CAR / PARK

DRIVEN AS SHARED VEHICLES

PARKED AS URBAN FURNITURE

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Chalmers School of Architecture + Department of Architecture & Civil Engineering
Architectural Experimentation | Examiner: Jonas Lundberg | Supervisor: Kengo Skorick

Thesis title: CAR/PARK: driven as shared vehicles, parked as urban furniture

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Fig. 1 *Les voitures pelouses* by Benedetto Bufalino photographed by Stéphane Bourgeois

ABSTRACT

No other tool has marked on a city's physical environment as significantly as a car. Nevertheless, an average automobile stays unused 95 percent of its lifespan (Sperling, 2018, p. 2). This paradox results in numerous private vehicles purposelessly occupying public areas, prompting the question: what if an automobile could serve a function while being parked within an urban environment to increase social life of public streets filled with parking spaces?

Once cars were popularized, they sparked passion among modernists which further led them to designing their own vision of an ultimate vehicle. However, as sustainability discussion arose, the presence of cars in cities has been questioned by architects in recent decades. In response, car manufacturers have been proposing new prototypes of urban vehicles each year. Nevertheless, such proposals often lack a deeper understanding of architectural principles, which keeps them isolated from the social fabric of urban spaces. This thesis aims to reintegrate an automobile into architectural discourse and infuse architectural qualities into transportation design, demonstrating how these two fields can mutually benefit from another.

To achieve complementary solution under Interdisciplinary Design Thinking, the thesis considers selective aspects at the intersection of architecture and automobiles. To present a universal guide through this juxtaposition of disciplines, the thesis follows a circular framework closing the design process in loops that filter all iterations through constant evaluation. The project approach is to answer the majority of needs in stages closest to architectural field of expertise and supplement them with solutions at a system level. The design is shaped by evaluating the architectural qualities that appear between a vehicle and an inconsistent surrounding it faces, which results are concurrently validated by interviews with professionals of the automotive industry.

Findings culminate in a concept of a shared vehicle that transforms into urban furniture while being parked. Prototype function in a fleet on a street level which is exploited through stacking possibilities, as well as on a city scale using systematic solutions contributing to the development that automotive industry has fostered on Gothenburg.

CAR / PARK

AUTHOR BACKGROUND

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As both an architecture student and professional, I have participated in numerous projects across various themes, scales and fields. Over time, I have gradually rediscovered my initial passion for car design, which I developed at a young age and have been increasingly finding it relevant to the architectural discourse. By maintaining my interest in the automotive sector while gaining education and experience in architecture, I have noticed significant similarities yet huge separation between these two fields. Such perspective has enabled me to identify the potential on the intersection of architecture and the automotive industry, which finally led me to conducting this thesis.

TABLE OF CONTENTS

Fig. 2 *Ship of fools (Home truth / Just in general)* by Erwin Wurm photographed by Eva Würdinger; © 2017 Erwin Wurm; used by permission

1. RESEARCH QUESTION

How to examine architectural qualities in automobile design to exploit social potential of parked cars within urban environment to (a) increase social life of public streets filled with parking spaces and (b) simultaneously embrace shared driving experience?

2. AIM / PURPOSE

The thesis aims to incorporate automobile design into architectural discourse and architectural qualities into transportation design, demonstrating how one field of expertise can benefit from another.

3. OUTCOME

The thesis begins with a reflection on the intersection of automobiles and architecture, which is later investigated and materialized in a vehicle concept. Therefore the outcome of the thesis consists of both a theoretical framework established to resolve the juxtaposition of these two fields, as well as a prototype that embodies such methodology in an exemplary project.

The theoretical outcome strives to evaluate most crucial aspects of a vehicle design and put them in position to spatial qualities of urban parking spaces . The framework aims to put light on conflicts of the interests of these two professions and bring them further as design challenges to discover new possibilities for a vehicle presence in an urban environment.

The final concept serves purpose of a public shared city vehicle that transforms into urban furniture after being parked. Prototype's static potential is fully exploited while being stacked in a group, which aligned together create a bigger piece of a temporary street architecture. Vision represent dualistic character of its purpose throughout design both pragmatically and aesthetically. The initial task has opened up a fresh perspective on a vehicle as not only part of architectural environment but potentially a representation of architecture itself. Concept manifests architectural qualities and possibilities that can be implemented in car design envisioning an alternative role for cars in future cities.

4. BACKGROUND

Introduction

The broad context of the thesis is pictured by the inefficiency of automobiles within urban transportation. While automotive industry explores transport solutions such as vehicle sharing, the architects are fighting for decreasing the role of automobiles within contemporary cities by absorbing parking spaces and redesigning them into public spaces. Despite the fact that passion to automobiles among architects of the previous century contributed to unsustainable development of cities, with which we struggle up until this day, a higher level of attention was laid on automobile's potential in answering the needs of the time. Meanwhile the local context of Gothenburg pictures a significant role of local car brands development on the city planning.

4.1 GLOBAL

The role of a car in everyday life has been gradually rising since assembling first line production car a century ago. No other tool has marked on the city's physical environment as a car did. Although, when it comes to compilation the scale of its influence with frequency of its usage, a clear paradox appears. According to statistics, an average car stays unused about 95 percent of its lifespan (Sperling, 2018, p. 2). Taking that under consideration, it is easy to visualize the proportion between number of vehicles that are in motion concurrently with those occupying public space of a city landscape.

Fig. 3 *Saturn commercial* © 2003 Goodby Silverstein & Partners; used by permission;

Automobile

The state of affairs established in modernism has remained unchallenged until a discussion around sustainability of the automotive industry has arisen. Contemporary urban planning relays on public and human-powered transport, but there is no doubt that an automobile stays a matter of choice, when it comes to fulfilling particular needs of the individuals. Therefore, the industry managed to enter the next phase of its development. It is not only by electrification or automation of vehicles but also by developing the concept of sharing a ride.

Although car sharing in the form functioning today has been popularized last decade, the first car sharing program according to Sperling and Shaheen has already been introduced in 1948 (2000, p. 6). A further attempt and one of the first materialization of vehicle sharing service has came into life in the Netherlands in 1973. ‚Whitaker' was the first shared electric vehicle prototype followed by a whole infrastructure and a costumer service system, that was exclusively designed for car sharing not using already existing regular passenger cars. A vehicle was a two-seater cylinder-shaped two-seater that could have been renter from one of a few charging spots looking similarly to modern bike sharing stations.

Throughout the years, car sharing services have got popularized worldwide pushing the automotive industry to find a new typology for vehicles of such a public character. Together with sharing functionality, electrification and automation, representation of these values resulted in certain new arrangements and aesthetics.

As mentioned before, it was 2010s that outlines modern experience of on-demand transport thanks to development of technology which resulted in sharing platforms expansion and consumer adoption (Sperling, 2018, pp. 56-61). As a response the automotive industry have taken the challenge up and entered a new conceptual design phase, preparing for upcoming automation era. This trend resulted in numerous shared, electric and automatic prototypes being crafted, which could be distinguished among three different scales. Per each category one example is presented in order to visualize characteristics of such vehicle types.

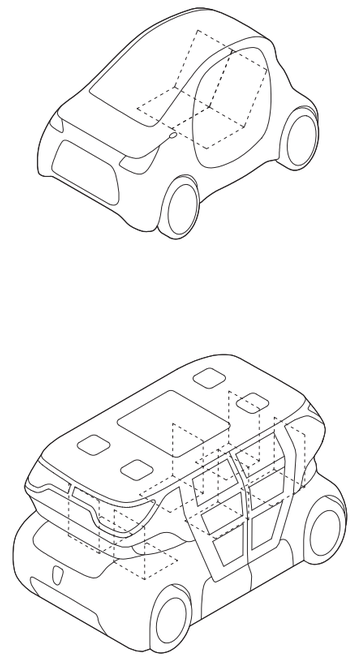


Fig. 4 *Illustration of exemplary shared electric automatic prototypes;* own work

Smart Vision EQ

The concept present small urban-scale vehicle including two seats that could be shared among two separate costumers (McNabb, 2018). Such a vehicle type doesn't differ much from a regular one as both of the seats are facing the dashboard. However, it doesn't contain controls, though, yet features an informative screen for both of the users. A similar screen is additionally placed on the outside of a vehicle aiming to welcome user's once their approach the car. Stylistically, design follows minimalistic rules represented by a smooth form and a plain body surface that can be adequately found in other modern electric vehicles.

NEVS Pons Sango

Next example works as a representation of an automobile which dimensions were pushed to maximum to achieve highest usable area, yet fitting standard vehicle footprint. This vehicle type goes typically with two rows of seats facing each other, among each one is at the front and the other at the back of the vehicle. In the case of Sango, interior was complemented with one additional row. The automobile was designed for ride-sharing usage (Lorente, 2020), which is an expansion of car-sharing experience to sharing a ride with other service users heading the same direction. Almost symmetrical arrangement has been reflected in exterior volume providing axial design that can be found arguing against transportation design principles, that always stood for dynamic and clear vehicle's direction distinction.

Toyota e-Pallette

Originally prototype was a small bus-scaled capsule, which initially introduced exchangeable interior modules opening the vehicle for various functionalities, however the final concept was produced in a standard version (Clifford, 2025). Arrangement of a vehicle recall traditional setting of public transport including multiple seats by three walls of a vehicle as well as standing places. One unoccupied side ended up being the only accessible point featuring wide low-entry doors that could be easily accessed from elevated bus stops by people on a wheelchair. The vehicle found to be used during Tokyo 2020 Olympics as a mean of transport around the area limited to the Olympic Village.

Clear direction to automation of shared mobility has found its realization just in recent years due to artificial intelligence development. Currently pioneering service providing shared automatic mobility on regular streets is Waymo. They are using regular passenger cars equipped with numerous cameras and scanners artificially attached to vehicles' bodies, while other companies as Zoox are recently launching first robotic taxi's designed specifically for automatic control on streets.

Given the complexity of these solutions, where multiple factors interact with each other, systems need to be established. Examples of communication models responding to that are Vehicle to Infrastructure (V2I) and Human to Infrastructure (H2I) (Mostowfi & Buttlar, 2020, pp. 147-155). Both of them aim to link a human with a vehicle through system that exchanges data between them and infrastructure. Usage of autonomous systems release a big potential, especially in parking management, where such vehicle can drive a user to one's destination and find a relevant parking space independently afterwards.

Architecture

While automotive industry focuses on finding sustainable mobility solutions to respond to contemporary problems in order to secure their interests, architects answer with an opposite approach. Most common movement appearing while transforming city centers involves adjusting the balance between a pavement and a roadway in order to create public space for social life, which is a reversed process to expansion era of the road infrastructure happened in the last century.

One of the few most recognizable large-scale examples would be the transformation of New York's Times Square committed by Snøhetta. Such initiatives are usually long-term processes that are managed on a city planning level, which provides pedestrians with less crowded pavements equipped with recreation spaces at the expense of drivers' accessibility.

On the other hand, such initiative can happen on much smaller scale, regardless city planning changes or authorities' intervention. Parklets are a result of a singular, or multiple parking spaces transformed into small-scale recreation areas working as a sidewalk extensions. Although less spectacular outcome, such solutions are possible to be implemented anywhere and can be done by individuals as a bottom-up interventions.

Artists alike architects usually share a critical view on the presence of cars in modern cities, however they express it in a playful way. Benedetto Bufalino for example, redefines the role of a car in cities by adapting them to usages that deviates from its original function alike ping pong tables, swimming pools, disco balls, or city lanterns. His work, such as "Les voitures pelouses," (Fig. 3) where he plants grass on upside-down cars, creates a surreal yet oddly familiar scene for urban dwellers.

A different approach takes Erwin Wurm by experimenting with the physicality of various objects. In his "Fat sculptures" (Fig. 4-5) series, he gives cars and buildings an obese appearance, highlighting the relationship between humans and these objects. This method brings attention to importance of object's identification and a tendency to impersonate automobiles through the lens of their owners.

Although it was architecture that primarily outlined design of vehicles, starting from a very first carriage, cars has also came by influencing architectural world not only on urban scale, but also stylistically. Such occurrence has came into life most vibrantly in the 20th century.

Fig. 5 *Fat House* by Erwin Wurm © 2003 Erwin Wurm; used by permission

Fig. 6 *Fat Car* by Erwin Wurm photographed by Arthur Evans © 2002 Erwin Wurm; used by permission

On the intersection

The further the development has been progressing, the clearer the separation between architecture and automobiles got. However, that has not always been the case. In modernism era, some of the greatest architects of their time have been trying their hand at car design. This phenomenon was clearly determined by the expansion of motoring era in the early stage of 20th century. Among those were Le Corbusier and Buckminster Fuller. Both of them have designed iconic car prototypes that were to be a vision of the future of automotive industry.

Le Corbusier is well known from his fascination with machines, often broadening machinery concept into such fields as architecture. The role of the relationship between a car and a building was clearly stated in Toward a New Architecture:

"If the problem of the dwelling or the flat were studied in the same way that a chassis is, a speedy transformation and improvement would be seen in our houses"

(Le Corbusier, 1986, p. 133)

It was only a matter of time for him to propose his vision of the perfect automobile. Voiture Minimum was a compact car, which volume was defined by minimalist geometry and space efficiency (Amado, 2011).

In contrast to his principle, Buckminster Fuller introduced Dymaxion Car (Fig. 6-8). This prototype, named after 'dynamic-maximum-tension,' (Maneval, 2018) stood in opposition to what Le Corbusier would propose three years later. Dymaxion featured an aerodynamic cylindrical shape which resulted in half fuel consumption comparing to any car of the time (Norman Foster, 2011). An interesting fact is that the car has met its representation in architecture. Dymaxion House was a former result of implementing the same nomenclature within a building.

Either standing for the minimum or the maximum, both of the projects experimented with efficiency, while highlighting their relationship with architecture. Although both concepts weren't necessary realistic, they have made an unquestionable impact on further industry development. Norman Foster, in interview while opening of Dymaxion reconstruction exhibition said:

"I would never pretend that this is [...] a blueprint for a car of today, technology has moved on, but there are lessons to learn from the past, important lessons"

(Norman Foster, 2011)

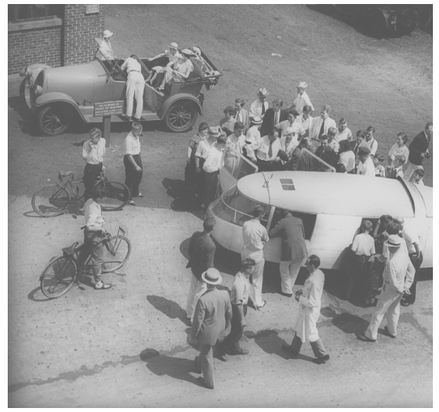


Fig. 7 *Dymaxion Car by Buckminster Fuller: general overview* 1933 Lincoln, F. S.; CC BY-NC-SA 2.0

Fig. 8 *Dymaxion Car by Buckminster Fuller: interior view* 1933 Lincoln, F. S.; CC BY-NC-SA 2.0

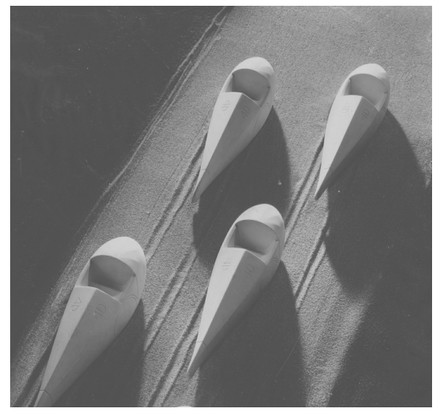


Fig. 9 *Dymaxion Car by Buckminster Fuller: models* 1933 Lincoln, F. S.; CC BY-NC-SA 2.0

Fig. 10 *Volvo manufacture in Gothenburg* 1943 Gullers, K. W.; CC BY-SA 4.0

Fig. 11 *Saab 95 delivery by train* 1959 Gustafsson, A.; CC BY-NC 4.0

Fig. 12 *Transport of Volvo bodies by train to Gothenburg* 1955 Nilsson, L.; CC PDM 1.0

4.2 LOCAL

Sweden is well known for originating several recognisable automotive companies, of which most recognisable ones headquarters in Gothenburg. Therefore, automotive industry has put a significant impact on city's development. A few of the biggest investments in the city of recent decades was part of transport infrastructure. Among them are Götatunneln – a car-traffic tunnel flow under the city old town and Västlänken, an underground railway tunnel that is currently under construction. Additionally, there was even a plan to construct a cable car system across the city, however the project did not ever come to fruition. Moreover, the city contains a few automotive-themed facilities spread across the city. These are not only factories of previously mentioned brands, but also newly opened World of Volvo, brand's museum and event venue. Companies not only influence on municipality investment focus but also treat the city as a test bed for implementing their new innovations. Industry's impact on city urban fabric is surely indisputable, although what matters as well is its high impact on city's identity and legacy as a city that is associated with automotive development.

5. THEORY

Introduction

The thesis is built upon principles of Interdisciplinary Design Thinking, which result in combination of different theories.

The automotive context is framed by Daniel Sperling's Three Revolutions (Sperling, 2018). His theory states for implementation of electric, autonomous and shared vehicles as a key to make future of automotive industry sustainable. Continuing reflection of Mario Bellini on unexplored potential of an automobile in human's life (Bellini, 1972), the thesis brings out a term of a Third Space, as a social surrounding of human life, that goes after home and the workspace, and apply it to the means of transport.

In terms of architectural theories, the thesis primarily draws from Soft city (Sim & Gehl, 2019) and Urban Acupuncture (Lerner, 2014). The former emphasizes scaling density of city infrastructure to a human dimension, while the latter stands for implementation of numerous interventions in a small scale that results on a large urban areas transformation. Framework i is additionally put in juxtaposition with a term standing for solutions in temporary character called Ephemeral Architecture (Ferreira, 2025).

Fig. 13 *Volvo office in Gothenburg* 1943 Gullers, K. W.; CC BY-SA 4.0

CAR / PARK

Automobile

With contemporary era of automotive development comes number of challenges that are described in Three revolutions: Steering Automated, Shared and Electric Vehicles to a Better Future (Sperling, 2018) (Fig. 18). Three Revolutions set a division of the switch that is currently happening within an industry into: electric, shared and automated. Every of these vehicle features meets certain doubts.

Electric vehicles face challenges in both becoming affordable and meeting expectations of range and charging time. Meanwhile, sharing rides with strangers can raise concerns about sacrificing passenger's' chase for comfort. Finally, the automation of driving can lead to lack of trust in computers responsible for one's safety.

Those doubts can be either dispelled or reinforced. Both optimistic and pessimistic scenarios are presented in the book, and it is rapidly being brought to attention that we shall not allow the negative vision to materialize. Three revolutions stand for a theory according to which the upcoming changes are crucial for bringing automotive industry into sustainable future. So as to achieve it society need to be prepared for the upcoming.

This aspect was discussed by Jonah Houston in his article Driving is so last century, let's bring back the horse (Houston, 2015). By using a simple metaphor, author compare the interaction between a car and a driver to the relationship between a horse and its rider. According to current state of affairs, transferring control to s vehicle equals command and control paradigm, which automatically suggest the machine requires oversight. What author states for is to redesign a model of this interaction into a relationship, where clear division of roles leads equal exchange where human no longer a supervisor, rather a partner:

"The rider picks the destination. The horse picks the steps. Each task is equally distinct and important and leverages their respective strengths. The horse is not controlled by the rider. They have a common goal with a shared outcome. It's a partnership."

(Houston, 2015)

The demand for a change was already noticed by Mario Bellini in Kar-a-sutra: Italy, the new domestic landscape (Bellini, 1972) (Fig. 19). Although it wasn't time for a discussion on the three revolutions states yet, the author already touched on problematics of an automobile, when it comes to sustainability. Half century ago, an indispensable change for automotive industry was already stated by Bellini:

"It is principally in this perspective of human space in motion that the automobile must discover its own proper role, the reasons for its own survival as a positive force."

(Bellini, 1972)

As a solution, author introduces term of the Mobile Human Space represented by his prototype called Kar-a-sutra. According to the concept an automobile shall be intended for human, nor automobile rites. It should be a living room on wheels. Such description brings definition of a car closer to become example of the Third Space. Such places are explained as social surrounding of human life, that goes after two most usual areas where each spends his life: home ("first place") and the workspace ("second place"). According to this theory a car works as bridge between our various site of habitation, which provokes a discussion about the importance of treating it with the same consideration as the time we spend within its interior.

Architecture

It is impossible to elaborate on a future of urbanism without considering transportation challenges. It is the reason why mentioned above optimistic visions for transport are expressed in a few urban theories, such as New Urbanism, Smart City or Soft City. The last one has been introduced by David Sim and Jan Gehl in Soft City: Building Density for Everyday Life (Sim & Gehl, 2019) (Fig. 20). The vision that book stands for is about scaling the density of every factor of infrastructure to a human dimension. While elaborating on a role of a public space in human life, following definition of a street is stated:

"[...] a direct and dynamic connection [...] between the static world and the mobile world"

(Sim & Gehl, 2019, p. 103)

In such light, the definition can be expanded and applied to automobiles as integral components of the street. Just as the relationship between architecture and transport is characterized by the static meeting the dynamic, a car can either remain stationary or be activated. That hidden agenda shows a true dualistic nature of an automobile, which is contemporary expressed only partially.

Following on urban scale, the thesis draws form Urban acupuncture. The term, which is investigated in Urban Acupuncture (Lerner, 2014) (Fig. 21) by Jaime Lerner refers to numerous small-scale targeted interventions that aim to transform larger urban areas. The theory symbolically relates to traditional Chinese medical practice, with the goal to release stress from urban environment to create space for social regeneration.

A small scale exemplary solution in the topic of the thesis, could be parklets - pop-up sidewalk extensions created on a place of a former parking space. While such a single intervention doesn't need to be done under any a bigger plan as Urban Acupuncture theory assumes, thesis concept brings function of parklets on a systematic level.

Moving from an areal range to a time range thesis work in a spirit of Ephemeral Architecture. Theory states for a switch from treating architecture as a fixed matter, rather standing for transient structures able to adapt to changes quickly (Ferreira, 2025). Project squeeze temporarity understood in traditional architecture matter to even shorter time frame thanks to mobilized character of a prototype.

Thesis finds its approach joining Ephemeral Architecture with Urban Acupuncture frameworks through application of short term impact, yet on a bigger scale. Adjusting this approach to mobility solutions, the positive impact can be distributed even more equally across the city, than by immobilized structures.

