

Extrapolate



Extrapolate

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Abstract

Object and context are inseparable. Meaning, interpretation and function are derived from the relation between them. Extrapolate emphasizes the connection between the object and its context. The luminaire is the start of a series of objects, which extend their presence by relating closely to the existing context – complementing it instead of working against it.

The cable spans between two points, suspending the light source in the air. The light can slide along the cable to change position. At one end of the cable, a loop provides the possibility to make use of existing connection points within the context. On the other end is a hook, where the cable can be pulled tight to create a straight line between the two points. This hook can be attached to a weight, the ceiling, the wall or the floor, which introduces different configurations and placements.

The lamp functions as task light, general light or soft light depending on its position, direction and the light intensity. Extrapolate becomes a versatile object, complementing the context and adapting to it.

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00

Introduction

In my thesis work I set out to learn more about meaning in objects. After having studied design for over 5 years, it feels only natural that the meaning of it all is looked at closely to determine why I want and like to work in design. When proposing this topic and entering in dialogues, the conversation progressed to the understanding that meaning in objects is contextual, which I believe is a very interesting starting point for further research and investigation.

The meaning in this sense is only related to the outcome on its own, and not so much on the meaning or fulfillment of working on it or feeling meaningful as a designer. By relating it to context and exploring how objects can relate to context it is approached from a more broad viewpoint, keeping the bigger picture more consciously in mind when working on it.

Next to creating meaning, this way of thinking has the potential to also be a critical perspective in considering if things are needed and make sense for what they are, which is a necessary perspective in this approach.

01.1 Meaning of objects

The very start of the research was defined by a question which came naturally near the end of a Master's education in design, since I have been working to create and make sense of objects for 6 years at this point. The question that came up: *What is the meaning in/of/for objects?*

Even though the broadness and many aspects of the question made it impossible to give one answer, it did set the tone for the entire thesis project as I started an exploration, together with Tommaso Mirabella Roberti, into what kinds of meaning there are, or can be, to an object. I believe all objects should be designed to contain meaning, as otherwise there is no right for the object to exist. Especially considering physical objects are bound to taking up natural resources, physical space, care and attention.

Exploring this topic through discussion, personal experience and research we concluded on the following.

Meaning in this context can be defined as the purpose or significance of an object. This purpose or significance is always related to someone or something, as it is a situationally dependent factor. Just like information is embedded in objects (Dillon and Howe, 2003), meaning in objects can also be considered as an attribute which can be projected onto an object. An object has meaning to something or someone if it adds value in some way. This works like a scale and objects can add more or less value to something, in many different aspects. If an object adds enough value it can be defined it as meaningful. Where this division is can

be discussed, but it seems to be personal and subjective what can be considered enough, as well as what type of value is recognised as more important for the user or the context. There are two ways in which an object can add value to become meaningful: practical and emotional. Practical incorporates the functioning of a product and consequently the meaning that the ability to perform an action generates.

The practical value of an object is based on how well an object functions and performs the task it is being used for or is designed to do, replying to the user needs (Maslow, 1943). However, the amount of value it can potentially add is less than an emotional value, because the value ends where the function performed ends as well.

Emotional value can be in how objects can remember us of something or someone important or make us think. Many studies and techniques tried to explain and give indications on how objects affect human emotions and happiness, therefore generating an emotional attachment (Hale 2002). Emotional value has the potential to add more value over time, and thereby the chance to make objects more meaningful. Practical and emotional value do not work against each other though, so a positive practical and emotional value can only increase the meaning of the object more. However, a negative influence of either practical value or emotional value affects the meaning of the object negatively. For example, if an object has an emotional value, but stops functioning and thereby loses its practical value, it becomes less meaningful. In that sense the practical and emotional value of an object can depend on each other.

Emotional value is often initiated by story or narrative. A clear example of this is the remembrance of an important moment in your life by a picture. This picture can add value and be meaningful, because it makes you remember and think of a certain memory. Just like a picture can embody a memory or story, so can objects (Dillon and Howe, 2003). However unlike a picture, a new object has no personal memory or story associated to it, other than the story of the object itself. It lacks emotional value from personal experience and in this sense can be considered as a fresh object. Our proposal is that the story of an object itself can add an inherent emotional value and thereby be meaningful on a deeper level than purely practical, also without attachment from personal experience. The story of the object can be driven from different aspects or factors of the object, such as:

How is the object made? What is the object made for? Why is the object made? From what is the object made? When was the object made? By who is the object made? What is the inspiration for the object? Where does the material of the object originate from? How unique is the object? Is the object part of more? Has the object changed over time?

This inherent emotional value has been established in the product before contact with the person, while emotional value from personal experience is established from contact with the person. The practical value is primarily given before the contact with the user, but can over time change when the functionality deteriorates when it breaks or changes when repurposed.

So far the focus has been on the object itself. However, the value and meaning of objects can change according to the context and space they are in. As such, contexts are able to change the meaning of objects.

This is also said by Krippendorff (1989) after observations of Ulric Neisser (1976): *"People do not perceive pure forms,*

unrelated objects, or things as such but as meanings. The distinction between what an object is and what that object means to somebody may not be demonstrable .. objects are always seen in a context (of other things, situations and users, including the observing self)"

From this it can be concluded that objects and their meaning are inseparable. Objects can't be seen without their meaning, as well as the context they are in. This then raises the question if it's possible to design for meaning and if meaning, as well as context can be included in the design process of an object to improve it.

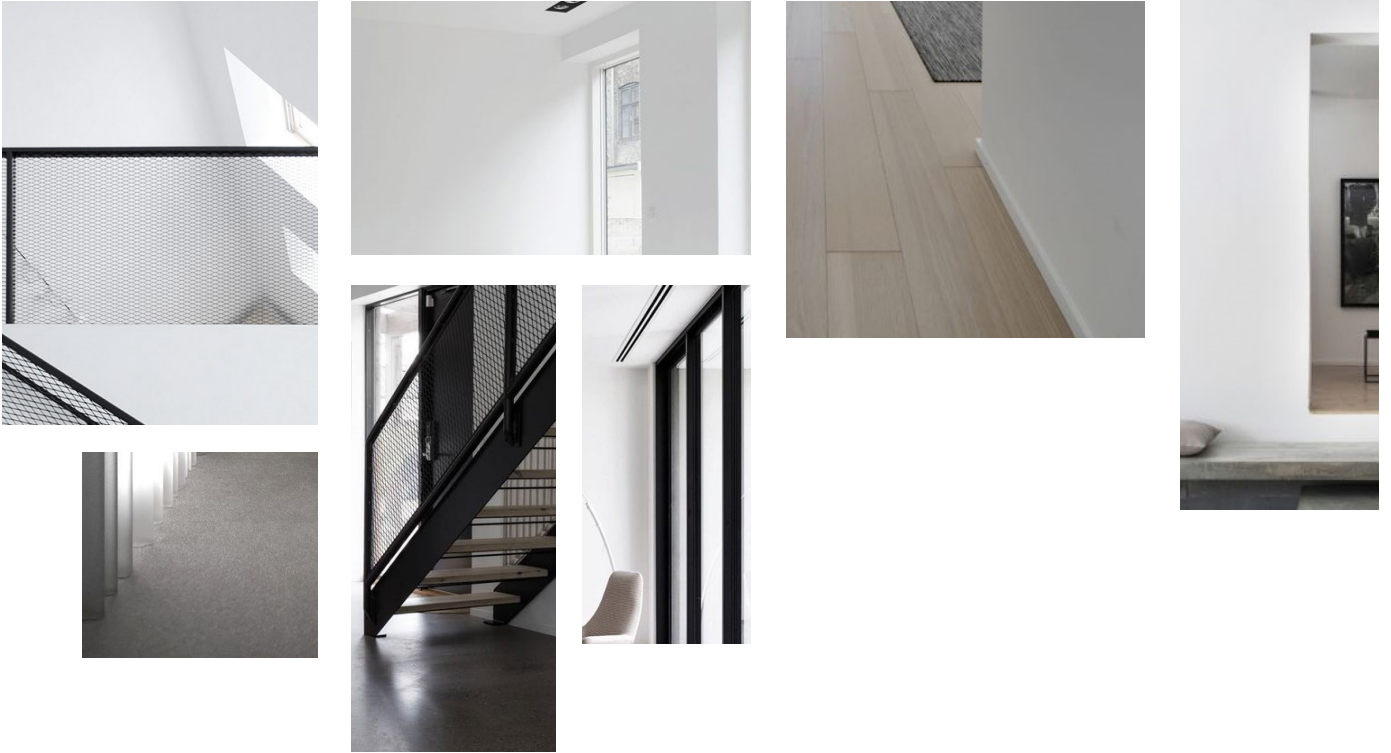
01.2 Direction

As previously concluded, inherent meaning is driven by the story of an object and can be embedded in several aspects that make or have made the object. An object's story is mainly about its purpose, both practical and emotional, which identifies the object and why it exists. An object's existence is related to context, as any object that exists, exists within a context. The relationship an object has with its context can be stronger or weaker, which often shows most in the aspects of (in)dependency, specificness and versatility.

Context as will be referred to in this project is not about specific environments in the sense of the function or use of a space, like office or living room. Instead, the context which will be implied are architectural elements, which are on a smaller, yet more general level. Architectural elements are defined as all the components which make up a space, such as: floors, walls, ceilings, corners and edges between those, windows, doors, handles, construction elements, rods, hooks,

ledges and steps. By focusing on this aspect of context, the object becomes more relatable to any space and remains independent from the specific function of a space. Next to that, it directly refers to the physically existing context, rather than implications of a context.

In this direction, I intend to explore and elevate this relationship between object and context. The goal of which, is to enhance inherent meaning, purpose and function of both the object and context by inducing a strong connection. Important in this, is that the consequential dependency of the object on the context, should open new possibilities and add something, rather than appear restrictive or suppressing.



Creating one, or multiple, object(s) with an inherent and functional meaning by emphasizing the relation between the object and its space - in a form referring and extending the context.

01.3 Object and Context

Object

As the relationship between object and context is the main driver in this project, it is important to dissect these terms a bit more. Starting with the object, an object is defined as:

“A material thing that can be seen and touched.” – Oxford Online Dictionary

Following this definition there are three requirements for something to be an object, which are that it is made up from a material, it is visible, and it is tactile. This definition might seem redundant, but it is not. For example, light is not tactile or made up from a material, meaning it is not an object. So, if light is not an object, then what is it?

Context

Continuing with context, it is defined as:

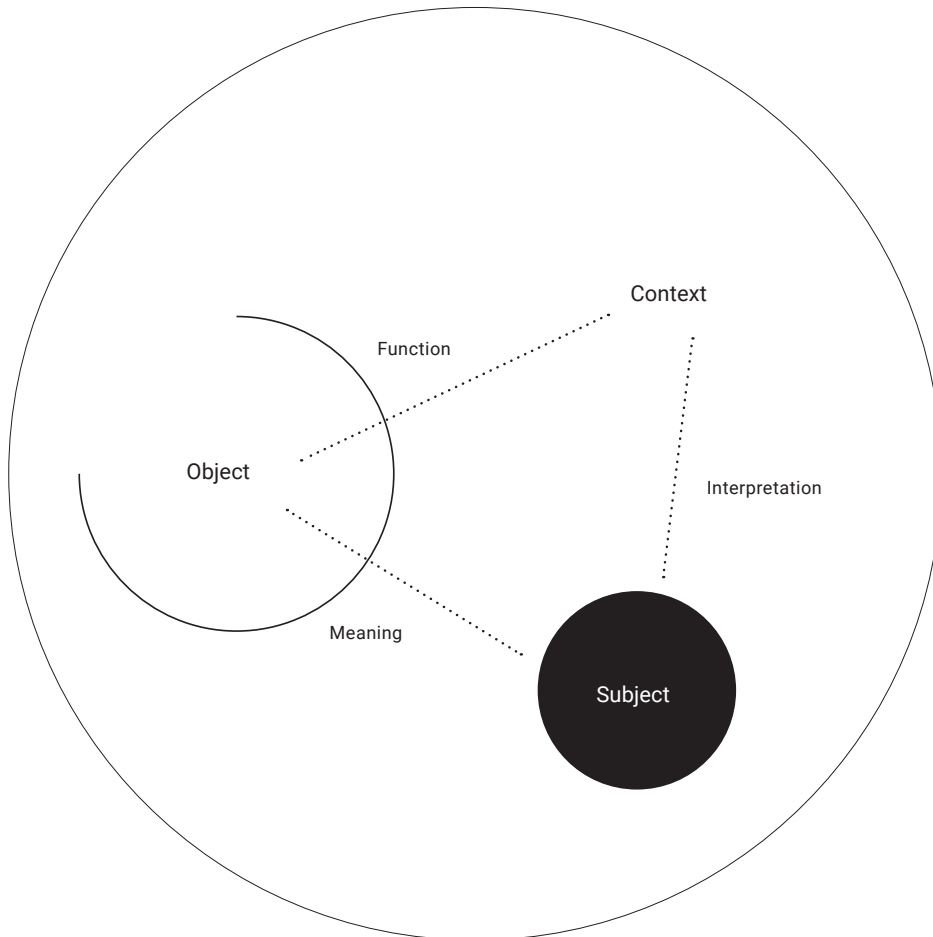
“The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood.” – Oxford Online Dictionary

Concerning a physical context: the circumstances that form the setting. If we consider a space to be the setting, then the question to find out what context is becomes: *what forms a space?* What forms a space depends on what is to be considered as forming, which is subjective. When we think about a context, it can be assumed with certainty that the architectural elements as defined before do form a space. However, *can objects at some point be considered to form a space?* This question raises a key insight for working on object-context relationship, which is that there is a grey area between object and context.

To consider some examples, *is a table not the context for a dinner setting? Does a large wardrobe not form the space the same way as a wall? Are integrated spotlights not part of the ceiling forming the space?* These questions expose this grey area between object and context, where it becomes possible for an object to have such a strong relationship with the context that it will start blending into it and it is unclear where the object ends and the context begins.

Subject

As object and context are nothing by themselves, there always needs to be the third element to bring everything together, which is the subject. This can be a singular person as well as multiple people or a group. The subject is what uses the object and is contained in the context as well. This can mean there can be multiple subjects and other subjects are inherently part of the context they are in.



Connections

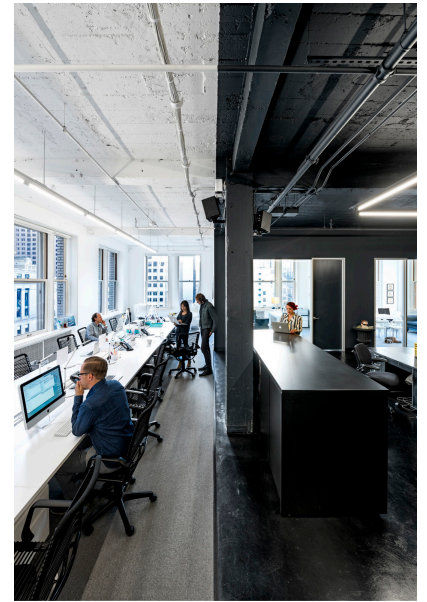
The connections between the object, subject and context make the relation between them clear. Between object and context there is the relation of function. The object receives its function (or disfunction) partly because of the context it is in. This relation can be stronger or weaker depending on how much the function of an object changes according to the context. This relation works both ways though as objects can also alter the function of a context. To illustrate: putting chairs and tables in a certain configuration can make the context a classroom.

Between the context and subject there is the relation of interpretation. We make assumptions and conclusions based on the context we are in. These interpretations can have a large effect, and can go as far as changing our behaviour within certain contexts, such as whispering in a library. Subject can change the influence on these interpretations and in the long term change the interpretation entirely.

Lastly, the connection between object and subject is meaning. As discussed in the previous chapter, objects contain meaning to subjects. The practical meaning of an object comes from the object itself within the context it is in, while the emotional meaning (both inherent and personal) is induced on the object by the subject. This meaning is what gives the object a purpose and a reason to exist.

