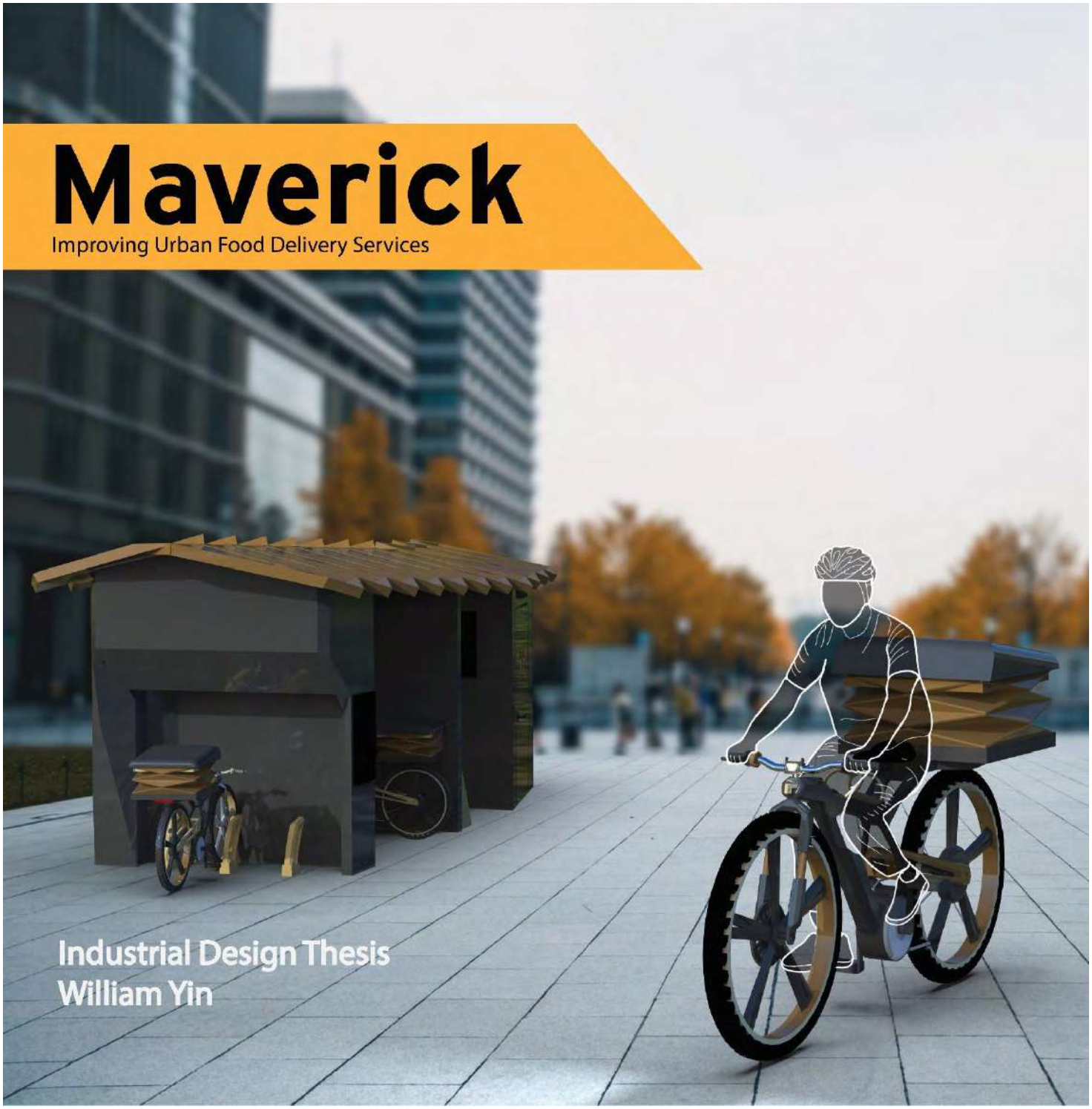
Maverick
Improving Urban Food Delivery Services
Industrial Design Thesis
William Yin

Improving Urban Food Delivery Services

by

William Yin

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Industrial Design

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Abstract

There has been a gradual shift toward Gig economy jobs over the past few years. The pandemic only accelerated this trend predominately in the food delivery industry. This has become a problem, especially in cities as there are now many couriers who need to rely on equipment that is not intended for delivery of food as well as there's a lack of space for them to relax and relieve themselves in-between shifts. This industry is relatively new and due to the negative perception of the workers in this field, their concerns are not taken seriously. Both qualitative and quantitative research has been conducted to better understand the user's needs, as well as ergonomic considerations for the full-scale model. The data collected is used to better inform users on how to further develop the food courier hub and electric delivery vehicle, which in turn that will better enhance the quality of life and offers a more seamless transition for potential employees to enter the field. The concept was established to fulfill the needs of the food couriers through the use of a more comprehensive solution.

Keywords: Gig-worker, Food courier, courier hub, comfort

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CHAPTER 1: Introduction

1.1 Problem Definition

As the Gig economy continues to grow due to the nature of work, the food courier career is playing a much larger and more important part in today's economy. There is an increased demand for food delivery services due to the convenience and abundance of restaurants that exist around the city. The COVID-19 pandemic only increased the need for food couriers to fill this role as many people were let go of their previous jobs, and there weren't many job opportunities available. The work environment of these food couriers is tough on the body as there is very little ergonomic consideration for these types of jobs. They spend a large amount of time on the road as well as moving in and out of restaurants. Due to the social aspect of this career, many people do not look too high at this choice of career, and as a result, their needs are not met. How may we improve food delivery services in dense metropolitan areas?

This thesis report will focus on how food couriers conduct their activities, which is to deliver food in urban areas of the city. The research and content are to try to design a comprehensive solution that will enable anyone with the cycling ability to become a part of this community. In addition, there will be ergonomic and sustainable considerations for the imagined solution.

1.2 Rationale and Significance

To better understand the needs, insights and experiences of the food courier in dense metropolitan areas, there will be several different research methods will be deployed to better understand this demographic. The first initial research is conducted through the use of scholarly research through Google Scholar, as well as, the Humber Library. To better understand the lived experience of workers, the second-hand experience will be gathered through the use of video

observations, as well as, news articles depicting their needs and wants. Through the use of research, it is possible to better understand the main pain points. Below is some key information that will be vital to better understanding the problem that couriers face on a day-to-day basis.

Key Questions to be answered
What are the fundamental needs of the food couriers and Gig Workers?
How can the comfort of the users be enhanced while on the job?
What impact can the new solution have on product sustainability?
How maybe mitigate the challenges that are faced by food couriers in the city?
What are some existing solutions that exist on the market?

Table 1: Key Questions to be Answered

Key Information to be determined
Current Food courier standards and practices
Emerging market trends and the transportation technologies
Ergonomic design strategies and considerations
Current products that exist on the market

Table 2: Key Information to be Determined

These key Questions were created to try to determine areas on how to improve the quality of life for the food couriers.

Research Methods				
Online and Scholarly Articles	News Articles	User Observation	Ergonomic Study	Video Analysis

Table 3: Research Methods

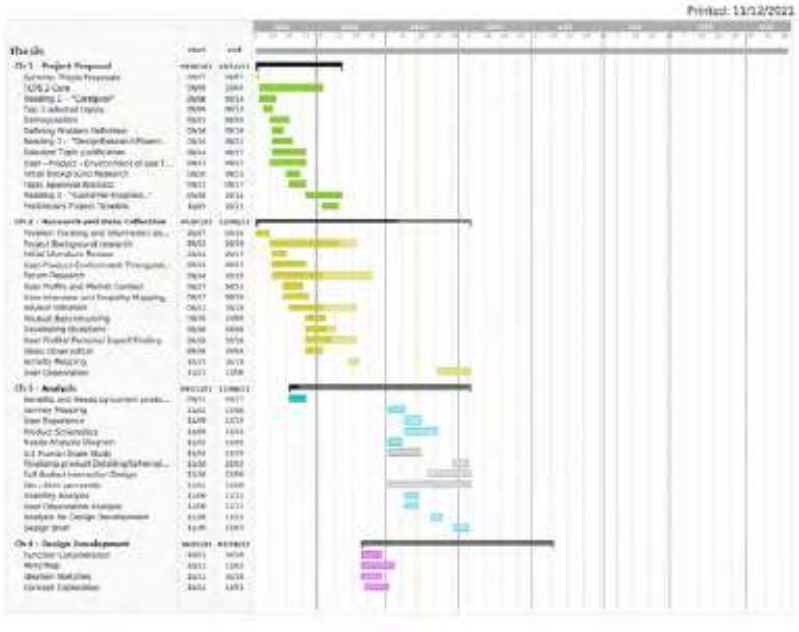


Figure 2: Flow Chart of Thesis Activities

1.3 Background/ History/ Social Context

According to the article “Five UberEATS and Fedora couriers on what is like to cycle with your food delivery”, there were complaints about the lack of awareness from both the cyclist as well as the delivery driver. This is only increased as the food courier may tired while on the job which will increase the risk of getting into an accident. The weather conditions play a large role in the number of hours that the riders can go, usually more during the spring, summer and fall weather compared to the winter seasons.

From the Government of Canada website (Canada, E., 2021), it is estimated that now in Canada, Gig workers represent more than one in ten Canadian adults and that more than one in three Canadian businesses employ Gig workers. There has been a large reliance on Gig workers to try to

fill in the gap of providing greater convenience to the consumer. This line of work is seen as attractive as people see this career path as flexible and empowers them to work on things they want to do. Some other people want to work in this field as it an immediate work that they can find employment in. However, the drawback of this career is that the workers are classified as independent contractors and don't have the labour protection that other careers may have.

According to the article" Ontario wants to give food delivery drivers washroom access," there has been a general lack of public infrastructure for the Gig workers to use which form a washroom point of view is not convenient. Recently, the Ontario government has tabled legislation to allow food couriers to access bathrooms at businesses that pick up and deliver food items. This is because thousands of workers are being denied the right to basic decency of using the restroom; this legislation will be applied to as many as 200,000 workers. Earlier this year the city of New York approved this bill package.

There has been very little effort made to try to remedy the issue of employment in this field as the workers in this field are seen as replaceable. The ergonomic issues, solitary nature, and poor working conditions increase the turnover rate for those in the field. There needs to be a fundamental shift in the way that the couriers can access readily available equipment, and rest in between orders. A solution should be created to improve the ergonomic design of a bike, as well as provide them with a place to rest which will reduce the burden on the courier. This will ensure that the bike couriers will be more easily accessible for the Gig workers to enter.

CHAPTER 2 – Research Results

Figure 3: ***Food Bag. Image Retrieved from. https://www.nytimes.com/2019/06/16/business/uber-eats-deliveroo-glovo-migrants.html***

CHAPTER 2 – Research Results

The goal of this chapter is to better sort the information between the product and the user. The main focus will be on the different levels of users, the primary users with recognition of the secondary and the tertiary users. The product will be designed around the primary user to cater to their needs and their wants. The product will be a comprehensive solution that involves a hub for couriers to rest and use the restroom.

2.1 User Research

The objective of this thesis study is to better understand and design a focused solution, through the use of scholarly articles as well as online search engines. The research topic was to try to understand the challenges that inexperienced Gig workers may face when entering the food delivery industry.

The areas of focus that will be looked into are the user needs and demographics, design for their full-bodied interaction, interviews and analyzing components. The data collected will be used to determine the people that the product is intended for.

2.1.1 User Profile/ Persona

Primary Users:

The Primary user that will be the main focus of this thesis is the Gig Workers working in the food Courier industry.

Secondary Users:

The Secondary users are the Maintenance Workers who will repair or keep the food courier hub clean. They will have limited time interacting with the bike rental as well.

Tertiary Users:

The Tertiary Users will be food delivery Companies such as Uber Eats, these companies will have a very limited role in the day-to-day interaction with the product but will have some control over how the couriers behave in the field.

Persona:

Figure 4: Portrait of a man handing over a food package. [Image] Retrieved from https://techcrunch.com/wp-content/uploads/2020/03/GettyImages-1154103372.jpg?w=1390&crop=1

Name:	George Carlin
Age:	30 (Caucasian)
Occupation	Full-Time Food Courier
Income:	$42,000
Location:	Toronto, Ontario, Canada
Education:	Graduated from a college program
Relationship Status	Living with his girlfriend
Frequency and Duration	Works six days a week for roughly 7 hours a day, only takes a break when there is inclement weather and works in all seasons
Activities	Like to ride and explore the city, and likes to hang out with friends.

Table 4 – Persona

This persona of a food delivery person is a fictional character that fits the demographic of the target market. This user persona was developed based upon the research conducted on this targeted research. A made-up user background was created below.

George Carlin is a 30-year-old Caucasian man, we currently work as a full-time food courier in the city of Toronto. Before he worked as a delivery person, he went to college and studied for a communication degree and graduated from the program. He found out that he didn't like the program so he went into this food delivery field as a way to earn money. From working around 42 hours a week, he makes around $42,000 a year. He likes to keep in touch with other food couriers in the field and hang out with this friend. He enjoys the freedom that this job brings him as he can pick and choose the timing of his delivery. He enjoys the views of the city that is afforded by this career and feels in control of his career. He does feel the negative impact of this career as he needs to keep on top of the maintenance of his equipment which can get quite expensive with the limited amount of

funds. He likes to work during the surge hours which are the lunch and dinner rush to maximize his earnings. Working for long periods, he runs into the issue of trying to find a place to rest in the city as he is constantly working in various locations. This also means that he has to go out of his way to try to find a washroom, as many businesses do not allow couriers to use the washroom unless they are paying customers. Due to these issues, he often finds it difficult to run extra-long shifts that he could use for extra income, and have to work an extra day to make up for a lost time.