On the intersection

By juxtaposing architecture and automobile industries, this thesis will be founded on the principles of Interdisciplinary Design Thinking. It is a practice of collaboration across various fields with an emphasis on integrating diverse perspectives in order to achieve innovative design solutions. The thesis is built on belief that the relationship between cars and architecture can become positive rather than remain in conflict. Building the thesis on foundation of this theory aims in achieving a comprehensive outcome as a result of a research.

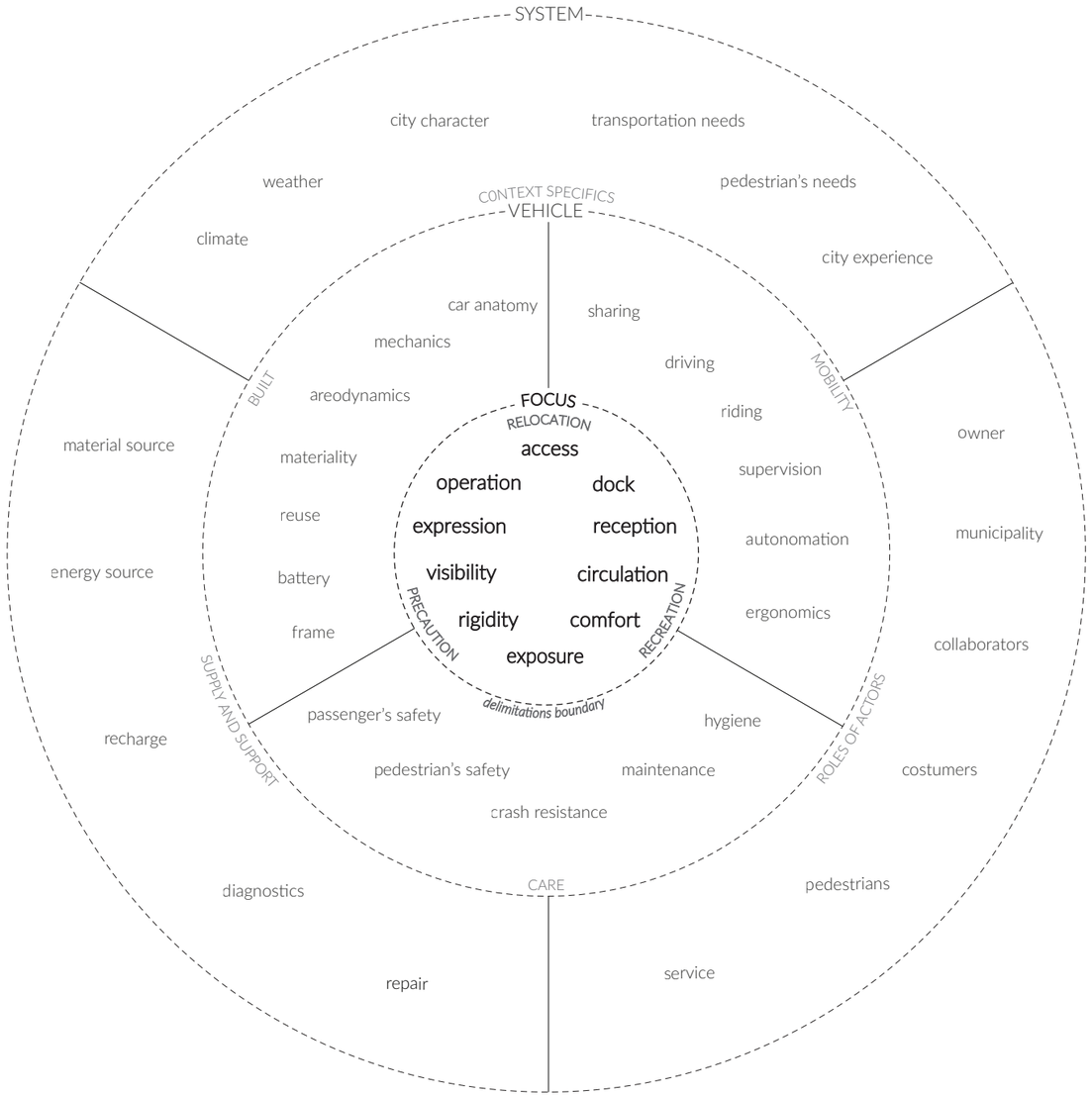


Fig. 14 *Diagram layering delimitations;* own work

6. DELIMITATIONS

As thesis's concept oscillates between various fields and scales it naturally requires attention on multiple levels. To acknowledge all of these layers three fields of expertise on a system level have been specified consequently followed by three aspects on a vehicle scale.

Actors

To develop a service of on a city level numerous stakeholders need to play their roles to enable stable functioning. First is the owner of the service who would be responsible for managing a fleet. Secondly it would be a municipality that plays a crucial role in integrating the service into the cityscape and collaborating on legal matters. For income generation, some commercial partners would be likely involved. Finally, there are costumers and other users of the service.

Supply and support

The next level of expertise would rather touch on resources and technical support rather than who is responsible for what aspect of the service. This category contains elements such as energy and material source, as well as recharging logistics which are crucial for overall carbon footprint of the whole service. Additionally, vehicles diagnostics and repair would play a crucial role for extending life-cycle of each product.

Context

Last of system's elements are all aspects determined by the local context in which it is implemented. Starting form the geographical background, including things such as certain climate and weather, through emphasis on city's logistics and transportation needs, finalizing on social context based on the characteristic of the city and its inhabitants.

Mobility

As the first factor that needs specification going down to a vehicle scale is the logistics of its usage. In a light of current technology, a question on supervision above a car arises. Should a car be operated by a driver or should be automated instead. Further level of its usage would be sharing strategy, if subscriber rent a vehicle on his own or if he shares a ride with others heading the same direction.

Care

As an unavoidable aspect of vehicle design stands safety and maintenance. A transportation tool needs to remain safe both for its users as well as for other participants of a traffic. On the other hand of caring comes maintenance and diagnostics of a vehicle, especially important due to abnormal exposure on weather conditions and wear.

Built

Responding to all traffic characteristics answers need to be find in a vehicle's structure. On behalf of this category stands automobile anatomy which could be defined as a set of limited components that creates mechanical system of a car. Such elements need to be taken under consideration while arranging car interior and exterior. Additionally, there as aspects as materiality or aerodynamics of a form that need to be considered.

However not every aspect of the concept will be expanded in this thesis. Questions stated in categories on a system level are answered for the purpose of the concept but are not deeply explored. Following up, aspects on a vehicle level are taken under consideration but not all of them are prioritized. Finally, for the sake of delimitations, the thesis follows certain level of focus, where most crucial factors resulting from mentioned above categories are examined with a special level of understanding.

Intention of the thesis isn't to investigate and report complete history of the relationship between a car and architecture. It is also not to explore each field of this intersection. What thesis specifically focuses on is an exploration of parked vehicles as an architectural space and unleashing its social potential as urban furniture, without ignorance on limitations of both professions with a limited expertise in an automotive sector.

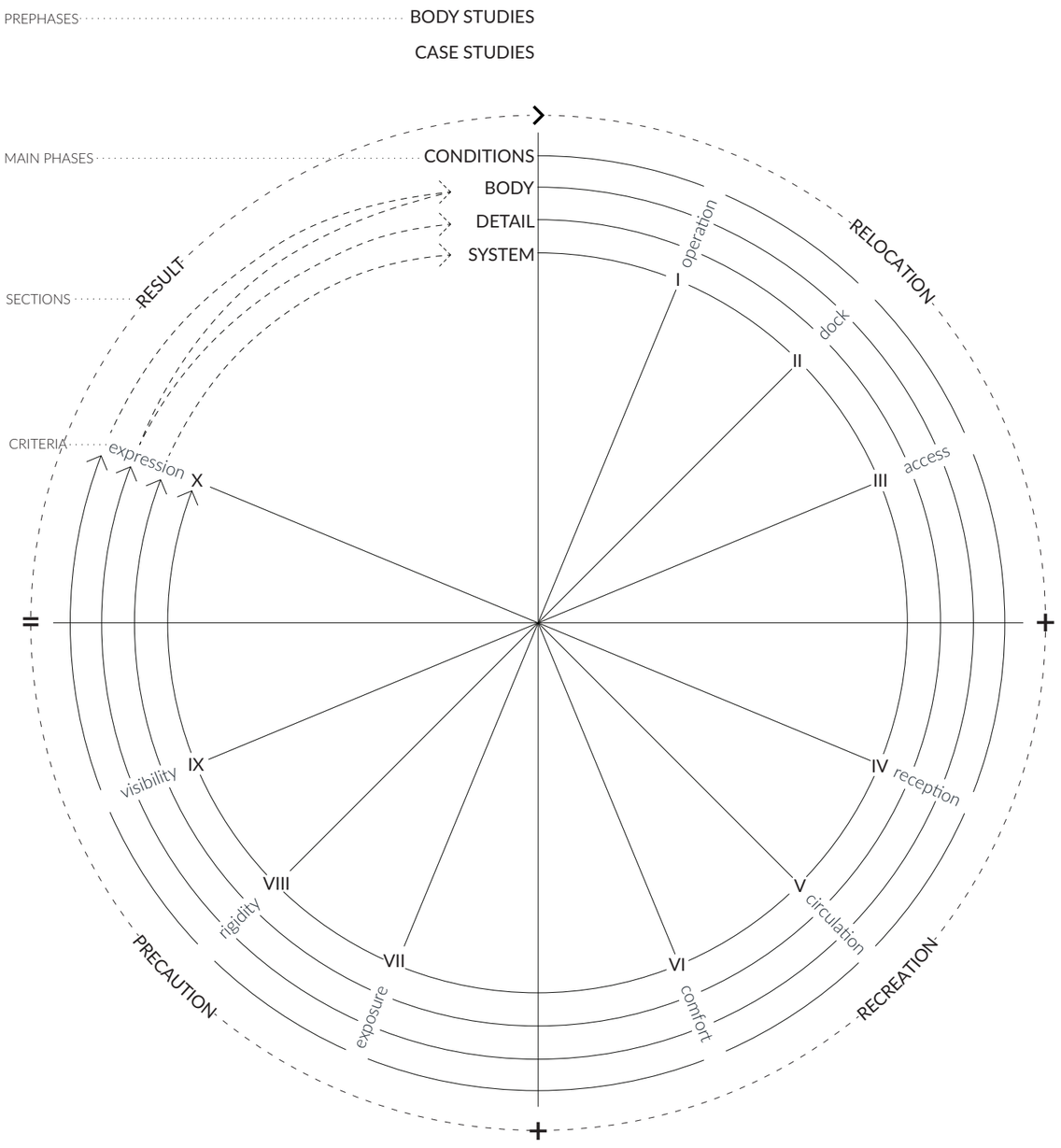


Fig. 15 *Circular framework diagram;* own work

7. METHOD & STRUCTURE

As the thesis explores an uncharted territory under a juxtaposition of two separated industries, it strives to develop its own framework, that has been arising non-linearly throughout the process. A blueprint for the thesis workflow is introduced presenting selectively chosen aspects on the intersection of an automobile and architecture. Such a circular guide closes all design phases in loops that filter successive iterations through constant evaluation. The strategy is to answer the majority of needs in early stages, which are closest to architectural field of expertise and supplement them in further phases with solutions at a system level. Each cycle consists of three sections of criteria, formulated in equation:

RELOCATION + RECREATION + PRECAUTION = EXPRESSION

In order to present the method accurately, it is gradually explained further in a booklet beginning with a breakdown of process phasing. While prephases serve mainly inspirational purposes, the first main phase identifies problematic for the whole thesis becoming a foundation for the upcoming design. While the body phase aspires to propose a universal answer for identified problems, detail phase presents rather an exemplary solution based on previous findings not forcing it to become an ultimate solution. Lastly System phase zoom out the scale of the prototype and gives a glance of logistic behind the concept in order to bring the prototype closer to reality.

PREPHASES

Body studies

The first approach attempts to study different car body types through architect's lens. Same as architects use the term of typology, car industry uses body types. Usually, cars are being categorized in terms of their capacity to transfer goods or people, whereas the phase aims to reflect on their spatial qualities that has potential to be used while being parked. The method results in diagrams showcasing results of the exploration.

Case studies

The following investigation consists of case studies on experimental vehicle prototypes featuring architectural qualities. In opposition, this study doesn't take under consideration production vehicles, rather concepts representing values ahead of its time. Correlation of these vehicles with architecture can be either functional, defined by their shape, or characterized by any other feature. Mapping them serves as a method that define the ground on which the final project is designed. Drawings finalizing this phase aim to picture patterns between various concept in order to identify the most qualitative features that appear in the niche of architectural vehicles.

MAIN PHASES

Conditions

Initial step of the design process is to identify all possible ways how a vehicle can be situated towards an urban environment. Therefore, the thesis explores all possible consequences that comes with particular situation additionally compiling it with a vehicle built and functionality of its usage.

Body

Based on conditions analysis, first design attempts are done. Multiple iterations at a schematic level of detail are proposed and therefore valuated based on previously set criteria. Results of valuation are brought to another round which are consequently put back on the loop of verification in order to achieve most efficient finale effect. Valuation process focuses on both fulfilling architectural expectations and engineering efficiency. Iterations that do not meet pragmatic guidelines are eliminated, and concepts that require adjustments are repeatedly redesigned.

Detail

After finishing elimination process of car's blueprint, proposal is taken into detail level. The overall development of the design includes methods such as sketching, 3D modeling and visualizing. All challenges identified in the conditions phase that haven't been fully answered through with a body are being revisited with a hope to answer them in the current phase. On this stage results are being searched both in a design of a vehicle as well as among technological solutions. In order to meet requirements and expectation of automotive design practice, interviews with professionals of that sector are being held to gain feedback on different stages of detailing the project.

System

The last step of the design process is to locate concept in a conceptual system. This requires identification exemplary problems that needs to be taken care of on such level. Systematic aspects that according to thesis delimitations are apart from its focus are set in a very schematic way, however its introduction is crucial for understanding the overall concept of a project. The development of a model for a system of such vehicles is based on existing communication models. This model considers the dualistic usage of a car, both in motion and while parked. It also reflects on the vehicle's life cycle, economic aspects, and the symbiosis between vehicles, forming a fleet that is highly integrated into the urban fabric.

CAR / PARK

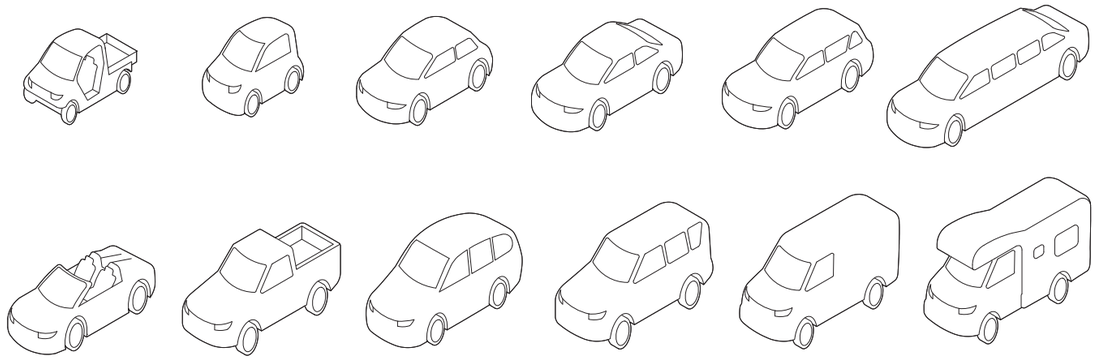


Fig. 16 *Car body types;* own work

8. PREPHASES

8.1 BODY STUDIES (next page)

Aim

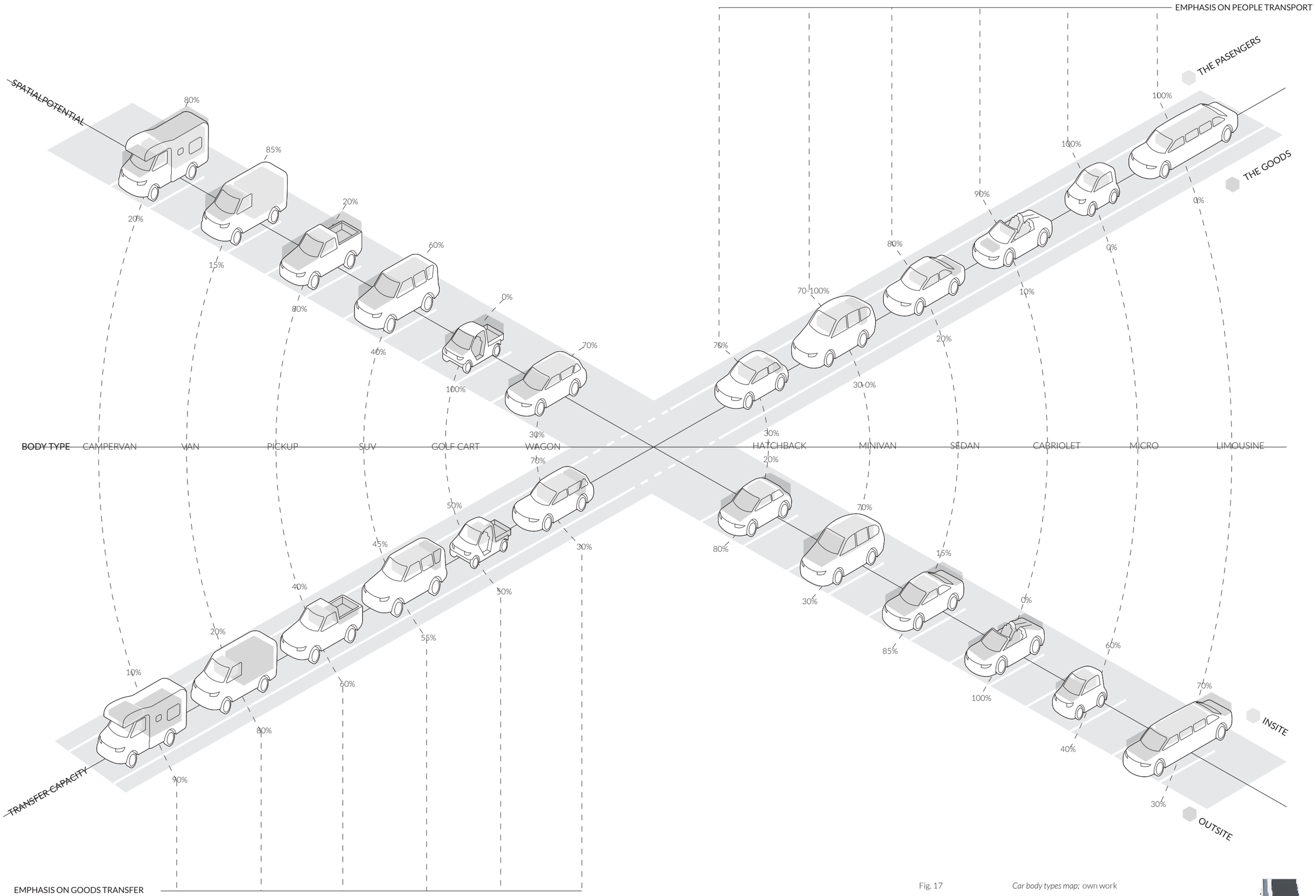
Second study brings different categorization of automobiles to the table. This time the subject of the research is not a set of groundbreaking prototypes, but every regular vehicle. A car has always been a subject of division between different body types. They are originally understood as various kinds of car body shapes that refers to different transfer capacities. Meanwhile, for the case of this thesis, additional values are added to this categories. The experiment investigates spatial values of all car body types and reinterpret them into typologies by reflecting which space, either interior or exterior, can be used while vehicle remain parked. It gives an architect's perspective on the shapes of the cars, that usually are designed to serve the motion efficiency.

Conclusions

The study result in a map that showcase two dimensions of usage of every car body type. First axis shows transfer capacity divided weather the space is used by people or the goods. Body types are showcased in the order determined from this category, starting from vehicles used for cargo transfer, ending on automobiles putting impact on transporting people. The other axis shows the spatial potential, that car has when its parked divided either it refers to interior or exterior.

The results shows that relationship between two category isn't linear. There are both spacious vehicles that are meant for people as in goods and the space cam be either exposed or sheltered. The study showcases how individual every car body tape should be approached. For instance, a pick-up truck has a potential for using its trunk as an outdoor recreation space, while a camper-van can easily serve as an urban living room by simply opening its door.

BODY STUDIES

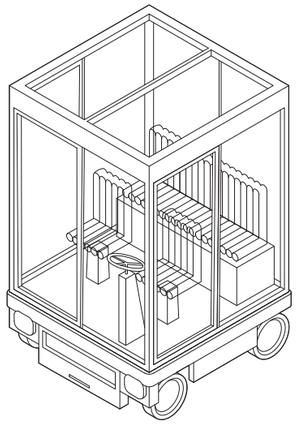


CAR / PARK

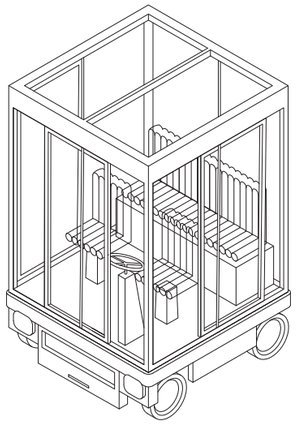
CAR / PARK

Fig. 17 *Car body types map;* own work

EXTERIOR VOLUME



ACCESS POSSIBILITIES



INTERIOR QUALITIES

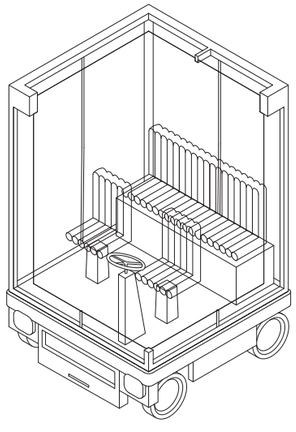


Fig. 18 *Quasar Unipower;* own work

8.2 CASE STUDIES

QUASAR UNIPOWER

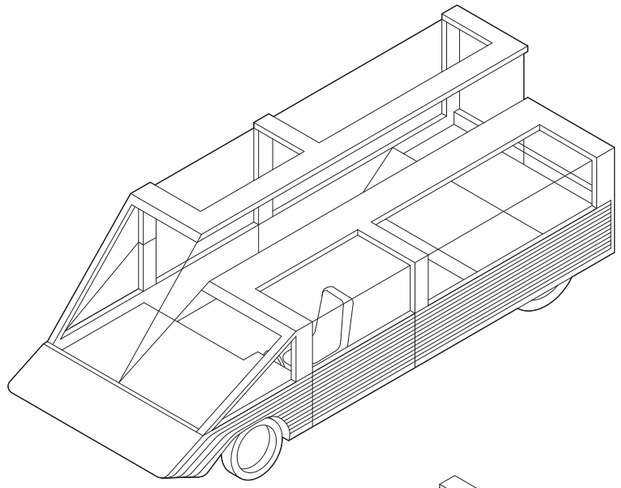
Quasar Unipower, also known as The Cube Car, was designed by French- Vietnamese engineer and designer Quasar Khanh (Hulford, n.d.). The car was a small utility vehicle in the shape of a transparent cube, produced in limited number between 1967 and 1968.