02 Extrapolate

Extending object and context using existing points



02.1

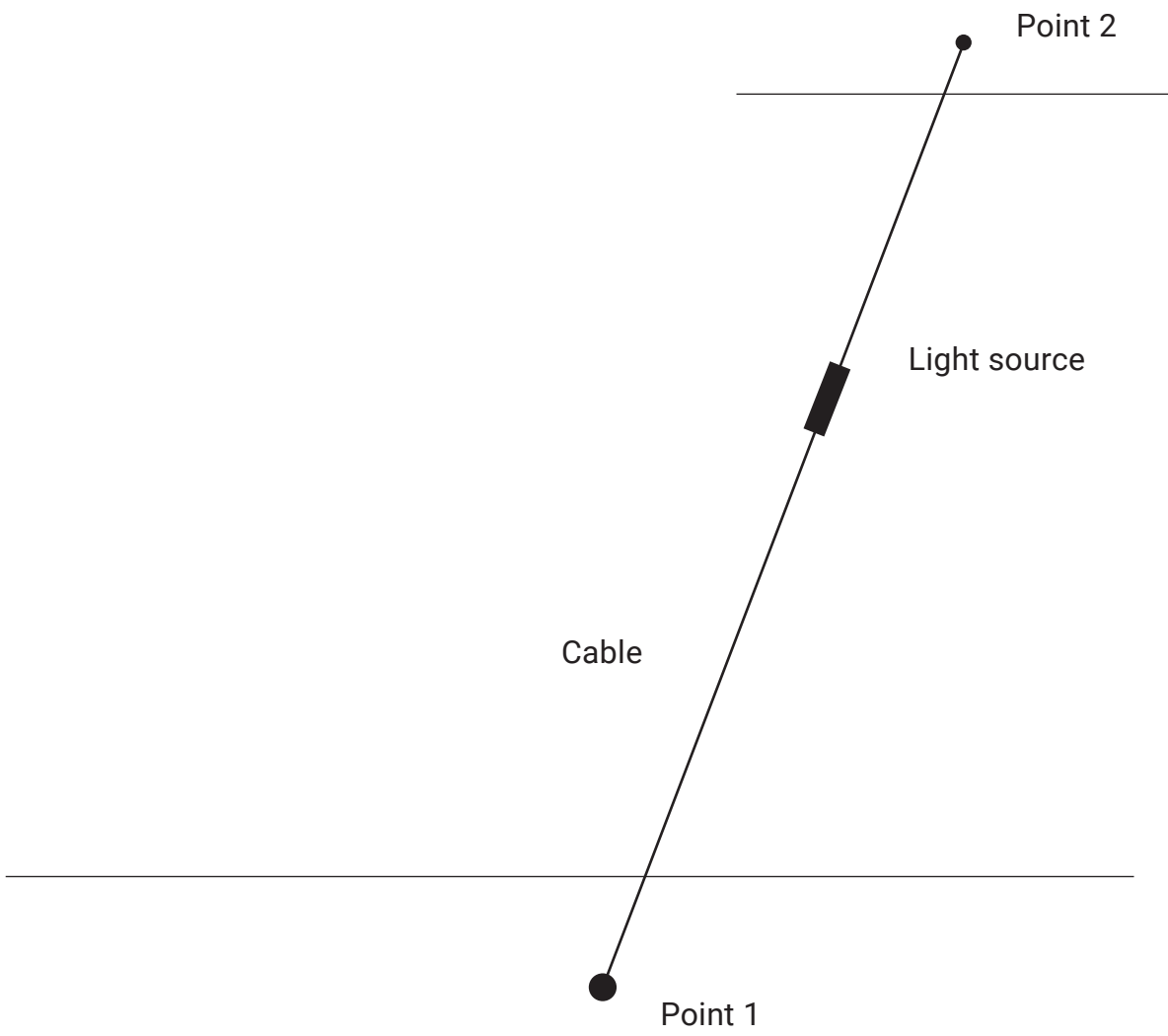
Identification

Following the brief I decided on, coming from the previously mentioned thoughts on the meaning of objects and the relation between object, context and subject, I decided to start the process by attempting to integrate the context into the concept. This meant that, instead of only thinking of the object itself, I tried to design with the context as part of the concept.

A way, logically and intuitively found, to do that is to use existing points within the context to adapt what is in place already, thereby extending object and context. These points can be a hook in the ceiling, the railing of a stair or even the floor itself. To then fill in the concept as to what its function should be, became apparent when illustrating it. When drawing a line between two of these contextual points, it immediately made sense for the object to be a luminaire as it could be positioned hovering in a space.

Integrated lighting is already a widely existing concept, which blurs the lines between object and context. However, in that case the lighting is stuck in a context and cannot adapt to different contexts without a lot of adjustments. Moreover, integrated lighting is often part of a bigger system. Extrapolate is meant to more flexibly connect to the context, and remain an object by itself, rather than being part of a system.

Rather than by traditional ideation and problem solving, the idea of Extrapolate was initiated out of the attempt to involve the context into the concept using the two points. As such the next step for requirements and conceptualization came sooner than expected in the project.



02.2 Requirements

Point 1 (Base)

- Heavy
- Spring mechanism to retract cable
- Exit for power plug
- Exit cable to light source
- Possible to attach to ceiling/wall?

Cable

- Flexible (small bending radius)
- Around 4 meters long (should reach from floor to ceiling and power source)
- Durable enough to resist pulling stress

Point 2 (Attachment)

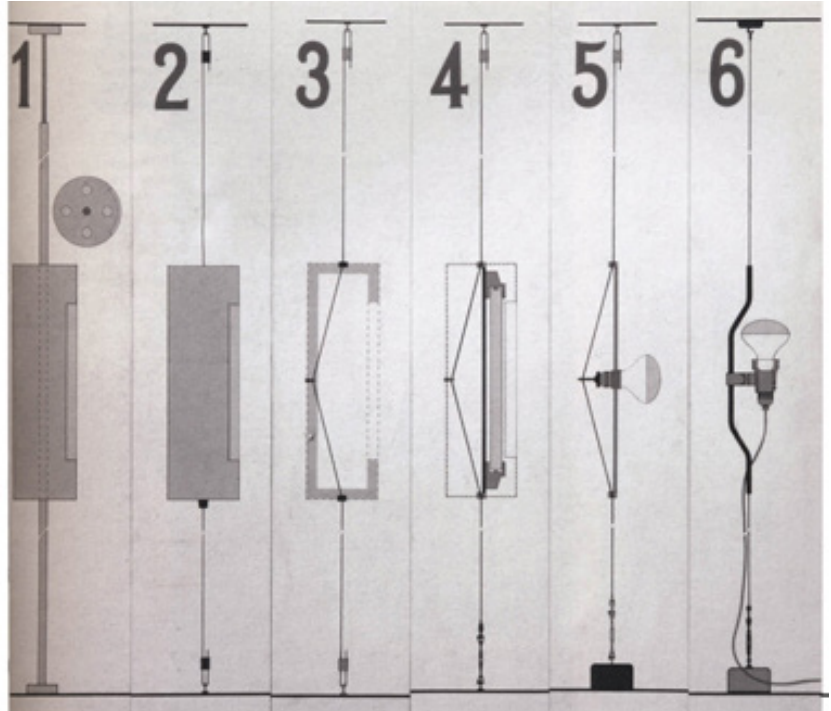
- Possible to attach to hooks, rods, beams and grids
- Ensure minimum bending radius of cable
- Reduce vibration

Light source

- Possibility to direct the light
- Lightweight
- Single LED light
- High lumen output
- Suppress glare
- Dimmable
- Lead the cable to create friction
- No hard edges where the cable touches
- Keep everything balanced (stabilizing)
- Lightweight

02.3

Exploration



Parentesi by Achille Castiglioni + Pio Manzù
for Flos (1970)



Aim by Ronan and Erwan Bouroullec for Flos (2013)



Plusminus by Diez Office for Vibia (2020)



OK by Konstantin Grcic for Flos (2013)



WireRing by FormaFantasma for Flos (2017)

The previous pages show research into objects which are in the direction and archetype of the luminaire as illustrated with the requirements. They show techniques and solutions on how to suspend a luminaire, mostly using the power cable. The main difference here between these luminaires and the concept, is the connection to the context. All of the concepts are rigid in their installation and configuration in the sense that it's pre-defined and not dependant on the context.

However, having these examples to take inspiration from, mainly in technical solutions, proved to be a good starting point for me to start trying things out. Since there was no access to workshops I used what was available, to iterate the concept further. As the concept requires many elements to work together, such as stability, connections, rotations, I wrote quick notes about what works and what doesn't every step to keep track of what should be improved.



1



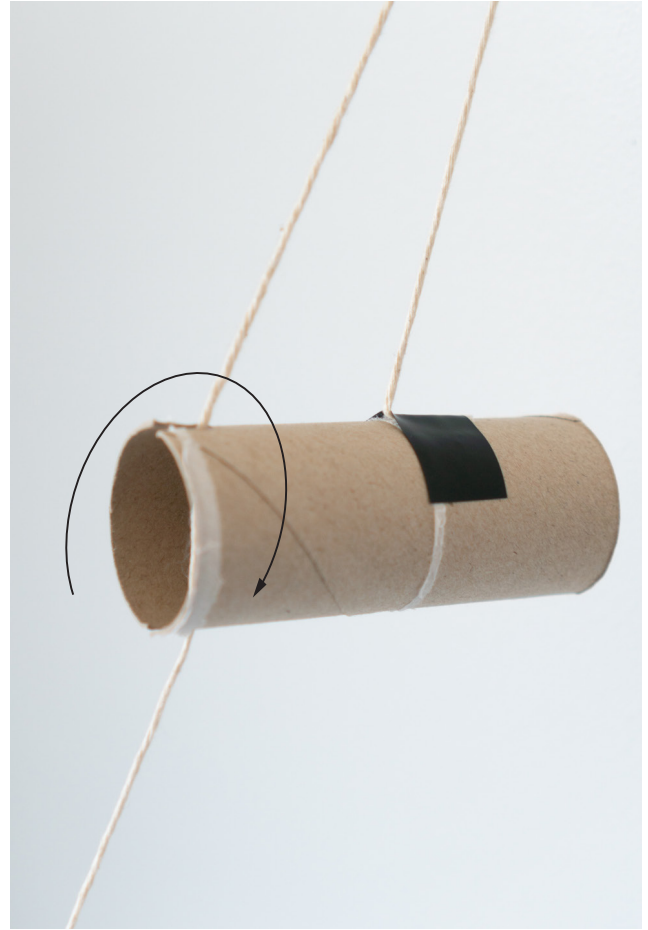
2

- 1
 - Cable needs to be able to be tightened at the base
 - Light source needs to be moveable along the wire
 - Installing really easy, but can be hard to find something to attach it to in a good spot
 - On/off on the light source or base are ok
 - Fits in a smaller apartment, but better in bigger open space
 - Also usable with the base on a desk or table
 - A lot of cable is necessary

- 2
 - Using an extra element makes it imbalanced when the weight is off center. Can be solved with leading the rope straight inside slider?
 - Hinge can work to rotate the light up or down the cable
 - How to rotate left right?



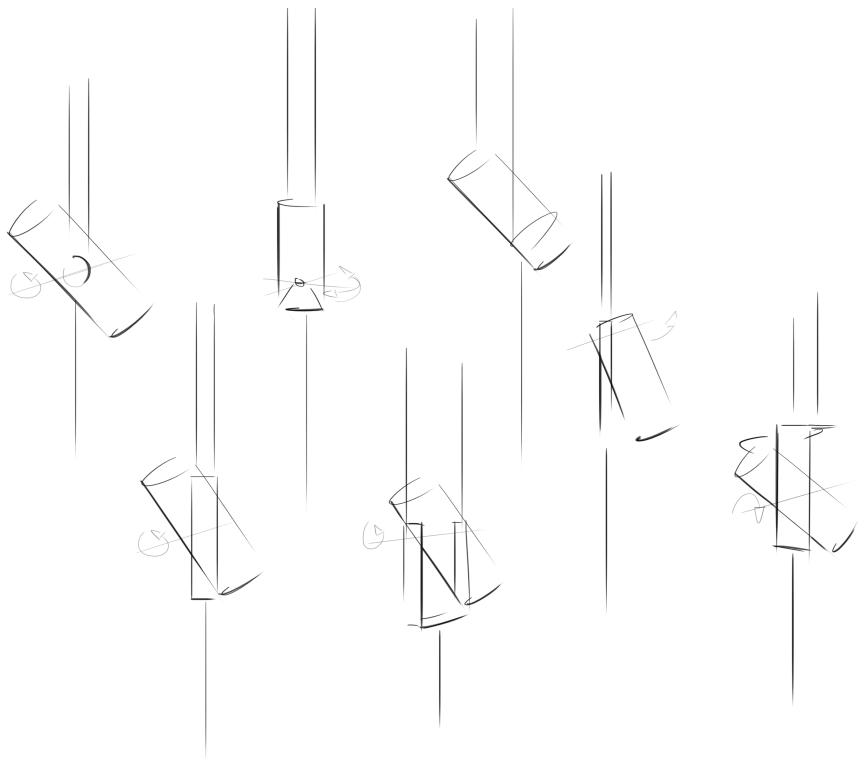
3



4

3 - Can't adjust the angle. Angle is determined by distance between the two points where the wire goes through at the top of the light source and where it comes back in.

4 - Can't adjust angle.



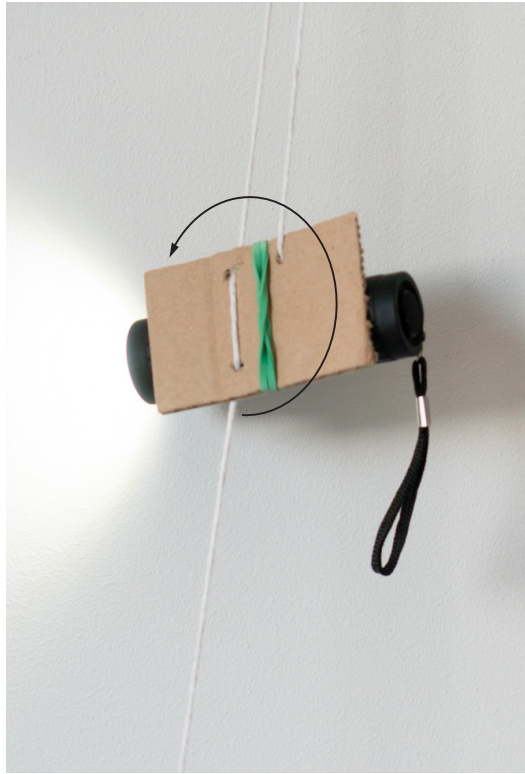


5



6

- 5
- Rotation of the light source up and down along cable works well
 - Sliding works well
 - Light source rotates around cable according to angle. (light source always falls to the inside of the cable)
 - Cable inputs need to be centered to avoid angle
 - No rotation left + right on the cable possible light source is always on inside of the cable.
- 6
- Light points straight down instead of along the cable
 - Sliding works well
 - No rotation of light source along cable possible
 - Possible rotation left and right, but cable and structure get in the way of light source



7



8

- 7
- Shakes a lot in the beginning, might be possible to be helped in the sliding mechanism. When light is pointed down (weight closer to the cable) shaking stops way earlier
 - Pulling mechanism works very well
 - On/off is better on the base, since touching the light source causes more swinging (also the light source can be higher up)
 - Not sure if controlling of turning is necessary
- 8
- Keeps the weight close to the cable
 - Direction of the light source is better (instead of sideways to the cable)
 - Good mechanism for angling
 - Missing rotation to be really versatile

After going through these iterations, I started understanding what works and what doesn't concerning rotations, angling and sliding. From the last iteration, I decided to move to a 3D programme to explore options further with more refinement in shape and size.



- 1.1
- + Useful spotlight
 - + Weight close to the wire so less swinging
 - + Enough space in the sliding part
-
- No rotation possible, only angle
 - Less minimal



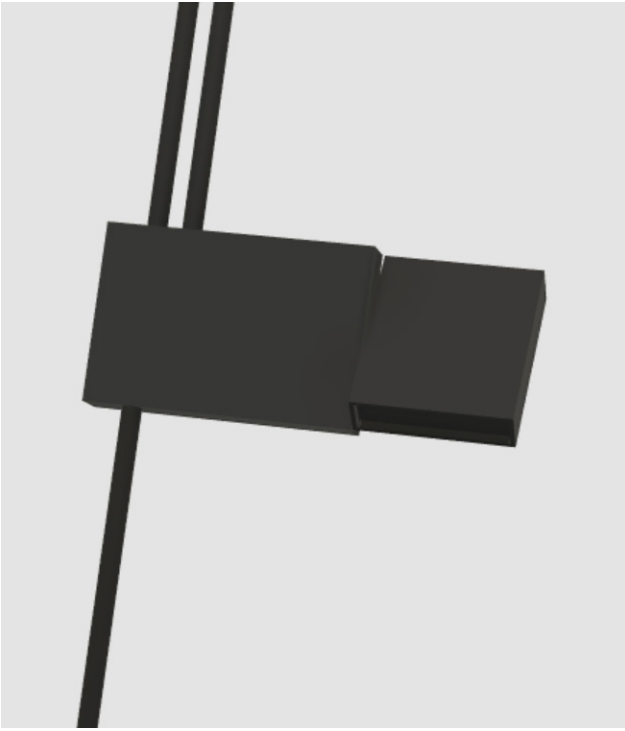
- 1.2
- + Minimal
 - + Useful spotlight
 - + Enough space for normal heatsink
 - + Rotation and angle possible
-
- Weight quite far out of the wire, can cause swinging
 - Tight on space in the sliding part



- 1.3
- + Useful sport/area light
 - + Weight closer to the wire in all positions compared to thinner cylinder
 - + Enough space for the sliding part
 - + Rotation and angle possible
 - + Swinging less problematic, because light is less focussed

- Less compact

The final iteration of the physical prototypes was developed further to also allow for rotation. Version 1.3 keeps the weight closer to the cable than a long cylindrical shape as in 1.2. This avoids swinging of the light, which will be a crucial element to the quality and functionality of the entire concept. Next to this on the following pages I decided to explore a few more conceptual shapes and technical developments in order to verify if this was actually the right choice.