The age range for a food courier is quite large because this is a Gig job and anyone of about any working age can enter the field. From the interview conducted, the average age seems to hover around the age of 30 – 36. Due to the nature of this field, a large number of people enter and leave the industry all the time. Those who are looking to enter the field need to have a strong desire to work outside for an extended duration of time.

2.1.2 User Observation – Current User Practice

The purpose of collecting and understanding the data is to better understand the different situations and the conditions of the food couriers in dense metropolitan areas. Understanding how bike couriers go about completing their tasks will help identify the problematic issues that can be resolved. This has been done through the use of literature review, and user interviews.

Food couriers usually perform the tasks similarly to one, as they are all independent contractors. There are a few tasks that need to be completed before making deliveries, which is to ensure that their equipment is in tip-top shape to make it through the shift. Because they are independent couriers, they have to rely on their equipment to make their deliveries. This becomes a large problem for those whose equipment is often not reliable, and those who are trying to enter the field for the first time. This is compounded by the fact that they need to complete the tasks on time and quickly. Some of the tasks they need to complete the tasks are checking their phone for the heat zone (which has increased payout), cycling to that location, rejecting other requests to get orders that

have the most amount of potential, cycling to the restaurant, picking up the order, making their way to the delivery zone, and dropping off the package.

There are a few categories when it comes to those who are working as a food courier, some are looking to make it their full-time job, and those who are just looking to make a supplementary income on top of their regular work. This means that the hours of work range widely from just a few hours to an entire day's work. Some work from outside the city so they have to rely on bringing their equipment from their homes to the city which is quite cumbersome as they do not want to store their equipment downtown where it could get stolen. These types of couriers often find it difficult to rest or use the washroom compared to those who are living in the city as they are not allowed to loiter around in the businesses during peak hours. Due to the nature of buying takeout food being quite expensive, couriers find it to be much cheaper to try to bring their food with them for lunch. Additionally, due to the nature of the job, they find it difficult to try to keep personal belonging with them as often their bikes are not capable of keeping them stored.

From the dissertation, Delivering Justice: Food Delivery Cyclist in New York City by Do. J. Lee remarked that the delivery work industry is a precarious one where since Uber Eats classifies these workers as independent workers, so they don't provide them with the necessary tools, healthcare and worker's compensation. This meant that their wages are often suppressed from what they should be earning, those in the Latinx and Chinese communities are the most affected by this (Lee, Do J, p. 106, 2018). Those who are new immigrants often find work as they have limited ability to improve their verbal skills. This was also remarked by the user interview, where Matthew remarked that he also saw that there is a large food delivery community that comprises on newly immigrants as this was the easiest job for them to enter.

2.1.3 User Observation – Activity Mapping

Information was gathered and conducted from the user's activities to develop a potential solution. The following steps have listed in the table below:

- Preparing for work
- Getting to a heat map location
- Accepting and picking up the order
- Riding to the location
- Making the delivery to the customer

The user journey mapping and the user experience mapping were created and constructed through the use of an in-person user observation. The user observation took four hours during the lunch rush. The charts listed below look at the user's daily routine when they are making food deliveries to the customer, examining their feelings and the challenges on the job.

Journey Mapping

	Preparation	Set Up	Task 1	Task 2	Task 3	Task 4	Task 5	Completion
User Goal	Accepting an order	Getting to the store	Picking up the order	Putting it into the bag	Riding the bike to the location	Getting off the bike	Handing the food, the customer	Checking for new orders
User Action	Looking at the Uber Eat Heat Map	Navigating around traffic and pedestrians	Showing the cashier, the order on Ubereats	Taking it from the worker	Taking roads and bike lanes that are empty	Locking up the bike to the bike lock	Taking a picture of the packaging	Checking the phone for a new order
	Prepare the equipment for order	Locking the bike against the bike lock	Waiting by the pickup area	Setting thermal bag on the ground	Navigating around pedestrians and cars	Looking at the Uber Eats delivery direction	Ensuring that it is at the right address	Unlocking bike
User Thoughts	Why are all these orders so bad	Where is this location at?	I don't want to wait here for too long	Will this fit in my bag?	Need to watch out for road hazards	Hope it didn't melt/ get cold	Do I need to take a picture of this food	Should I take this order
	Is it going to rain today	Where can I lock up my bike	Are they done yet?	I don't want it to spill	Where do I need to go?	Did anything spill or get ruined	Where do I put this?	It is far away from me
Storyboard/ Photos								

Figure 5: Journey Mapping

This was conducted through an in-person interview with a bike courier in downtown Toronto. This was done to better understand the task and technique that the interviewee uses to complete their

delivery. During the journey, I often ask him questions about what he is doing and any pain points that stem from their actions.

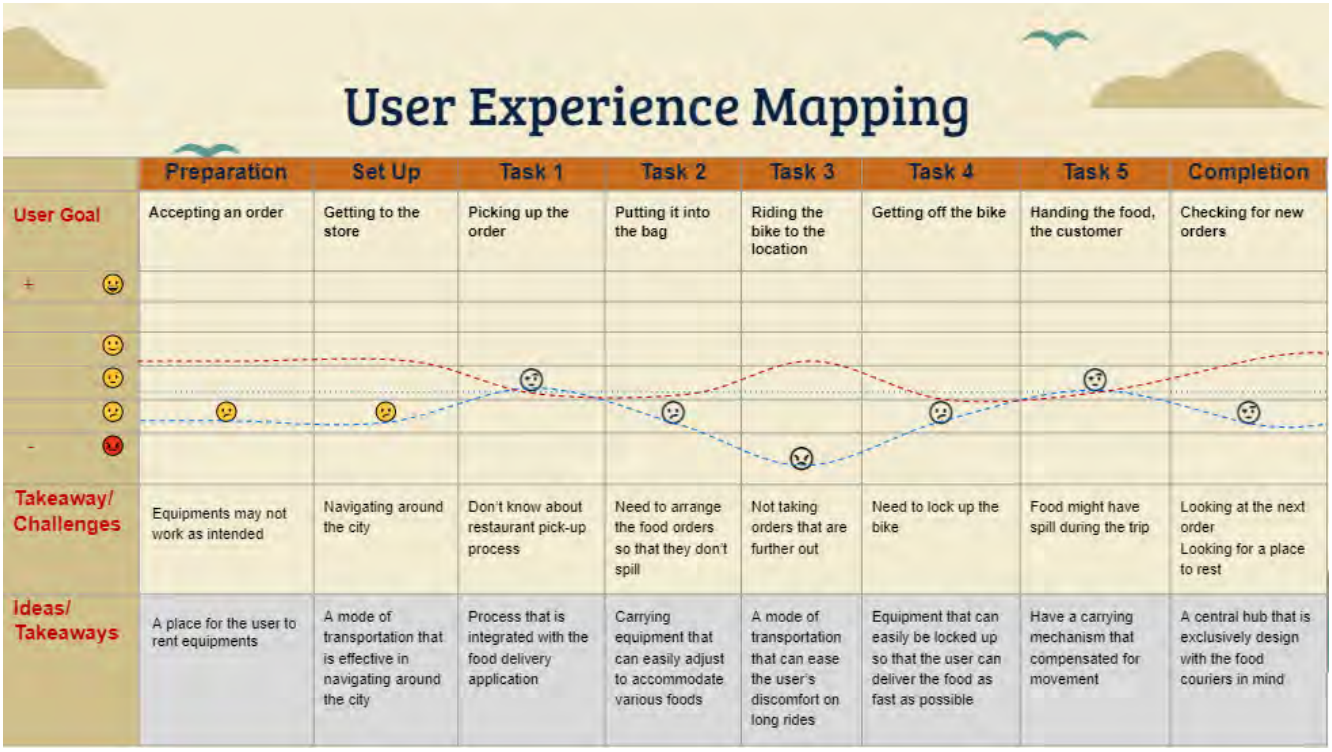


Figure 6: User Experience Mapping

From the information gathered from the in-person observation review, it seems that there were a few issues that came up during the transportation of the food, as well as during the breaks which were not demonstrated through the user observation. His ability to perform relies solely on his equipment, and that equipment is not well suited for the job. Additionally, weather conditions and long periods on the road can increase the likelihood of injuries which takes a toll on their body.

2.1.4 – User Observation – Human Factors of Existing Products

Biking for an extended period can cause several injuries due to the positioning of components on their bikes. Even though there has been several remedies and more ergonomic consideration made by the biking industry, there are still issues that occur such as in the saddle of the bike. According to the article, "The effects of relative cycling intensity on saddle pressure index by Holliday, W., Fisher, J., & Swart, J., there is increased contact loaded area on the public bone and the sit bone

where there is increased workload., this means that the hip and the back have to compensate for this pressure change which can cause a tense riding position. There can be further developed the ensure that a natural riding position is maintained by altering points of contact on the saddle (Holliday, W., et al, 2019). Some bikes come with the suspension to try to make the ride smoother, it can only increase the comfort of the user slightly as it doesn't remove the issue of sitting in an unnatural position for an extended period. Another issue that came up during the user observation was that the user, Matthew Ham, remarked that his back also gets sore and tired as he must carry food on his back in an unnatural position. This could be resolved through a better riding position or a different food carrying method.

Figure 7: Courier Loading his backpack

In addition to the video observation made with the YouTube channel, The Cycling Courier is a Toronto-based bike courier. He made a few videos that were of interest, the main video used for analysis is the video titled, "This is what working for UBER EATS is like." This video was taken from the first-person point of view. In the video when during his biking trip, the courier seems to have a harder time reaching the controls such as the bell, the gearing control and his smartphone. There can be further investigation into how to ensure that the controls can be accessed ergonomically so that they will not interfere with the user's ability to perform their task.

Figure 8: First POV of the user making deliveries

2.1.5 – User Observation – Safety and Health of Existing Products

Existing biking products have reflectors on various parts of the bike, from the edges of the bike pedals to wheel spokes. This is to ensure that the bike is visible from various angles during low light to motorists. Additionally, there is a need for lighting for the front and the rear of the bike, to ensure that the courier can see at night and for better visibility. Before a trip, the courier is required to make sure

that the equipment is safe to operate, checking if there are any dents in the frame to may cause the structure to fail, tire pressure, and checking if the battery levels are up to snuff. Additionally, some couriers use mirrors to check on their blind spots, but there is an issue that they may be too wide for navigating smaller city streets. For the resting stops, the user often has to hang inside streets, and alleyways to rest on their bike as proper seating areas are often out of the way for the couriers.

2.2 – Product Research

The objective of this research is to better understand the existing products that are currently used by bike couriers. This is done to understand the benefits and features of the products that work well and those that can be improved. The benchmark products focused for this section of the thesis will be the bikes to try to find opportunities for improvement and innovation.

For comparison, there will be eight different types of courier transportation which will be analyzed which couriers have used to make deliveries. They all fit the purpose of a maneuverable food transport which will work well in the city, but with different variations to them. The key findings for benefits and features are organized to determine the features and benefits that they all share. The information can be seen in Appendix A.

2.2.1 Benchmarking – Benefits ad Features of Existing Products

A total of eight different methods of transportation will be used by the couriers to showcase the benefits and features of these products. This will be listed in the following charts.

Radcity 4	 Figure 9 – Radcity 4. Image retrieved from https://radpowerbikes.ca/products/radcity-electric-commuter-bike	• Comfortable • Smooth and Quiet • Display easy to use • Long battery life • Powerful for uphill rides

Honda PCX	 Figure 10 – Honda PCX. Image retrieved from https://powersports.honda.com/street/scooter/pcx	• Affordable • Comfortable seats and suspension • Under-seat storage • Weather Resistant • Reliable
Tern GSD S10	 Figure 11 – Tern GSD S10. Image retrieved from https://www.wired.com/gallery/best-electric-cargo-bikes/	• Ability to be Stowable • Nimble around obstacles • Easy to climb hills • High load Capacity
Goplus Road Bike **Commuter Bike** **Shimano 700C**	 Figure 12 – GoPlus Road Bike Commuter Shimano 700C. Image retrieved from https://www.amazon.ca/Goplus-Commuter-Release-Aluminum-Shimano/dp/B01NCWD4UM	• Durable • Comfortable • High top speed • Lightweight to be easily stowed away • Stable and Smooth
Urban Arrow Family		• Effortless pedalling • Comfortable • Can carry passengers and items • Lower centre of gravity for agility • Agile

	Figure 13 – Urban Arrow. Image retrieved fromhttps://www.fullycharged.com/Urban-Arrow-Family	
Kent 24" Northwoods RockPoint	 Figure 14 – Kent 24" Northwoods Rockpoint. Image retrieved from https://kent.bike/collections/specialty-bikes/products/24-northwoods-rockpoint-trike	• Easy to use as riders are always stable • Smooth over rough terrain • Sporty Fee around obstacles • Superior Strength
Honda Rebel 300	 Figure 15 – Honda Rebel 300. Image retrieved from https://motorcycle.honda.ca/model/cruiser/rebel_300	• Low Seat height for accessibility • Great Handling • Reliable • Low torque for quick takeoffs • Unique Look • Comfortable riding position
Arcimotor Deliverator	 Figure 16 – Arcimoto Deliverator. Image received from https://www.arcimoto.com/deliverator	• Maneuverable • Large load carrying Capacity • Minimal Maintenance • Sleek Design • Protects the user from the elements

Table 5 – Product Comparison

Feature	Frequency
Comfort	11
Useability	11
Durability	10
Stylish	6
Fun	6
Affordable	3

Table 6 – Feature frequency Table

2.2.2 Benchmarking – Functionality of Existing Products

The purpose of the X – Y graph in figure 13 is to better understand the design of the bikes, which the endurance and comfort being on the axes. This chart was made to better understand the correlation between comfort over a long-term period, and how well the bike can fulfill the purpose of a food courier. The short-term use vs the long-term use, as well as, the limited usage vs. the level of comfort due to the ergonomic principles are used. These charts will be used to explore and determine what will be the best type of solutions for bike couriers and to find out any types of solutions that were not discovered initially. My take away from the chart is that the longer-distance vehicles rely on the non-human powered component to allow for the cyclist to go for a longer distance. This implies that during the design exploration, an external power source, a battery, should be one of the key components of the vehicle. Additionally, comfort has a correlation with endurance on both ends of the spectrum, as Kent 24” Northwoods is very comfortable however it’s designed for short-term usage, and on the other end of the spectrum, the Arcimoto Deliverator is also comfortable and can travel long distances. They have a more upright posture which means that the lower back is not stressed out during the ride. For the other products that are situated between the two above products, they sacrifice both comforts for increased endurance.