The five-seater had sliding glass walls-doors and allowed easy access from three sides including the front. Its speed was limited to 95kph, which seemed enough for its purpose of city car. Due to rectangular plan, the cube could park perpendicularly in a parallel parking space, especially in a situation where there wasn't enough space for either full car, or to perform regular parallel parking maneuverer.

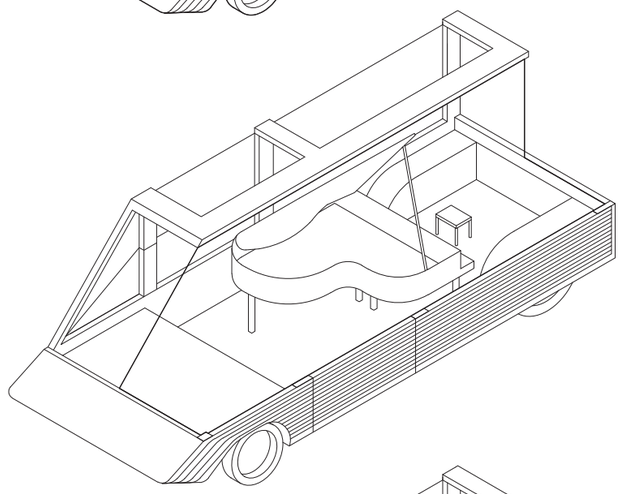
The designer wasn't known from designing cars, but he gained popularity thanks to his inflatable furniture line Aerospace. Nevertheless, the vehicle heavily mirrored his interest in transparent and inflatable volumes. Not only every side of the car, beside the floor, was covered in glass windows, but also the seatings were transparent.

Despite the project might seem ridiculous and it obviously met some difficulties when it comes to thermal, privacy or safety conditions, it definitely brought attention of the public, which proof we can find in the fact that it was featured in French television. Meanwhile for the purposes of my thesis I find the car to be a strong symbol of what juxtaposition of architecture and automobile could look like. Although the experiment was a bold manifesto, some pragmatic features related to accessibility or parking possibilities must have inspire latter car designers.

EXTERIOR VOLUME



ADDITIONAL FUNCTION



INTERIOR QUALITIES

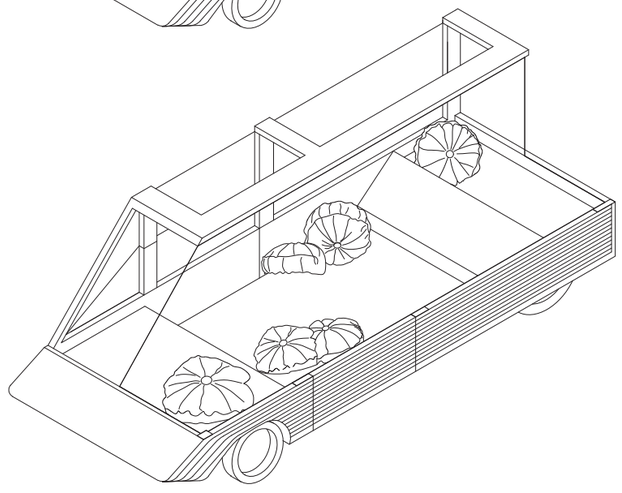


Fig. 19 *Citroën Kar-A-Sutra;* own work

CITROËN KAR-A-SUTRA

Kar-a-sutra is a concept designed in 1972 by the renowned Italian architect and designer Mario Bellini (1972). Although it represented a car it doesn't serve transportation function, it rather focuses on making a bold statement on what a car should take under consideration apart from transferring people from point A to B.

"(Kar-a-sutra) is not a real product. it's something to talk about the meaning of moving. a new territory, visiting around and having people involved with this adventure"

(Bellini, 1972)

Aware of arising problems with automotive industry, Bellini wanted to express a necessity for a fundamental change in the way society treats transport. He addressed mono-functionally of contemporary transport and proposed a prototype that discuss with current state of affair of an automobile. The concept present spatial interior full of windows, bringing passenger closer to surroundings. The body is convertible and openable: the ceiling can be lifted and the interior rearranged.

"[...] a mobile space into which one may enter and sit down, be seated even more comfortably, stretch out, sleep, smile, converse face-to-face, observe the outside world and breathe in its essence, enjoy the sun, stand up, take films while under way, change places, sit with one's back to the driver or sideways, play cards, eat a sandwich and drink, consult a map, put away and pich up all kinds of objects, carry children and play with them, make love in a manner not conditioned by the automobile, transport baggage and things - many things and fewer people, a load of apples plus the driver, completely empty, with only the two of us and some pillows: on the way we'll buy a horse and a piano."

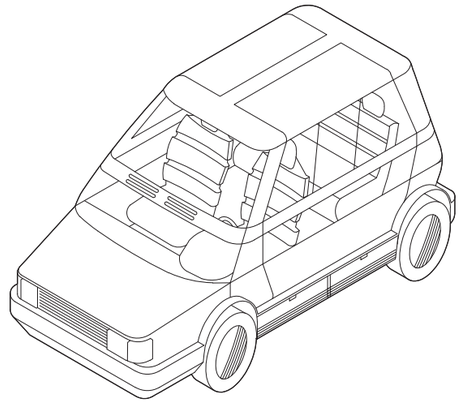
(Bellini, 1972)

Possibilities and scenarios for recreational usage for the car are presented through number of sketches in a chronological order, relating to a narrative a comic book. This representation method shows a revolutionary approach in presenting cars as subjects of living rather that luxurious transportation tools. By such reinterpretation, designer has showed the world that it is possible to live in a car, alike in a mobile living room.

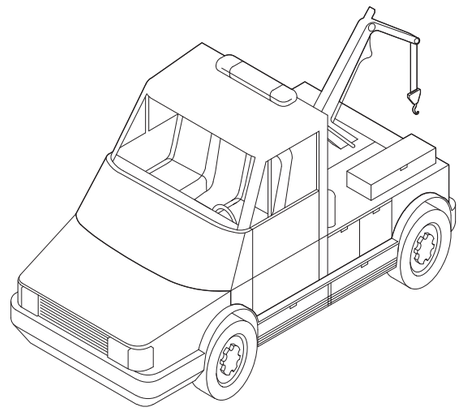
Concept's relationship with life was also expressed in its name. Kar-a-sutra combines the word of car with Kama Sutra. The term is culturally associated with a book that contains detailed descriptions of sexual relationships. This playful blend bring focus on vitality, which is lacking in contemporary approach to automotive design and refers to functional flexibility of the proposal.

Bellini's approach seems much closer to contemporary realities, rather than a half century ago. We already have a name for vehicles serving various functions, which we categories as Multi-Purpose Vehicles (MPVs). In addition, since discussion around possibilities of autonomous driving started, car designers try to discover new ways to fulfill car interior with functions apart from steering. Taking all of this under consideration, Mario Bellini's Kar-a-sutra seemed to be a processor of its kind.

EXTERIOR VOLUME



ADDITIONAL FUNCTION



INTERIOR QUALITIES

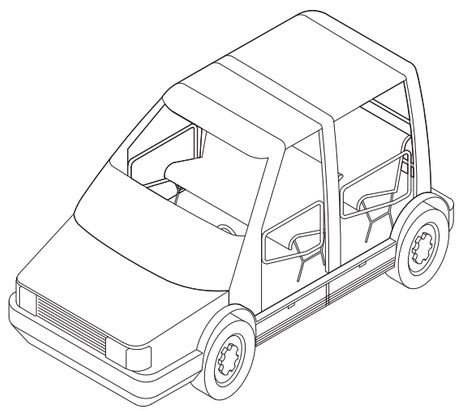


Fig. 20 *Italdesign Capsula;* own work

ITALDESIGN CAPSULA

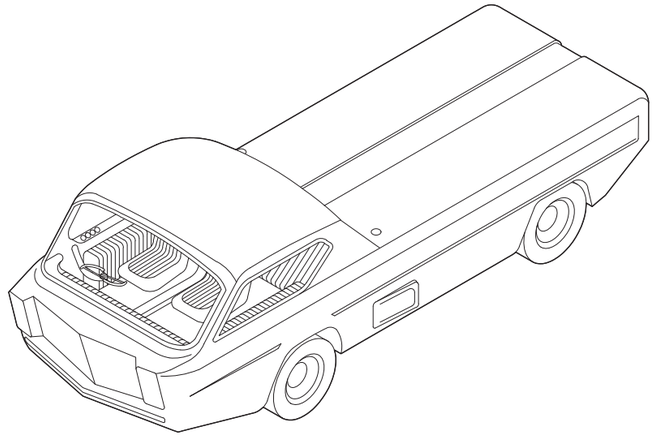
Italdesign is an automotive brand well known from its experimental approach expressed in their prototypes. The company has been progressively pushing boundaries of how cars can deliver range of varying characteristics. Capsula is an unquestionable representatives of such experiment (Italdesign, n.d.).

Project present an innovative concept of a car build from two separate segments, among each there's a platform and a cockpit. The base consisted of the chassis filled with all driving mechanisms but lacking any arranged space for the users. The exception was a trunk that was included within the basis. Intention of such concept was to produce a modular base that can be fulfilled with equipment of different vehicle types.

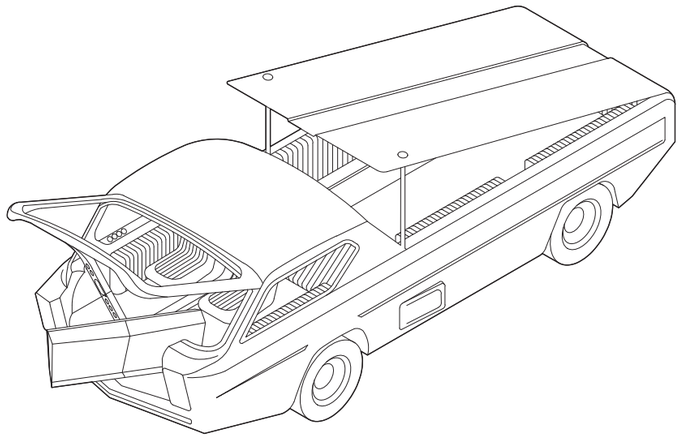
Except from original function which was a regular car in the size of a minivan, following proposals for vehicle function were featured: a school bus, an ambulance, a fire truck, a delivery van, a tow truck and a buggy. The compartment representing each iteration is a capsule applied to the chassis and can be substituted in every moment with another.

The concept brought concept of modularity into a car to a level that hasn't been outstripped yet. Building a product with a primary assumption, that it can be disassembled one day refers to sustainable approach of the present. The brand doesn't consider the car as a formal research, rather calling it a construction hypothesis. No matter how conceptual the proposal was, there is no doubt that much can be gained from the car due to its adaptive and sustainable values.

EXTERIOR VOLUME



ACCESS POSSIBILITIES



INTERIOR QUALITIES

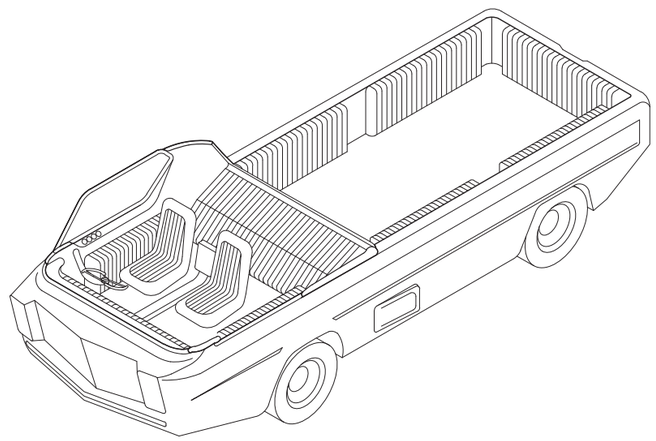


Fig. 21 *Dodge Deora;* own work

DODGE DEORA

It is a custom-made car built in 1966 by Alexander Brothers and designed by Bentley Bradley (Kustomrama, 2025). Although the car wasn't made on direct supervision of Dodge, the company has been displaying the vehicle alongside their factory, which proves that the brand highly identified with the concept, which ended up as symbol of early liberalism in automotive design.

The basis for the construction was 1964 Dodge A100 pickup truck. Despite the original car was a pickup truck, some parts were assembled from vehicles of different body types. For instance, the front window of the car was actually constructed out of rotated rear window of 1960 Ford Station Wagon.

In spite of its futuristic and revolutionary design, the car was innovative as well. A key future of the vehicle is within its openings. The car is entered by singular door placed on the front of the car, rather than from its sides. In order to open it, the windshield is getting lifted, while the lower gate is swivelled. Although the feature is found controversial even nowadays, it became one of the strongest of the most recognizable characKey moment in car fame played its representation in Hot Wheels, a popular franchise of scale model cars. The car was featured in Sweet 16, debut series of Hot Wheels brand, that was released in 1968. Moreover, this first series of sixteen toys were designed by Deora's author himself, while he was working for franchise's owner Mantel. Under supervision of Hot Wheels brand, two other iterations of the car were produced. Deora II was designed in 2003 and even got its own full-scale representation. In 2019, Hot Wheels released a third generation of the pickup.

It is unquestionable that the design of the car was far ahead of its time and that its pop-cultural history was unique. Its custom build draws from different body types in innovative way. This is evident in the utilization of elements from one function to replace elements of a slightly different function, such as the front window. by replacing elements outside of box. Additionally, the accessibility features and a qualitative approach to traditionally industrial pickup truck to deliver luxurious vehicle arguments for uniqueness of the prototype.

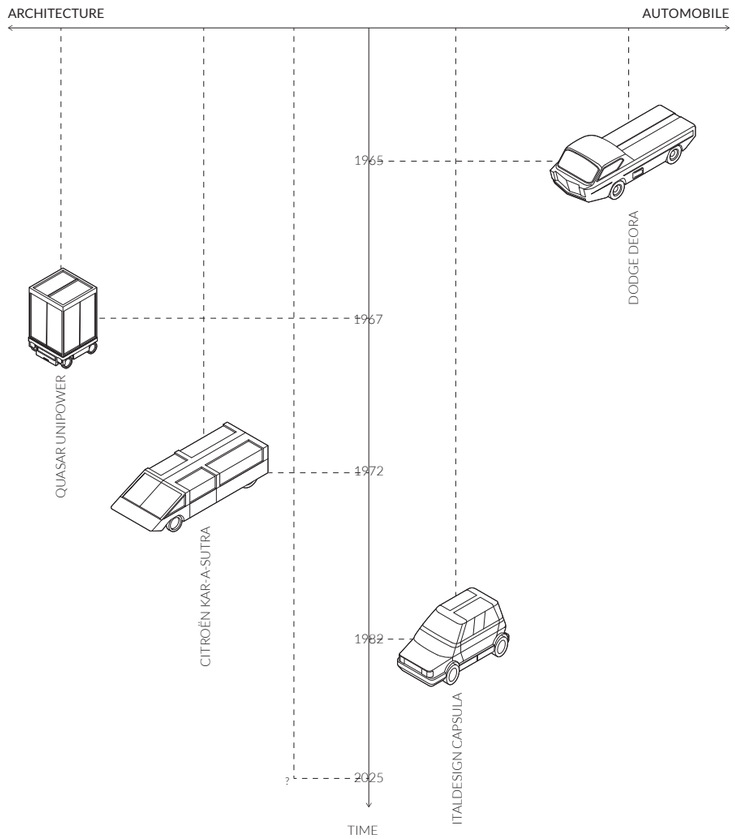


Fig. 22 *References positioning map;* own work

REFERENCE POSITIONING MAP

Aim

Study fulfills its experimental approach by taking under consideration only car prototypes that express experimental design when it comes to architectural values. Every reference project is considered either it represents architectural values or automobile functions better. The range is shown on a horizontal axis as every of researched projects oscillates between those two categories rather than assigning with one exclusively. On the vertical axis, a timeline appears, where date of production first prototype of each car is traced.

Conclusions

The task to design on prototype's association between those two categories happens to be relative. Every case study stands for different qualities and values which determinate their overall character.

Chronologically first Dodge Deora is considered to be closer to automobile, due to its dynamic character and bold aesthetic. What also stands for its categorization is his phenomenon when it comes to his history in toy industry which is strongly identified with cars.

Talking about Quasar Unipower, although it doesn't serve any additional function than driving, its appearance speaks for architectural values much stronger than the automobile's. It is not only thanks to its visual aspects, but also the components such as sliding doors and clear muntin construction of the cabin.

In contrast to Unipower, Citroën Kar-a-Sutra doesn't serve any mobility function. Nevertheless, as a prototype it doesn't necessary need to, as it could be easily become a full-functioning vehicle. What stands for his categorization is his approach. The designer, as architect expressed his perspective on social potential of a car, as a living room, but opened for mobile opportunities.

Lastly, there is Italdesign Capsula. The feature that has stronger connection to architecture is modularity. The car proves that it is possible to apply adaptivity in automobile industry. Although, it seems to be the only characteristics of the car that relates to architectural field, so it has been categorised as close to automobile.

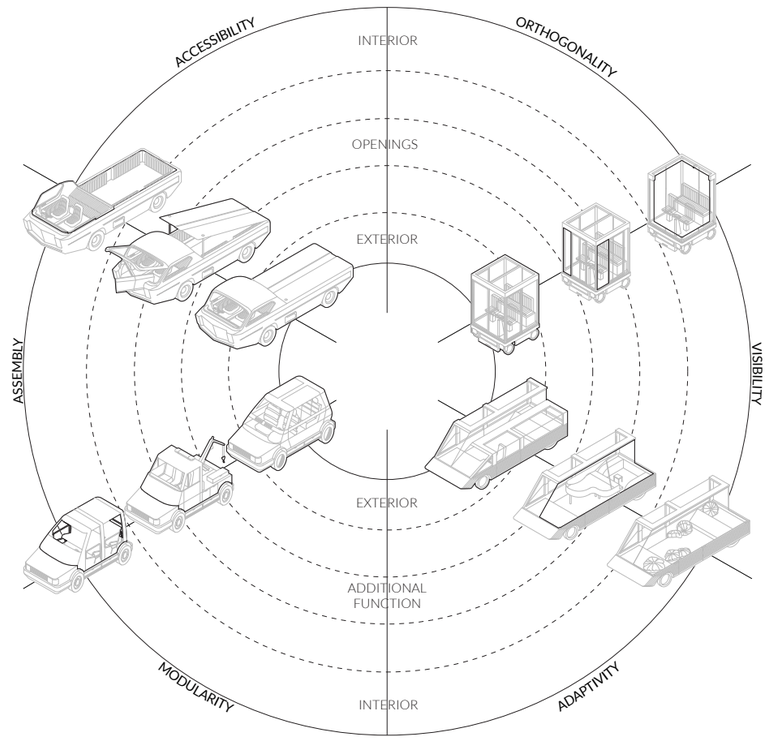


Fig. 23 *References qualities map;* own work

REFERENCE QUALITIES MAP

Aim

After radical categorization of vehicles' character, a deeper examination of their features is conducted. Instead of time dimension a relation between the prototypes is researched. The qualities that connect the references are identified and annotated on the outer ring of the diagram.

Conclusions

Orthogonality
Even though such characteristic might seem superficial, it is the first feature that can subconsciously associate a car with a building. Architecture has always been coming with straight angles. They express space efficiency which challenges car designer, as it stays in conflict with automobile's aerodynamic

View Clarity
In architecture, the feature provides sunlight and the views. Meanwhile in automotive design it primarily stands for safety. A clear vision has its advantages in plenty of fields, but it also builds similar challenges. Same as too big exposure for sunlight affects negatively on thermal environment of a building interior, it also affects the car. The other values that can be questions in terms of view clarity is intimacy which leads to user's comfort.

Adaptivity
In the light of the Anthropocene, adaptivity seem to be a future of architecture. Why couldn't it be implemented in car design though? Car prototypes that stand for this feature managed to accomplish qualities that hasn't been known before and have definitely influenced future generations of the designers.

Modularity
The characteristics that very often comes with adaptivity is modularity. It can be used as a method to achieve adaptive proposal. With modularity comes also production unity, which allows to produce bigger number of components for less. On the other hand, modularity wouldn't be sustainable if it would exceed a lifespan of a product, that could be easily replaced.

Assembly
Objects can be either mass produced as the modules, or custom made. While both methods are an opposite when it comes to the scale of the production, they remain similar when it comes to life cycle management. Assembling both form manufactured parts in a modular way, and reused elements in custom production brings second life to components that would become w waste.

Accessibility
This category contains cars that challenges current state of affairs in the topic of automobile accessibility. This can be proceed in two directions. First relates to the side of a vehicle form which we enter the interior. Second relate to mobility of the vehicle in terms of how differently it can approach parking in various situations.