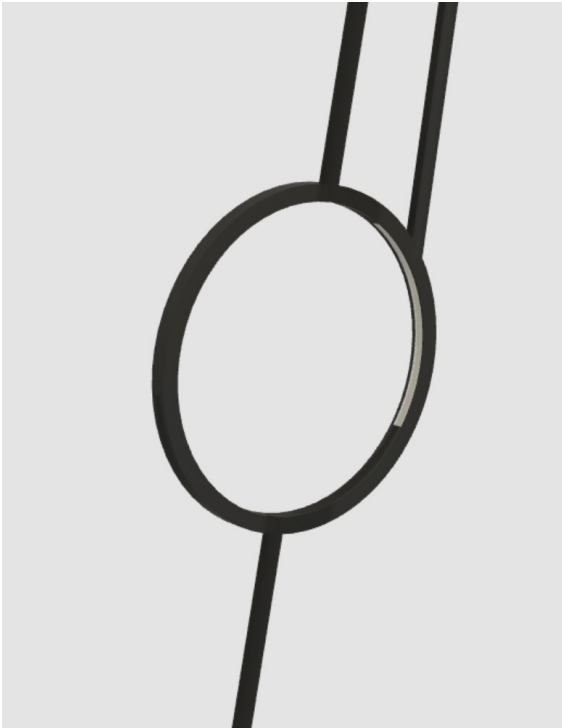
- 2.1
- + Minimal
 - + More different and conceptual
 - + Spotlight (but rectangular)

- No angle possible, so not useful anymore when line is horizontal
- Weight is far out of the wire, can cause swinging



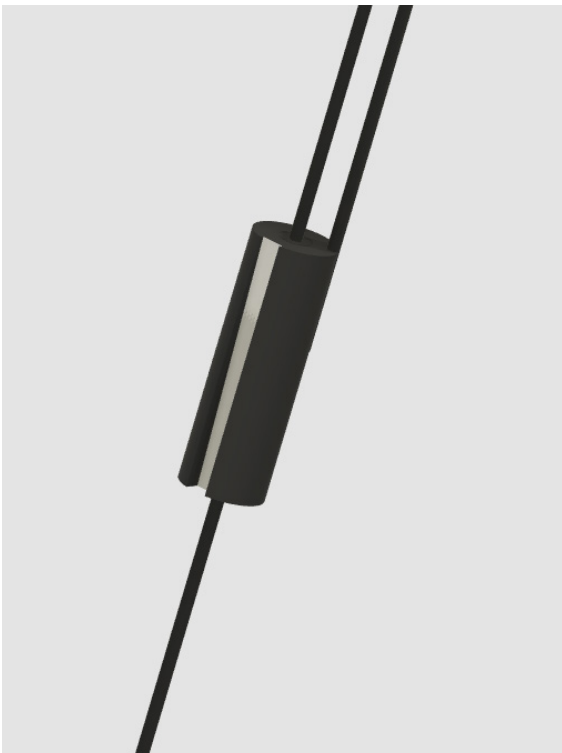
- 1.2
- + Weight closer to the wire, less swinging

- Looks a bit more like OK, Grcic
- Unclear what type of light this would be
- Not a lot of space to fit components



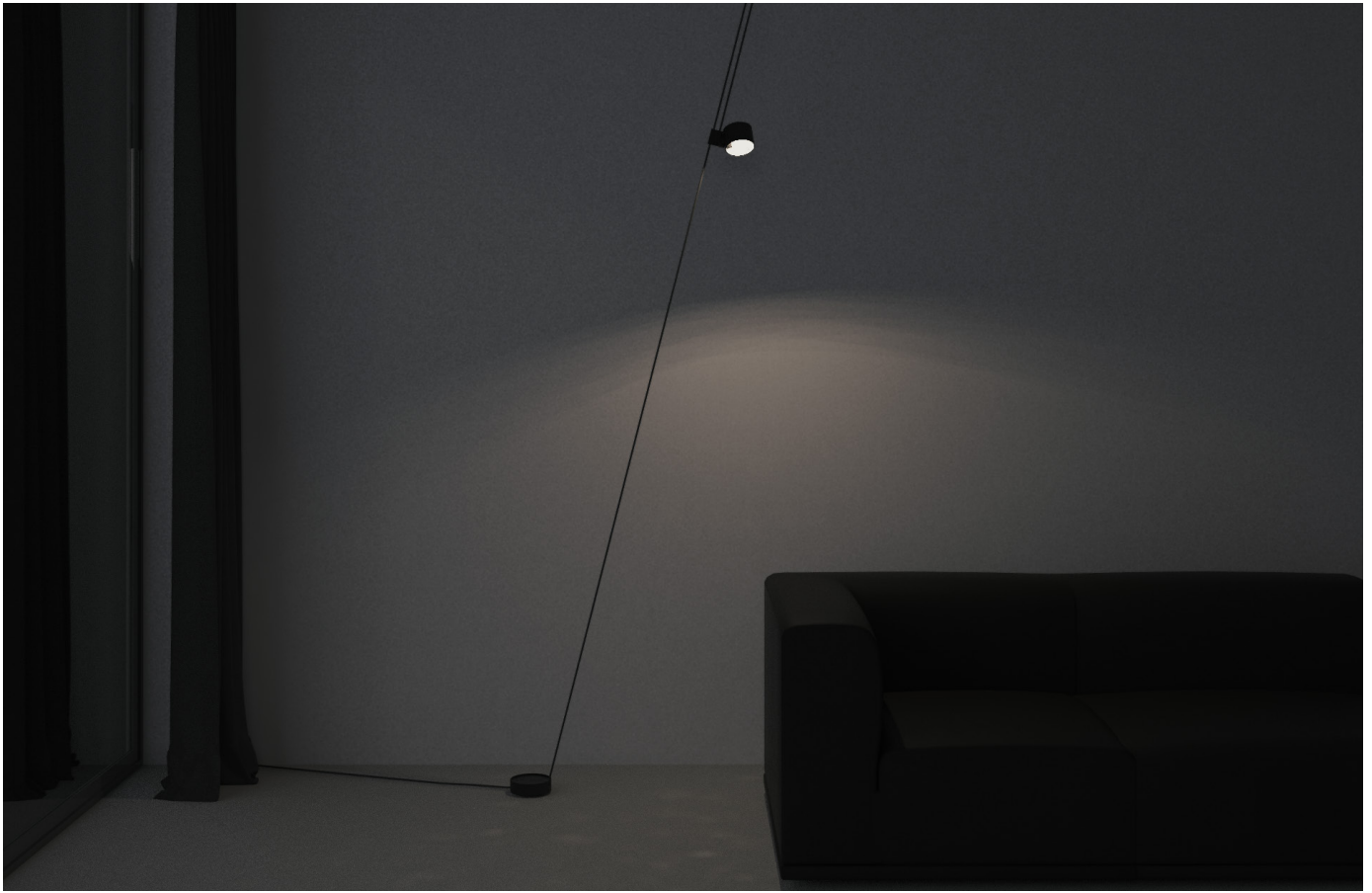
- 3.1
- + Minimal
 - + More different and conceptual
 - + Sliding can be integrated in the shape nicely
 - + Weight quite well distributed, probably not a lot of swinging

- Looks a lot like Formafantasma's Wiring
- Less useful light? Unclear how it will be
- Very tight on space for components
- Complicated construction



- 3.2
- + Weight on the wire, will prevent swinging entirely
 - + Minimal

- Hard to direct the light
- Less useful light
- Complicated construction
- Difficult interaction
- Not a lot of space to fit components





The last version of the cylindrical light source was further developed to be able to put it into a context and to develop a 3D printed model to verify the concept itself and the interaction. It is also the point to decide whether the concept in its current form has enough potential to start developing further technically. The images in context show the expression of the lamp clearly, emphasizing the control the hinge gives with both rotation and angle to direct the light in the desired place. The entire configuration with a base point and from there a connection to an electrical plug works well and makes sense. It is easy to imagine the lamp integrating and working with the context using the two points as described in the ideation.

The next steps are to start the technical development of each component and finalize proportions, details and interactions. Every component depends in some way on the other, whether it is purely in expression and form or in electronic requirements. It is therefore important to give prioritization to the components which should be leading, which in this case is the light source.



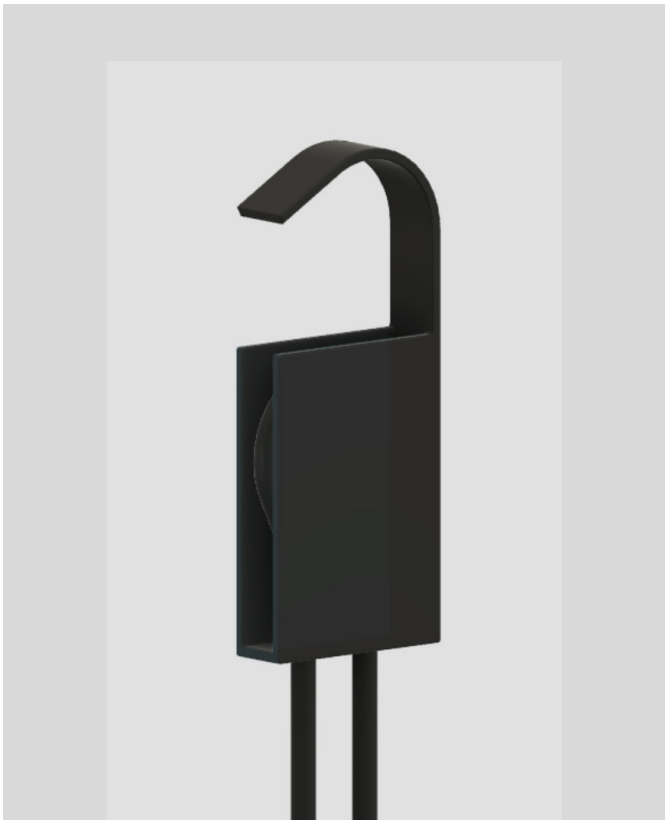
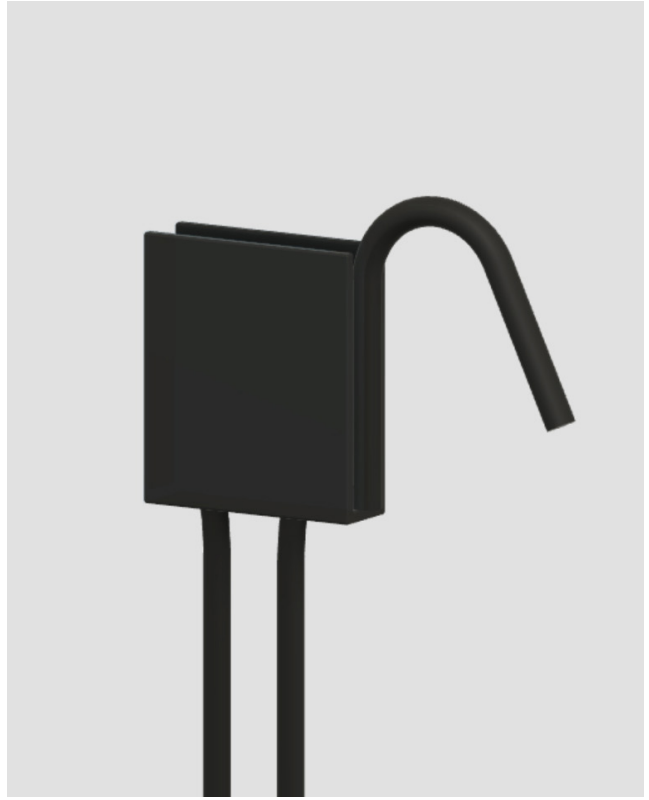
02.4 Conceptualization

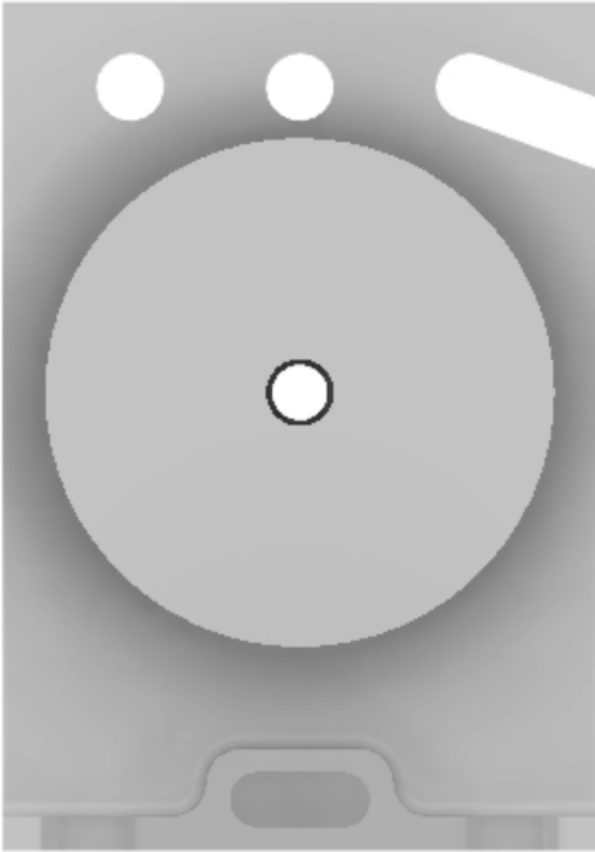
This first 3D printed version of the light source gave a lot of insight in what needs to be developed further. A very good thing about the prototype is that it is possible to check the stability of the light, which would hard to solve if it was not stable. Luckily, it was almost not shaking or swinging after positioning it, which was very positive to note. Another positive is that the interaction of the hinge to rotate and angle the light source worked naturally and smoothly.

However, there were also some issues that still had to be worked out or needed more refinement. First, the cable is more stiff and thick than expected, so ideally it should be replaced with a thinner and more flexible cable to make a lighter expression. Related to that, sliding the light source requires too much effort and force, because the bending radius is too small inside. The light source was also maybe a little too big and the proportions need more work.



The 3D printed model already incorporates the double hinge, making use of two bolts and nuts allow for the rotation and angle. The bolts attach the light source to the sliding part. In the functional prototype the cable would have to go through the bolt to get to the light source.





02.5 Technical development

The cable has a direct influence on the attachment point (or hook), as it requires a minimum bending radius to run smoothly and remain undamaged. The round cable was again too thick and stiff as the bending radius, and therefore the entire hook, was too large and complex. The 3D printed attachment has multiple holes at the top to try different ways of attaching things. It was quickly found that the best way to attach something is with a rope or band so that the electrical cable is not being twisted when the attachment is hooked to something not collinear to the cable.

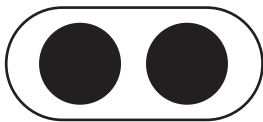


Large bending radius

Standard

Round (2x0.5mm², 4mm diameter)

The round cable is the most common standard cable. For low voltages it is usually around 4mm in diameter. It comes in a wide variety of finishes and cable covers.



Smaller bending radius in one direction

Standard

Flat (2x0.5mm², 4x1.5mm)

The flat cable is still a commonly used and seen cable, but less than round. There are a few less options from regular sellers, but can be widely found. It is a lot thinner than the round cable as the wires inside don't twist around each other.

Smallest bending radius in one direction



Special (sometimes used for speaker systems)

Superflat (2x1.25mm², 25x0.5mm)

This superflat cable is an uncommon cable that is currently only being used for high-end audiosystems to connect speakers. It has a very small bending radius on the flat side. It's not standard and therefore quite hard to find and purchase.



Looking at different options for the cable, a flat and superflat cable seemed to be better alternatives as they have a way smaller bending radius on one side. To get an understanding and see the consequences to the sliding of the light source, these were both worked out digitally and with 3D printing.