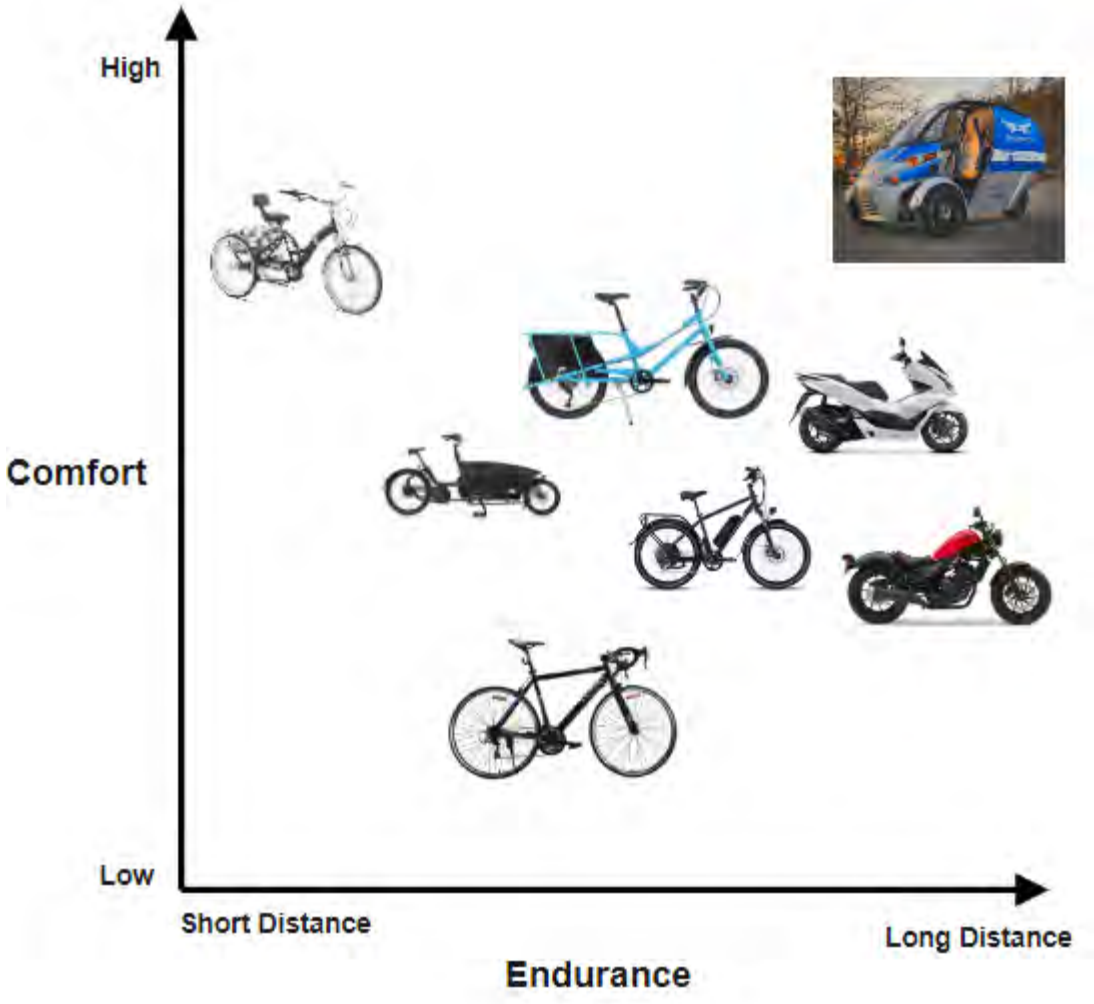


Figure 17: XY Chart of Functionality

The product's websites, promotional information, and reviews are used to reveal the top features and benefits of the products. By focusing on and highlighting the features of the products, common key benefits can be discovered, and implemented into the design. The table below is a list of the main key features and benefits of the benchmarked products.

Key Features of the products	
Features	**Benefits**
Battery Pack	Long-distance travel
Aluminum construction	Lightweight
Rack	Carrying cargo
Slim Profile	Easy to navigate around tight spaces

Table 7 – Key Features of the products

2.2.3 Benchmarking – Aesthetics and Semantic Profile

The aesthetics pertain to both the courier hub and the courier bike that is often overlooked and not considered. This is because couriers often use a variety of different bikes that they have on hand and those often are cheaper. They are often being used for more functionality rather than appearance. Some of these bikes often range from old city bikes to cheap but reliable e-bikes. Due to the nature of the job, these bikes often see a lot of wear and tear due to rough working conditions. The aesthetics of the public bike rental, Bike Share Toronto, currently lack the visual appeal as they are designed primarily with a utilitarian purpose in mind. They are designed with a simple locking mechanism that attaches to the front of the bike, and a simple kiosk for those who are not using their phone to rent out the bike. They are utilitarian and are designed to keep the cost as low as possible, which is rectangular-like shape.

Below is a mood board that will be used as an inspiration board. The current ascetics that are aimed for are contemporary with hints of neo-futuristic in terms of the shapes and lines. There are sharp lines that transition into one another naturally to ensure that the bike and the courier hub give a feeling of strength and increase the dynamism so that the user feels energized. All the detailing will be cohesive to ensure that the two products can be easily recognized as a cohesive package.

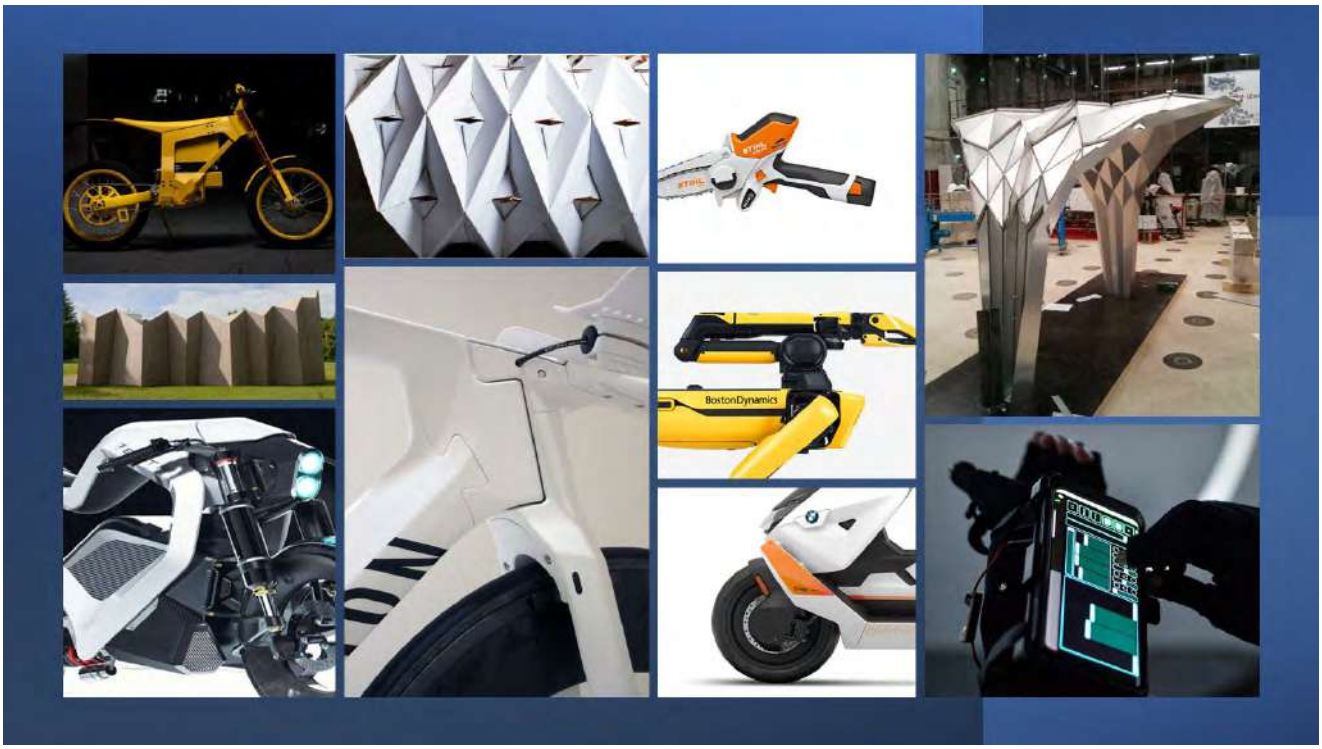


Figure 18: Mood board for design Inspiration

From my interview with my advisor, Matthew, he expressed that bright and reflective colours are recommended for bikes as it is much easier to see the courier in low light situations, such as during dawn and dusk. This is important as food couriers work through all four seasons where it gets dark early during the fall and winter. The current form factors that are seen today are often bikes with integrated batteries in the frame to bike the bike a more streamlined appearance. Additionally, Matthew states that the shape of the bikes today is mainly determined by the materials, with the stronger materials often being much lighter due to the reduced need for materials such as carbon fibre.

From the peer-reviewed paper by Katja Scheleinitz on the unique appearance of e-bikes, *"car drivers often tend to underestimate the speed of E-bikes and accept smaller gaps for crossing in front of them compared to conventional e-bikes*" (Schleinitz, K., & Petzoldt, T., 2019), since they often look like conventional bikes, drivers often have a lowered expectation of speeds. To avoid this from

occurring, it is necessary to try to give them a unique appearance so that drivers are aware of this situation.

2.2.4 Benchmarking – Material and Manufacturing

Materials	Benefits	Reference
Laminated Glass	Harder to break for increased security, reduce noise pollution, and reduced sun heat transfer	https://www.leeglass.com/news/laminated-glass-benefits/
Bamboo	Fast-growing and renewable material source, great strength and flexibility,	https://www.guaduabamboo.com/blog/advantages-of-building-with-bamboo
Polypropylene	Low cost, resistant to moisture, good fatigue and impact resistance, easy to repair	https://www.creativemechanisms.com/blog/all-you-need-to-know-about-polypropylene.-part-2
2024 Aluminum	High strength to weight ratio, good fatigue resistance	https://www.howardprecision.com/what-are-the-advantages-of-working-with-aluminum-2024/
4130 Aluminum	Easy to machine and weldable	https://matmatch.com/learn/material/4130-steel
6061 Aluminum	High strength, workability, corrosion resistance and ease of joining.	https://www.hydro.com/en-us/profiles/6061-aluminum-properties-uses/
Composite – Carbon Fibre	Significantly lighter than other metal-based materials, can absorb road vibrations better.	https://www.igpsport.com/post/advantages-and-disadvantages-of-carbon-fiber-bicycles

Table 8 – Key Features of the products

2.2.4.1 Materials

There have been quite a few innovations within the cycling and building industry with their use of materials. Maverick uses sustainable materials for the courier hub and the bike respectively. The makeup of the kiosk is made from aluminum 6061 and stainless steel, which is almost entirely recyclable. This means that the materials can be used almost infinitely without any degradation in the strength and quality of the steel (Author Wiley., 2020). The washroom interior and the seating area make use of bamboo which is a renewable source and can be grown very quickly. For the E-Bike, unlike titanium, aluminum only lasts about 5 –10 years and is much more susceptible to wear and tear. Due to the nature that the bikes being shared in the community, this material would not be suitable. Titanium is durable, doesn't rust and is easier to repair if dented (Rontescu, C., Cicic, T. D., Amza, C. G., Chivu, O., & Dobrotă, D). The increased strength and 100% recyclable nature means that it can keep up with the strenuous nature of the job while ensuring that the materials from the bike

can be recovered at the end of its lifecycle. A new promising bike frame material is composite bikes which combines the best physical properties of carbon fibre and metal, lightweight, responsive-without the durability issues of carbon fibre bikes (Black, S., 2019). The composite bikes consist of carbon fibre as well as a polypropylene shell. Composite bike frames consist of carbon fibre which is an inert material so it will not rust and can be easily repaired in the event of a crack.