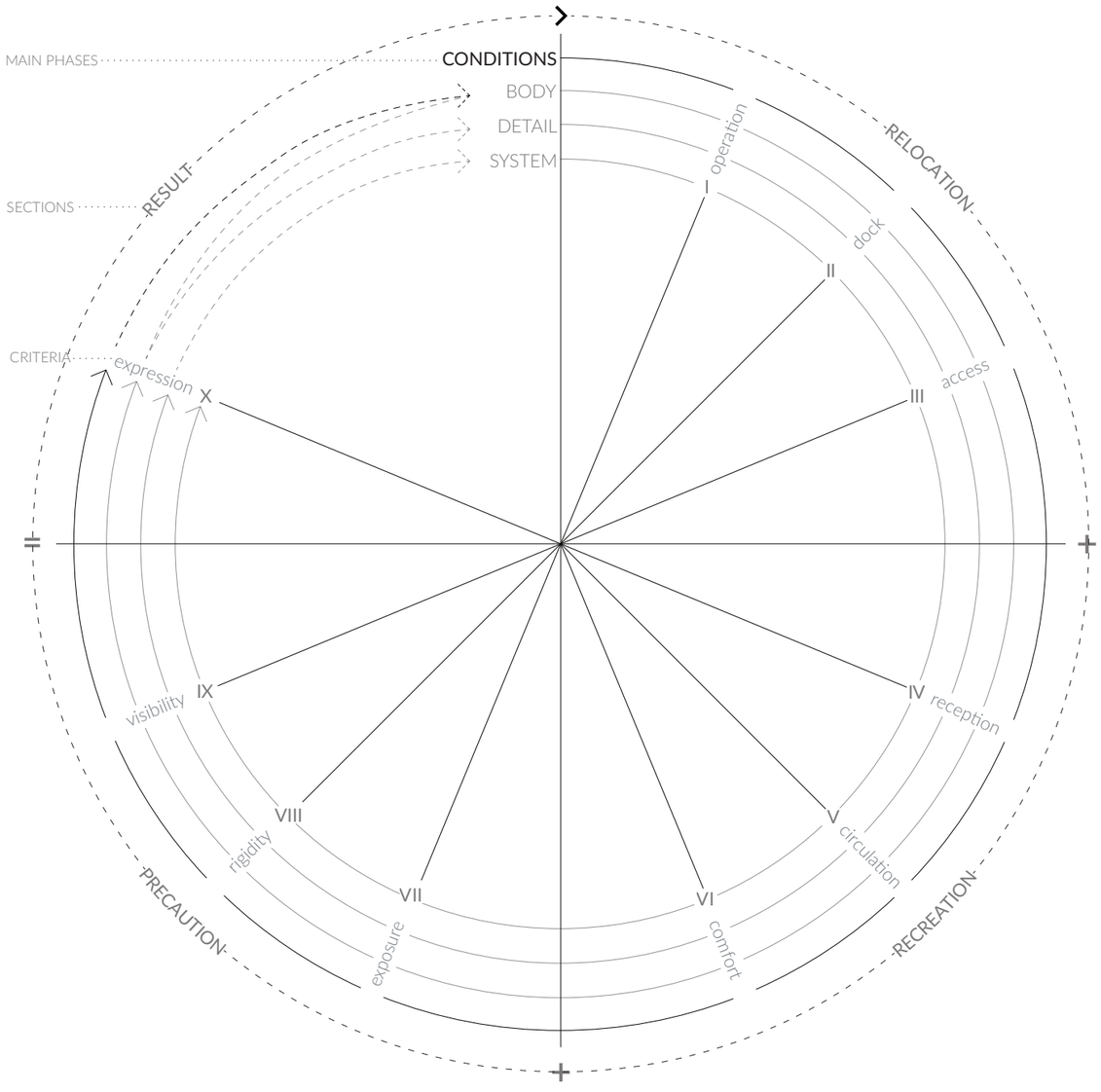


Fig. 24 *Circular framework diagram / conditions* ; own work

9. MAIN PHASES

Coming closer to proper design phases, closer look to the previously introduced framework is presented. Methodology delivers a universal guide through juxtaposition of architecture and automotive disciplines specifically while designing a vehicle with an emphasis architectural values of itself and its surroundings. Iterative design phases are structured in a circular framework repeated in each phase of the design process, starting from the analysis of conditions, progressing through subsequent design levels. Such a blueprint closes all design phases in loops that filter successive iterations through constant evaluation based on three sections of criteria:

9.1 CONDITIONS

As the first of main phases stands an analysis of conditions that a vehicle is exposed to throughout its constantly changing environment. What specifically research focuses on is how a vehicle's relationship to its surroundings changes based on different parking positions it can approach and consequences of its orientation in comparison to vehicles anatomy limitations. Study strikes to stand as a base for future proper design phases.

SECTIONS		CRITERIA	
RELOCATION	I	operation:	transportation efficiency / control / ride-sharing / service functioning
	II	dock:	approaching parking space / aligning with other vehicles /stacking with aligned prototypes
	III	access:	car anatomy / wheels arrangement / obstacles / lowering threshold / accessibility
RECREATION	IV	reception:	entrance / integration with pavement / welcomeness / quick-stop / perch seating
	V	circulation:	relation between concepts / passage / flow through / by-pass
	VI	comfort:	seatings arrangement / privacy zones / regeneration conditions
PRECAUTION	VII	exposure:	weather resistance / noise proof / shelter / maintenance / wear / damage
	VIII	rigidity:	crash resistance / crumble zone / structure stability
RESULT	IX	visibility:	driver's / pedestrian's / other traffic participant's / inside visibility / throughout visibility
	X	expression:	character / dynamism / statics / signature / impression / pattern / aerodynamics

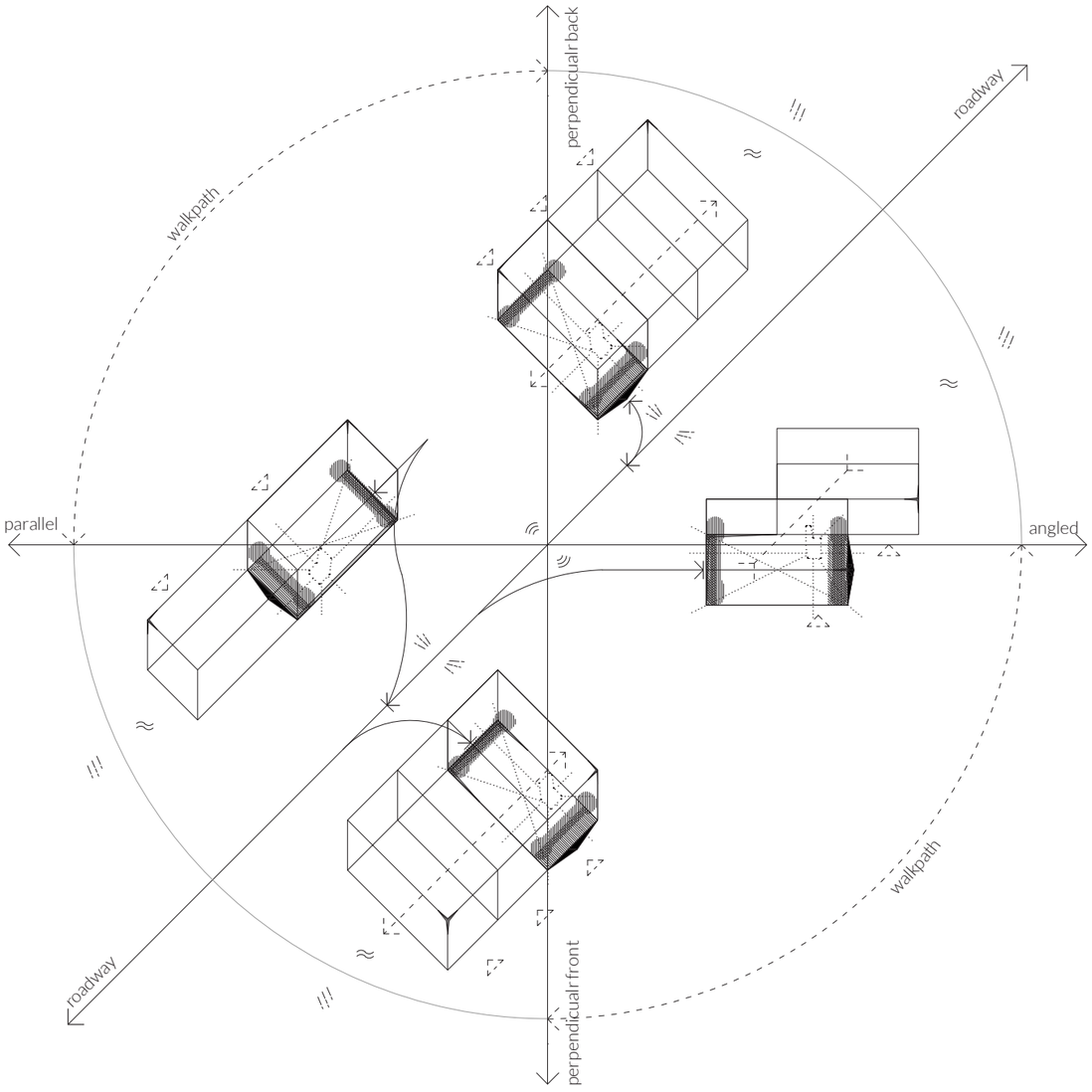


Fig. 25 *Conditions analysis;* own work

CONDITIONS ANALYSIS

Aim

As a first approach for treating a vehicle under architectural manners is exploring its relationship to its surroundings. Under the mindset of traditional design principles according which a building should react to its environment, it is easy to suspect a vehicle as a matter of no solid relationship to the neighborhood due to its constantly changing location. Although there is no solid certainty of a vehicle possible location, there are some most probable typologies where a vehicle can appear, especially talking urban vehicles. Four of the most likely situation possibilities are investigated in order to identify differences between each parking orientation: parallel, angled, perpendicular front and rear. Not only a relation to car's built environment is taken under consideration, but additionally other possible parked vehicles of same kind. Consequences of a vehicle position are therefore put into juxtaposition with standard vehicle anatomy limitations.

Conclusions

Considering selected parking possibilities, vehicle access and exposure on the pedestrians right side of a vehicle might argue for a priority. However considering alternative parking options which is parallel or angled parking on a left side of a road that happens to appear on one-way roads, situation is getting equalized again. In the opposition direction of potential users approaching the vehicle, stands noise and splash exposure that is usual to appear from the road side. On the other hand there is more probability for a wind and rain from the sides of a street, while putting the assumption that a hypothetical parking spot would be located by a street built up with buildings, which could have therefore create a wind tunnel that could carry not only wind but rain as well.

operation
- motorized traffic
- parking maneuverer

dock
- access obstacles

reception
- main entrances

access

circulation
- pedestrian traffic

comfort
- comfortable corners

exposure
- wind
- precipitation
- splash
- noise

rigidity
- crumble zone

visibility
- visibility
- exposed views

expression
- direction

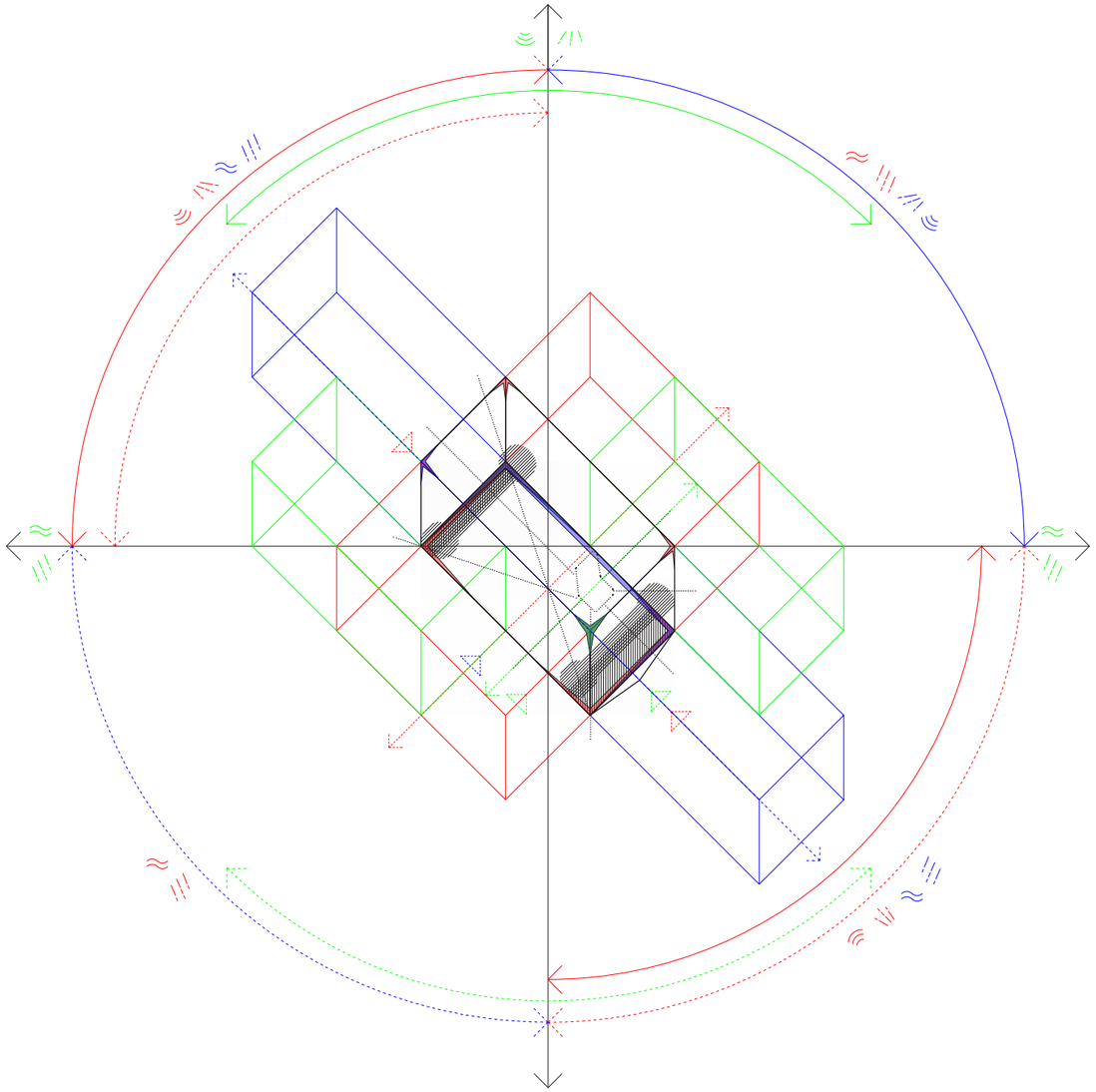


Fig. 26 *Conditions overlay* ; own work

CONDITIONS OVERLAY

Following diagram presents an overlay of all findings from a previous analysis. In contrast to the preceding illustration, the picture introduces colorful graphic code that will be continued consequently through the body phase. Each color represents different parking angle and helps visualize relationship of a vehicle to it's attached copies.

Problematics specification

Access vs threshold

The biggest challenge when it comes to transportation design meeting architectural restrictions is accessibility. Vehicles that are adapted to people on a wheelchair are equipped with technological solutions helping them to get on a board. However in a case of passenger cars, such adaptation is limited to a solution where such person with disability still require assist because of high threshold of a car resulting in steep ramp. Additional factor is wheelchair's turning angle as well as it's width which unable such user to access a vehicle from a side while perpendicular parking, which is a main motivation for achieving ass to a vehicle from the front or back.

Entrance vs obstacles

As soon as traditional entrance from the sides of vehicle is considered, there is no much obstacles on a way of a under except actual interior arrangement. However situation gets complicated while starting discussion on entering a vehicle either from front or back. It is not only an engine or electric motor that creates barrier, but also vehicle's suspension including its front and rear axles.

Comfort vs exposure

Considering the most comfortable seatings to be by the wall of a space with a possibility to observe space in front of you, the comfortable corners result to appear on the opposite of a sidewalk. In opposition it is a place mostly exposed on weather and noise exposition which stands in contrast to recreational values that comfort can arise.

Crumble zone vs seating

As a crumble zone stands a deformable buffer on a vehicle's end designed in a way to absorb impact forces protecting passengers in result. Across such zones are front, back and side ones, which fits to the engine/motor subframe, trunk or side doors. For passenger safety no one should be seated in that area during a drive which is limiting lumber of seats resulting in having only additional seatings in such areas that wouldn't serve purpose during a ride.

operation
- motorized traffic

dock
- parking maneuverer

access
- access obstacles

reception
- main entrances

circulation
- pedestrian traffic

comfort
- comfortable corners

exposure
- wind
- precipitation
- splash
- noise

rigidity
- crumble zone

visibility
- visibility
- exposed views

expression
- direction

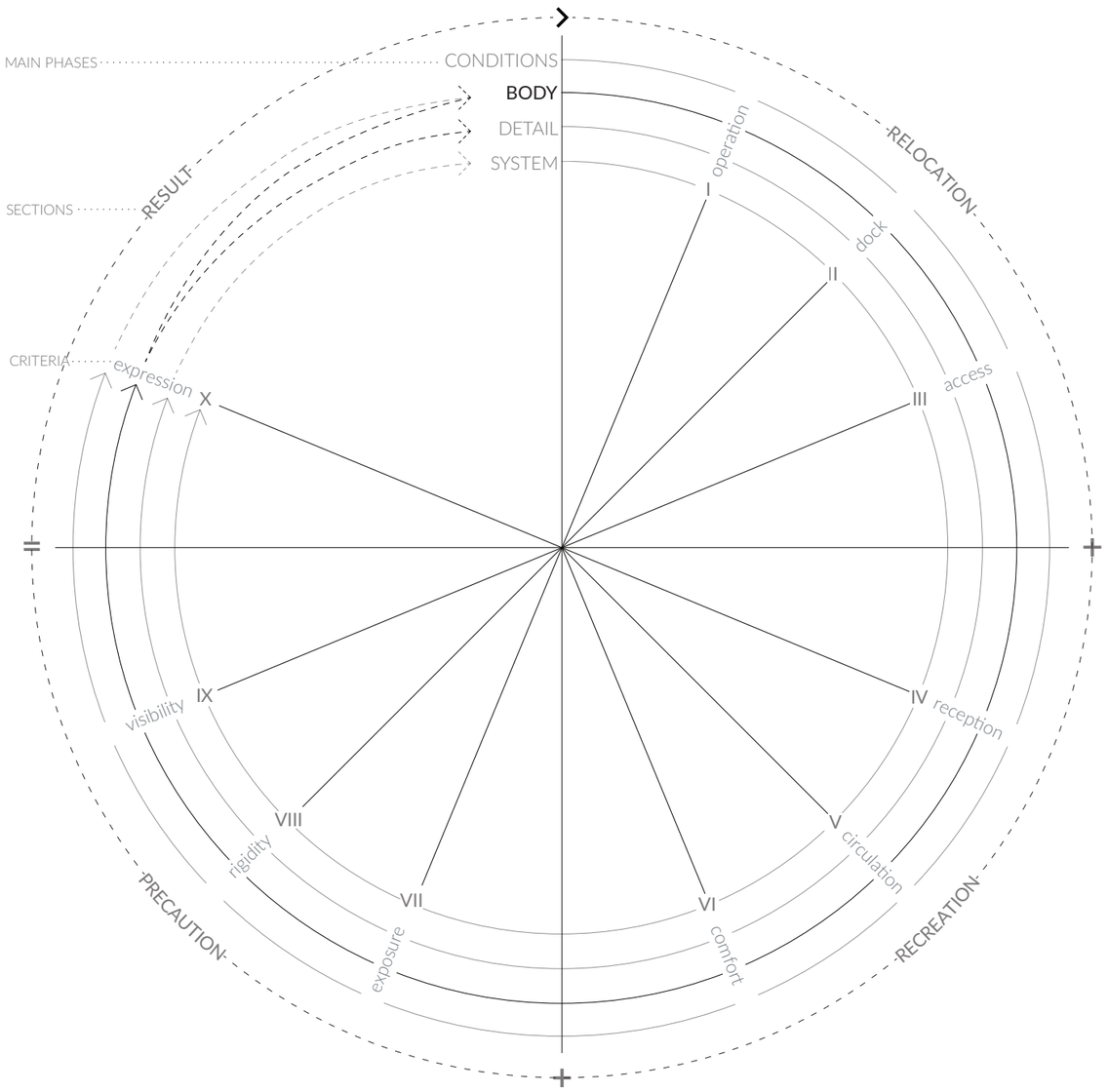


Fig. 27 *Circular framework diagram / body* ; own work

9.2 BODY

Following research on body types categorization, thesis strives to develop its own body type that will reflect problems specified in the previous phase. Additionally it is a phase that is conducted in the strongest reliability to established circular framework.

In first place comes an explanation of a design sequence conducted in the order of the framework's criteria. Therefore following explained way number of nine iterations are produced which are subsequently valuated based on the set criteria. Such process is repeated three times in order to finish the phase with the most successful iteration.

The phase aim to develop a strategy on dealing with vehicle's natural obstacles challenged accessibility, that should be available from all the necessary sides. Additionally there are certain structural components of a vehicle bodyframe that should not be ignored while resolving the prototype.

Considering all of that, phase finalizes in a volume proposal that works as a boundary for vehicle's body, including gaps represented by access points, vertical walls identifying main structural pillars and boxes as a space for necessary mechanisms of the automobile.

BODY DESIGN SEQUENCE

RELOCATION

operation

dock

access

+

RECREATION

reception

circulation

+

PRECAUTION

comfort

+

rigidity

exposure

visibility

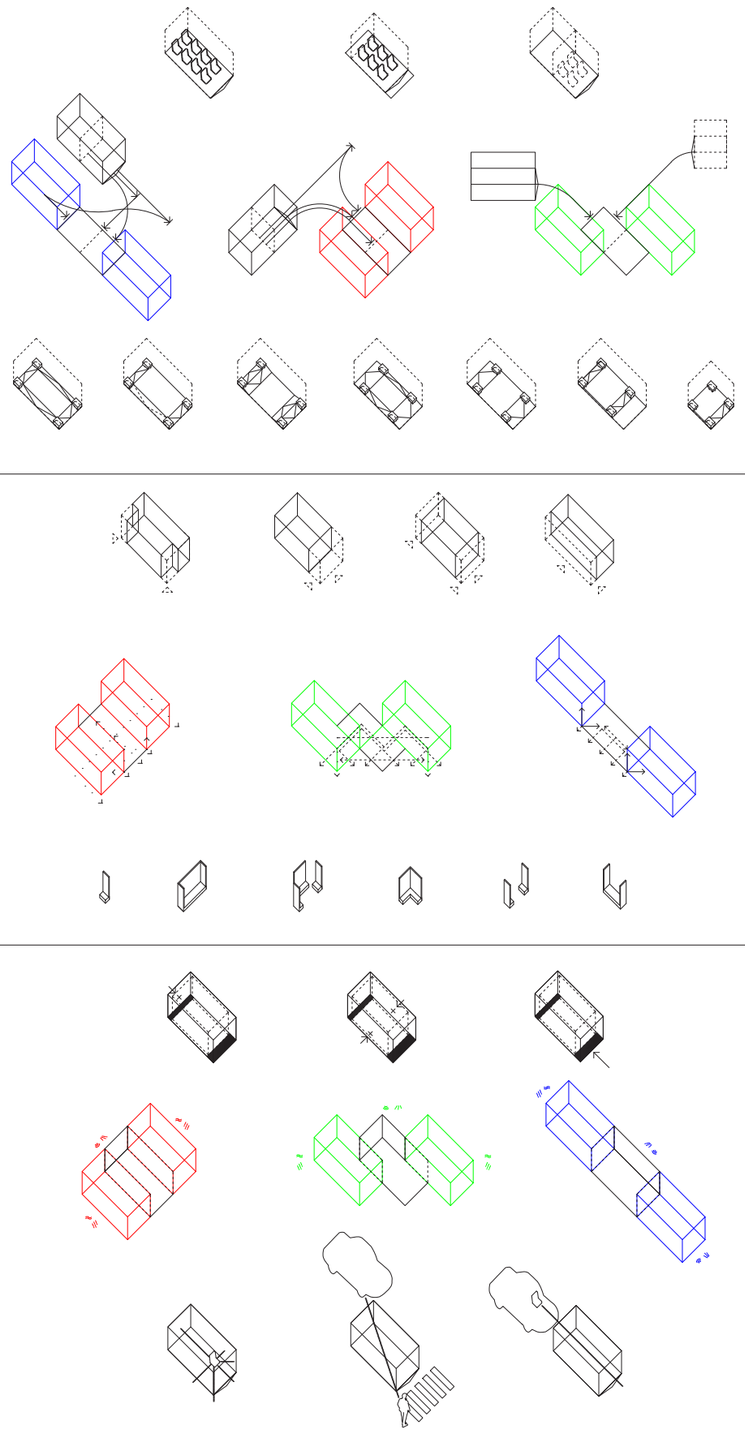


Fig. 28 *Design sequence based on criteria;* own work

Operation

As the first design decision comes a reflection on vehicle's size. Maximum prototype dimensions has been set by a minimum parking spot size regarding European compact standards. Following iterations variate across full and not full parking spot sized footprint.