Varation with superflat cable



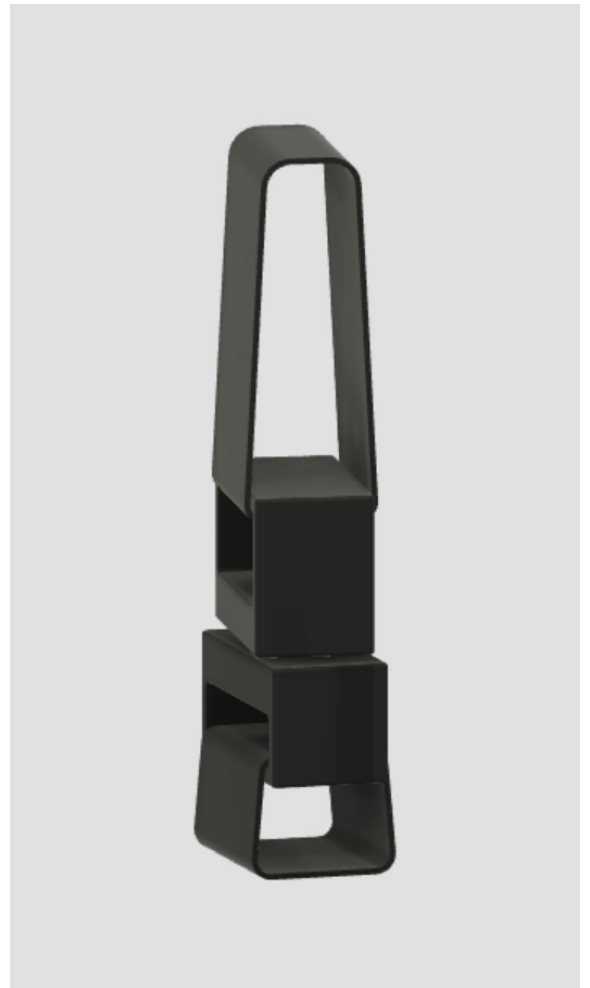




Variation with flat cable

The choice which cable to use was difficult, especially since it proved to be complicated to find good quality cables. Logically, both cables could fit and could be suitable, making it a decision based on intuition and a few underlying motivations. The decision was made to continue with the regular flat cable.

The main reason for this is because it is a standard used cable, meaning there is more variety and better quality finishes available for production. Even though the superflat cable looks very good from the side, from the back the profile is very thick, taking away attention from the light source. Lastly, it is also unclear how well the superflat cable works with LED light, since it is normally being used for audio transmission.



As a consequence to changing the cable from a round to a flat cable, the attachment can become smaller as the minimum bending radius of the cable is reduced a lot. It was therefore also possible to remove the wheel and instead work with a webbing band that the cable goes through. The same webbing band is used at the top to attach the lamp to a hook or something else.

In between the elements an axis has been added to make sure the electrical cable will not be twisted, a turning axis has been added to the attachment. This prevents the top to have any influence on the orientation of the cable going through the bottom.



02.6 Configuration

The final element of the lamp is point 1, named the base. For the base there are a few requirements that have to be taken into account in any case, such as that it should be heavy. However, there were two main concepts possible for the base which would affect the electrical scheme, usage of the lamp and configurations.

As the cable needs to be tight in order for the hinges in the light source to work, one concept was to include a cable retraction reel, as seen in vacuum cleaners. This would keep the cable tight at all times and remove the need to tighten it after adjusting the light. After technically researching how the mechanism works, it seemed like it should be possible, but still quite complex in terms of mechanics and electronics. It would be possible to have an on/off switch and a few electrical components in the base as it would anyway have to be connected there to the end part of the cable.

Extrapolate retracting cable base

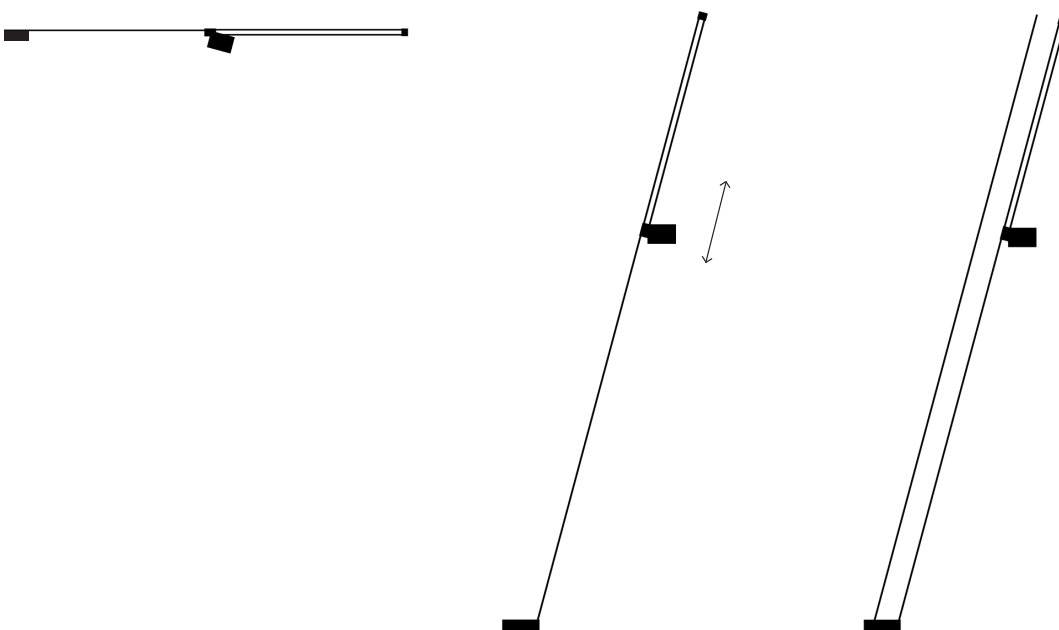
+ Possible to slide the light source across the cable without having to readjust the base.

+ On/off and other components can be in the base

- More complex electrical wiring

- More development time to get the tolerances right

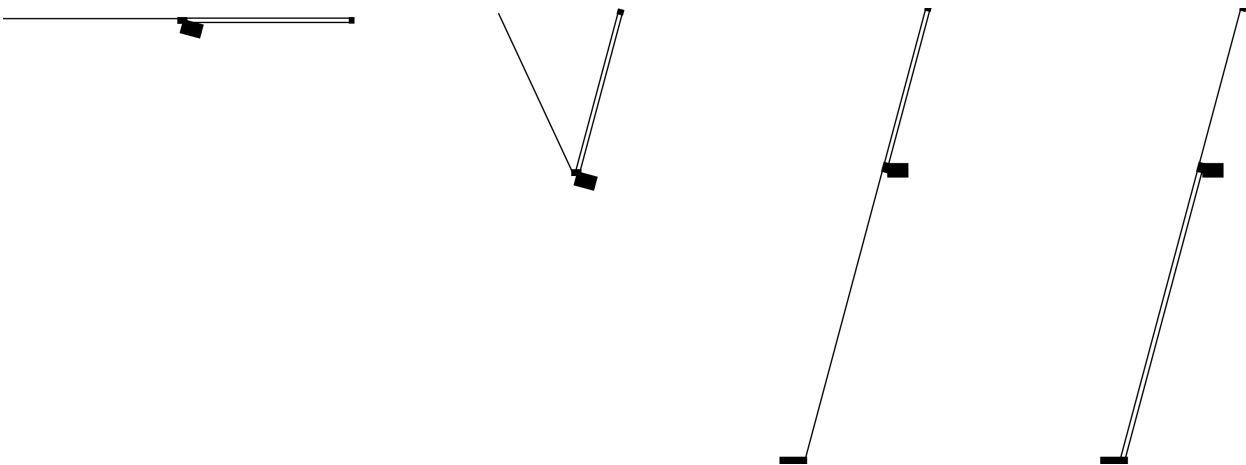
- Other configurations only possible if weight is removable and there is a hook in the base



The second option was to not have the cable retraction mechanism. This option allowed for the base to be removable as there would be no electronics or cable connections inside. Having the base removable wouldn't only have simplified electronics and mechanics as a positive, it also offered possibilities in the amount of different configurations that would be possible to do. As the weight can be removed, it would be much easier to have the first attachment point on the wall or ceiling. A downside is that all the electronic components will have to fit into the light source itself. Without the cable retraction mechanism, it would also be necessary to tighten the cable after sliding the light source up or down on the cable.

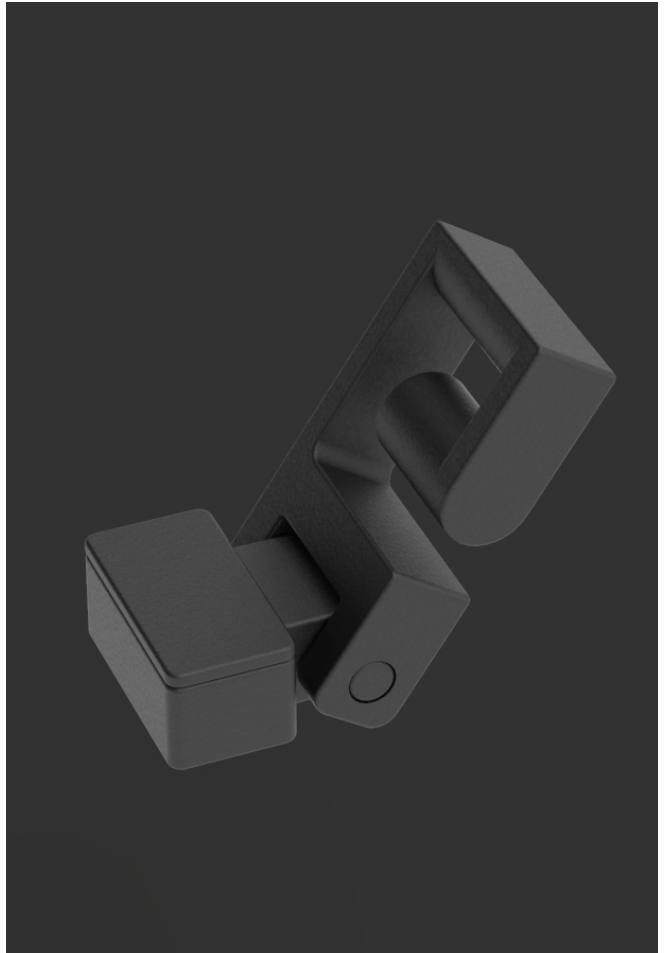
Extrapolate removable base

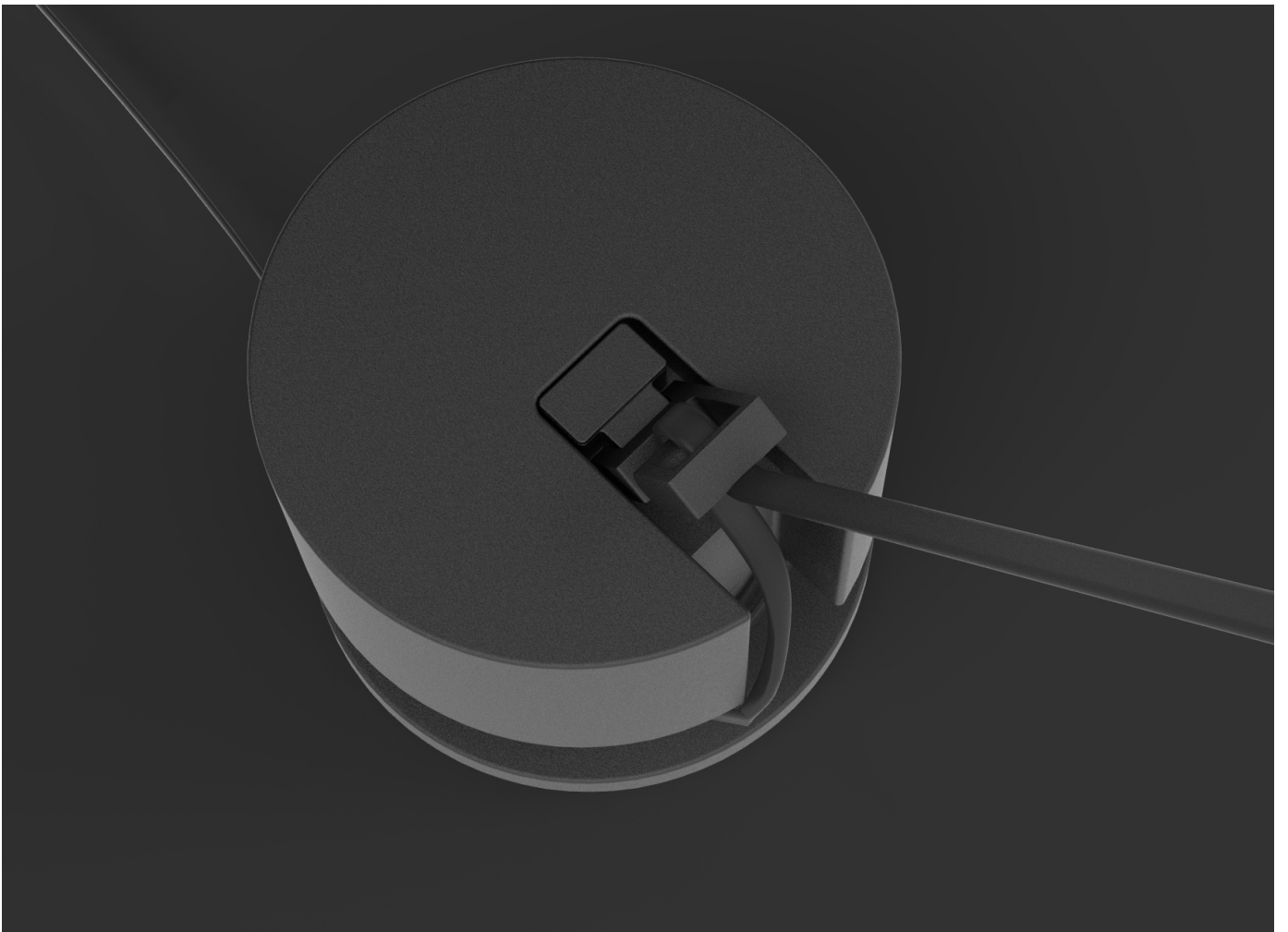
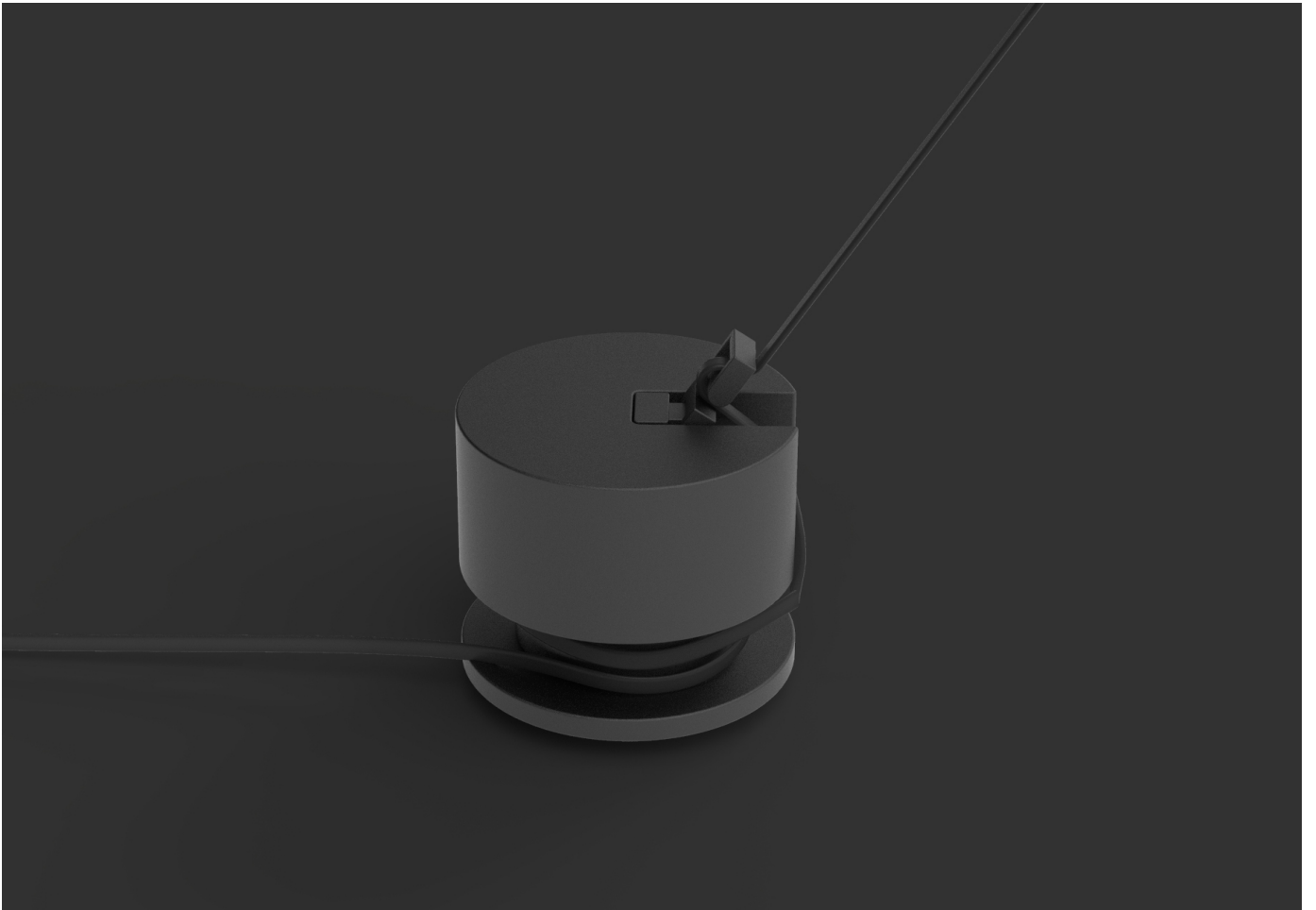
- + More configurations possible especially with electrical connections in the ceiling
- + Easier electrical wiring
- On/off and all electrical components have to be in the light source
- Not possible to slide the light without adjusting the base



The second option was chosen to continue with, mainly because it stays more closely to the initial thought and concept due to the higher amount of configurations possible. Allowing the base to be removable really allows the object to be adaptable to the context and to what the context needs. Another reason was that there are already a lot of technical details in the object for it to work, adding another mechanism with a rotational spring would really complicate the object further.