2.2.4.2 Manufacturing

Electricity generated from fossil fuels and large qualities of water is often used during the manufacturing process, especially when created in manufacturing plants in less developed countries. The switch to renewable electricity will lower the carbon emissions during the manufacturing process. For manufacturing the courier hub, The Nest, it is much more environmentally friendly to use local manufacturers, to reduce the emissions associated with transporting larger materials for extended distances. There are new manufacturing processes, such as additive manufacturing known as metal 3D printing for smaller components. This allows for more complex designs such as a bike frame to be made while also having a reduction in the number of manufacturing steps (Arvelo Rodriguez). They eliminate the use of unnecessary materials, while also increasing the structural efficiency as welding is no longer needed (Arvelo Rodriguez).

2.2.5 Benchmarking – Sustainability

There are a few sustainable initiatives that revolve around biking and the food delivery industry. There is a company called Call2Recycle offers current Electric bike owners the option to recycle their old bike batteries. They stated that all batteries received will not end up in the landfill (Call2Recycle). This is quite important as 130 million E-bikes are expected to be sold between 2020 and 2023. The reclaimed materials will ensure that the recovered materials can be used in new batteries. A Canadian-born company, Facedrive, has launched an initiative in which for every order made through their website, they will take a portion of their profit to plant trees in Canada. So far in

one year, they have planted 3,500 trees (Nguyen, M., 2020). Net Zero Buildings is where the building consumes the same amount of energy that it creates, the goal of this building type is to try to reduce the number of emissions down, water consumption and waste. The building creates renewable energy onsite as well, as sourced them offsite through wind turbines, solar panels, etc. Additionally, there is another certificate, LEED Certification, which offers advice on the exterior and interior materials.

2.3 Summary of Chapter 2

Chapter 2 outlines the different aspects of what is expected of a bike food courier in the city which stems from the literature research, advisor interview, user observation, and comparison of products. Additional data was gathered from news articles and the one-on-one user interview. Food Couriers are expected to make sure that they can fulfill their role regardless of the challenges that they face on the job. From making long trips to deliver food in condos, to the city environment that they need to navigate around. Due to the way that society looks upon this section of the Gig Economy, the couriers are often looked down upon with little equipment and support from the community. It was through user observation and interviews from their experience that creating a solution for this problem can be developed. Aspects like a longer range, more ergonomic designs and an easily accessible washroom are all features that stem from the user interviews. Since food couriers are paid by the order, efficacy is a key aspect of the design so it is important to make the task of delivering food a much more enjoyable experience. Due on-demand the food delivery industry growing as a result of a newly formed Gig economy, there is an opportunity to further develop these solutions for this industry that would resolve their needs.

Chapter 3 – Methods and Analysis

Figure 19: High-Speed Food Courier. Image Retrieved from. https://www.forbes.com/sites/carltonreid/2019/01/14/bicycle-courier-is-the-job-that-burns-most-fat-finds-fitness-guru/?sh=2af2b8e32ee4

CHAPTER 3 – Methods and Analysis

The Goal of the following chapter is to try to analyze the information from chapter two so that the final solution will be tailored toward the primary user. Key information will be identified so that their needs are met. Some of the tools that are used in this study are ergonomic analysis of a 1:1 ergonomic buck, user observation and usability analysis. This analysis will help aid in the development of a solution that is well suited to bike food couriers.

3.1 Analysis – Needs

The food delivery service industry was responsible for keeping many restaurants afloat during the global pandemic. The people who work in this industry were considered to be essential workers as they provide a value-added service that many people demanded during the lockdown. However, post-pandemic these workers are now disregarded and the industry doesn't offer any support to this community, which leads to a higher turnover. The turnover can be linked to the working conditions which involve long hours on the road, harsh weather, and road hazards. Additionally, since this job is a part of the gig work, many people are not well prepared for what this job entails. The food couriers need to be in good physical health so that they can perform their job well. Developing a solution that involves remedies their human needs such as rest, ability to use the restroom, as well as, providing a comprehensive biking solution, will reduce the amount of turnover that this type of industry is experiencing as well allow for a healthier lifestyle while they are on the job.

3.1.1 Needs/ Benefits Not Met by Current Products

Some of the current products and equipment used by food couriers mainly fall under the transportation aspect such as bikes, phone mounts, and thermal bags. After further consideration and research, there are two main aspects on which the design solution will be focused, which are the bike and the hangout space. Due to a large range of categories of the various types of E-bikes, they either focus on the aesthetics of the bike or try to emphasize its utilitarian nature. All of these bike products

were not designed to work as a mode of transportation for food delivery. These bikes lack the ability for the user to access storage for small personal items, use an inefficient method of charging which takes hours to fully charge up the bikes, and are not convenient to lock up the bikes.

3.1.2 Latent Needs

Figure 20: Maslow Hierarchy of Needs. Image Retrieved from https://www.thoughtco.com/maslows-hierarchy-of-needs-4582571

The new design is based upon the Maslow Hierarchy of Needs, which is used to try to satisfy the basic human needs first, physiological needs, then satisfy their higher needs such as self-actualization. By examining and highlighting latent needs, it is possible to come up with a design solution that the users were not able to think of.

Latent Needs	**Benefit Statement**
Comfort	To offer increased comfort for the couriers on the bike and in the docking station, to reduce mental and physical stress.
Storage	By providing extra spacing for personal belongings, they don't need to worry about whether or not they can carry their belongings.
Shelter	The food delivery hub protects the couriers from the elements such as rain and provides shade.
Productivity	Providing the couriers with a means of transportation that doesn't put a large physical demand on them when making deliveries that are further away.

Table 8 – Latent Needs

3.1.3 Categorization of Needs

Immediate Needs	**Benefit Statement**	**Relationship with Benefits**
Restroom	Allows the user to use the restroom without buying food items from restaurants or going to a public rest area that is further away from delivery areas	High
Durability	Reliable equipment's for long-term usage of the equipment so that the products don't break down on the road.	Moderate
Safe	The user needs to be safe on the road	High
Latent Needs		
Comfort	To offer increased comfort for the couriers on the bike and in the docking station, to reduce mental and physical stress.	High
Storage	By providing extra spacing for personal belongings, they don't need to worry about whether or not they can carry their belongings.	Moderate
Shelter	The food delivery hub protects the couriers from the elements such as rain and provides shade.	High
Productivity	Providing the couriers with a means of transportation that doesn't put a large physical demand on them when making deliveries that are further away.	Moderate
Wishes/wants		
Cheap options	Good equipment is quite expensive for the Gig workers.	Moderate
Aesthetics	Ensuring that the equipment is easily recognizable to other pedestrians and other couriers on the key functionality	Low

Table 9 - Categorization of Needs

3.2 Analysis – Usability

The information gathered from the user observation both in person and through video, analysis is conducted to break down each of the courier steps. I can see that the people are going to be well.

3.2.1 Journey Mapping:

The table below goes through the main activities of what a food courier goes through during the user interview and tries to find ways to improve on them.

	Activities	**Steps**	**Experience**	**Rooms for improvement**
1	Preparing for the trip	Preparation of equipment Determining the best order to pick up Using the phone to check the best route to the destination Proper clothing	Takes too long to make sure all components are working Preparing for order on a street corner	Create a system that is ready for use Providing tools that are accessible Need a space to prepare
2	Picking up the Order	Making space for the food Checking the right order Locking Up the Bike	Talking to the restaurant worker to confirm the order Locking and unlocking the bike is sometimes cumbersome Multiple food orders need to be properly stacked on top of one another	Food thermal bag that is sufficiently large enough and has dividers or different orders The more convenient bike unlocking mechanism
3	Riding to the Location	Checking phone for directions Checking road conditions Keeping aware of the road conditions	Using bike routes to avoid traffic Adjusting posture to be more comfortable Takes frequent drinks of water	Convenient spot for water bottle holder. Better seating posture to reduce strain on the back as on the sit bone.
4	Dropping off	The user makes	The user needs to ask	Have a convenient

	the food	his way to the resident's door Taking food out from the thermal bag Taking the picture of the food delivery to confirm	the main desk for permission to enter the building The user needs to assure that the food package has not spilt during the trip	way to gain access to the delivery destination A thermal bag that securely holds food packaging

Table 10 – Journey Mapping

This journey mapping analysis has been quite helpful during the process to look at which part of the process can be improved upon. These steps and activities are relatively straightforward, however, the tools that the couriers use to make this occur are not well designed for this purpose. They spend a long time on the bike and on foot to make their deliveries and without the proper ergonomic support during the bike ride, they may face some back and pelvic pain. During the time they want to take a break, they may have a harder time finding the necessary washrooms and resting spots that are available to the couriers. Many businesses often don't allow non-paying patrons, in this case, couriers, to use the washroom which meant that they have to go washroom that is not conveniently located and lose time getting there. To ensure that the final solution must include the features that will enable the deliverer to reduce the likelihood of ergonomic injuries and perform at a higher level.

3.2.2 User Experience

The key activities listed in the table below are based upon the user observation in real life as well as from a video observation. This study looks at the different steps that the bikers use to make their deliveries, their thoughts/ feelings and problems/ challenges. The targeted user experience is represented by the dotted red line and the dotted blue line is the user's current experience.

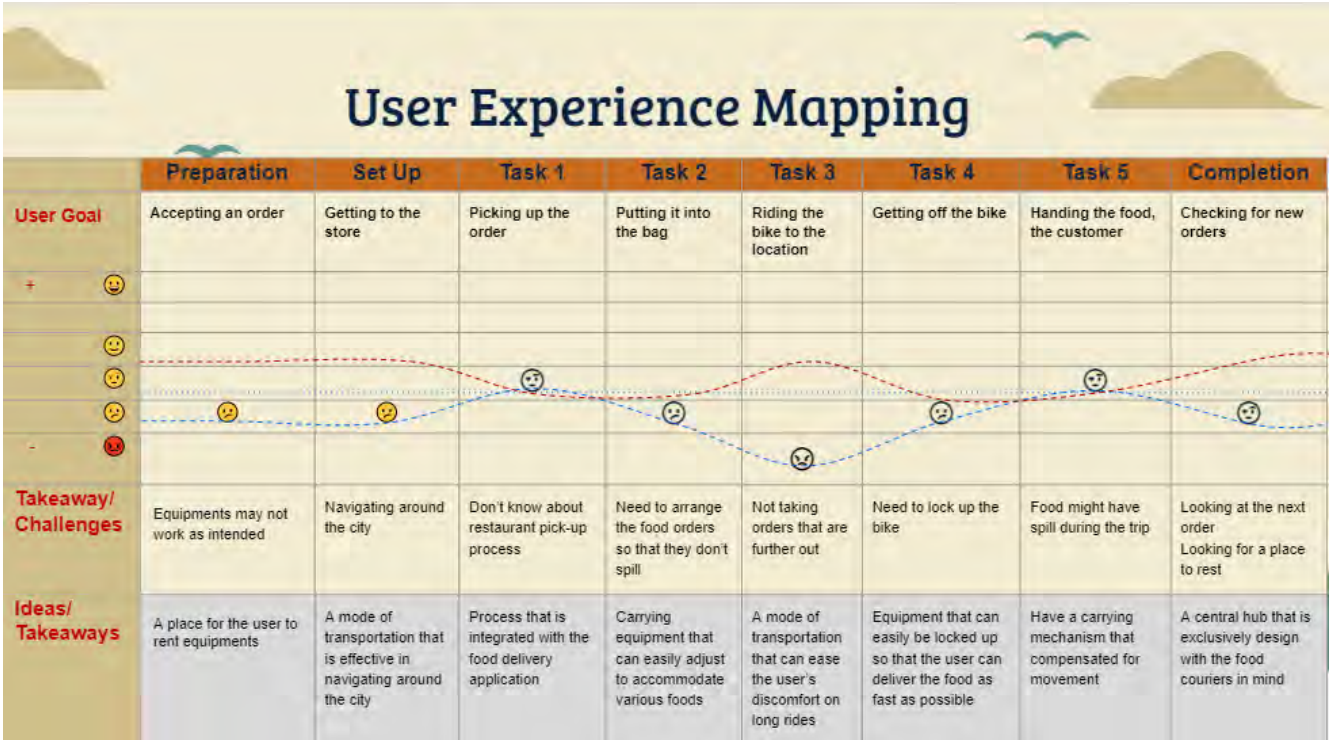


Figure 21 – User Experience Mapping

The user experience demonstrates the experience of a food deliverer deviates quite a bit when accepting the order and getting to the location. The two areas that the user is quite happy in are when they are picking up the order as well as making the delivery to the customer. This was because the user was able to physically confirm that they have started their shift and when the user drops the food off, felt relieved that they were able to complete the order. The worst experience is that the user is riding the bike to the location, as the user is riding on a non-electric bike and the delivery destination is quite far away. There were often traffic and road conditions which the user was not able to control. One aspect that wasn't observed from the user observation but was discussed during the user interview was the time in-between order where the user needs to take a break or to use the washroom. They ranked that to be lower than navigating around the dense metropolitan areas. The projected new experience will reduce the low points of the journey and will become more proficient in their job. The final design solution will aid the food delivery process and help reach its targeted experience levels.