Dock

As a consequence of vehicle's size decision different parking possibilities appear. As soon as regular sized vehicles park throughout traditional maneuvers, half-size vehicle can park perpendicularly on a parallel parking spot, opening approach on new possibilities. Additional question would be if a car should be able to park both by a front and by a back on perpendicular parking or should limit itself to only one option regarding technical constrains.

Access

While considering accessibility different strategies regarding reducing threshold caused by vehicle's suspension appear. Following decision would be to choose from which side vehicle should have accessibility points, which align with previous question how vehicle would be parked.

Reception

After specifying entrance locations, a reflection on variating spatial experiences appears. In order to lean towards a user that is not certain of entering the vehicle, which result in a buffer zone being created.

Circulation

In order to use a full potential of a fleet of vehicles, they strive to work together in a system by stacking with each other and creating circulation possibilities between the vehicles.

Comfort

Resolving interior of the vehicle, a special focus on keeping the passage is put. With various iterations, different arrangment possibilities rise resulting in various gathering experiences.

Rigidity

Aware of vehicle's nature to be exposed on impacts while drawing, the design take under consideration all crumble zones in order to resolve safe seating inside it.

Exposure

Considering different parking sequences, a vehicle is exposed differently on weather conditions and noise, which embodiment is provided through different covering walls iterations.

Visibility

In order to guarantee safe transport for all the participants of a traffic, the vehicle needs to have a good visibility through. It serves not only the driver, but also all other drivers and pedestrians, with which he shares the road.

BODY ITERATIONS 1ST ROUND

Each body iteration is produced following the order presented. Iteration's physical boundaries that are represented by walls and boxes together with empty access points aim to create a framework for further detailed design phase. Neighboring parked vehicles are colored by its parking position to help visualize how each iteration would align with each other in order to make proper judgment on its interrelationship.

Subsequently, iterations are put in a judgment loop that filter them through constant evaluation based on the pre-established criteria. Each iteration is scored based on each criterion in order to select winner of each category as well as compare the final scores of all the iterations. In the next step most crucial elements of the most successful iterations are identified in order to implement those in the next iteration round.

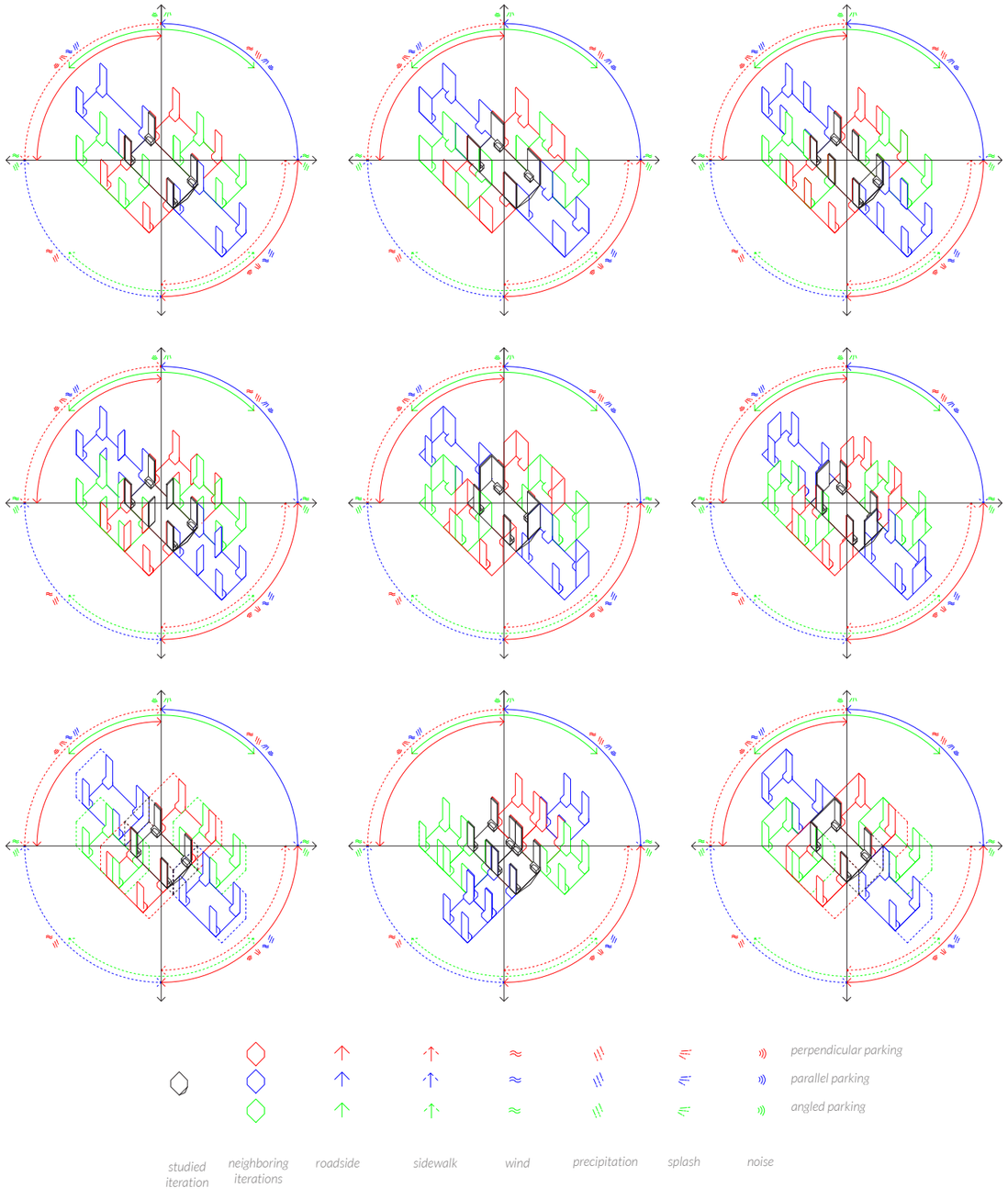


Fig. 29 *Body iterations 1st round;* own work

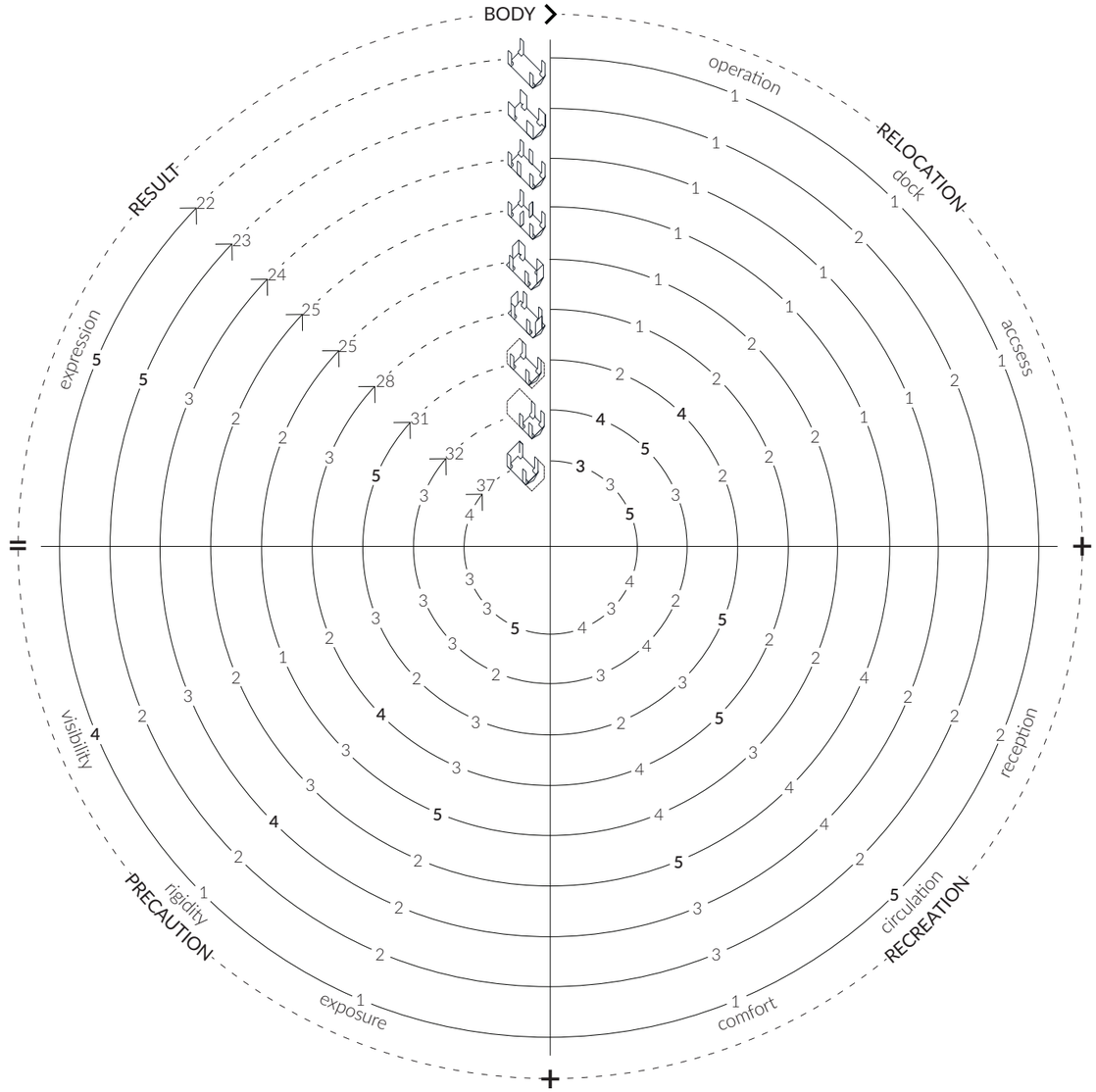
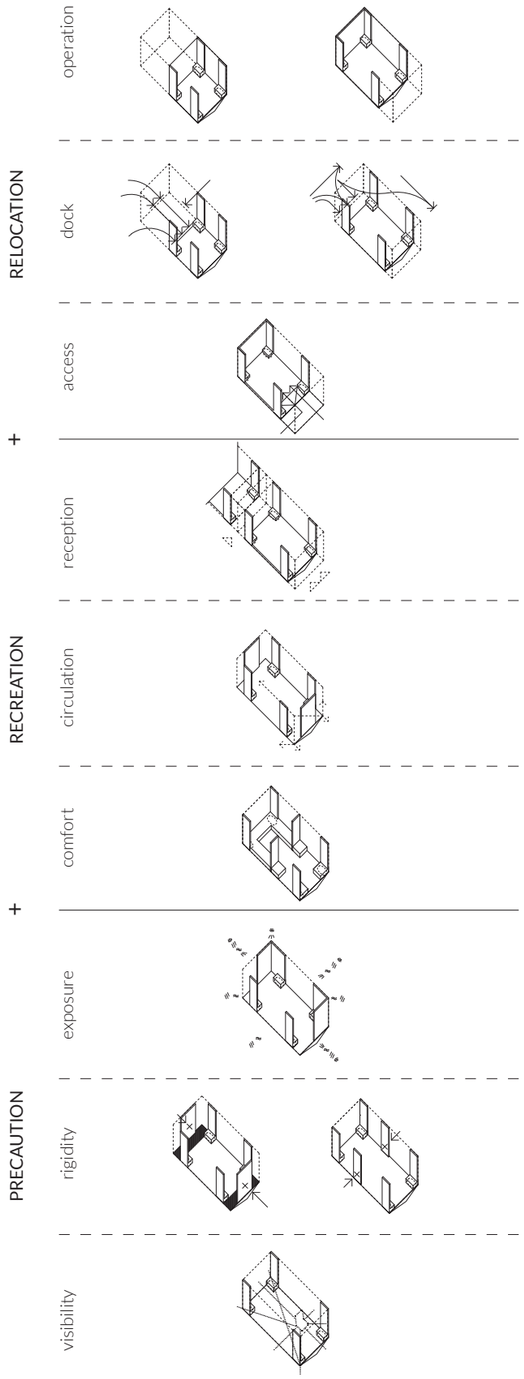


Fig. 30 *Body iterations valuation 1st round;* own work

BODY ITERATIONS OVERLAY



Comparing transfer efficiency with an area that a vehicle occupies, it is half parking spot size vehicle that has the highest rate. However being aware of some particular limitations of such design, bigger iterations came out reasonable as well.

Following operation category it is a half size vehicle that has the most options regarding parking possibilities, however it can block the access to its aligned neighbor parked behind it in perpendicular parking. Traditional parking fits as well as soon as a vehicle doesn't exceed certain length that makes it impossible to park in parallel position.

In order to provide accessible entrance for people on a wheelchair both in front perpendicular parking, as well as angled, the front of a vehicle needs to be accessible, what can help with than can be a buffer zone that might give a space for an accessibility ramp to extend.

Regarding the buffer zone, it creates a potential spot for spontaneous interaction with a vehicle for a passer-by-s making it the most attractive in this category.

Circulation between the vehicles is judged weather there is a possibility to access a board of an attached vehicle without leaving one. An interesting flow appear in the iteration open on corners of an automobile.

In terms of a seatings comfort, most successful arrangements are considered to be those with a variety engaging level as well as those providing various seatings number for different type of groups to gather.

Regarding prototype's exposure on weather and noise the most successful iterations are those that are mostly covered on the left side.

Regarding crash rigidity, iterations having additional construction panels in the middle of sides, front and rear walls are scored.

Regarding visibility, concept having the highest transparency win. Additionally it is important to consider location of front panels so they wouldn't cover visibility of a driver in case of a car being controlled by a human.

Fig. 31 *Crucial elements identification;* own work

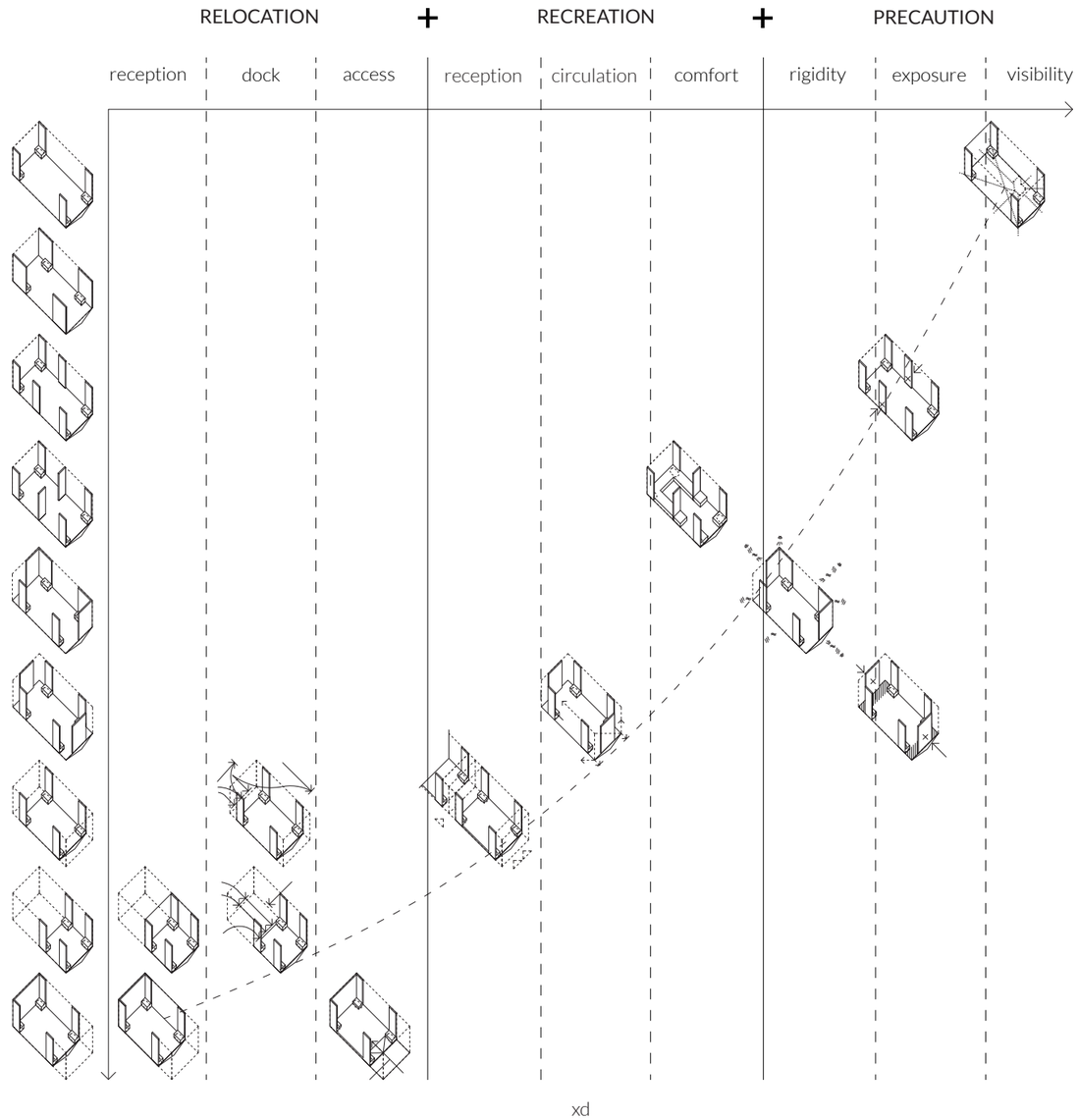


Fig. 32 *Most successful iterations patten;* own work

BODY ITERATIONS 2ND ROUND

Based on the conclusions from a first the first round and by applying as many crucial elements identified previously as possible, following four iterations are made and valuated.

