a couple of centimetres. This would also solve problem number two without changing the appearance too much.





reflection

Reflection

My goal was to design outdoor equipment and since I got a job doing that one could say this project was a success. I have also realised so many things about my self and how to tackle this kind of project. I learned the very hard way that it is far better to start to build something that is not very good than to sit and try to think how to create something that will.

The backpack industry within the outdoor segment seems to have gotten a lot closer to the fashion industry. Backpacks still have longer lifespans than clothing from a fashion point of view though. A backpack can be a big investment and very often they fill a quite specific purpose. My take on this has been to design something that has all the functionality and can be modified to fit the users need. If you don't want to carry an ice-axe for example there is very little sign of that possibility. This backpack could be used in a city environment and it would not be obvious that it's designed for off-piste skiing.

It is very difficult it is to design backpacks from scratch. To be able to make a good design you need to know a lot about how to construct them and to make patterns. Even if you make a really detailed 2D illustration with measurements there is still a lot that is open for interpretation when it comes to making the pattern.

I would also like to thank Jacob Von Matern for all the support and knowledge he shared with me during this project.

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