To support the different configurations more, it made sense to make the hook which the cable attaches to the base to be removable. The hook can then be screwed into the wall or ceiling when there are no attachment points available in those places. The hook secures the cable, making it unable to slide through, as it would otherwise lose its tension. Below the weight in the base, space has been left to roll the cable around before the electrical plug. The cylindrical shape was chosen to signify a link and express consistency with the shape of the light source.





LED: Citizen COB Series V8

Dimensions	19.0x19.0x1.4 mm
CRI	97
Warmth	2700K
Thermal Resistance	0.68 C/W
Efficiency	114 lm/W
Forward Current	450 mA
Voltage (min/typ/max)	30.6/33.3/36.0 V
Luminous (min/typ/max)	1506/1712/1897 lm
Max. Input	35.3 W
Case Max. Temp.	105 °C
Junction Max. Temp.	140 °C

Heatsink: Fischer Elektronik SK619 10SA

$$\theta_{s(\text{safe})} = (100-50)/(11 \cdot 0.8) - 0.7 - 0.2 = \sim 4.8 \text{ C/W}$$

(Lower value is better)

Dimensions	∅46x10mm
θ_s	3.2 C/W

Microcontroller: Adafruit Trinket M0

Dimensions	27.0x15.3x3.5 mm
Input Voltage	5 Vdc

LED Driver (CCS): MEANWELL LDD-350LW

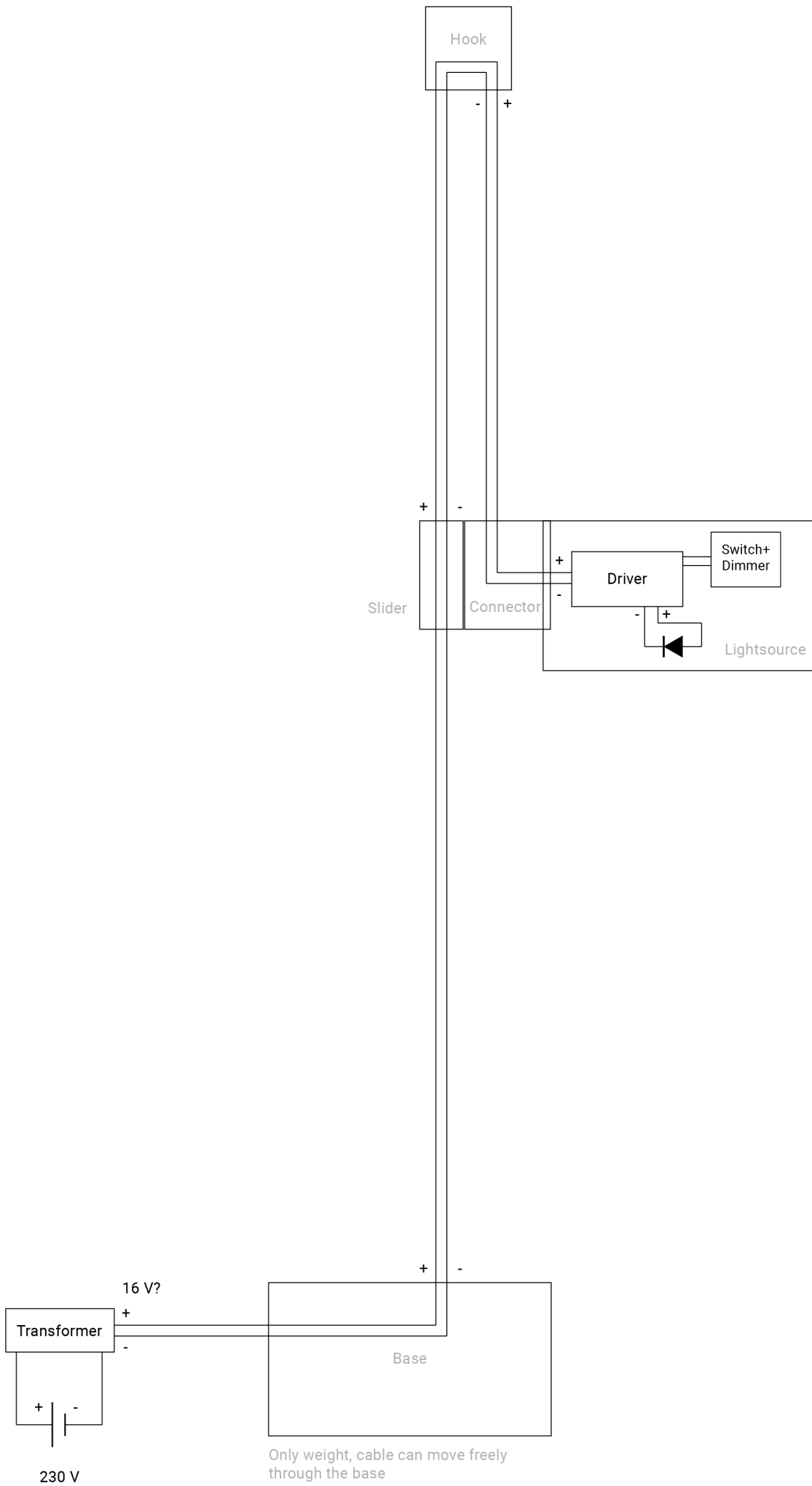
Dimensions	9.9x8.9x22.6 mm
Input Voltage	9 - 36 Vdc
Output Voltage	2 - 32 Vdc
Output Current	350 mA
Dimming	PWM
Output Power	11 W

Power Supply Unit: ?

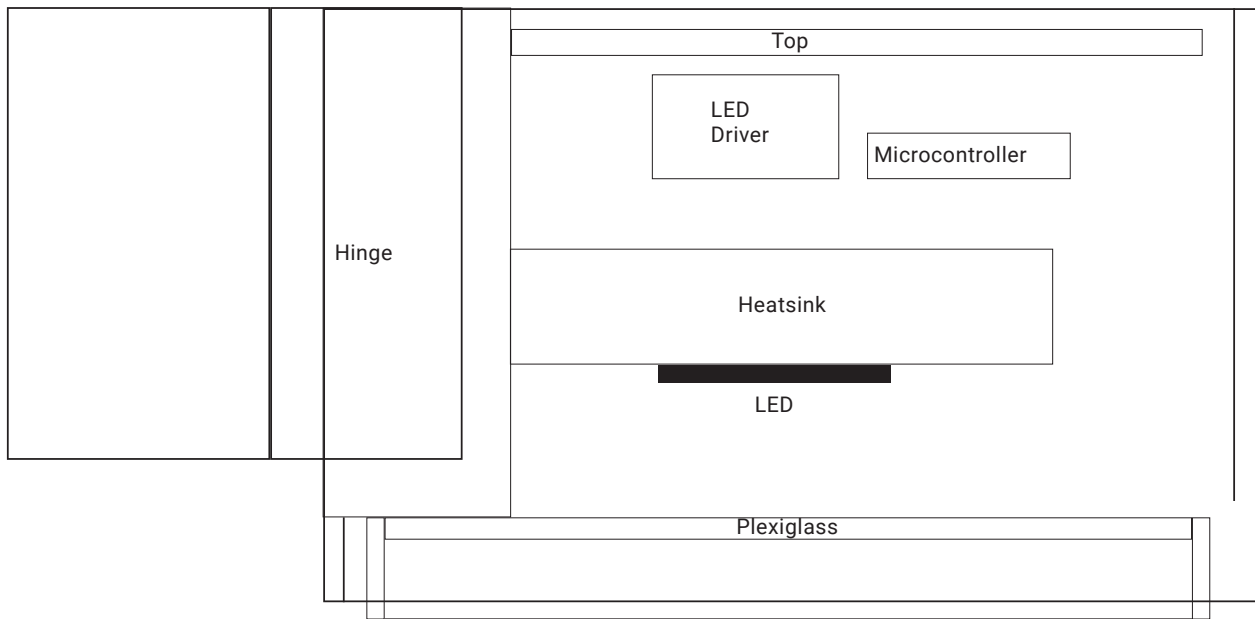
Dimensions	?
Input Voltage	80 - 264 Vac
Output Voltage	9 - 36 Vdc

The electrical components have been selected based on a number of requirements and specifications. First and foremost, the weight and size of the components has to be reduced as much as possible to prevent swinging of the light source. This was the reason to choose for a single COB LED. Secondly, the light quality (CRI) and light output (in Lumen) were an important aspect to be able to use the lamp for multiple purposes. As such, a task light requires a high amount of lumen, whereas a sofa light desires for less light output. This means the maximum lumen output had to be high and there should be a possibility to dim the light. The COB LED in combination with a LED driver allows for dimming, it also offers a very high CRI, giving realistic colors.

The heatsink for the COB LED was calculated according to the formula for thermal conductivity. A standard heatsink was found from Fischer Elektronik that provides enough heat transfer and fits within the shape and size restrictions.



Only weight, cable can move freely through the base



On the previous page the full electronic scheme is illustrated. Apart from the transformer, all electrical components will be in the light source. The transformer will be installed at the electrical plug. Above a more detailed image is shown with the electrical components in the right scale, showing it can all fit within the casing. The LED is purposefully placed with a certain distance above the plexiglass to achieve the best spread of light.

To ensure airflow around the heatsink to cool it, the glare protection and the top plate leave some space to the outer casing of the light source.



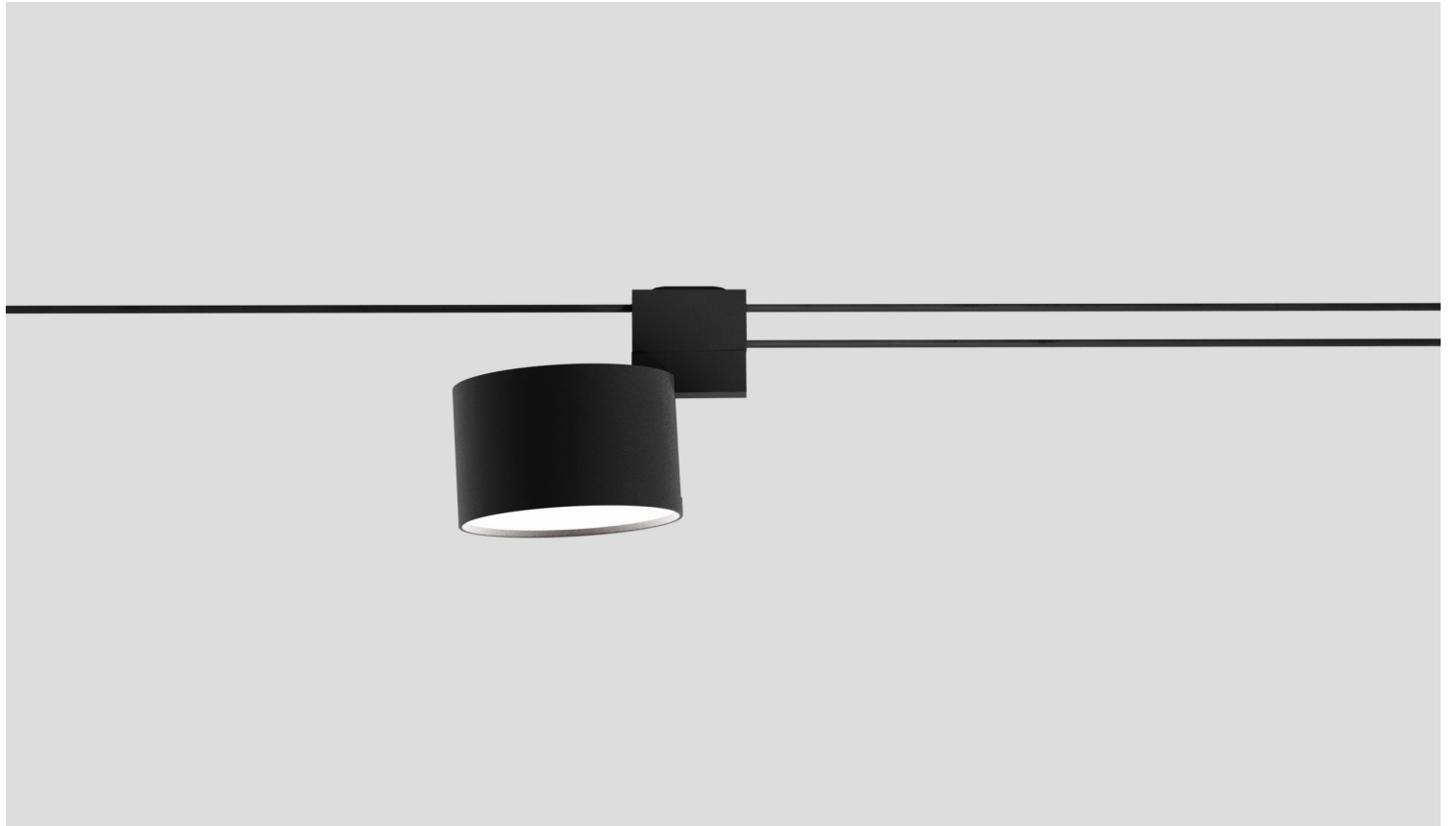
02.8

Finalization

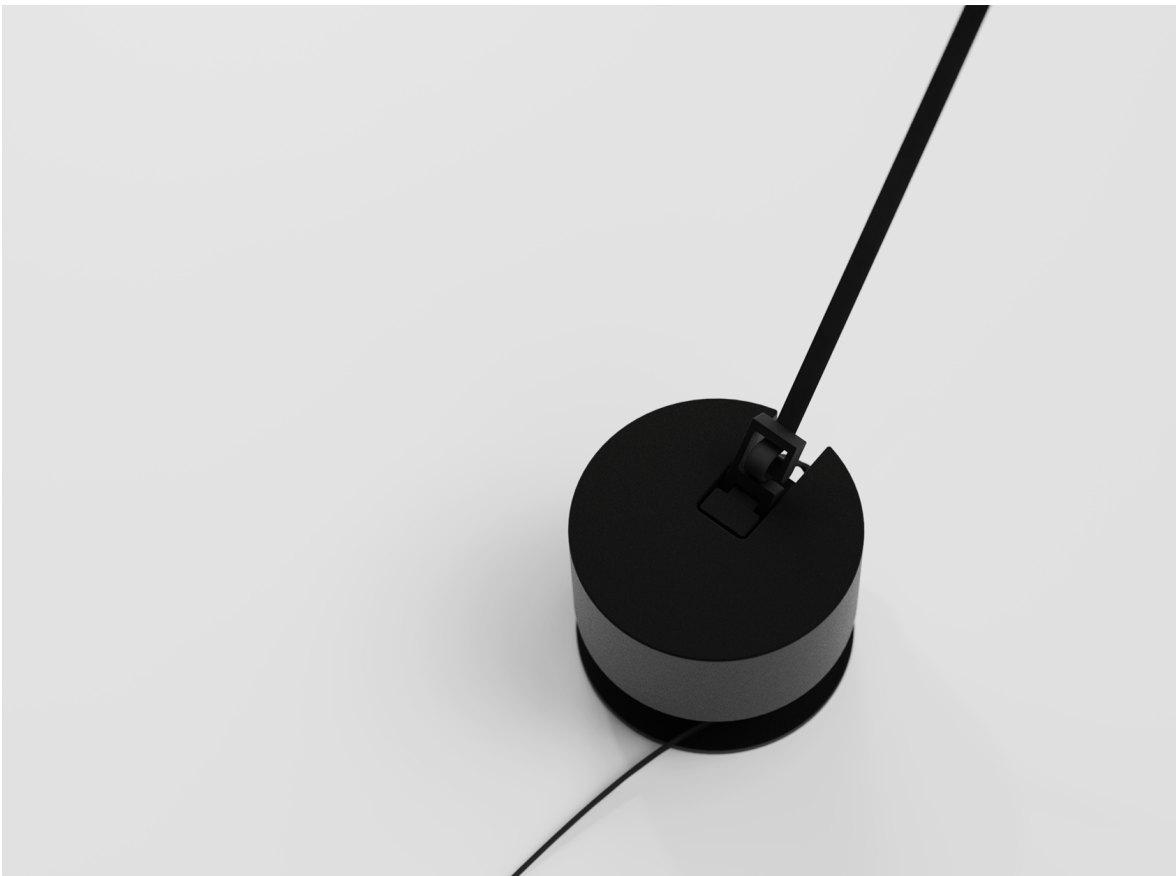
Extrapolate is an adaptable lighting solution that makes use of the relation to its context to take a meaningful position in the space. The luminaire consists of three parts: a first attachment or base, the lamp and the second attachment. The parts are connected by the electrical cable, which defines the light expression of the lamp.