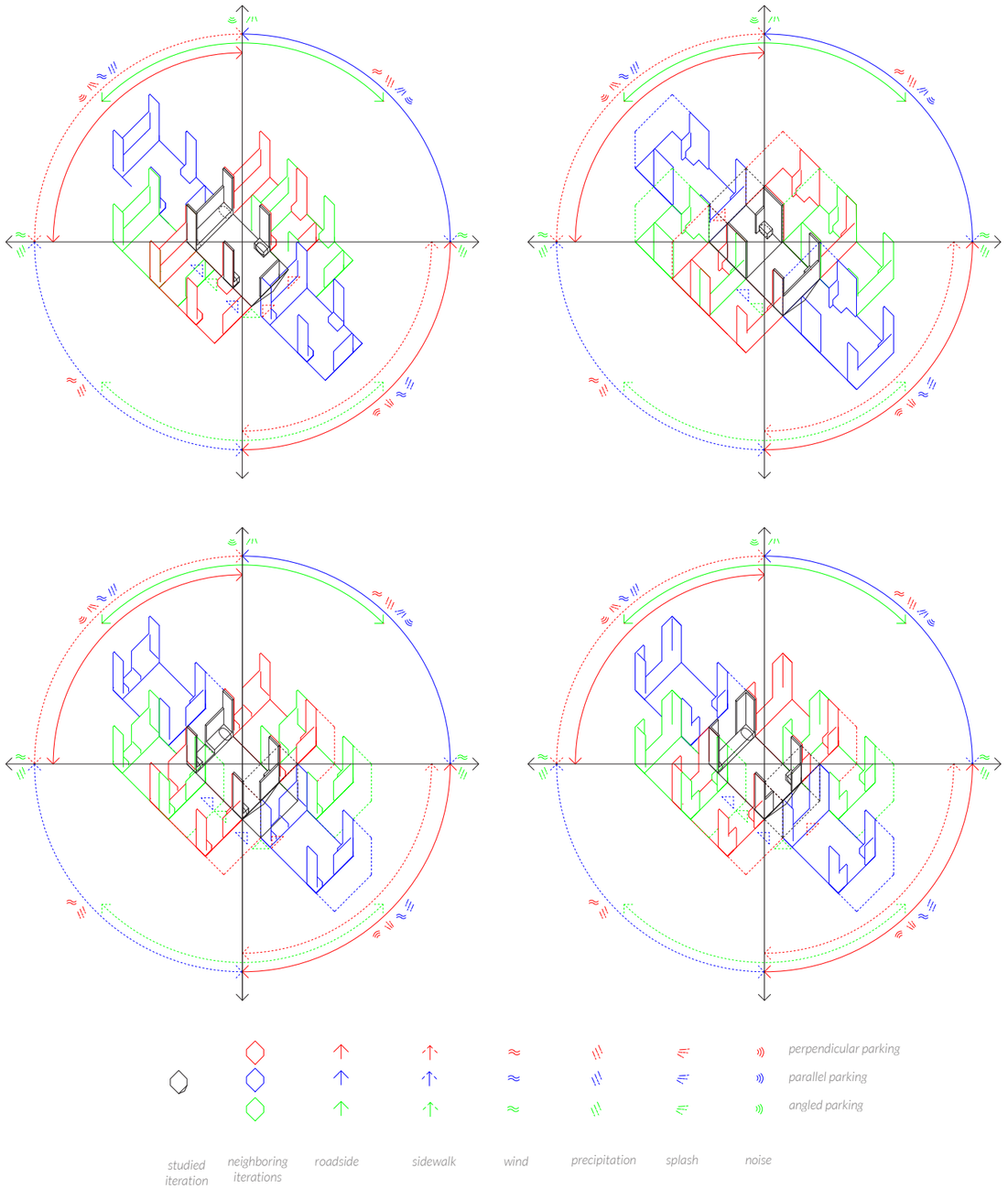


Fig. 33 *Body iterations 2nd round;* own work

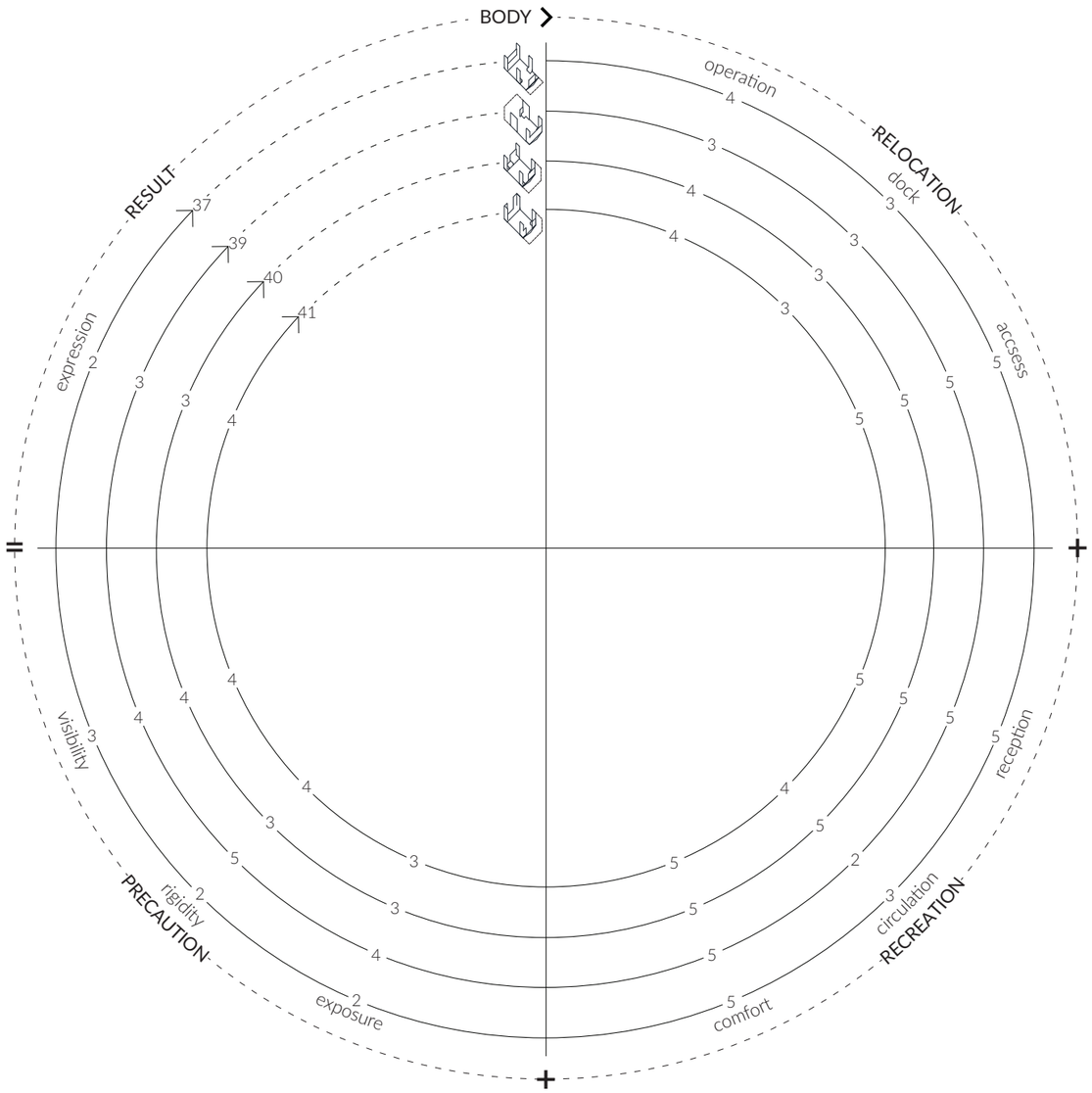


Fig. 34 *Body iterations valuation 2nd round;* own work

BODY ITERATIONS 3RD ROUND

As a result of the previous iterations round best iteration is chosen so as to work as a framework setting boundaries for the finale prototype.

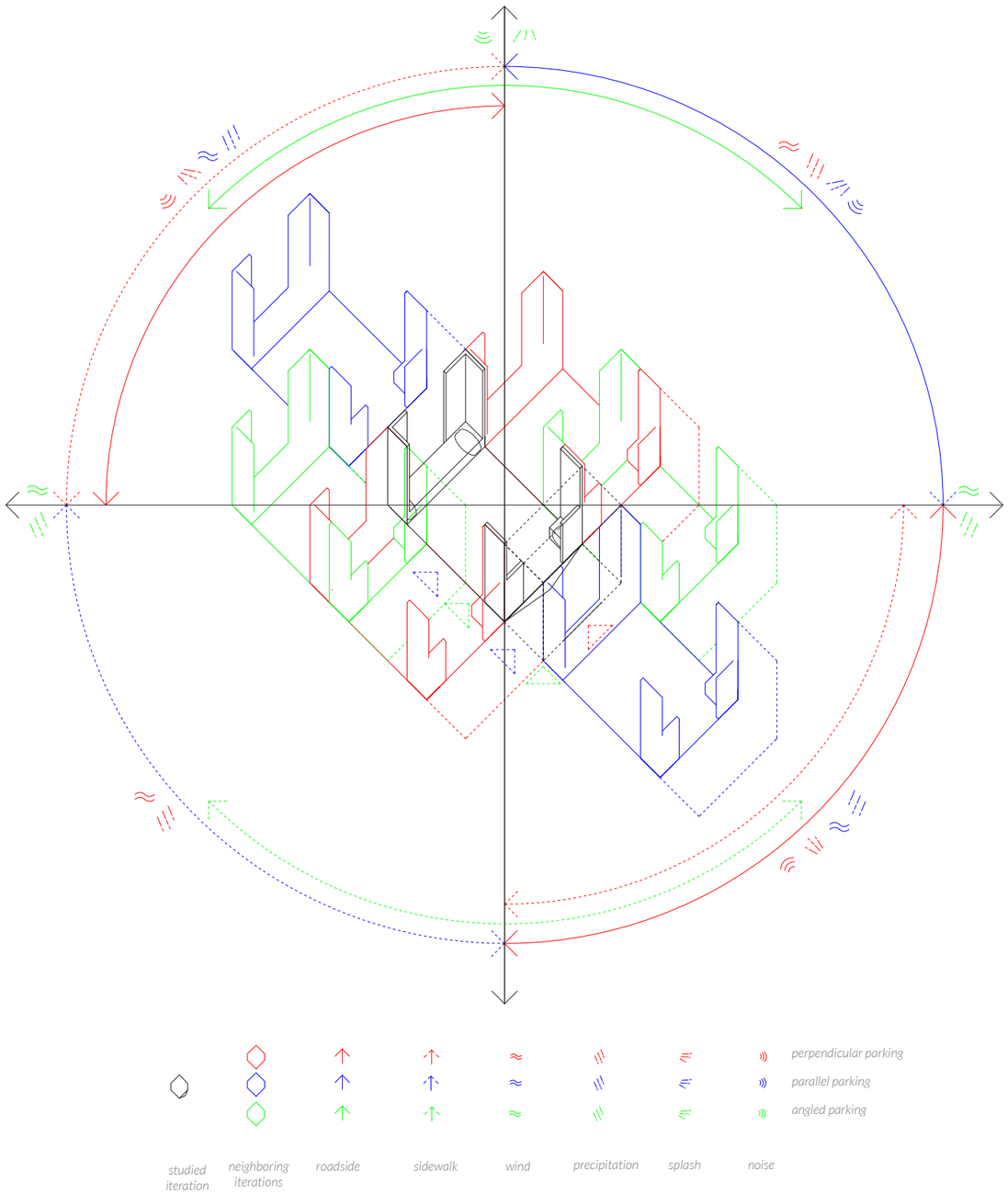


Fig. 35 *Body iterations 3rd round;* own work

Problem

Access

Prototype aims to answer the challenge to deliver access for people on a wheelchair without support of any additional assist. In order to achieve that, certain requirements for maximum slope of the ramps need to be taken under consideration. Such approach results not only in lowering the floor level of a whole vehicle, but also require to provide a passage of a minimum width.

Reception

Secondly considering various parking possibilities, entrance to a vehicle cannot be designed only on the sides of vehicle, but also in front or back. As a physical boundary serves not only vehicle's driving motor but wheel axles. In order to deliver access for people on a wheelchair in standard perpendicular parking size, that isn't categorized as handicapped parking, vehicle must be accessible from at least one of it's shorter sides.

Circulation

One of the most primal principles for a prototype is to enable stacking of any number of same vehicles in order to create bigger meeting hubs in a piece of a bigger architecture. To achieve that, passage through a row of a vehicles in certain parking positions would be beneficial. Additionally so as to be able to legally treat the vehicle as a piece of public utility it needs to meet certain requirements when it comes to ceiling and lintel height.

Comfort

Aware of different needs that people might have approaching recreation spaces, vehicle strives to answer two different types of those. First is type of a user that currently need to rewind and rest or meet other people in more private environment. The other one is much more under pressure of time which doesn't want interact with too engaging environment aware of temporarity of his rest.

Rigidity

Vehicle as a transportation mean is exposed on impacts from all of the sides resulting in a need of protection the passengers. Due to nature of higher speed crashes, most vulnerable part of an automobile is its front.

Solution

Low-entry suspension model

Drawing from an example of a vehicle type that is accessible for people on a wheelchair without assist comes city public transport buses. Getting inspired from their suspension type, that minimizes entry level, vehicle uses similar type of suspension. By pushing all mechanical components to the ends of a vehicle, suspension allows lowest floor level in a middle of a vehicle that can be even lowered by using active suspension that can mechanically deposition.

Rear wheel-drive axle

To achieve access from a front of a car, vehicle uses independent front suspension. It's usage is necessary to sacrifice front axle between the wheels, that would create a interrupting threshold. Similarly, such solution is also found in city buses, that allow low access at the front and an uninterrupted passage to the back of a vehicle.

Uninterrupted passage

Prototype allows pedestrian flow in two of three parking scenarios. In parallel parking vehicle's row create a gallery providing an alternative to its attached parallel sidewalk. In angled parking, a car's front meet a side of the other creating corners that connect spaces of vehicles in more organic way blending separate automobile's boundaries into more comprehensive composition. In contrast, in parallel parking, prototype focuses on creating an additional public space between two vehicles rather than creating passage between those.

Privacy gradation

As a solution to carious users' needs, vehicle provides two seating zones. One in a front and one in a back. First ones are located in a most accessible points from a pavement while the rest are hidden at the most comfortable corners of a vehicle, providing different qualities meeting either need for rapid rest or a long-term recreation.

Construction pillars

In order to increase rigidity of cubic shape of a vehicle vertical panels at the front and the back of car body are designed. Together with frontal and rear panels they provide stiff yet deformable protection of the passengers while hypothetical crush.

Fig. 36 *Body iterations valuation 3rd round;* own work

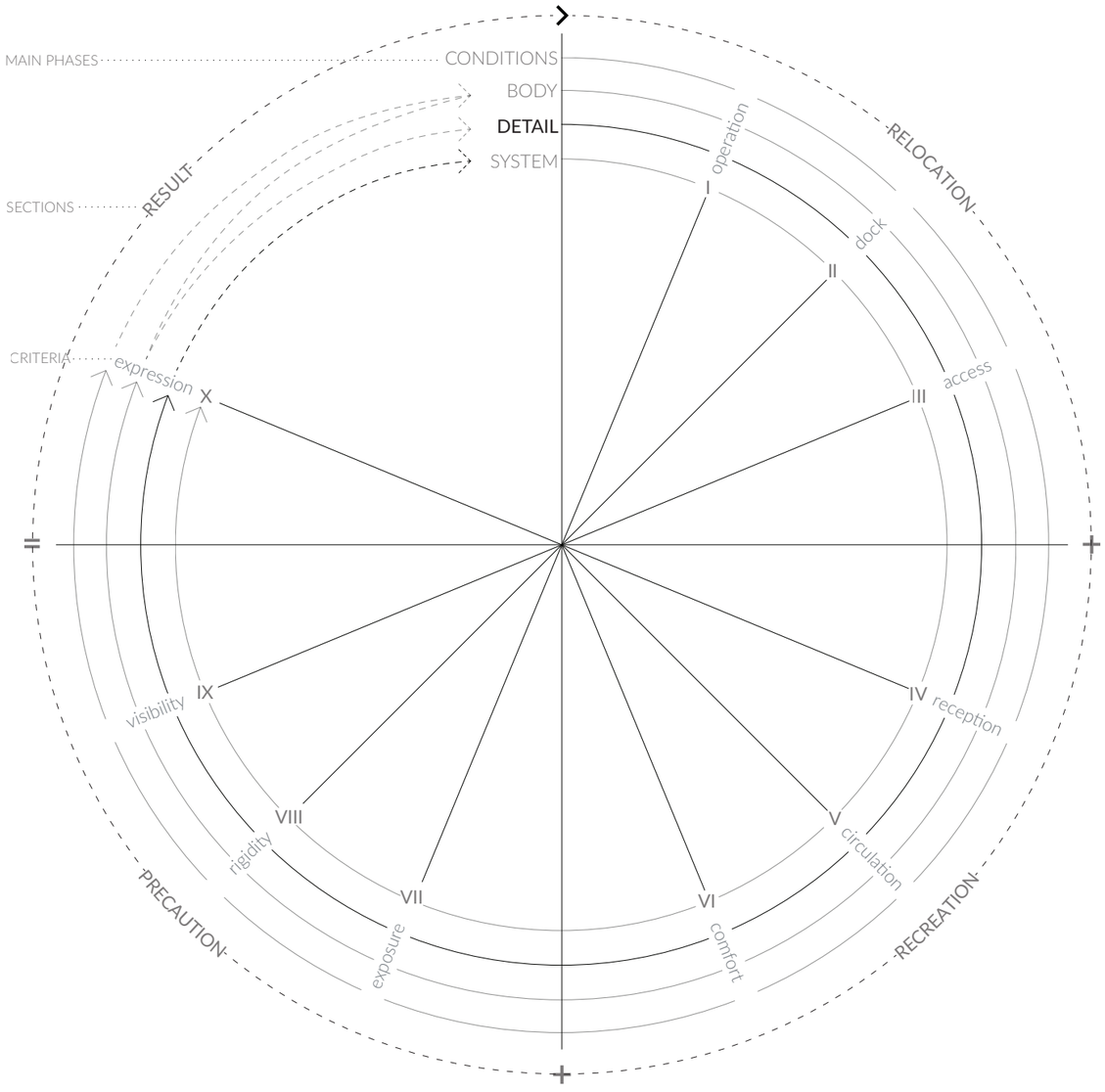


Fig. 37 *Circular framework diagram / detail;* own work

9.3 DETAIL

After resolving a general blue print for the design in a body phase, project finally finds its embodiment brought closer to reality thanks to a sufficient level of detail that helps envision the thesis outcome. As a design representation of theoretical findings, phase is considered as an exemplary interpretation of principles set up in two previous phases, rather than an universal formula. As the thesis has been focused on resolving pragmatic issues that happen on the intersection of an automobile and architecture, this phase aim to investigate a juxtaposition of these two professions from clearly visual principles. As a result of stylistic mixture of design values of two separate practices that usually stands in the opposition to each other, project challenges both of the industries to reconsider their values while working on a intersection of each other.

Interviews

In order to resolve automotive side of a prototype accurately thesis reaches for a help among professionals of automotive sector working currently in academia. Key method to gain feedback on my design and concept were multiple interviews with two professors in a form of design consultations:

Robert Thomson
Assistant Head of Department at Mechanics and Maritime Sciences
Chalmers University of Technology
Specialization: Vehicle Safety

Demian Horst
Head of Department at Umeå Institute of Design
Umeå University
Specialization: Product & Vehicle Design

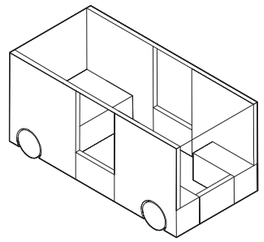
Two interviews with Robert Thomson have gained thesis a realistic insight in the nature of a vehicle with an emphasis on vehicle safety including discussion on passenger's safety, pedestrian safety, as well as . Impact scenarios from different directions and hypothetical reaction on them of a vehicle has been raised finalizing in some detailed ideas that concept might feature to reduce risk of pedestrian injury in an impact situation .

Participation of Demian Horst in a design process has happened over the course of four meetings. Consultations focused mainly on a visual design of a vehicle giving thesis a deeper understanding of transportation design principles. Additionally some pragmatic features has been developed over consultations that answer some challenges of prototype's user experience.

DETAIL DESIGN SEQUENCE

Initial detailing process starts from a body phase and finishes on a final product. Process is simplified to all significant design decisions. Descriptions on a right embody a dialog between automobile and architecture driven decisions in order to introduce reader to conflictional character of the juxtaposition of these two fields, that result in a combination of values of both.

BODY PHASE

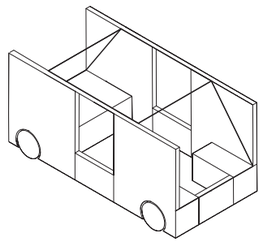


Automobile

Body phase has been finalized with a simplified cubic volume informing on vehicle's physical boundaries and limitations as well as accessible points. Initial challenge at this point is to introduce angled directions to reduce verticality of a vehicle for multiple pragmatic and aesthetic reasons. Angles other than 90 degrees will become a dynamic representation of active features of a concept in contrast to orthogonal character of architectural design.

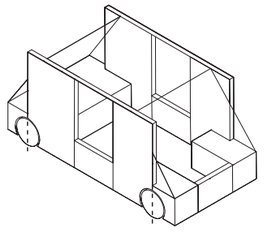
Architecture

On the other hand cubic shape of a concept most purely represent architectural purpose of a vehicle. Fine angles and proper ceiling height give a freedom to move around an automobile freely and to arrange space in a most efficient way. What this architectural half of a project will be fighting for against the automobile half are pragmatic spatial qualities of a parked vehicle as well as sense of stability, that can be easily disturbed by dynamic character of a vehicle design.



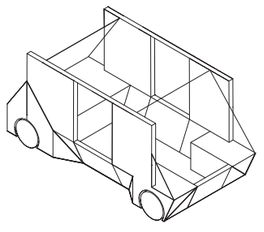
Tilt of vehicle's front and rear windshields create the first shift towards more dynamic posture. Such a decision mostly benefit aerodynamics of a car, which thanks to reducing drag lowers energy consumption resulting in more sustainable approach. The other practical reason is protecting pedestrian from deathly injuries while an unfortunate impact, by redirecting the strongest first hit to lower part of a body in compensation of hitting head or chest.

So as not to lose architectural representation in a vehicle design, prototype remain vertical walls on sides of a vehicle. Practically they serve as attachment planes while stacking with other prototypes in perpendicular and angled parking. In terms of parallel parking it is a standardized size of a parking spot size that determinates the angle of a windshield tilt, in order to let the openable windshields create a roof underneath a gap between parked vehicles.



In order to achieve a glimpse of a dynamic tilt in a core of a car from the side view, vertical walls are getting squeezed towards inside of a volume. Practically speaking, such an offset protects pedestrians in an impact situation once again by preventing them to hit vertical edge of a wall.

From a usage perspective, movement of a wall creates a hint of concept's furniture function. Considering front of a vehicle as a space where proper passenger seating cannot be situated, due to location within a crumble zone, front bumper is used as a less engaging perch seating zone friendly for rapid short-term usage. Such a small extension in a shape of a seating seems to be welcoming for such spontaneous type of user.



Following design decision intension is to create a sense of direction of a vehicle especially from it's side view. Creating pointy tip not only increase aerodynamics and gives dynamic character, but also continue development in terms of pedestrian safety. Additional chamfers and carves are introduced in order to highlight vehicle direction by interrupting symmetry of a solution.

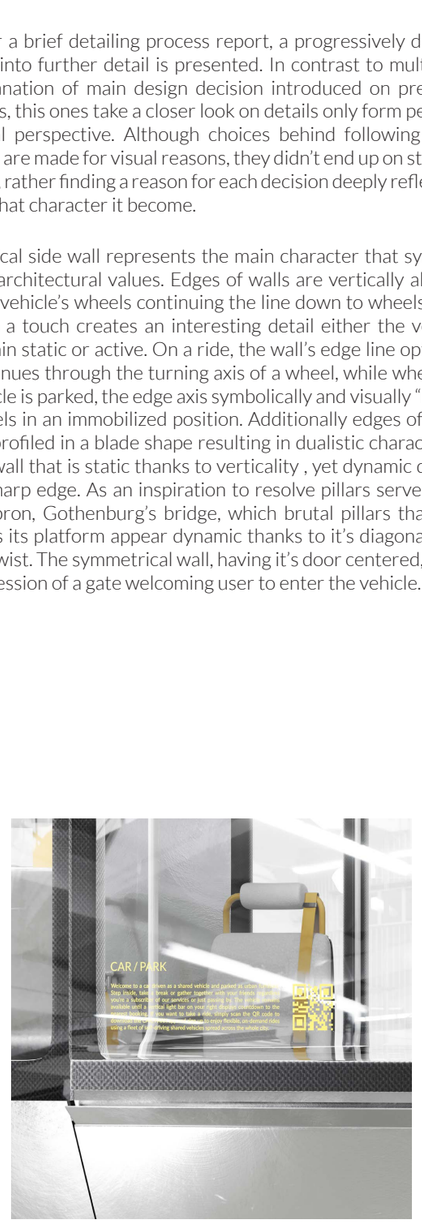
Selection of mentioned cut lines pointing out vehicle's direction is carefully conducted in order to balance dynamic representation of a vehicle with it's static usage. Certain elements such as windows remain standing vertical and symmetrical of to give a gate expression while car being opened. Practically side and front carves on the lower part of a body are integrated with accessibility ramps thanks to their carving angles.