3.3 Analysis - Human Factors

3.3.1 Introduction

The objective of this section is to understand the ergonomic needs and considerations of both the courier hub and the rental courier bike. This thesis tries to create a solution that best serves Gig workers in the food delivery industry. To meet the needs of the various users, ergonomic considerations for key touchpoints are required to be reviewed. Making 1:1 scaled cardboard products, helped hone in on the best selection of dimensions for the final product. The aspect of the activity that will be reviewed is the seating area with the bench, the washroom for the couriers to use and the rental bike. These are the main touchpoints the users would have encountered during the product usage were looked upon to understand how the end-users could interact with the solution.

3.3.1.1 Literature Review:

The anthropomorphic information for this is gathered from the Measure of Man and Woman (Tilley & Dreyfuss, 1993) for the 5th and the 90th percentile female and male respectively. This was used to apply to create a more human-centred design and for a full-bodied interaction. The pdf, "*The Guide to Cycling Ergonomics"* talked about the different postures for various types of bikes and the design of certain components such as the bike handles which are much more ergonomic for longer-term usage. The other article, ergonomics talks about the seating various aspects of how to make a bike more ergonomic from the saddles to functional areas of the hand.

3.3.1.2 Methodology:

Objective: There are four aspects of the solution that were created and tested which include the restroom, the sitting area, the bike, and the bike locking mechanism. The objective of this evaluation is to understand the challenges of the full-bodied human interaction that come from the food courier job. The evaluation will look at how these interaction areas work with the end-user from a 1:1 scaled model. This model is made out of cardboard with the dimension that fit the 5th to the 95th percentile courier whose pictures taken will be used to demonstrate how the user interacts with certain components. The design of the buck focused predominantly on the location, sizing and how the users felt during their interaction with the components. There was less emphasis on the styling of the various products as the design is in progress.

Location and Time:

Date of Observation: Sunday, December 5th, 2021

Location: Researcher's basement

3.3.1.3 Results:

The results of the ergonomic study are below shown through the ergonomic diagrams. The following diagrams depict the key illustrations depict important dimensions. The following

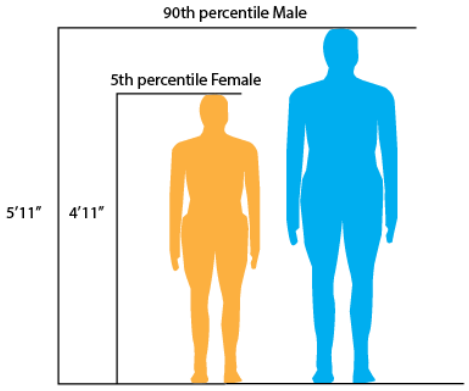


Figure 22 - 5th percentile woman and 90th percentile man

dimensions are based on the 90th percentile male and the 5th percentile female o how they interact with the different products in the food courier hub and the bike.