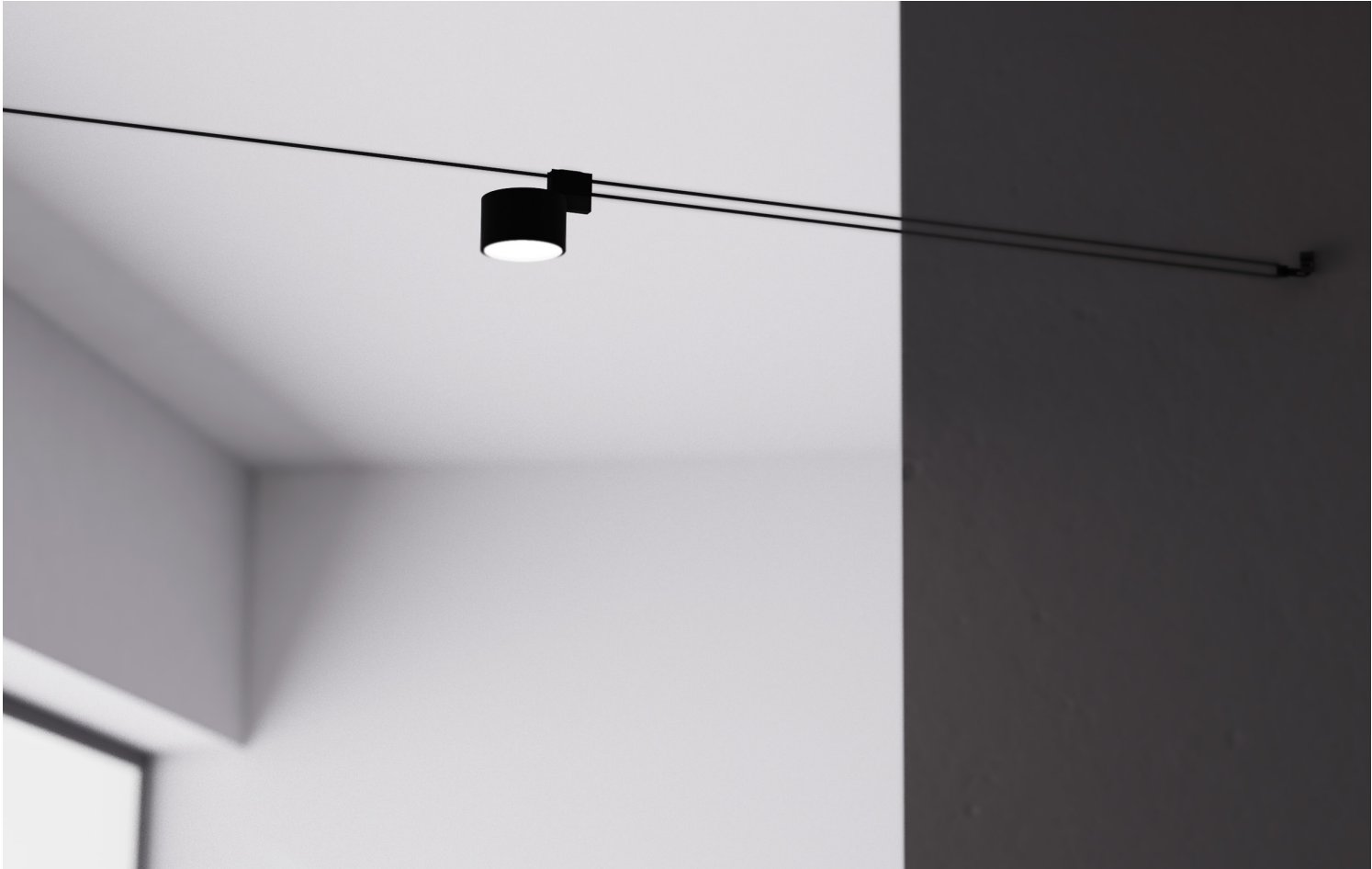


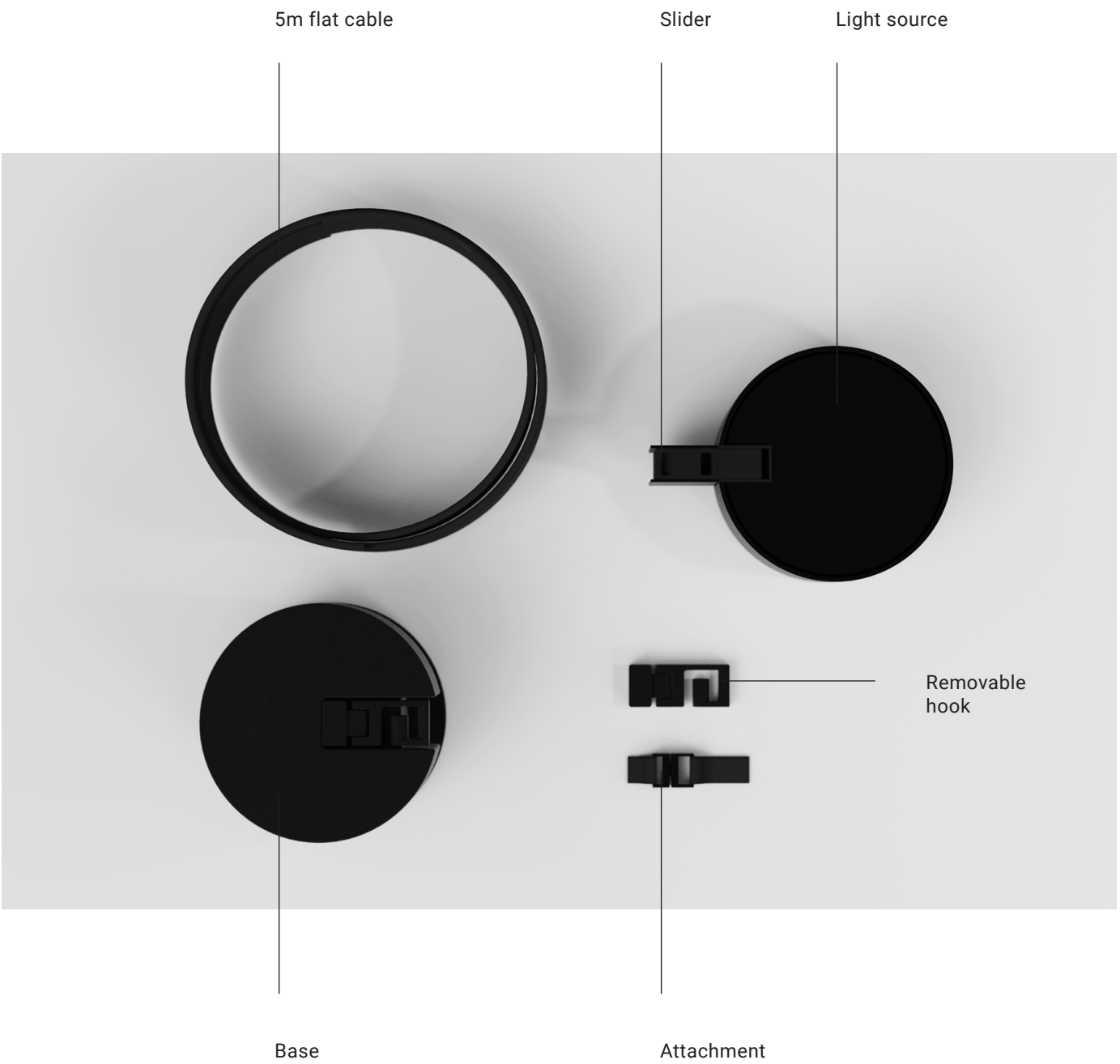


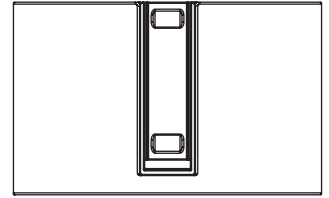
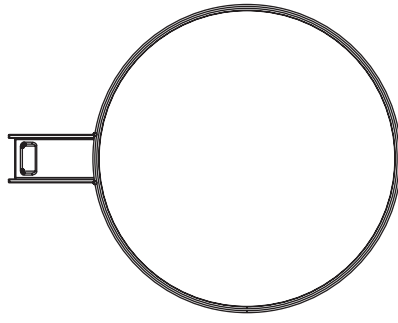












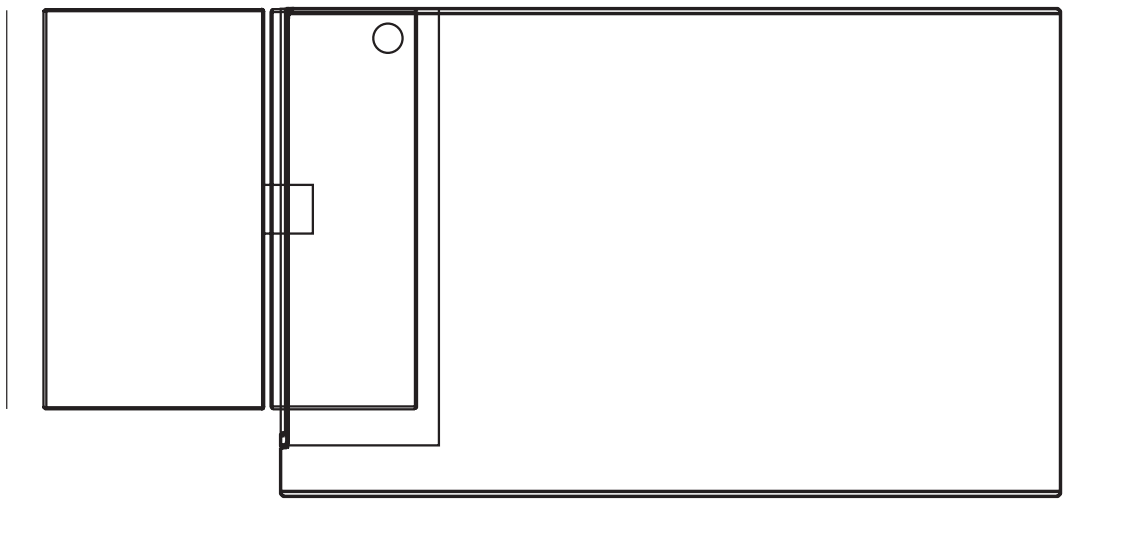
22.5mm

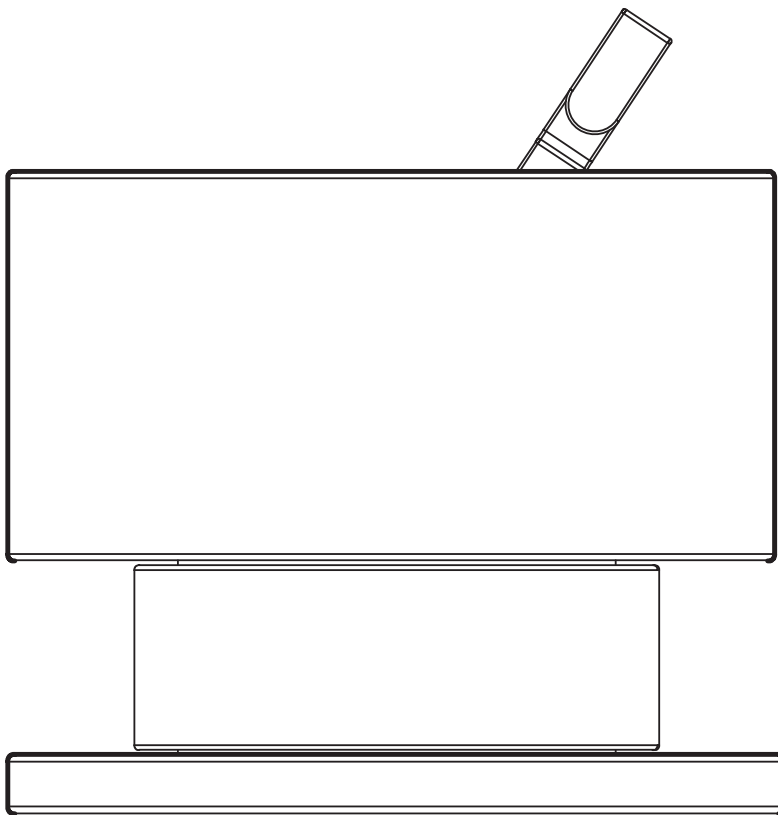
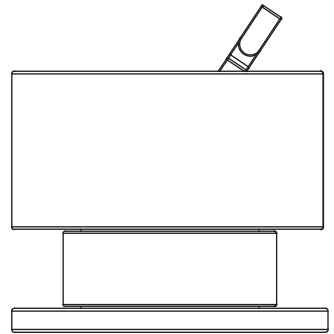
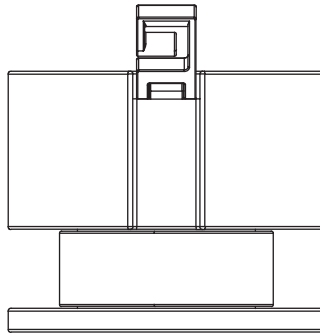
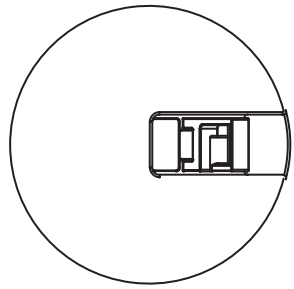
17.5mm