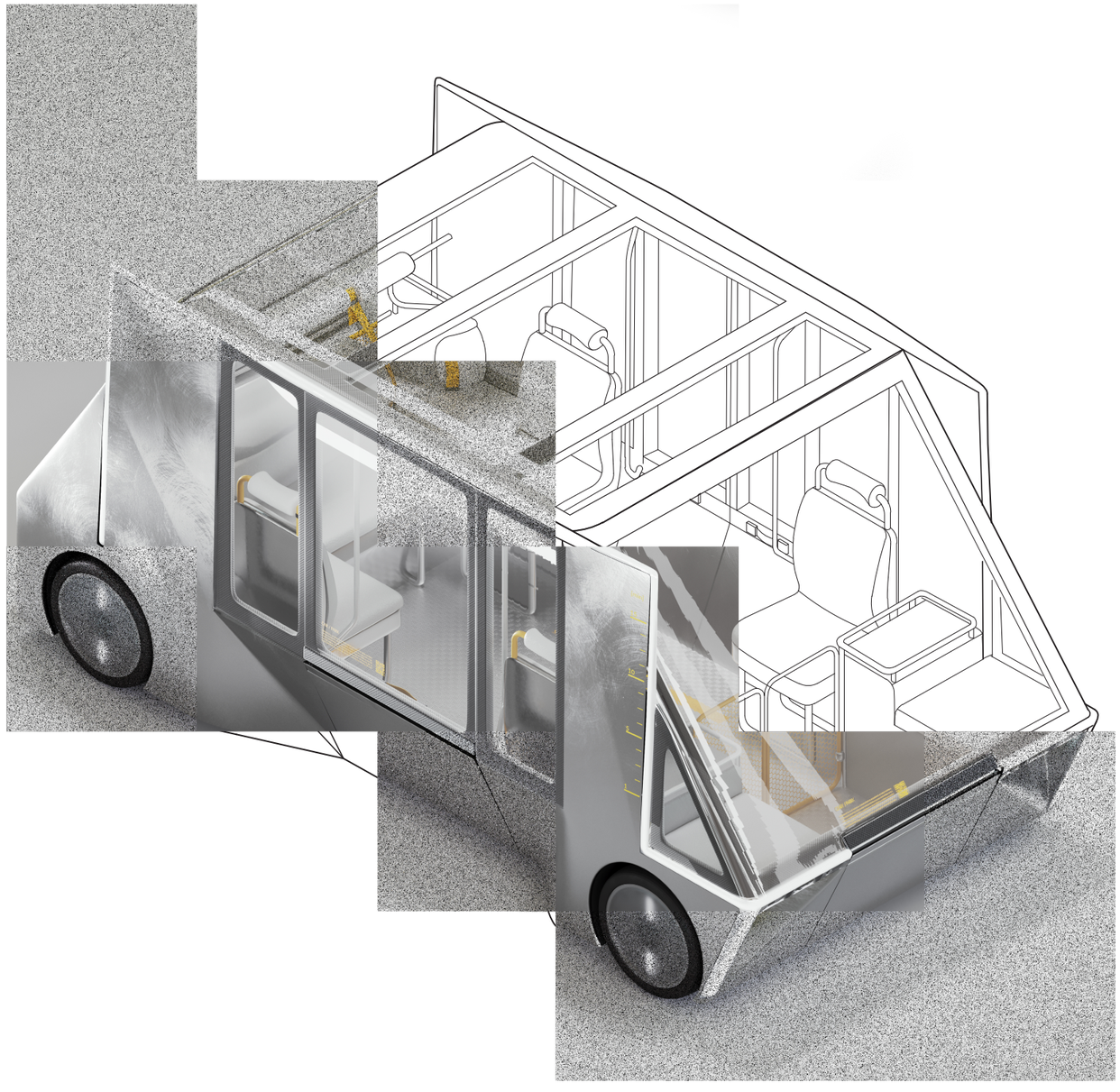
Fig. 38 *Detailing process;* own work

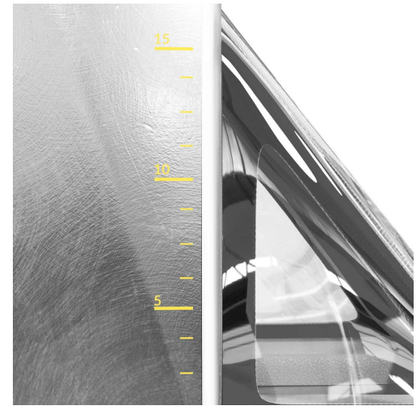
EXTERIOR DESIGN DETAILS

After a brief detailing process report, a progressively deeper dive into further detail is presented. In contrast to multilevel explanation of main design decision introduced on previous pages, this ones take a closer look on details only form perceptional perspective. Although choices behind following solutions are made for visual reasons, they didn't end up on stylistic level, rather finding a reason for each decision deeply reflecting on what character it become.

Vertical side wall represents the main character that symbolizes architectural values. Edges of walls are vertically aligned with vehicle's wheels continuing the line down to wheels' axis. Such a touch creates an interesting detail either the vehicle remain static or active. On a ride, the wall's edge line optically continues through the turning axis of a wheel, while when the vehicle is parked, the edge axis symbolically and visually "locks" wheels in an immobilized position. Additionally edges of walls are profiled in a blade shape resulting in dualistic character of the wall that is static thanks to verticality , yet dynamic due to its sharp edge. As an inspiration to resolve pillars serves Hisingsbron, Gothenburg's bridge, which brutal pillars that elevates its platform appear dynamic thanks to it's diagonal profile twist. The symmetrical wall, having it's door centered, gives expression of a gate welcoming user to enter the vehicle.





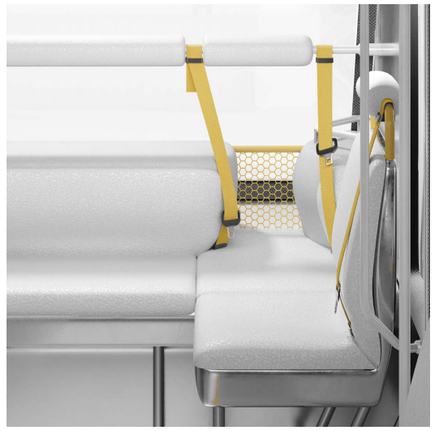


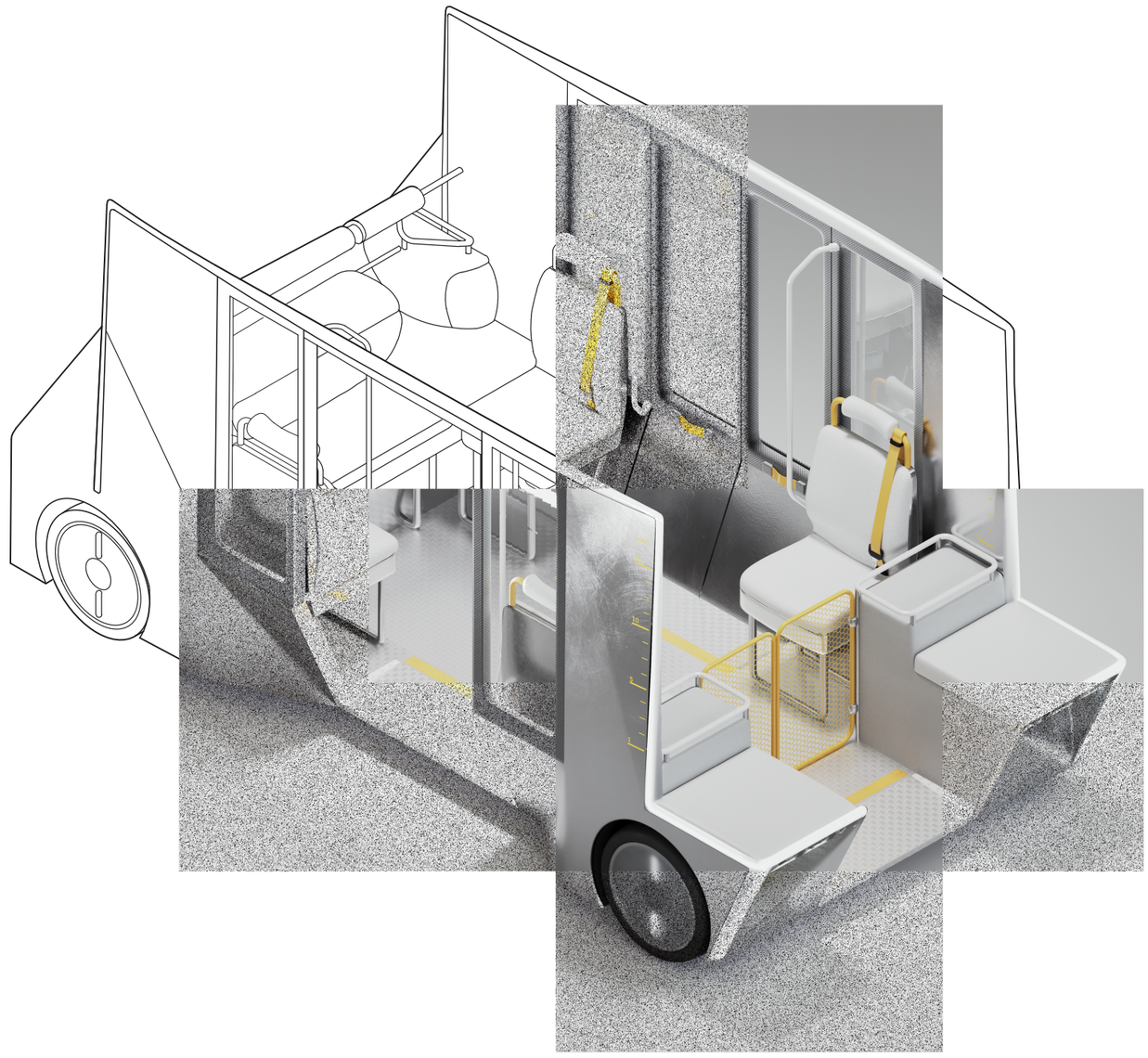
In opposition to ventricular edges stand angled chamfers aiming to suggest vehicle's direction. Angles between certain cuts throughout the body point where the vehicle's heading. Closing up to detail the vehicle is an interplay of soft and hard edges blending clear division between architectural and automotive representation. Edges are selectively sharped or blended in so as to achieve level of balance between two design approaches. Brushed aluminum finishing of a car aim's to remain neutral to city color palette softly reflecting it's picture in it's body. Robustness of the material brings the prototype closer to spontaneous user's, that while approaching a vehicle won't be confused by too luxurious finishing if the vehicle is open for them to use.

Fig. 39 *Exterior details expression;* own work

INTERIOR DESIGN DETAILS

Following an aim to give a vehicle public expression, concept for an interior design draws from public transport. This slightly literal reference intent to dispel any doubts for a potential user, that is unfamiliar to concept's services, if he's welcomed to use a vehicle for recreation purposes. With public transport character, comes adequate quality and resistance level as a response to exposure of a vehicle to numerous external factors.





Design introduces attributes of referred public means of transport, such as handrails, accessibility ramps or language racks. Interior color scheme remain neutral until it comes to mentioned characters, that are contrasting with an intense color. Highlight of utilitarian elements guides users through vehicle's usage, representing a physical manifestation of vehicle's manual. Such familiar to society aesthetics aims to accustom moderate participant of city life with an unfamiliar concept, that project delivers.

Fig. 40 *Interior details expression;* own work

MODE SWITCH

Functional and representative interplay between architectural and transport applications of the vehicle result in prototype to be transformable. First comes it's physical unwrap pragmatically using all vehicle's openings to align with neighboring prototypes. Secondarily, interior arrangement changes so as to optimize seat's number and passengers' safety. Finally vehicle communicate it's status by developed informative system.

Fig. 41 *Mode switch illustration;* own work

Openings

Although the vehicle is accessible from three sides, openings at all sides of a vehicle are actively used. First of all, each openable wing serves particular static function while being parked. Front and rear windshields unfold to create overhanging roof underneath two ends of a vehicle providing an informal recreation space simultaneously filling up a gap between stacked vehicles in parallel parking. Both right and left doors create as follows horizontal and vertical walls of a passage between vehicles in perpendicular parking. Finally lower wings of each door unfolds into a ramps that together with minimized floor height and possible active suspension delivers access for people on a wheelchair.

Elements that provide cover or access has been integrated within doors in order to incorporate act of "unwrap" into user's natural habits such as opening the door. As a result a parked vehicle would be left ready to access for the next user, especially helpful if it were a person with mobility disabilities.

The additional feature for openings in a front is integrating them with pedestrian protection system activating in the case of an impact, that pops out both lower and upper wings slightly just before contacting a body to provide additional deployment space able to protect him.

Arrangement

In order to maximize possible number of passengers in a vehicle when it is driven simultaneously avoiding crowding the corridor when it is parked, rotational seats are featured. In a static mode seats are located by a wall to allow passage and face others. Additionally both the front and the back of a vehicle provide perch seatings for people who don't want to interact more engagingly with a vehicle due to time limitation for instance. When vehicle switches to the driving mode, front and middle seats can be rotated. This allows seven people to travel in an automobile accurately using the vehicle's full capacity. In that mode seats rotate to a position facing vehicle's direction, that has it's reason in passengers' safety in a potential crash situation.

Transfer-wise vehicle uses front and back of a vehicle that cannot accommodate passengers regarding location in crumple zone as luggage areas. While rear rack recalls a regular trunk, front area provides new type of luggage space that is located on a floor with an intention to transport bigger items such as child carriages.

Illumination

Reflecting on user's experience of vehicle's dualistic function, certain social conflict between different type of users has been revealed. Questionable spot occurred to be a hypothetical encounter of people with an intension to use the prototype for recreational purposes with people aiming to use a it for transportation reasons. As an answer, vehicle provides an informational design feature using illumination as a visual message for all type of users.

While driving, vehicle uses its regular lights for traffic purposes. However when a vehicle enters the parking mode, it is a vertical 'blade' wall that is being framed by illumination bar on its rim. An uninterrupted line between two lights animate continuous illumination gradient informing current stage of a vehicle. Additionally in order to prepare user's for upcoming changes vertical lines on the sides of walls provide engraved scale that informs on how much time has left since a vehicle needs to be left ready for starting a ride. Therefore a fluent light gradient travels down the scale illustrating count down to upcoming switch, which is visible both from far and from the inside of a car.

SYSTEM

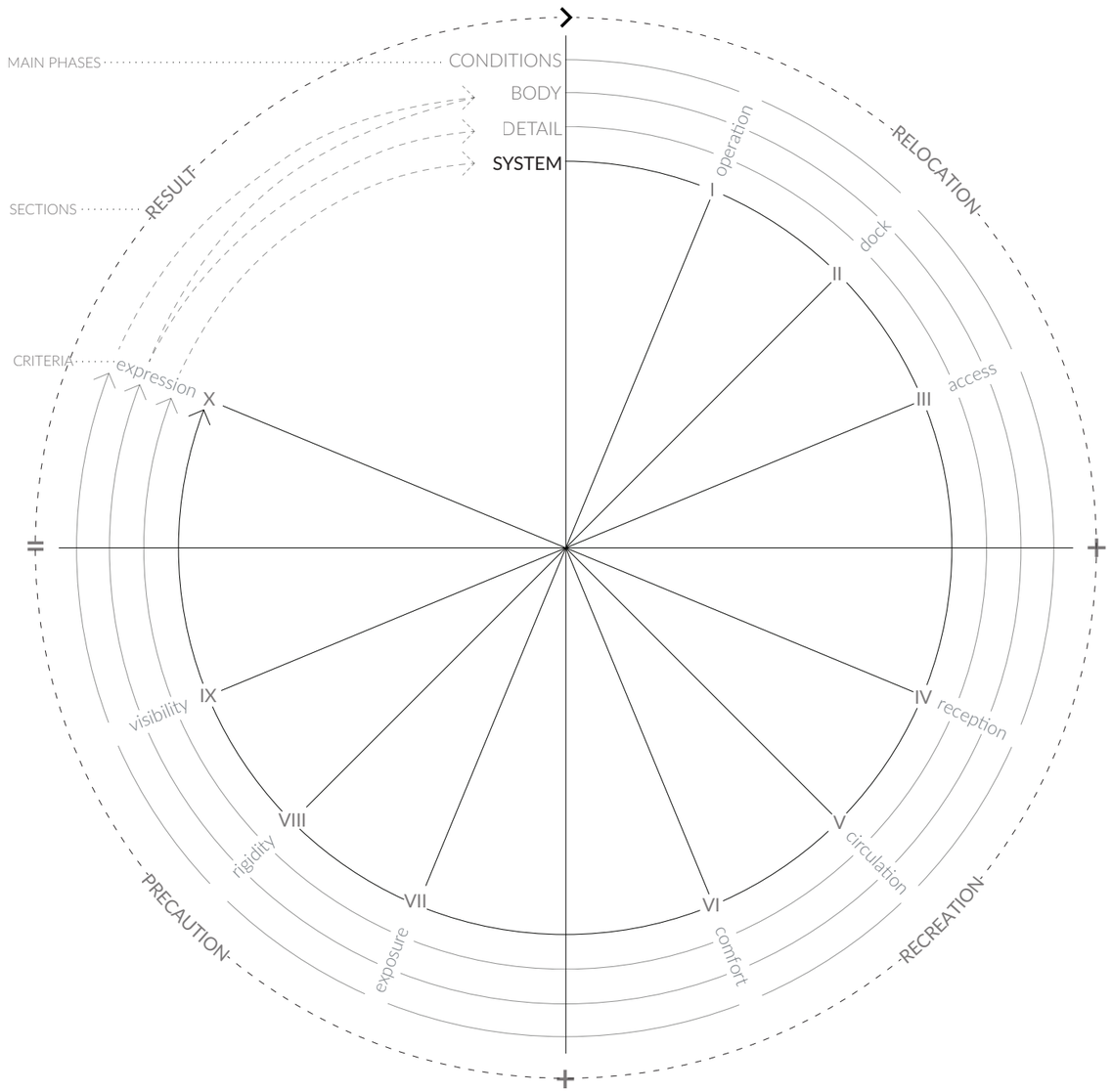


Fig. 42 *Circular framework diagram / system;* own work

9.3 SYSTEM

The system phase presents a strategy in the realm between the vehicles and other elements of the service. Although being further from a thesis focus, theoretical part of this last design chapter intend to answer some unavoidable questions when it comes to service logistic. The phase aims to bring the concept closer to reality and help visualize everyday use of concept including fleet operation possibilities.

USER EXPERIENCE

Following illustrations present different scenarios of the prototype usage. Each situation takes place in a surrounding of a different urban archetype for a parking space. Across them are: roadside parking spot in a city center, large-scale parking lot across a supermarket and multilevel car park. Each illustration shows example of different circumstances where people find a prototype useful. Alternatively, paragraphs assisting illustrations, describe various actors' perspectives on a service functioning t to give a glimpse of different possible usage for a car.

CAR / PARK

The initial scenario for a vehicle is obviously using it for transportation purposes. Shared vehicle appear in a dynamic posture that is represented on a visualization purposely located on Hisingsbron illustrating references in vehicle design to its subject of inspiration.

Active user

As a representative of the target group comes a regular service subscriber. Such person uses prototype for its transformational purposes. A person with an intension to use one of fleet's vehicles either spontaneously approach one of unoccupied automobiles, or order a vehicle from application level. System would automatically pick free vehicle from close surrounding or reserve an occupied by stationary users giving them proper amount of time to leave the vehicle. Subscribers not only could order an automobile for active purpose but also reserve it for limited amount of time for stationary usage.

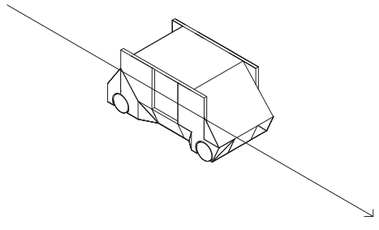
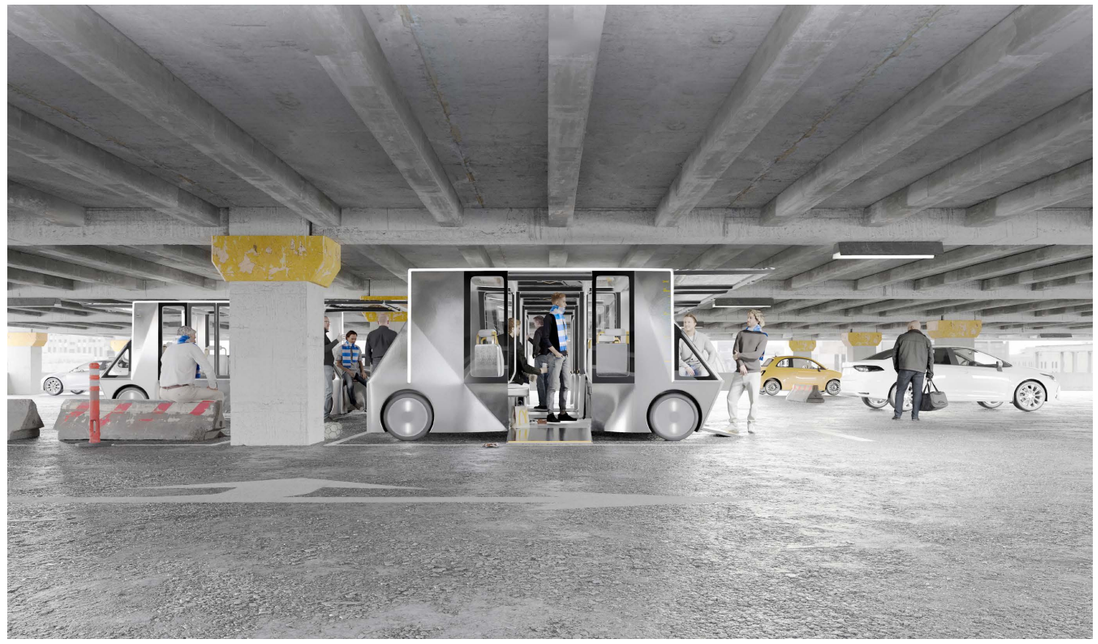
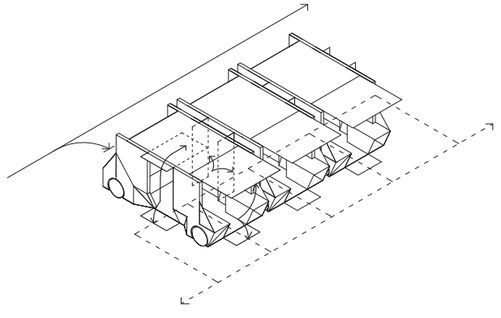


Fig. 43 *Usage scenarios / driving;* own work





The second scenario and a the first parking archetype shows a group of people using the set of vehicles as a meeting spot within a multilevel parking lot. As an exemplary space for such a meeting could work a parking by a stadium in which certain event has taken place. Filling these infrastructure-focused places with recreational spaces could benefit social life of city areas of a smaller range of gathering services.