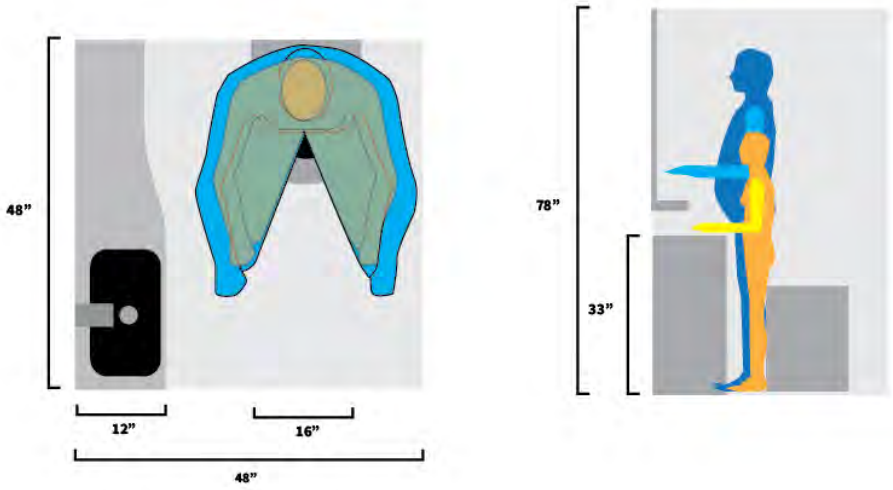


Figure 23: Restroom

Figure 24: Resting Area

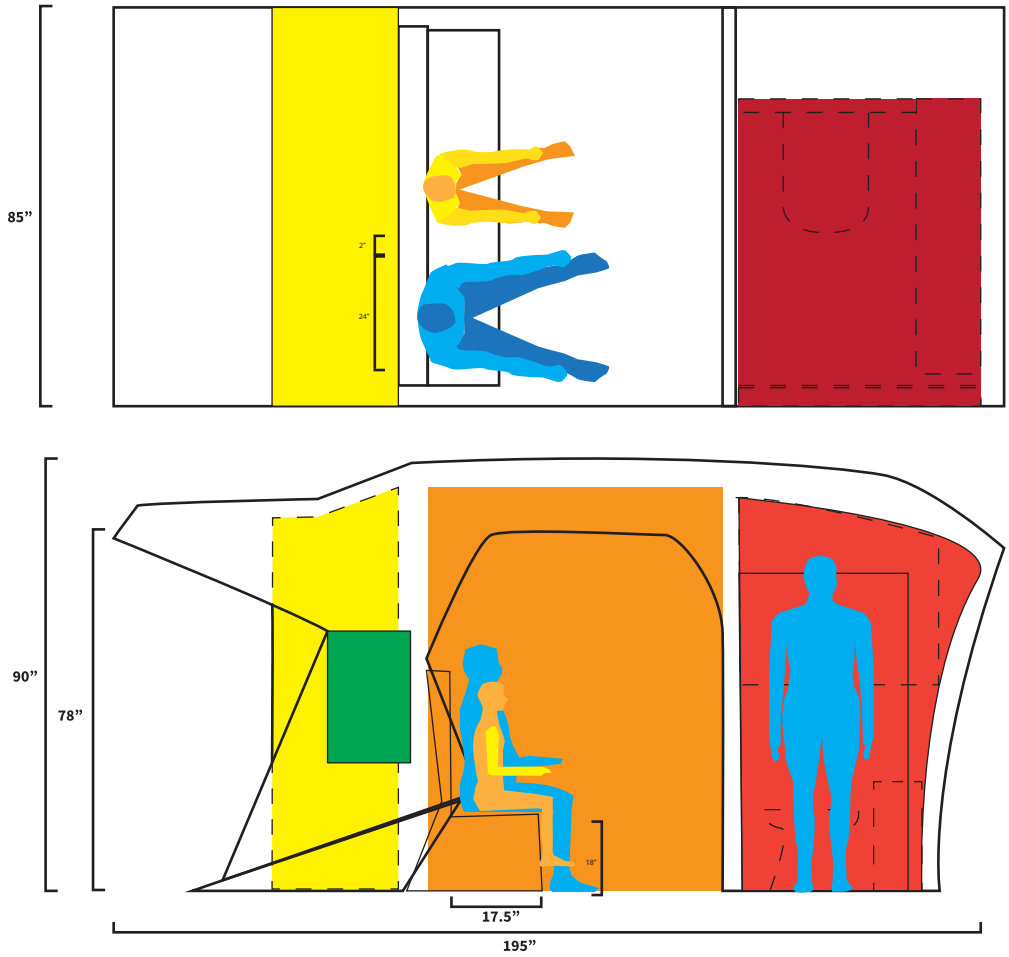


Figure 25: Food Courier Hub Dimensions

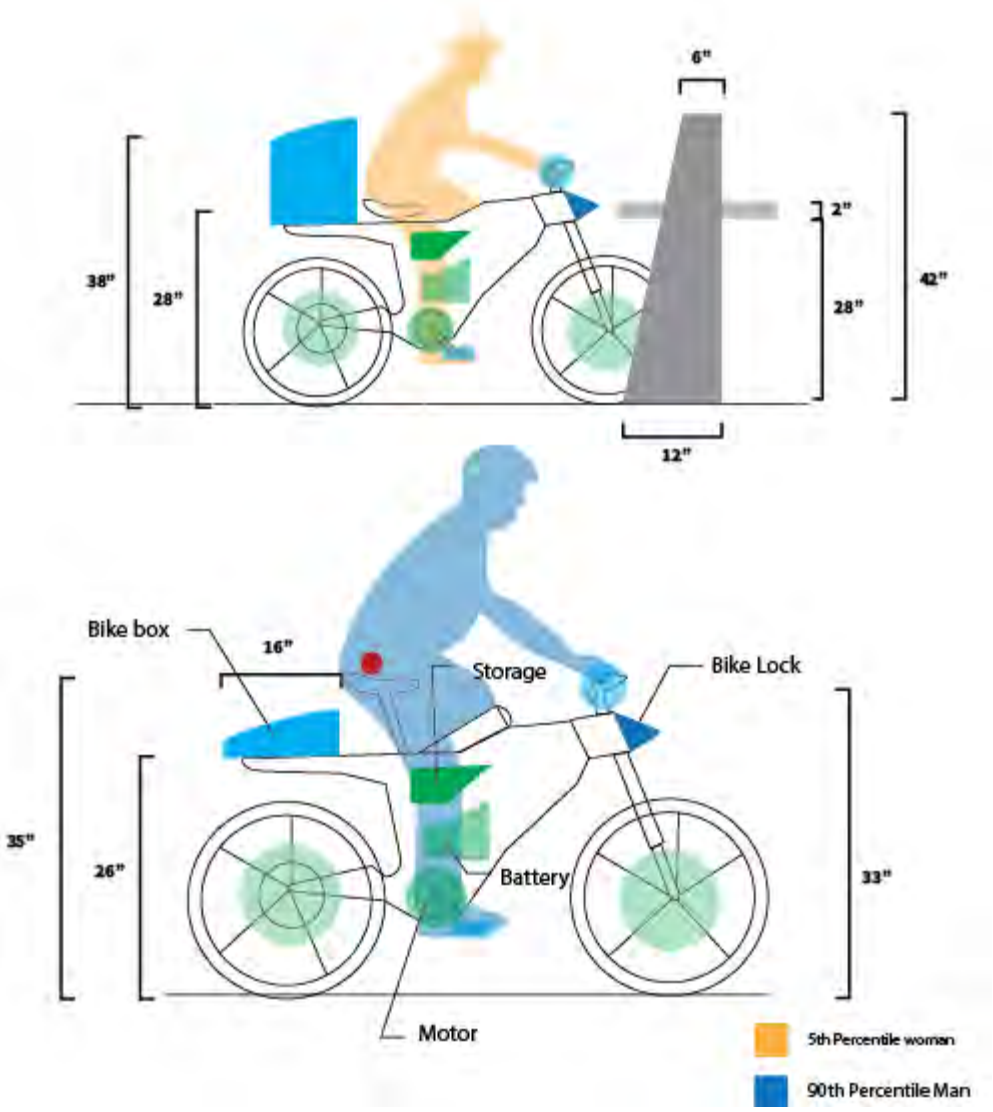


Figure 26: Bike Components and Dimensions

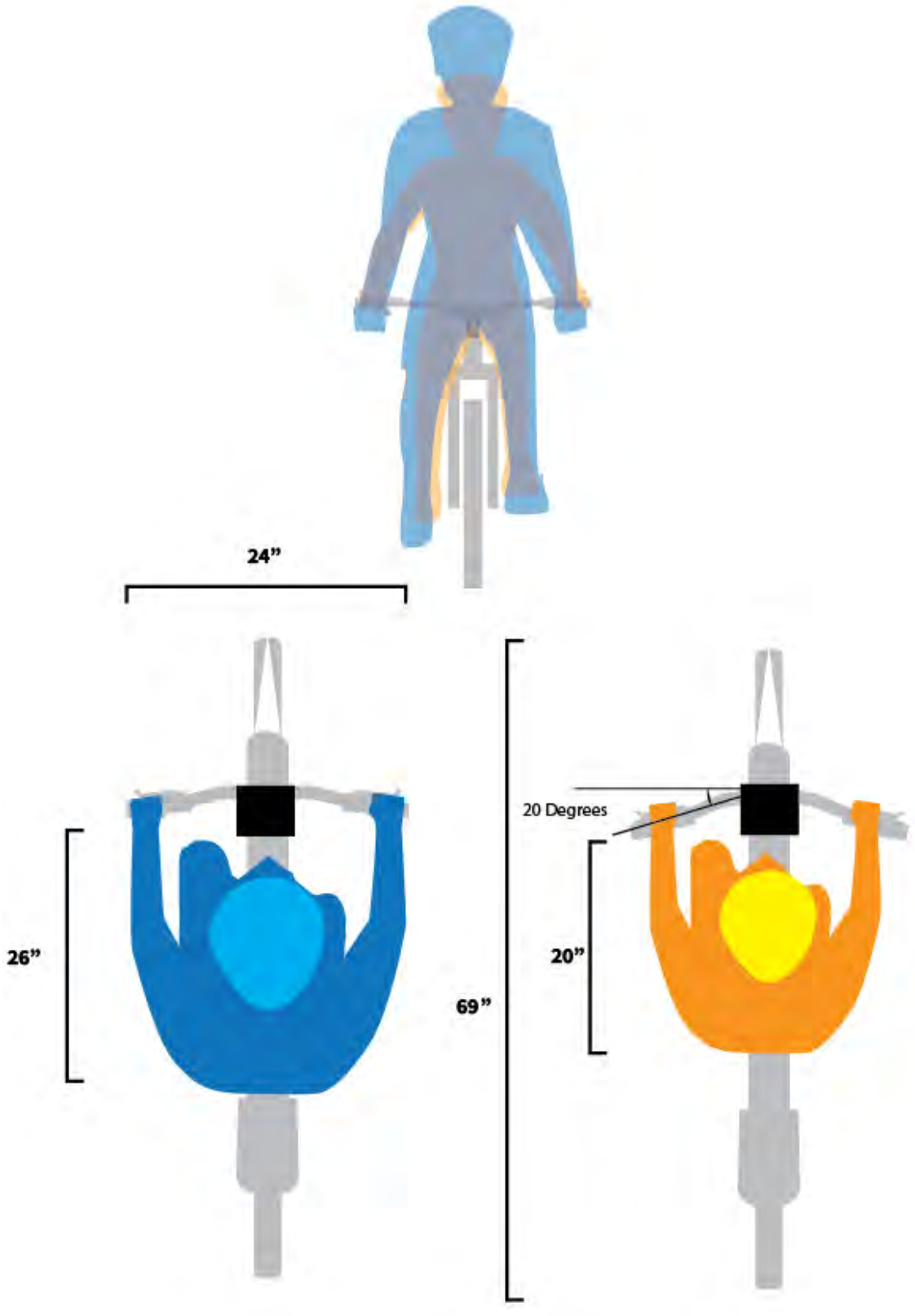


Figure 27 - Bike Dimensioning Top and Front View

Figure 2: Bike Configuration

Picture products in the user

87th percentile	5th percentile	Analysis
 Figure 28 - Bench front view	 Figure 29 - Bench front view	Interaction with the seating area: The position of the arms and legs has been recorded to see if there is sufficient spacing for the users.
 Figure 30 - Bench side view	 Figure 31 - Bench side view	
Restroom		

Figure 32 – Washroom Front view

Figure 33 – Washroom Front View

Interaction with the toilet:

Consideration with the toilet positioning with the countertop so that the user doesn't feel uncomfortable while on the toilet. Ensuring that the toilet height and the depth are sufficient enough for the 87th percentile courier.

Figure 34 - Washroom side view

Figure 35 - Washroom side view

Figure 36 – Sink Side View

Figure 37 - Sink Side View

Interaction with the sink/ dryer:

Note the position of the sink which is in the optimal position for the 5th percentile person.

Bike

Figure 38 – Bike Unpacked Thermal Box

Figure 39 - Bike unpacked thermal box

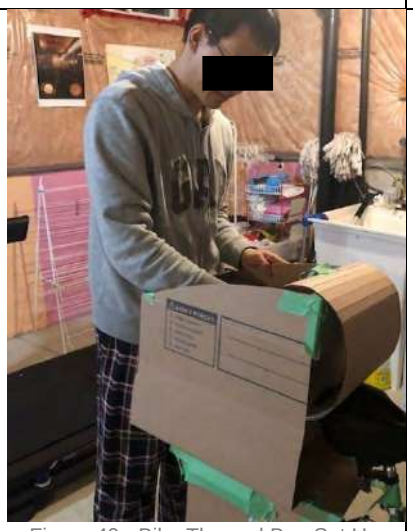


Figure 40 - Bike Thermal Bag Set Up

Figure 41 - Bike Thermal Bag Set Up

Interaction with the food thermal box:

Take note of the position of the unexpanded box located at the back of the bike. The box is not at an ergonomic position for the larger percentile person. Further adjustments can be made to accommodate the group by raiding the positioning of the unpacked box. The upright box position is critical as the dimensioning of this box will indicate to the courier how many food orders they can fit into the box.

Figure 42 - Riding Position

Figure 43 - Riding Position

Interaction with the seat:

Note the seating positing that is necessary for the final solution. The angle of the user needs to be taken into account as different angles of the cyclist can be analyzed in the pdf “The Guide to Cycling Ergonomics” to see what pain can arise. Additionally, it seems that the saddle is uncomfortable for the 87th

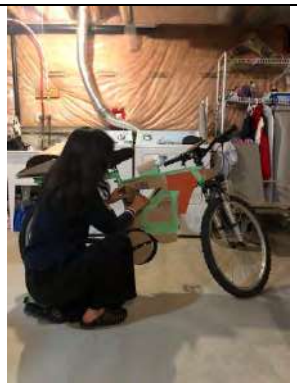
		percentile male so further development is needed to ensure that the saddle is comfortable for a larger range of people.
 Figure 44 - Phone Positioning	 Figure 45 - Phone Positioning	Interaction with the smartphone/ control panel: The positioning of the smartphone seems to be pretty comfortable and easy to access.
 Figure 46 - Water Bottle Holder	 Figure 47 - Water Bottle Holder	Interaction with the water bottle holder: The placement of the water bottle holder is too close to the user and requires to be moved forward. It is noted that the water bottle at the top is quite convenient for the users to grab and use.
 Figure 48 – Storage Compartment	 Figure 49 - Storage Compartment	Interaction with the storage compartment: The size of the storage compartment should be further considered and to reconsider the location of the storage compartment as it is rather low.

 Figure 50 - Biking Dock	 Figure 51 - Biking Dock	Interaction with the docking station: The users found it easy to access the bike from the docking station. The user can grab the handles of the bike rather easily.

Table 11 – 1:1 Ergonomic Buck Test

3.3.2.1 1:1 Model Analysis:

Food couriers are a necessary part of the local economy as they served restaurant businesses of all sizes. They however came across the issue that their physical needs are not met by the new and rapidly developing food delivery services in the Gig economy, this meant that the couriers have a high turnover rate. It is necessary to ensure that the ergonomic needs of the couriers were met, it would help the couriers work more efficiently and help them live a better lifestyle. The 1:1 model has been created with different ergonomic needs in mind such as the location and position of the sink and toilet in the washroom, strategic placement of the courier thermal food box, storage on the bike, smartphone placement, and the bike locking mechanism.

The fact couriers often spend a long time on the bike, means that the ergonomic solutions required need to deal with a more suitable riding position that mitigates the pain that is associated with leaning over for an extended period. From the pdf, “The Guide to Cycling Ergonomics”, there are several different riding positions that are possible when it came to a cyclist. Through the combination of the two riding positions, the city bike and the trekking bike posture, the most suitable posture was discovered. The angle of 55 degrees to 65 degrees for the 5th percentile to the 87th percentile respectively allowed the couriers a more active posture for when they require to overtake vehicles, while they can utilize all of their power. This also meant that the angle from the arm to the torso angle

was between the city and the trekking bike, the angle used was 75 degrees which reduced the load on the shoulder, arm and back muscles. The pdf, The Guide to Cycling Ergonomics, stated that the curved handlebar of 20 degrees allowed a more natural resting feeling which was necessary to reduce wrist strain. In addition, it is also necessary for them to be multiple positioned handlebars as the user often felt fatigued with just one posture so a dynamic handle was created to ensure the users were able to relax on longer trips.

Couriers are on the road for a much longer period than a commuter, this means that the needs for specific features are much more essential to the job. The placement of the easily accessed water bottle compartment allowed for the couriers to hydrate themselves on the go and provided a visual reminder that they should stay hydrated. On the 1:1 scaled mode, this feature was demonstrated on the bike frame, current bikes had placed their water compartment on the underside or the bottom of the frame as there was no space available for the water bottle on the bike. This reduces the risk of lower back injuries while in the seated position when they reached over to grab their water bottle. Because they are on the road for a much longer period, they required a saddle that could work with various percentile for both men and women which came from the Ergon bike website. The seat cushions were designed with a V-shaped channel that allowed more contact with the seat bone area to reduce the amount of pressure within the pelvis. In addition, the saddle was also widened to put less pressure on the perineal area and more pressure on the hip bone.

The food couriers often interact with the thermal food box to place or remove food orders. Due to the nature of the job, some people preferred to keep the thermal bag on their backs and some in their food boxes on their bikes. The scaled 1:1 model, demonstrated the possibility in which the user can decide upon when method they would like to carry their food. The collapsed position allows the users to carry food on their backs without having the thermal box interfere with the movement of their backpacks. The users were able to set up the thermal boxes quickly and able to reach into the boxes relatively easily. The angle of the sliding thermal box top allowed the user to have more power to open and close the lid which is essential to operate the thermal boxes efficiently.

One of the main touchpoints of the bike is the instrument panel and the smartphone holder on the bike which are used to indicate the status of the bike as well as give the user directions to the delivery. The user study is to better understand the optimal control panel height and angle for the best usage. This is to ensure that both the 5th percentile and the 87th percentile person can use the control panel very easily. The optimal angle for the product is about 30 degrees and 16 inches from the user's torso for both the users. Consideration was taken to ensure that the user did not have to strain their necks down too much which may increase the likelihood of neck pains and take their eyes too far off the road as they cycled.

The washroom due to its nature has its dimesons fixed, the height of the sinks is 33 inches the grounded faucet is 39 inches off the ground. Both the 5th and the 87th percentile person can comfortably use the sink. The users were also given adequate room for moving around, the rough dimension of the washroom is around 48 inches wide by 48 inches deep. This allows the user to move around comfortably around the washroom without making them feel clast phobic. The seat depth and height of 16 inches work out quite well for the 5th percentile. The seated area of the bike shelter was designed in a 1:1 scaled model to determine if the users were given an adequate amount of spacing.

3.3.2.2 Limitation and conclusion

The test from the user observation identified and refined the touchpoints of the solution to find out the ergonomic dimensions. The downside to this ergonomic study is that because this is going to be a high usage item, these current analyses don't allow for the analysis of the product while it is used. This meant that some ergonomics captured may not be well suited to the courier's needs. Additionally, due to the nature of the material, it was difficult to test the product with vigour due to the product is made out of cardboard and tape. The users were not able to put their full weight on the product, so some measurements may be slightly off. For further testing, more studier materials should be used to test out the functionality of the product. Overall, ergonomic testing is quite helpful for the further development of the product. It is essential to understand how the intended user interacts with

the product that was previously not thought about. This is to ensure that the product can be used effectively and efficiently.

3.4 Aesthetics, Sematic Profile

Many of the design elements depend on a multitude of factors from the engineering to the budgetary constraints of the design. Some public space designs were designed as one-of-a-kind central pieces which can afford them a unique look and feel, while on the other hand, shelters like bus stops have very basic designs due to the need to mass-produce them to outfit all around the city. The choice of material is often quite industrial with steel and aluminum making the bulk of the structure, allowing for easy cleaning and designs that can withstand the wear and tear. Over the past few years, the shapes and designs of public spaces and bikes are often modernized with more stylized designs as the manufacturing process can keep up with the new, more organic-shaped designs. Below are a few inspirations that influence my design solution with their shape, colours and layout.

Figure 52 - Machine Talk Booth Design. Image retrieved from: https://www.behance.net/gallery/

Figure 53 - Min Prom. Image Retrieved from: https://www.artstation.com/art

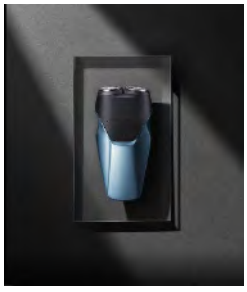


Figure 54 - Face Shaver. Image Retrieved from: https://www.behance.net/gallery/103046127/PRODUCTDESIGNFace-shaver

Form Language:

Through the research gathered through chapter 2, considering it when designing a solution that fits into the main demographic need, the design direction is of a contemporary and utilitarian look and feel as incorporating the geometric aspects. The courier resting station will rely primarily on clean, and sweeping geometric shapes and design that highlights the key features of the station. This is to give the station a presence in the city so that they could see that passersby and potential couriers could

easily recognize the purpose of the solution. Additionally, this also transfers over to the rental bike which will also share the same characteristic as the station. Additionally, the colour of the shape will be bright yellow and reflective so that it gives the couriers a high level of visibility during low-light situations.

3.5 Sustainability – Safety, Health and Environment

3.5.1 Safety and Environment

The city is often a bustling and chaotic environment, there are safety concerns with the lifestyle that tries to fulfill the essential needs of the user. As noted with the user observation, the courier is required to be always aware of their surroundings. The design was created with safety considerations in mind such as battery power packs, repairability, and material manufacturing process. The design solution was focused upon the increased durability of the materials as they are required to consider the wear and tear due to the nature of their shared nature. Making these parts easy to access and is easily replaceable; reduces the risks of injuries by maintenance personnel as they do not need to strain themselves when repairing the courier hub/ bike. Additionally, due to the nature of the batteries in the E-bikes, the batteries will degrade rapidly as it ages. This means that proper recycling of batteries is needed to be considered to reduce the possible contamination of the waste. The colours of the design need to be considered for the design solution to stand out in a dense environmental setting. By ensuring that there is a high-quality coating on the materials, acrylic polyurethane aka. enamel, this will ensure that the materials underneath would not oxidize and rust. Ensuring the equipment’s high reliability decreases the risk of equipment failure.