41mm

50mm

85mm



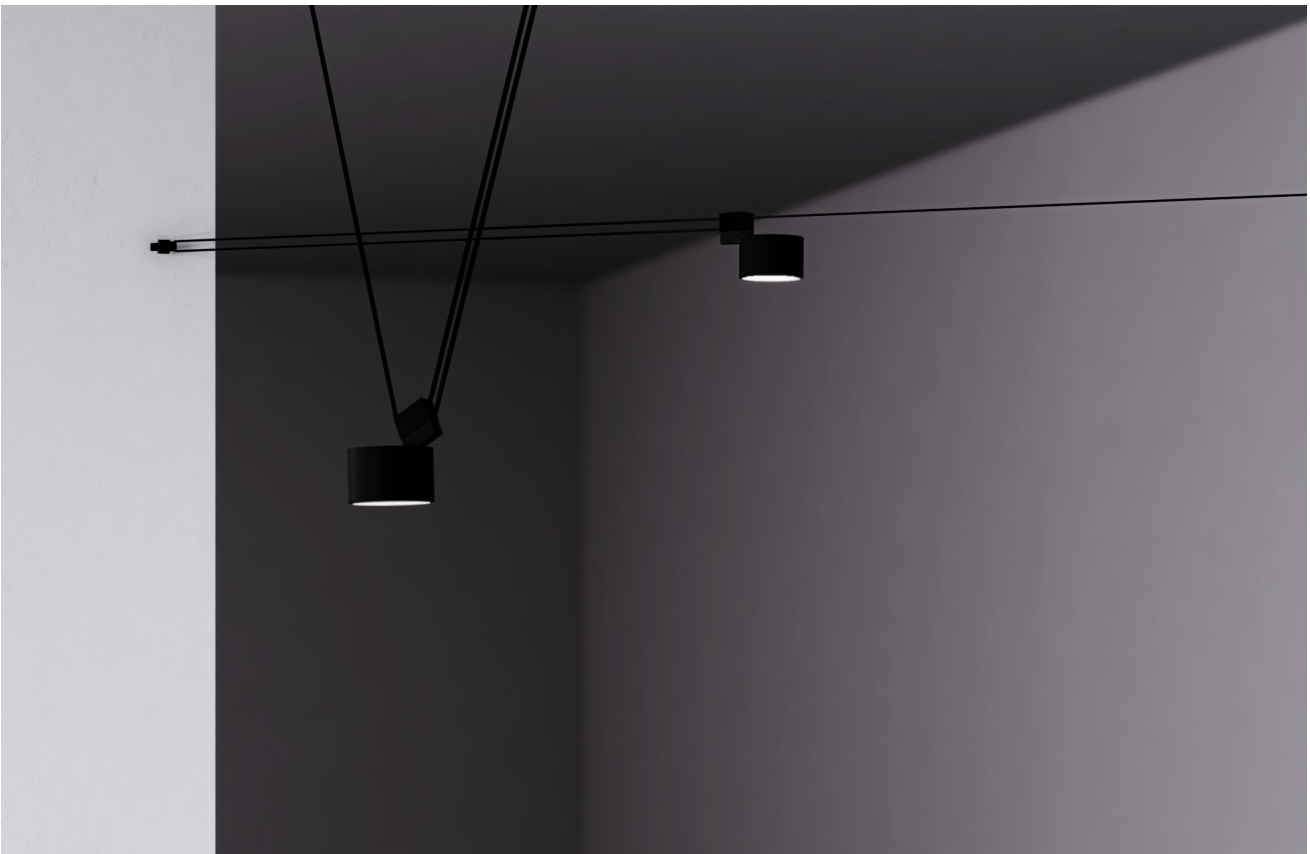


40mm

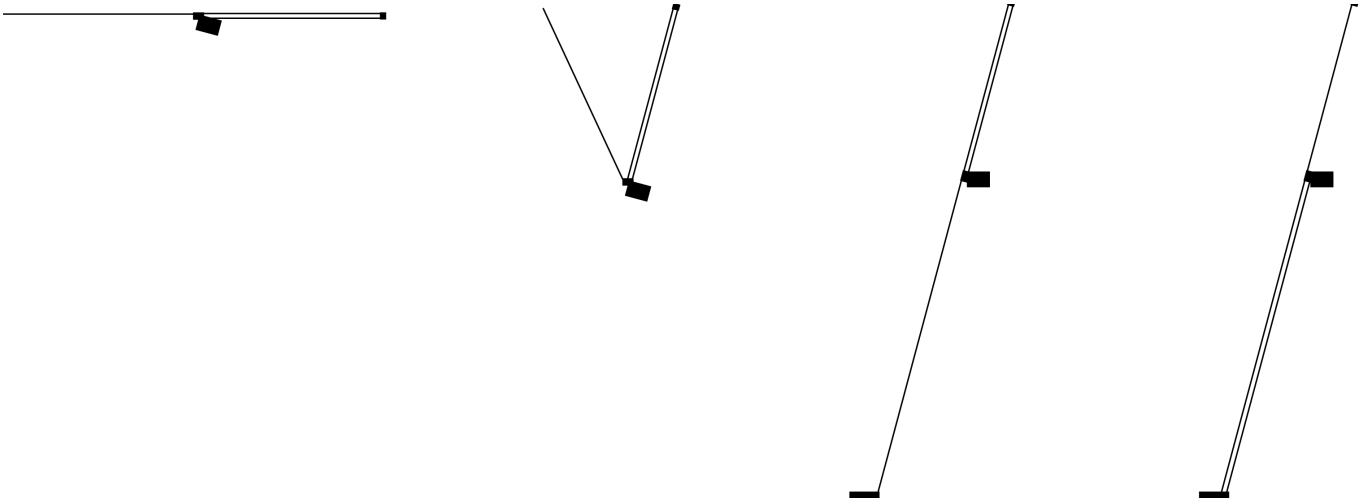
20mm

5mm

85mm







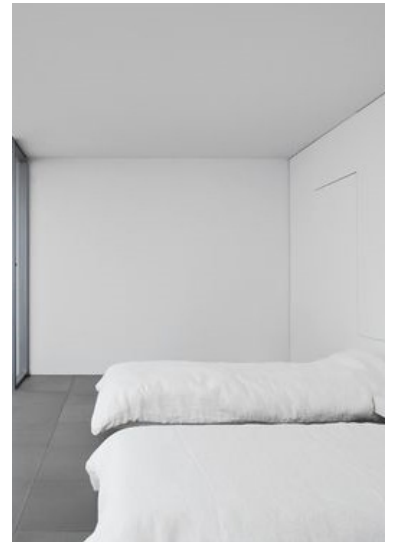
The result of Extrapolate is a feasible concept for a versatile luminaire that uses the context to extend itself. Even though it would need to be developed further technically, the development process that has already been done proves it is possible to bring it to the point that it is ready to be manufactured.

At the end of the concept the question arose if there is potential to expand the object to a family of luminaires following the same principle. However, given that there are so many different configurations possible in its current form, another variant is not adding anything to the possibilities, or covering any situations that it would not be able to function in.

03

Intersect

Extending object and context using intersecting surfaces



03.1

Ideation

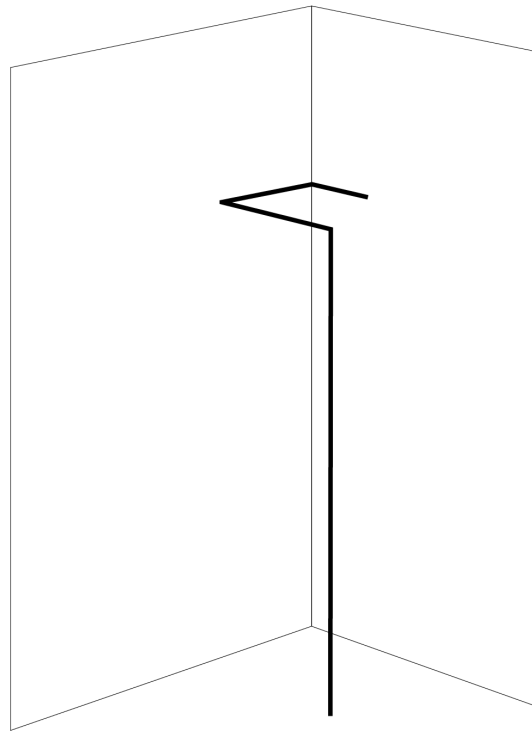
While working on the technical development of Extrapolate, I wanted to see if I could develop and strengthen the concept of the initial research by repeating the starting point in a different scenario.

Instead of making use of two points in the context, the goal of Intersect is to make use of intersecting surfaces, meaning two walls creating a corner.

The corner is often a difficult architectural element to work with. It can be hard to position anything in it, other than a cabinet or wardrobe, but it is best to keep empty as that will make the space feel larger. The process with Intersect, just

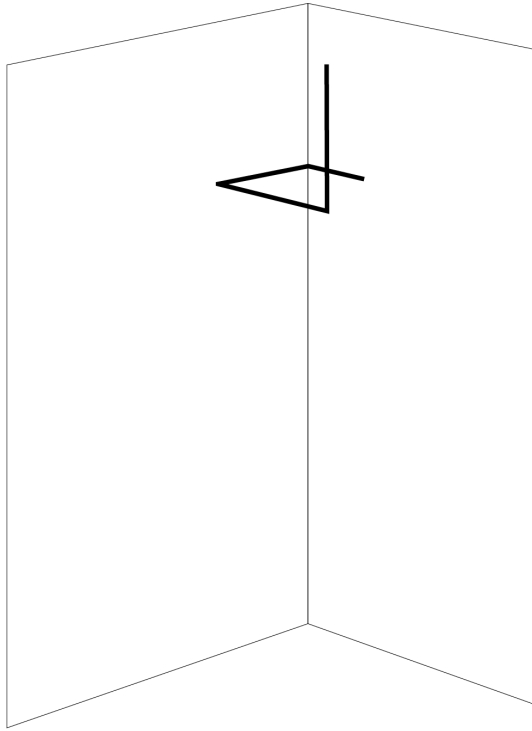
as with Extrapolate, is to include the context into the design process and instead of only relying on the corner, it should add something to the object.

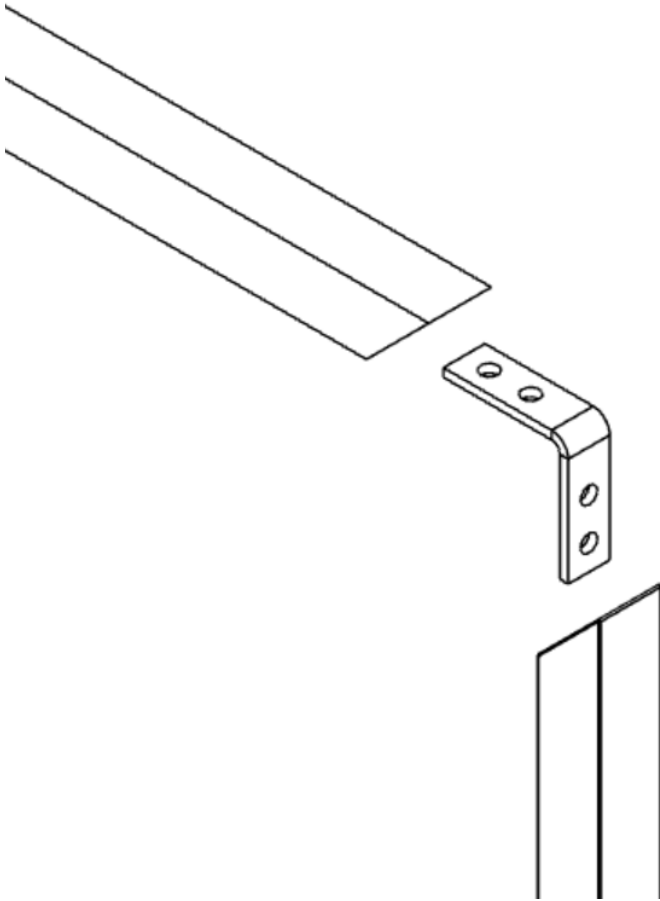
Inspired as mentioned before by often having storage solutions in corners, it felt like an interesting path to see if a corner storage solution could be made better by actually using the corner.



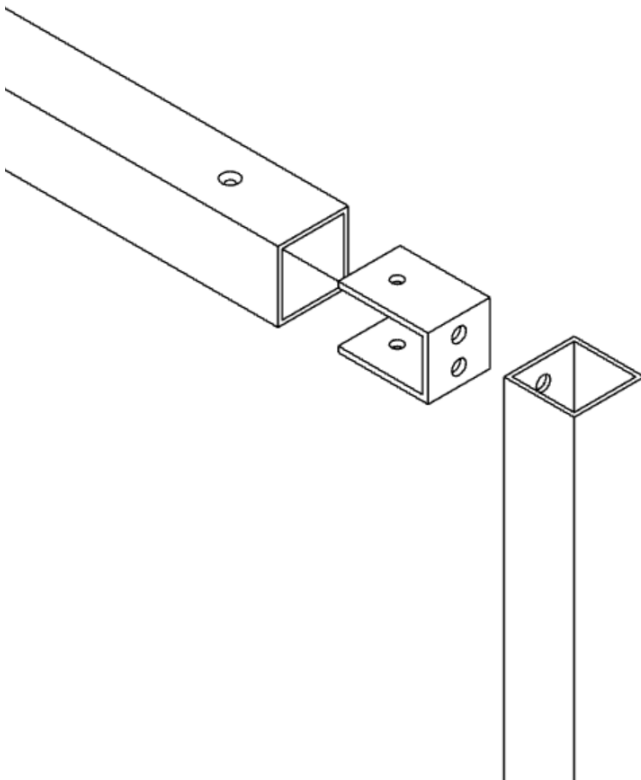
The key aspect of Intersect is that it is light in appearance, to ensure a spacious feeling in the context, while still adding function and meaning. It therefore made sense to work with a single profile to create something functional in the corner. Intersect is a minimal hanger, which fits a corner to stand freely without needing a base or foot. Made out of a single line, it has a minimal expression and almost appears as an architectural element.

To connect it to Extrapolate, the concept should allow for multiple configurations depending on what fits best and what is needed within the context. Therefore the complexity of the object is in its assembly and how it can be connected to intersecting surfaces in different ways.

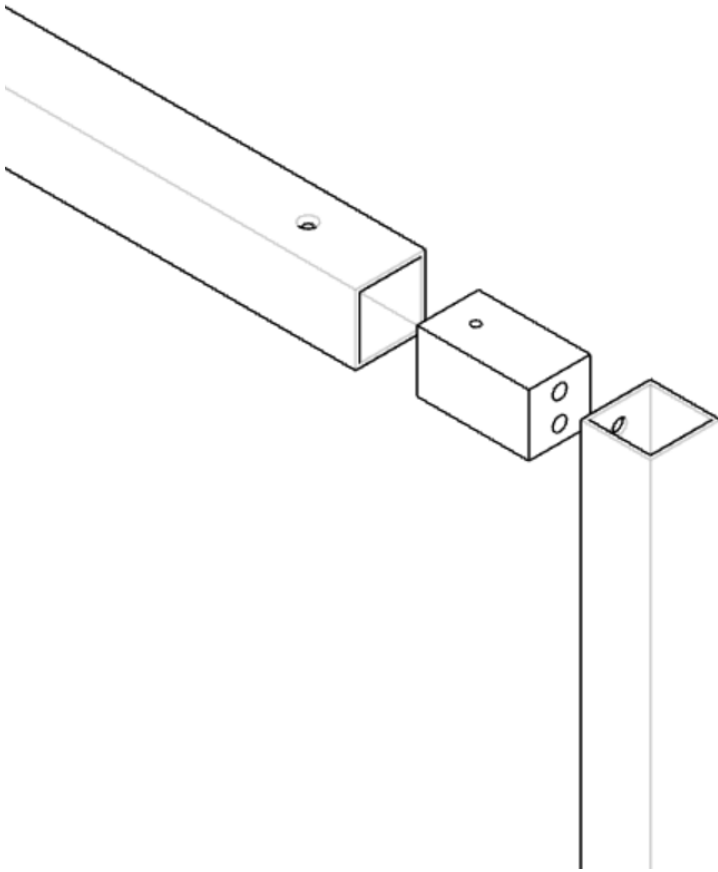




- + Strong connection
- + Good for manufacturing
- + Only 1 visible split line
- Not configurable for other side



- + Good for manufacturing
- + Configurable for other side
- + Only 1 visible split line
- Less strong connection
- Impossible/very hard to tighten the bolt and nut



- + Strong connection
- + Configurable for other side
- + Only 1 visible split line
- Not cost effective to produce out of metal.

03.2 Conceptualization

The crucial part to solve in Intersect is the connection between the beams. Since the object has to be able to fit to both a left-sided and right-sided corner there has to be some configurability with the same components. Next to this it should also be configurable to the version connected to the ceiling instead of the floor, which in total amounts to 4 different configurations. The connections then also need to still be strong enough to support the structure without any bending.


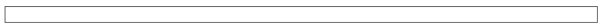
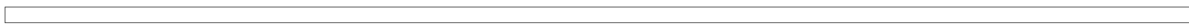


The possibility for different configurations requires a lot from the connection between the beams, since they need to be multi-directional. One of the goals in the connection has also been to minimize the amount of split lines and visibility of screws, as it will emphasize the minimal character of the object.

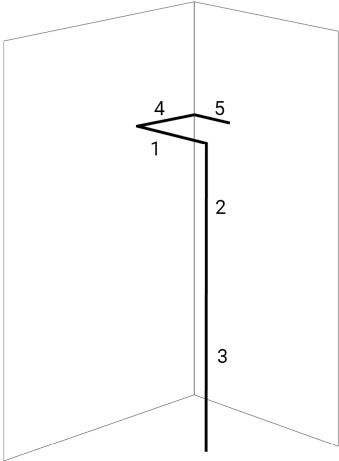
In the exploration of the connection a couple of things became clear immediately. The connection will need to be secured with a screw or bolt and nut, and to prevent rotation and support the weight at least 2 screws/bolts are necessary per connection side. The connection itself should be invisible as well.



03.3 Technical development

As a practical addition, holes have been added in the beam to connect it to the wall for added security. Even though it should not be necessary, adding it will relieve any concerns for safety in some environments, like public spaces.

- 1  600mm
- 2  600mm
- 3  1200mm
- 4  400mm
- 5  400mm



Splitting up the beams of square profile has been done with the intent to make it logical for manufacturing, transportation and assembly. The long beam is purposely not split up in the middle to offer two options in height when used for the ceiling configuration – facilitating both higher and lower ceilings.