Passive user

As one of the main principles in a spirit of sustainable approach is to open a vehicle for everyone without a need to become a subscriber. For economical reasons as well as in purposes of transport efficiency, a priority would be given to transportation orders. However, a system would make any possible effort to avoid passive user expulsion by redirecting a user to alternative vehicle in reasonable close distance or even let such vehicle pick a user autonomously from its current location.

Fig. 44 *Usage scenarios / multilevel car park;* own work

The following scenario illustrates a family approaching a vehicle with an intention to take a ride back home just after shopping. What vehicle offers in that situation is not only free space for a big piece of baggage, but additionally creates comfortable circumstances to wind down after exhausting session and take a snack just bought in a supermarket.

Owner & municipality

The service owner could be either municipality itself or some external private investor, such as Volvo, that used to own an on-demand service across the city that has unfortunately been discontinued this year (Volvo Car Sverige AB, 2024). In both of scenarios city's role would be crucial for efficient operation of a system. Possibly, some law regulations would need to be introduced so as not to limit vehicle's possibilities such as exempting the fleet from paying parking bills or city center entrance fees.

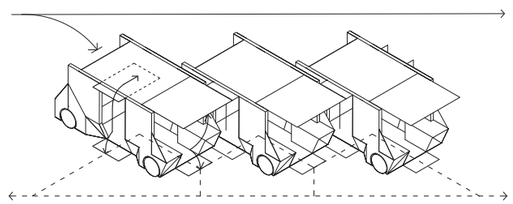
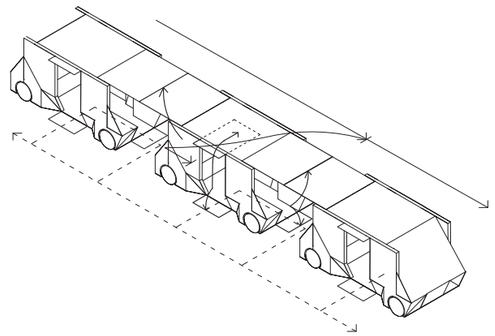


Fig. 45 *Usage scenarios / large-scale parking lot;* own work



Last scenario presents one of the most probable situations that could happen in areas field with services. Exemplary circumstances for vehicle usage would be to treat it as an additional seating area where there are no available spots nearby. This could be extremely useful in city centers where services tend to run out of free tables, or where a street-food place serves 'take away' only.

Collaborator

In order to give power to city inhabitants to control vehicle's strategy in choosing the most beneficial for society parking spot for a vehicle, system could collaborate with any local investors. For instance a bar that have ran out of seating spots might order a vehicle to serve as a temporary restaurant table. Such collaborations should not only generate additional costumers of a service, but also benefit social life of public streets by creating additional recreation spaces around vibrant meeting places.

Fig. 46 *Usage scenarios / central street;* own work

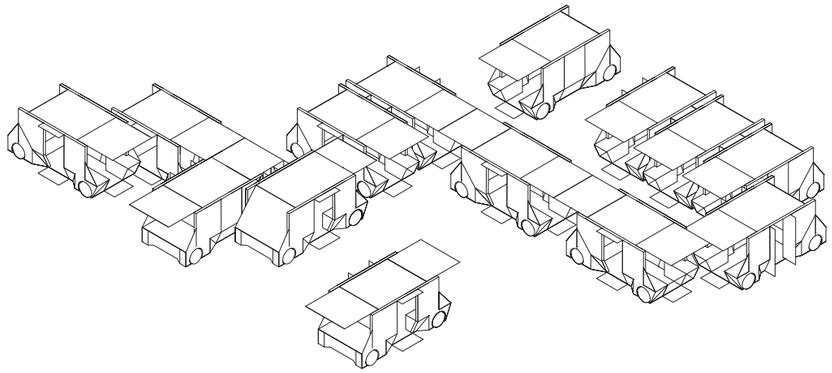


Fig. 47 *Advanced stacking diagram;* own work

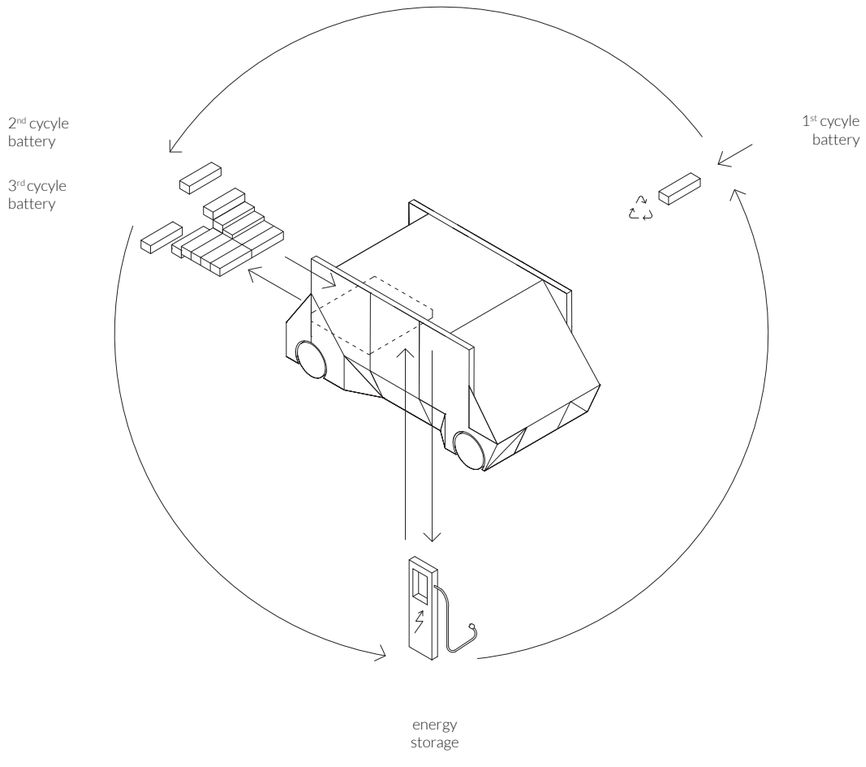


Fig. 48 *Life cycle diagram;* own work

SYSTEM IMPROVEMENTS

As a second part of a system phase, concept gets a zoom out in search of ideas on a system-scale that could improve fleet efficiency and sustainability. This part aims also to position its concept into a local context to integrating and enhance efficiency of certain locally implemented solutions.

Control and sharing model

Vehicle vision presented as a final result align with thesis theory to stand for shared electric and autonomous future for vehicles. However design make an effort not depend on a control system decision. In such light control model becomes secondary and let other important values of the thesis step out of a line. Exploring autonomous driving possibilities concept for a vehicle aligns better with artificial control system. Thanks to computer's precision in vehicle steering during parking maneuverer, prototypes can be precisely aligned. Additionally using adaptive and predictive calculations, informational system can more efficiently distribute the fleet across a city.

Power storage support

Continuing discussion on connectivity models, fleet aim to deliver additional benefits for a city regarding power management. An idea is to join V2G model, that has been tested on Gothenburg by Polestar in collaboration with municipality itself (Polestar Cars, 2023). System aimed to use plugged to electricity grid electric vehicles as temporary energy storage units. Due to asymmetrical nature of renewable energy source across a day/night cycle, access to additional energy storage can limit demand on energy from unsustainable sources during a night. Such load of plugged into a grid electric vehicles across a city under its disposal could significantly increase model efficiency.

Public transport

While implementing solution on a city scale, vehicles could integrate with local public transport system in order to propose a new alternative to current solutions or to complement already existing services or even replace certain services. Such an example can be found in Gothenburg's 'Flex Line' - public transport service on demand (Flexlinjen, n.d.). What this special line offers is to minimize distance for a person with mobility limitations to mean of transport drastically increasing accessibility on restricted areas. Fleet of proposed vehicles could potentially replace such service, increasing its responsiveness thanks to relatively small distance to the closest vehicle assuming even spread of concepts across city.

Battery life cycle

As the vehicle is driven by an electric motor, it aims to positively respond to sustainability struggles that happen in electric vehicle production instead of contributing in them. To achieve that a closed life cycle for it's battery is proposed. Once an exemplary electric vehicle's battery were diagnosed with significant power capacity loss it could be used in the prototype. Regarding vehicle's range of activity is limited to city-scale short-term usage, second cycle batteries with lowered capacity would find its application. Once a battery came to the end of its second cycle, it would either be reused a simple power storage unit or recycled to create new battery.

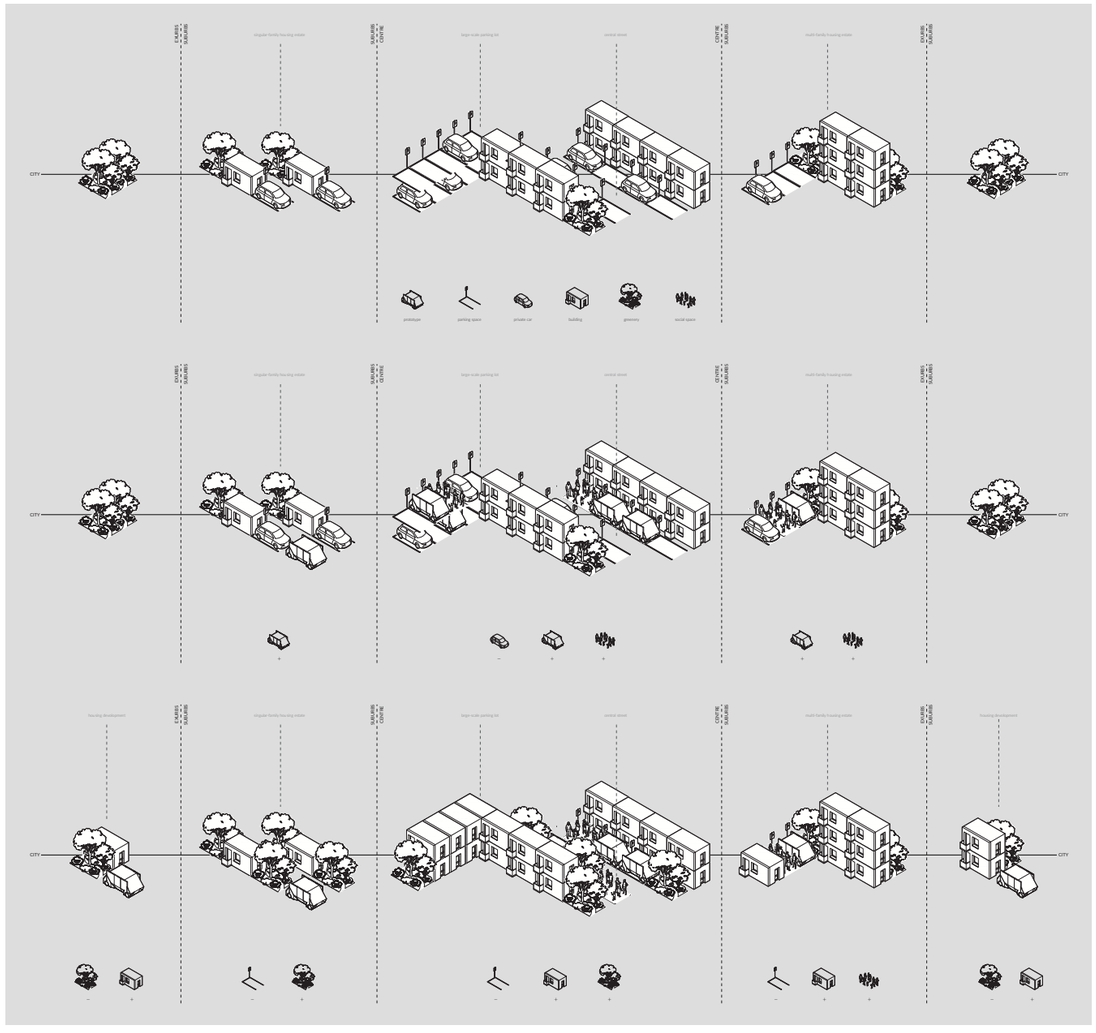


Fig. 49 *Urban speculations ;* own work

IMPLEMENTATION ON URBAN SCALE SPECULATIONS

When it comes to such prototype implementation on urban scale, the proposal should be delivered with certain business model. In order to propose such specifically for the concept that thesis proposes, logistics of its usage should draw mostly form car-sharing business models, yet also from ride sourcing services, due to an ability of an autonomous vehicle to pick up a costumer increasing the access range of a single vehicle.

1. First most probable step of the vehicle implementation would be to build a singular or a few physical prototypes that would be placed in several locations across a city centre. In this initial step, the vehicle wouldn't even need to be drivable at this point, as its first test would be to check the public reaction on a concept and to arouse interest and demonstrate static possibilities of a vehicle.

2. In the next step, a limited number of first vehicles could be launch in order to test concept's full purpose this time. Releasing exemplary number of 10 automobiles for a city, fleet full functionality should be limited to certain area of a city, which could be a city centre for instance, so as to provide effective transport at least on the smallest reasonable scale.

3. After achieving success on the first two test rounds, a minimum number of 50 vehicles should be launched to provide fully functioning car-sharing service, according to (movmi, 2022). System finally using its full potential, could demonstrate first consequences on an urban fabric of its taste bed. First visible changes could be spotted in areas of the biggest congestion of the proposed vehicles, which would naturally be central areas. This city part, as one with already existing social life, would serve function of familiarizing inhabitants with the service. Every moderate city inhabitant should already spot a vehicle due to regular trips to the city centre, while first uses would be both result from spontaneous needs of the individuals, such as lack of free tables by a restaurant, or determined by first service collaborators, offering the vehicle exclusively for their customers. Meanwhile, on the outskirts of the city spontaneous presence of the vehicle in random locations would work as a subject of attention probably without larger impact, however familiarizing these areas inhabitants with the concept as well.

4. Next release would experience a huge multiplication of the number of vehicles 300 Such scale should already provide most of city areas with regular presence of representatives of the fleet giving a positive impact on the outskirts of social life of the city. Service being already recognizable for most of the society, would finally become an intuitive choice when it comes to spontaneous rest in highly build-up areas of the city, as well as it might become the leading on-demand transport service replacing number of individual rides in private cars. Proportions between private passenger cars and these public vehicles would start switching in the central area, providing it with significant increase of public meeting spots previously occupied by cars.

5. Last predicted step consider full replacement of private cars with prototypes, remaining and developing public transport at once. An estimated number of these public vehicles would be 3000. Anticipating increase of switch from private transport to public means in the areas of the biggest level of presence of the fleet, spaces dedicated for large scale parking would free up leaving a space for a new type of development. Consequence on an urban scale would be the rise of development density, which would therefore help the ongoing housing crisis, by providing more people with a place to live in a city without expanding its borders. Meanwhile, singular parking spots aligned with public spaces could transform into greenery areas, adjustment of a sidewalk or a bicycle path. Freed parking spaces integrated with private buildings could complement their original function, as underground parking levels could offer common space for the dwellers, or backyard garages could be transformed into utilitarian house extensions. On the other hand, releasing traffic congestion could motivate individuals to choose locations on the outer rims of a city as their homes, due to shortening travel time to the centre. In order to prevent urban sprawl, both service implementation as well as housing development would need to follow certain regulations prioritizing core urban values and principles. In order to do so proposed concept would already need to be considered as "infrastructural change-agent that shape urban growth patterns" (Shieh, 2024. p.9), unlike automobiles which rapid expansion negative consequences hasn't been taken under consideration in the period of their implementation.

SYSTEM

CAR / PARK

Fig. 50 *Main visualization;* own work

10. DISCUSSION

In order to present holistic reflection on thesis outcome, discussion paragraph has been divided between preliminary chapters, in order to examine how the thesis result answers problematics of each part of its foundation.

Background

Global

As a response to sustainability issue with a moderate passenger car purposeless space occupancy in cities, which known to be for 95% of its lifetime, thesis strives to find an ultimate solution. In project scenario a car can stay in constant use serving actual functions not being activated. It is mostly through its furniture usage that is expected to be used mostly day time, but also through connecting to electricity grid in V2G model to store energy during night.

Automobile

Thesis put a fresh light on role of a car in built environment, by conducting comprehensive studies of vehicle behavior in different parking settlements. Thesis can be found as an alternative to automotive industry proposals that same as this project happen to implement social aspects in their vehicles. However, no work on this topic has been found from architectural perspective. Original approach trying to put architectural values on a par with its automotive requirements is therefore treated as a strength of the master thesis, enhanced through theory, design, as well as representation standing in opposition to what automotive profession is used to. In opposition to proposals that could be found on the market, design provide entry from the front as well from sides. Additionally the project comes with a new approach to express asymmetry & organicism commonly desired in transportation design and equalize it with symmetry & orthogonality that stands for stable expression of parked vehicle.

Architecture

Proposal works as an alternative to current architectural trends when it comes to city transportation for social purposes. Contemporary planning prioritize other means of transport than passenger vehicles, which result in decreasing number of parking spaces in city centers. Thesis propose another way for dealing with a problem without a need of complete elimination of cars form cities.

On the intersection

In a spirit of a first wave of automobile expansion that has found its response in architectural discourse, thesis aims to bring a car back to architectural discussion. Final project, same as twentieth century concepts designed by architects of that time, reflects contemporary values . In terms of present times it occurs to be a priority for sustainable development over technological revolution.

Local

Preliminary thesis motive to find it's implementation on example of Gothenburg was to align with automotive industry role in city legacy. However, prototype fleet has found a few scenarios presented in system chapter, in which it would supplement existing projects. In that case concept would not only improve local transport, but benefit municipality.

Theory

Automobile

As a supplement to theoretical foundation form automotive perspective, the thesis seeks to contribute to arguments supporting the three revolutions framed in Three revolutions: Steering Automated, Shared and Electric Vehicles to a Better Future (Sperling, 2018). Project add new electric, shared and autonomous mobility solution to the ongoing discussion and become part of the positive narrative, where cities are being liberated from the congestion caused by the mean of private transport.

In response to Mario Bellini's concept for a Mobile Human Space, thesis consider its outcome as a manifestation perfectly fitting for his definition of a vital space for everyday life, additionally merging concept with a term of a Third Space.

Architecture

Moving to architectural theories, the thesis strike to extend crucial definition in which theory of a Soft City is presented in Soft City: Building Density for Everyday Life (Sim & Gehl, 2019). This academic paper expands the definition of a street as a connection between static and mobile word and apply it to automobiles as integral components of the street. Just as the relationship between architecture and transport is characterized by the static meeting the dynamic, a car can either remain stationary or be activated. That hidden agenda shows a true dualistic nature of an automobile, which is contemporary expressed only partially. The thesis fulfill the gap and explore the potential for remained static half of the car nature, even though a true purpose of a device lies in its active feature.

Crucial part of the project idea is to release a system of vehicles that serves as Urban Acupuncture intervention. In spite of targeting permanent locations, the service provides qualities temporary wherever a vehicle is currently parked. Such treatment seems to be even more efficient than usual examples of this category of urbanism as it is constantly changing its focus and equally distributing positive influence across the whole urban environment of the city. Alike parklets, which are small-scale recreational spaces created from former parking spots as a form of urban acupuncture, this design proposal serves the same purpose but retaining the original function of a parking.

On the intersection

As stated at the beginning of theoretical chapter, the thesis works under principles of Interdisciplinary Thinking due to working on the intersection of automotive and architecture professions. The framework assumes multidisciplinary character of a workflow, that has been done through conducted research and cooperation with professionals spread across different sectors of two industries including vehicle safety, transportation design, architecture and urban design.

Question and Aim

How to examine architectural qualities in automobile design to exploit social potential of parked cars within urban environment to (a) increase social life of public streets filled with parking spaces and (b) simultaneously embrace shared driving experience?

Although the whole paper construct an answer to stated question, it is conditions and body phase that most accurately respond to methodological character of the research question. For the sake of the final result mentioned phases create base for final design project, which wouldn't come true if not conscientious analysis of crucial issues stated in condition phase and resolved in body phase. Although, from theoretical side of the thesis those phases occur to be the ones carrying more universal answers to thesis question, it is final design that help to visualize answer to findings.

Consequently to its primarily expected result, outcome of the academic work find its embodiment in a vehicle concept. Final design answers stated research question giving an example for how thesis idea could came to existence, which is therefore represented through number of solutions and scenarios.

The thesis aims to incorporate automobile design into architectural discourse and architectural qualities into transportation design, demonstrating how one field of expertise can benefit from another.

Theoretical and contextual background of the thesis report current state of affairs highlighting importance of the topic. Continuing with preliminary studies, the thesis outline relevant examples standing for similar values to the ones represented in design outcome. Similarities one can find in reported case studies to the final proposal proves their relevance.

Written report of the thesis progression strives to describe each design step allowing the reader to follow the process and understand importance of selected aspects that inform the final design.

Although thesis cannot take responsibility weather the discussion it arise will be continued, it is hoped to interest hypothetical public and at least convince readers to potential of the under explored territory of architecture with automobiles juxtaposition.

Case studies

Analyzing the relationship between the design proposal with selected case studies from perspective of finalizing the thesis, a lot of references could be found.

Vehicle is accessible form three sides, same as Quasar Unipower. Rearrangeable interior with its social character recalls Mario Bellini's efforts to express flexibility and vitality in his Kara-sutra concept. First stages of design process resolved in the body phase consist in building a base for a project that could be resolved in different ways similar as Italdesign Capsula provided user with defined platform for multi-functional usage. Finally openable front and back of a prototype resembles iconic door wing of Dodge Deora.

Although these allusions haven't been done intentionally, they are found to be arguments for successful selection of experimental prototypes at the beginning of the thesis. They not only worked as a good source of inspiration, but perfect starting points for reflection on architectural role of a vehicle that has been continued within this theses.

Final reflections and feedback

While presenting thesis topic to various type of public I have encountered a recurrent reaction of people brainstorming about adjacent fields where automobiles and architecture interact. Primarily, I interpret this sparkle of inspiration as a proof of topic accuracy. The fact that topic is so much uncharted and inexhaustible tempts to aspire to answer all questions arising on the intersection of these two industries. However, to complete the thesis it focuses only on selected aspect of this juxtaposition, which is exploration of potential of a car in cityscape as a both parked and driven social space.

These exemplary discussions caused by the thesis ultimately aspire to work as a starting point for a new filed of architectural discourse.

11. TABLE OF FIGURES

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