3.5.2 Health

The user is exposed to the elements during the duration of their shift, from the cold weather to the rain and the sun. The physical considerations need to be considered for the courier hub. The colour considerations were used to see for couriers to be easily recognizable and to put the user at

ease to reduce the amount of mental stress of the bikers. The design intent is to provide users with amenities for personal time from their work in the city. Allowing the food delivery personnel to fulfill their basic needs, washroom, and rest. In turn, this will allow workers to reduce the risk of injuries on the job.

3.6 Innovation Opportunity

There are a few areas in which there are potential innovations available for the users. A key area of innovation stems from providing users with a courier space that directly answers the needs of the couriers from a place for them to relax and relieve themselves as well as providing affordable rental bikes for the gig workers. This design was inspired by the IDEO design thinking methodology by first looking at what the bikers' needs are, those I interviewed on a one-to-one basis to get a better understanding of the topic. By conducting background research on the topic, the design remains human-centred. From the inspiration stage, I turned the research into a possible avenue that the solution can potentially explore.

3.6.1 Needs Analysis Diagram

Needs	Benefits and Underlying Needs	Importance of Needs:		
Basic Needs (Psychological)		**Low**	**Moderate**	**High**
Comfort	The user wants to be comfortable on the road and while making deliveries		Moderate	
Food/ Water	N/A			
Washroom	N/A			
Rest	N/A			
Pleasure/ Gratification Sensory	Courier: Feel a sense of pleasure while riding around the city making deliveries	Slight		

Needs	Benefits and Underlying Needs	Importance of Needs:		
Security		**Slight**	**Moderate**	**High**
Safety	Ensuring that the couriers are safe on the road			High
State, Group, Individual	Individual safe and daily routines for couriers		Moderate	
Securing Resources	Ensuring the rental prices are optimal due to limited funds, need highly reliable equipment, need the rental bike to be readily available, Need to try to save money as much as possible		Moderate	
Control over the environment	Need to have a bike that can easily navigate around the city,			High
	It is ready to rent right now			High
	E-bikes are faster than non-e-bikes			High
Long Term Security/ Stability of Group	Environmentally sustainable - electric-powered bikes	Slight		

Table 12: Basic Needs and Security

Needs	Benefits and Underlying Needs	Importance of Needs:		
Social Belonging:		**Slight**	**Moderate**	**High**
Fear of Abandonment	N/A			
Fear of the enemy	Someone might steal my bike, the pedestrians and the motorist should stay out of my way		Moderate	
Tribal Identity	Associated without food couriers, make a community of like-minded individuals			High

Behaviour cues for survival	N/A			
Behaviour cues for social interaction of group	Needing to deal with other couriers/cyclists on the reload on how to ride in traffic		Moderate	
Social Expectation	Direct: What job are you planning to get in the future? Indirect: Food Courier is not a good career		Moderate	
Needs	**Benefits and Underlying Needs**	**Importance of Needs:**		
Esteem		**Slight**	**Moderate**	**High**
Social status	Aspirational Products: Expensive, long-range electric bikes, own their own house/ condo,		Moderate	
	Aspirational lifestyle: Don't want to work in this industry anymore, loves to bike and explore the city	Slight		
	Fad or Innovation: Like to use products that will make the job easier.	Slight		
Social Recognition	Food Courier is not a prestigious job and tends to make less money than the average Torontonians.		Moderate	
Sexual Attractiveness	Tend to be fitter and healthier than the average person due to the nature of the job	Slight		
Needs	**Benefits and Underlying Needs**	**Importance of Needs:**		
Self Actualization (HIgher Order, Functions/ Needs)		**Low**	**Moderate**	**High**
Intrinsic Pleasure	Freedom to make a schedule for when they want to work, Riding exploring the city, fresh air and		Moderate	

	exercise, meeting new friends			
Creative Endeavours	N/A			
Experiential intrinsic	Exercise and experience the city on a bike			HIgh
Experiential extrinsic	Monetary Gain from deliveries made, new friends along the way		Moderate	
Emotional	How can I work through today's shift, I want to feel comfortable on the road, Is my battery going to die soon, is the weather good enough to bike		Moderate	

Table 13: Social Belonging, Esteem, Self Actualization

3.6.2 Need Analysis Diagram

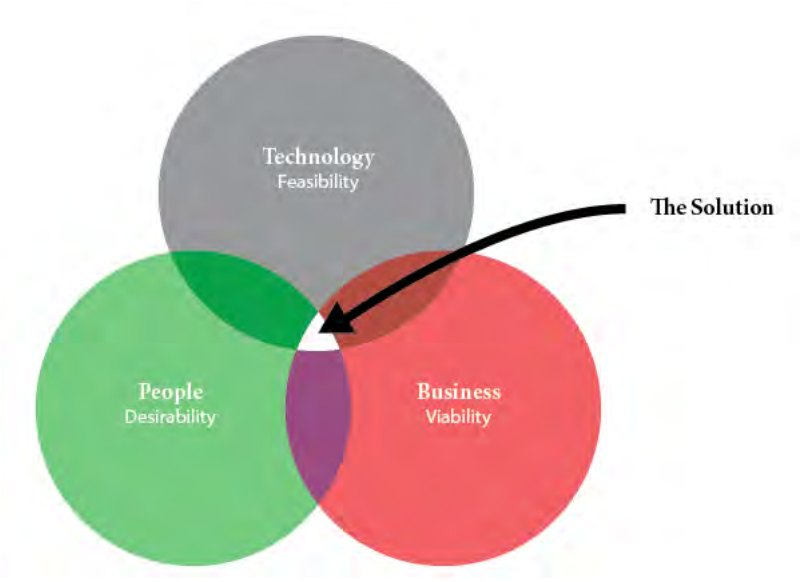


Figure 55 - Needs Analysis Diagram

Feasibility: The systems involved a multitude of different solutions from the rental bike, to the resting area and the washroom to try to serve the needs of the bike food couriers. The challenge is to try to incorporate new technology and design into the proposed thesis design that provides an innovative experience for the couriers. The possible manufacturing process is planned as 3D printing as they are less energy-intensive compared to the

Desirability:

There are a few things that can be improved in the food delivery industry with the main focus on the comfort of the couriers when they are making their runs, and when they are resting up before making their next deliveries. It is evident that this lifestyle puts a great deal of stress on the body and is quite taxing on the mind due to dealing with city traffic and the environment. Due to the lower economic status that the bikers have in society, there must be a solution that looks after the well-being of these overlooked individuals.

Viability:

The gig economy has been increasing over the past few years with the food delivery industry leading the charge. Because this is an on-demand job, many people are looking to get into the field but don't have the money or the equipment. There are currently no design solutions that try to solely focuses on this industry.

3.7 Defining Design Brief

The goal of this design thesis is to improve food delivery services in Dense Metropolitan areas.

Objectives:

1.	Identify **pain points** for food couriers through 1:1 interview, and user observation	**Comfort**
2.	Improve **the safety** of food couriers on the city roads through **increased visibility** and more **user-centric features.**	**Safety**
3.	Improve the **accessibility** of the public rental bikes for more Gig workers to **reduce the cost and equipment** required for food delivery.	**Usability**
4.	Creating a food courier **system** that enables couriers to **relax** as well as provide them with a means of transportation that will enable them to complete their job effectively.	**Integration**

5.	Improve the **aesthetic appeal** of using a public bike-sharing service that integrates well into existing communities.	**Aesthetics**
6.	Ensuring that the equipment and the facilities can **withstand the wear and tear of rough weather conditions**, and allow for **easier maintenance** for the service workers.	**Durability**
7.	Improve **storage capability** for the bike and the courier hub so that users don't need to physically carry their equipment around with them	**Convenience**
8.	To increase the efficiency of the bike couriers through **increased power delivery** through the drivetrain and battery sizing.	**Functionality**
9.	To allow the users ability to **relieve themselves** where other publicly accessible options are not conveniently available to the couriers.	**Convenience**
10.	To increase the **maneuverability and handling** on the road to better navigate around dense cities	**Maneuverability**

Table 14 – Defining Design Brief Objective

CHAPTER 4 – Design Development

Figure 56: Bike Dock. Image Retrieved from. http://www.mtgimage.org/electric-bike-docking-station/

CHAPTER 4 – Design Development

The goal of this chapter is to create an innovative solution that will solve the issues that a food couriers will encounter during their time on the job. The design development starts with the design semantics of various products, which will help develop and inform the product's form and features. From this process, scaled prototypes will be made to try to illustrate the scale and feasibility of key features as well as help refine the model for further CAD development.

4.1 Aesthetic Approach and Semantic Profile

During the process of the design, the design approach is to try to design a comprehensive solution that not only accentuates the purpose but also gives it a contemporary look that will fit into the urban city center. The design aim is to allow for a simplified and refined appearance that is easily recognizable from a distance. The final design solution elevates the design of both the mode of transportation as well as the hub since current bikes and types of equipment are mainly utilitarian. For the colour profile, strategic use of yellow and gray are used to help highlight the key features of the design as well as make the equipment easy to spot in times of low visibility. It is important to try to ensure that the design of the courier hub and the bike both have design elements and the exterior.

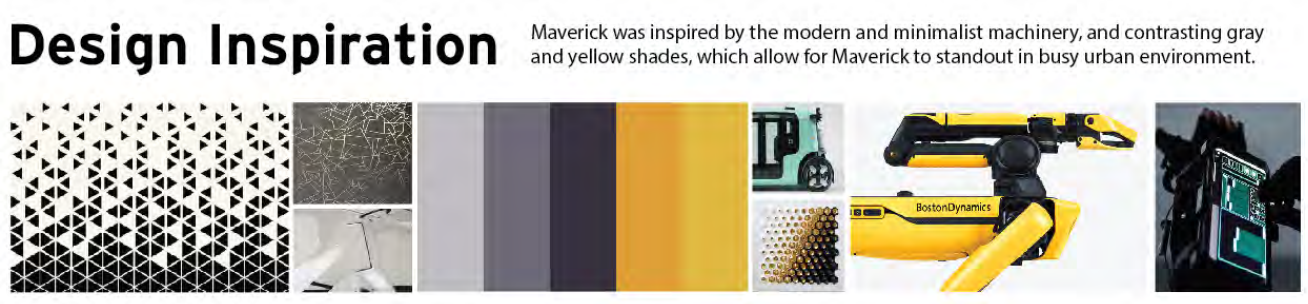


Figure 57: Design Inspiration

4.1.2 Mind Mapping

Before the final development for development of the design, it was important to try to ensure that the most important key features are present while trying to weigh the cost to implement such a solution. The mind maps were quite essential in trying to understand the ranking of the most important features.

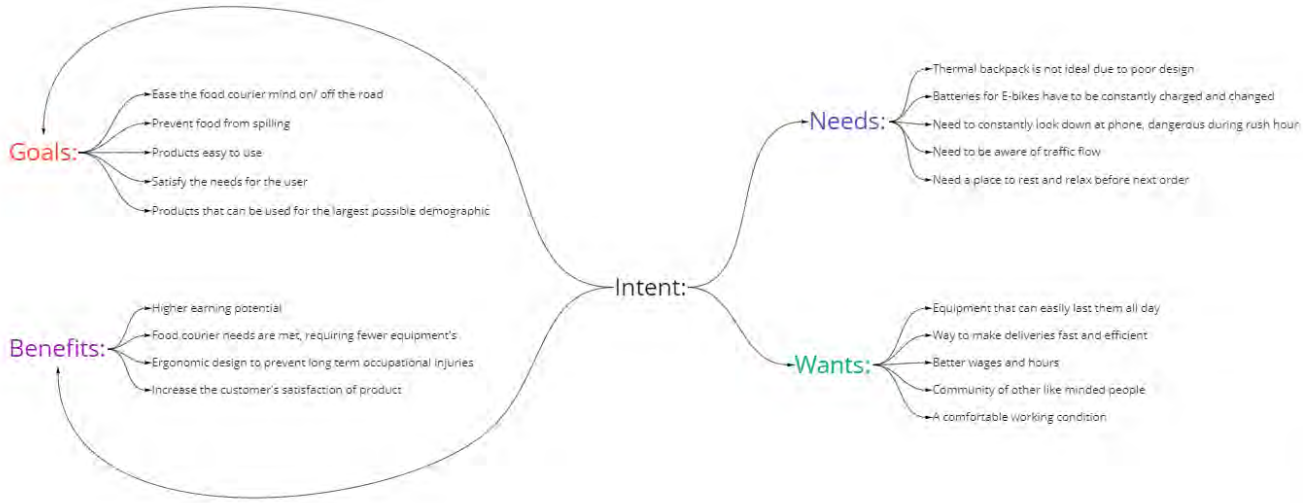


Figure 58: Intention

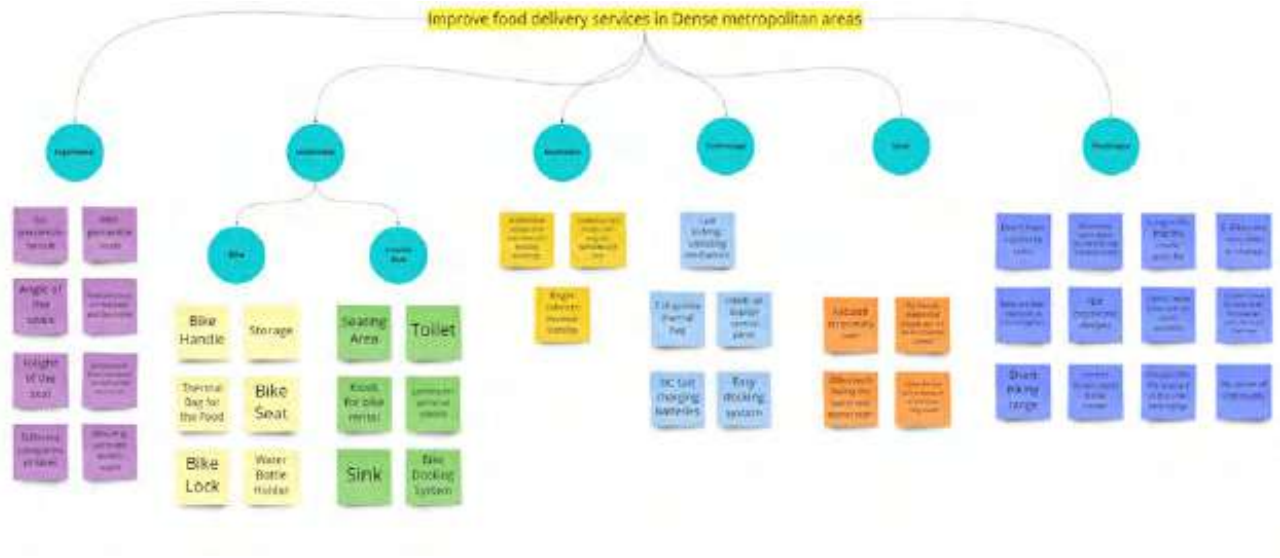


Figure 59: Improve food delivery services in dense metropolitan areas

4.1.3 Ideation Sketches

During the beginning stages of the design process, a variety of solutions were created to try to better understand the ideas of the design. Some designs were focused on the mobility aspect of the components while others focused on the wearable aspect of the design. The design was primarily focused on the functionality of the products rather than the aesthetic appeal of the products.