03.4 Finalization

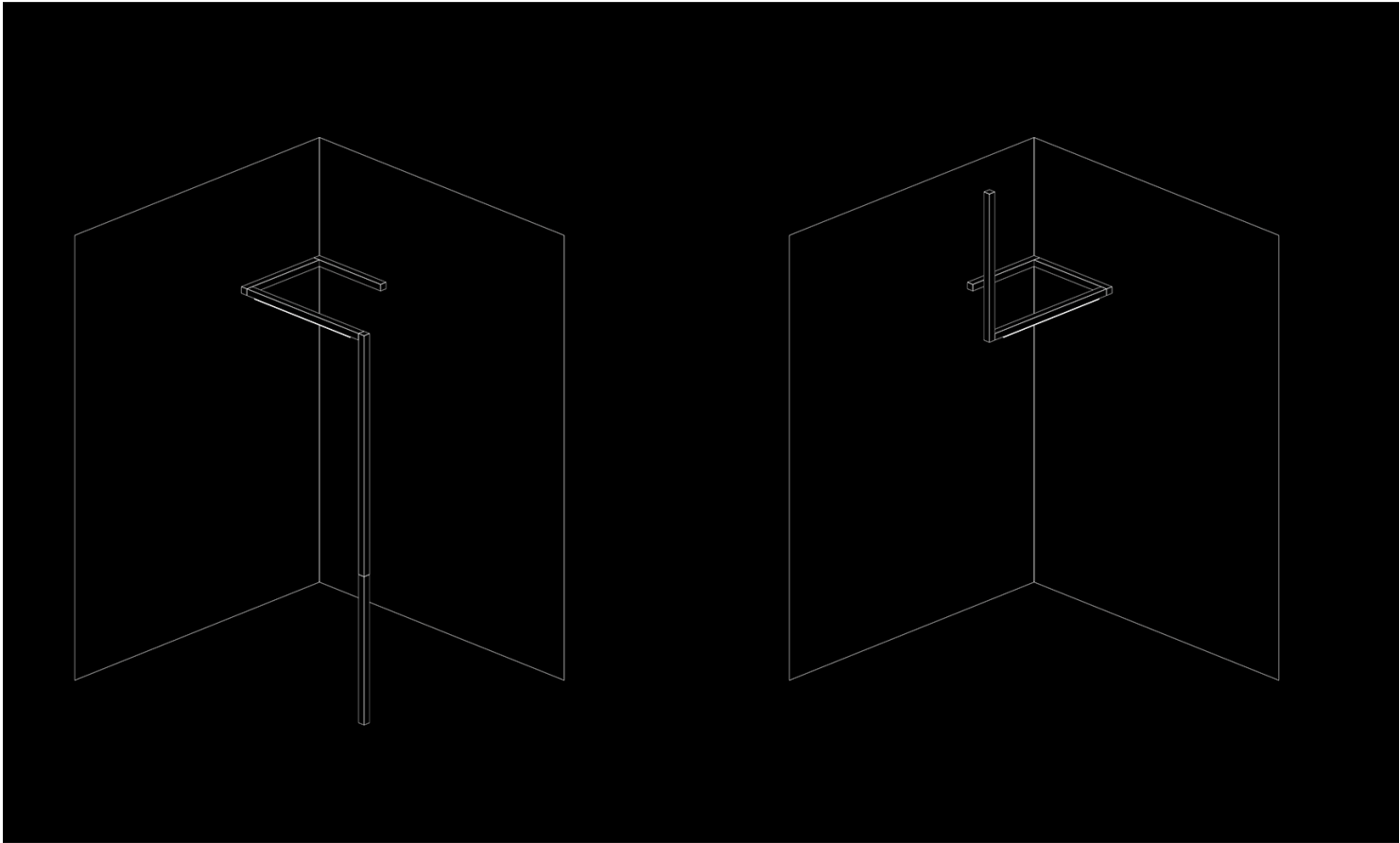
Even though it is a much simpler concept, Intersect connects to the conceptual starting point in a strikingly similar way as Extrapolate. It shows not only that designing with context is possible in multiple directions, but also that it can add value in different ways. The expression and configurability make it well matchable to Extrapolate, and even combinable.

A last addition to the concept was to add the possibility of a light source in the form of a LED strip, which works very well again as a single object, but also shows a whole new direction of possibilities in a lighting system.



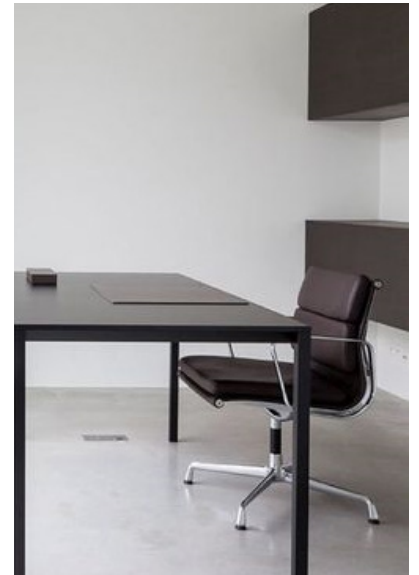






04 Offset

Extending object and context using a flat surface



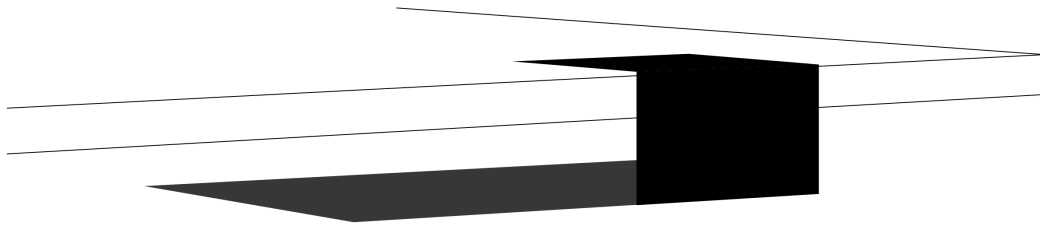
04.1

Ideation

The next step to bring this project and the set of objects further was to find a way to push the brief more. An idea came to mind that context doesn't always have to be a space as focussed on with the previous two concepts. Context applies in different scales, like a landscape or city can be the context of a building. With that in mind I decided to see if it was possible to consider another object as the context to integrate with.

Being reliant on another object can very rarely be seen already, and is then often called a parasitic object. However, similar as discussed before, these objects mostly just depend on another one or extend the already existing function, while with this project the aim is to add something new specifically by using the existing context.

As both other objects in this project have been interior objects, the most logical object that came to mind to consider as the context was a table, and more specifically its flat top surface, as it offers a wide range of possibilities. The table is a very archetypical object that has remained unchanged in its core for a very long time. It is such an integral part of any domestic and professional interior there is a lot of potential in application.



Following the other two concepts, this concept had to fit both the character and application of the others to form a coherent set of objects. Offset is a hanging table/desk accessory for storage of documents and smaller items, complementing and extending the top surface.

With working from home and smaller space living becoming more common, the object fits the need to store away work easily and out of sight at the end of the day. It extends the functions of a regular table with storage in a minimal and simple way.



When trying out the concept in cardboard a few things became apparent. First of all, it was necessary to have more edges when storing other items than just paper. When removing and putting the object, pens and smaller items kept falling off. Secondly, the edge on which it hangs needs to be extended to give it more balance and prevent it from tilting, and to give it more grip and make it harder to slide it off.

320mm

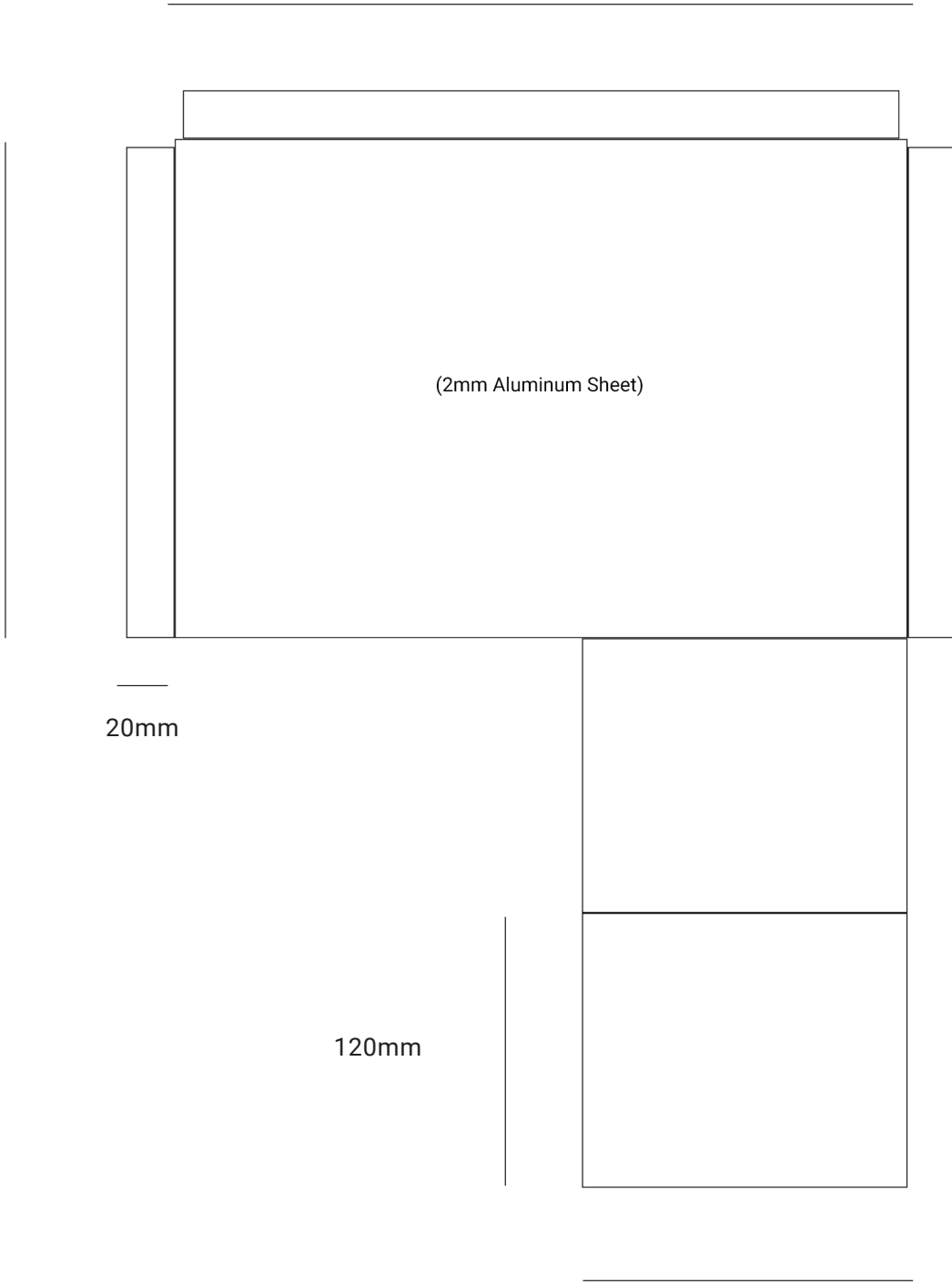
250mm

(2mm Aluminum Sheet)

20mm

120mm

140mm



320mm

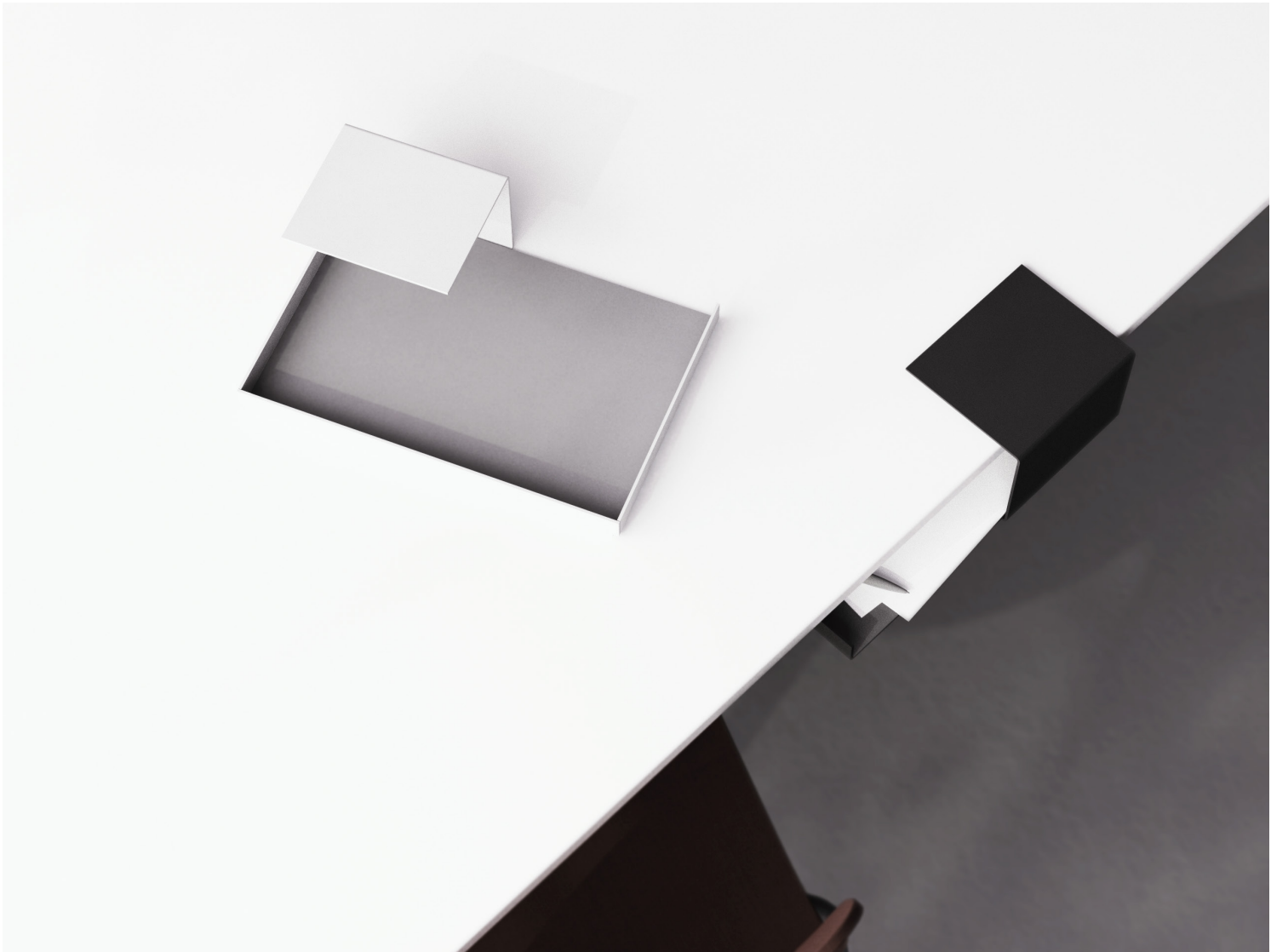
250mm

(Linoleum Insert)

04.2 Conceptualization

Offset is sized to be able to store A4 paper and other small items. The edges prevent things from falling out while moving it. It was chosen to not have an edge in the front, as the opening makes it possible to put in or take out items while it is hanging.

The shape can be cut from a single sheet of aluminum and then bent. On the previous page, it is illustrated in its unfolded form. A linoleum inlay prevents scratching of the aluminum and dampens sound when putting things in.



04.3

Finalization

The result is a simplistic object working together seamlessly with the simple archetype of the table. The outcome shows the initial thoughts and direction are still valid even if the context is set to a different scale than an interior space. Integrating with another object will of course not always work the same way, as the object needs to provide enough freedom to work with.





05.1 Conclusion

Extrapolate, Intersect and Offset build on the inherent meaning derived from the relationship between an object and its context. Through both theoretical thinking and practical experience, it's been possible to get a deeper understanding of contextual meaning by exploring, iterating and proving. As such, the process has been holistic and evaluated from different perspectives. What has become clear is that in a way, it is a new design method where a lot of importance, attention and focus is given to integrating the context into the frame of the project and making use of it in a meaningful way that enhances the object.

The awareness of this meaning and context makes sure that the right questions are asked in the design process to lead to something that adds value. In this case, the context has been very strongly involved into the object, but even if this happens less the questions and perspectives from contextual meaning are still relevant.

An interesting understanding coming from the practical experience is that the scale of the context is fluid, meaning it can be bigger or smaller depending on the subject and object. For lighting and furniture, it's a logical determination that the context is considered to be the space that it's in. However, as shown with Offset, context can be considered a table when zooming in more. The same can be done in the opposite direction, where context can be considered a building, area, city or even something larger. Within these different scales, the principle of designing with the context still applies, and in some cases is even more evident and relevant.

The three objects as a set convey that story conceptually and show an example how a context dependent object can be an advantage rather than a restriction.

In a way, it is a new design method where a lot of importance, attention and focus is given to integrating the context into the frame of the project and making use of it in a meaningful way that enhances the object.

05.2 Reflection

During this thesis work I have been able to develop and grow as an individual designer, both in the theoretical and analytical skills as well as practically going through the design process at a high level. The project required a wide range of skills, from conceptual thinking to more detailed product development and visualisation. It has helped to go through that process multiple times with the same starting point to work on a collection, which brought in new considerations as well in order for the objects to work together.

Since the start of this thesis the COVID-19 pandemic has induced restrictions in the availability of the workshops, and in the accessibility of people. However, I did not have a strong sense that it influenced my design process a lot, since I worked more with rapid prototyping using material and tools I had at home. This proved to be sufficient to make conclusions and continue through multiple iterations between digital and physical.

As this thesis has been an independent work, it also became a real experience into working as an industrial designer professionally, where it's not possible to rely or wait on external factors or tools all the time. In this process I also learned to be more decisive and allow myself to follow my intuition and background knowledge, rather than always having to find research or facts to support decisions. The flexibility of being able to work this way has proven my own initiative and motivation to work in design, and is convincing to me that I can contribute in a meaningful way.

05.3 References

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