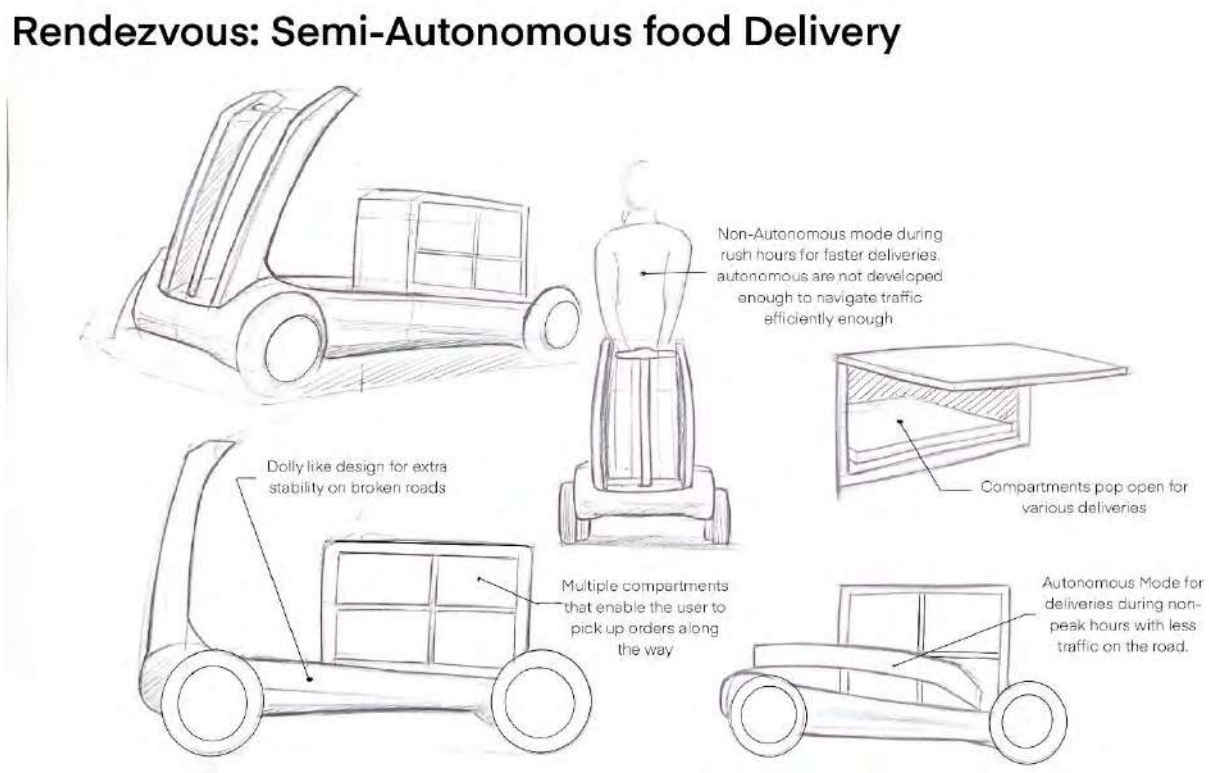


Figure 30: Semi-autonomous Food delivery

This figure was created by a scooter hybrid with a carrying capacity of both the rider and the food deliveries. During nonpeak hours, the handle can fold down, and the scooter can make autonomous deliveries which will reduce the need for food delivery workers. During peak hours, a delivery worker can ride the scooters at a higher speed. This helps the food delivery services as it reduces the need for food delivery workers in low peak hours as well as allows for a large number of food deliveries to be made within a short period.

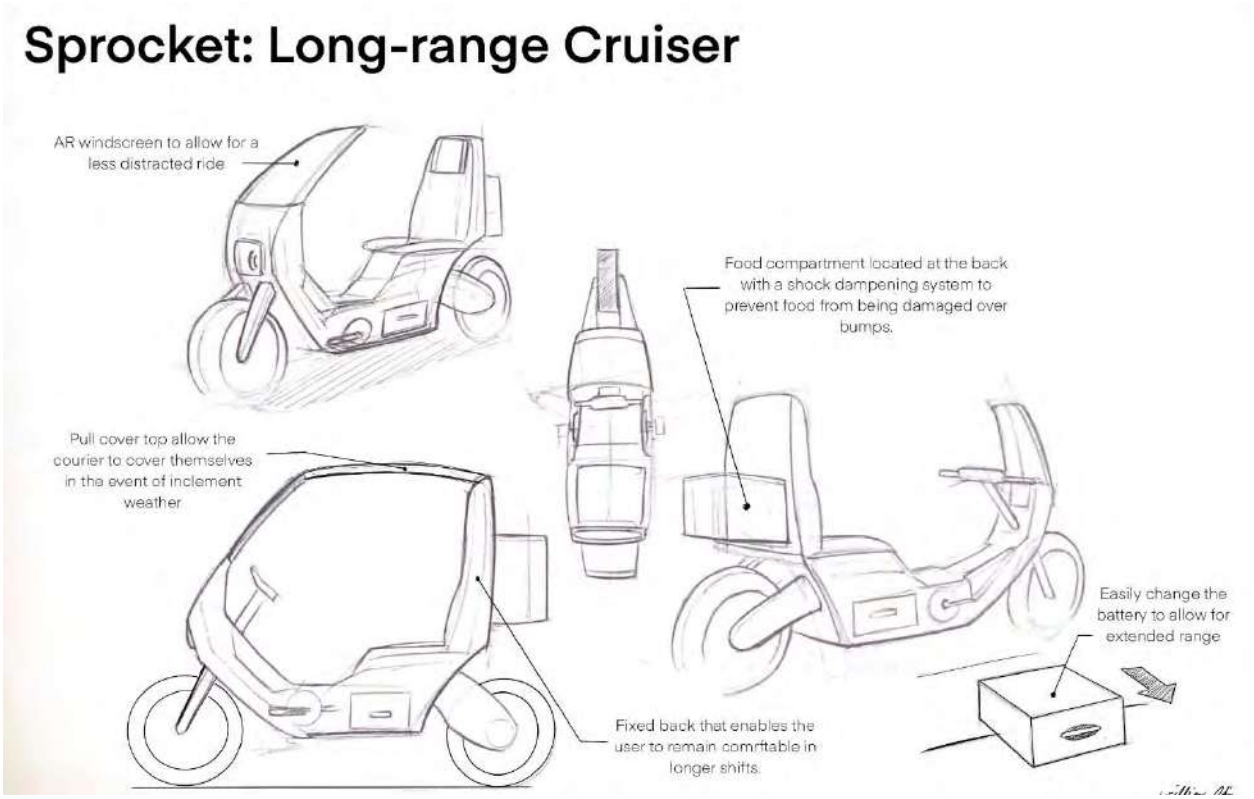


Figure 61: Sprocket Long Range cruiser

This is a bike-motorcycle concept that tried to combine the advantages of both the easy-to-use nature of the bicycle and the carrying capacity of a motorcycle. This concept provides covering for users from the elements, which means that they can operate in more weather conditions. The leaned-back nature of the money creates a more relaxed and comfortable feeling for the delivery workers. The easily swappable battery allows the user to reduce their downtime between charges. This helped the thesis topic as it allows the user to make deliveries much faster, as well as eliminate the requirement for a motorcycle license which is costly and time-consuming to obtain.

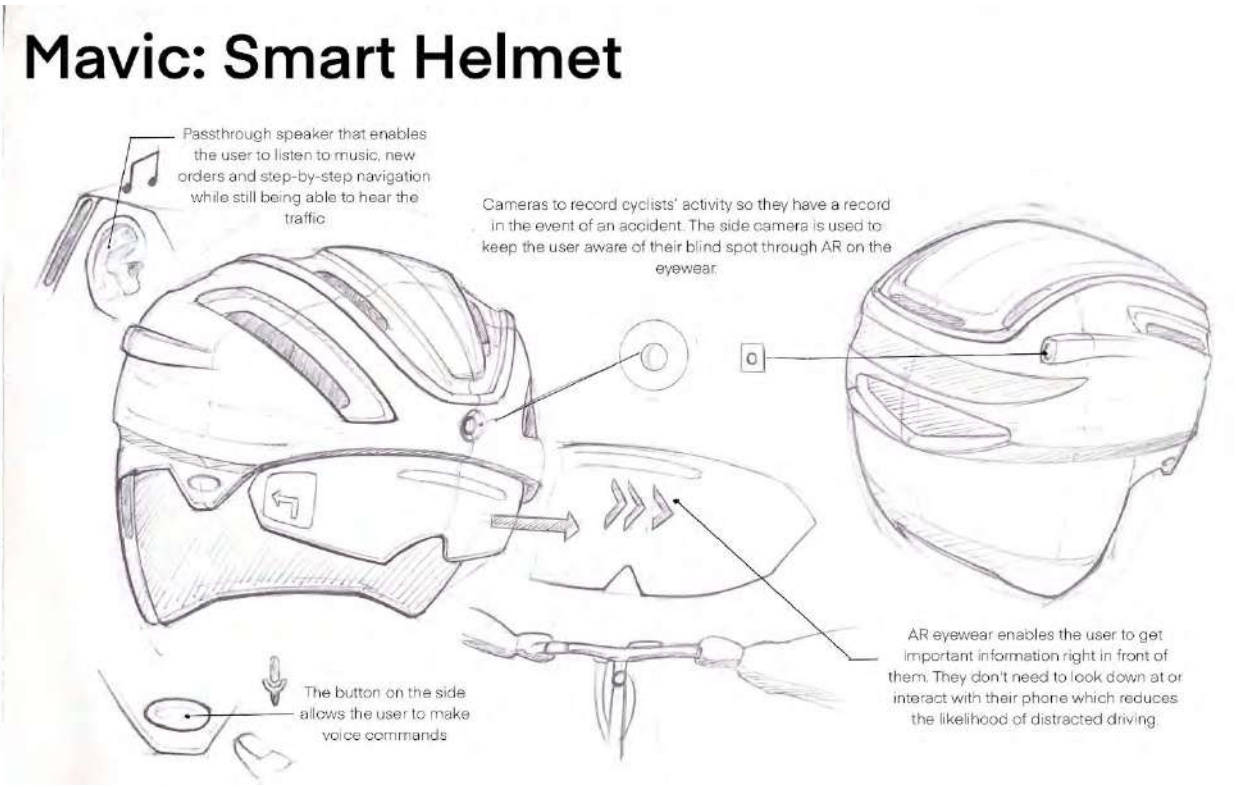


Figure 62: Mavic Smart Helmet

This concept incorporates the nature of the AR goggles and incorporates them into the bike helmet. This concept allowed the user to get step-by-step instructions on the delivery information such as time to location, and traffic conditions as well as provide the user with the ability to view their blind spot using cameras in the helmet. Additionally, it incorporates an audio bypass system where that will allow the users to listen to music and audio cues so that they are always aware of the city around them. This will develop the thesis topic as creating a comprehensive safety device for the food courier, it will increase the safety and development of the users while they ride in the city.

Figure 63: Stalos: Self Stabilizing backpack

This concept takes the concept of a gyroscopic camera system and brings them into a food thermal bag. The bag can be locked into place, so it acts like a regular backpack and unlocked so that it can absorb impact from the user's movement on a bike. It can compensate for movement in the fore-aft as well as side-to-side movement. The locking system is inspired by the luggage system handle system which is l-shaped pin locking and quite robust. This will help the thesis topic as it allows for more effective handling of food products during transit, it allowed the food couriers to solely focus on effectively getting to the destination without food spilling during transit.

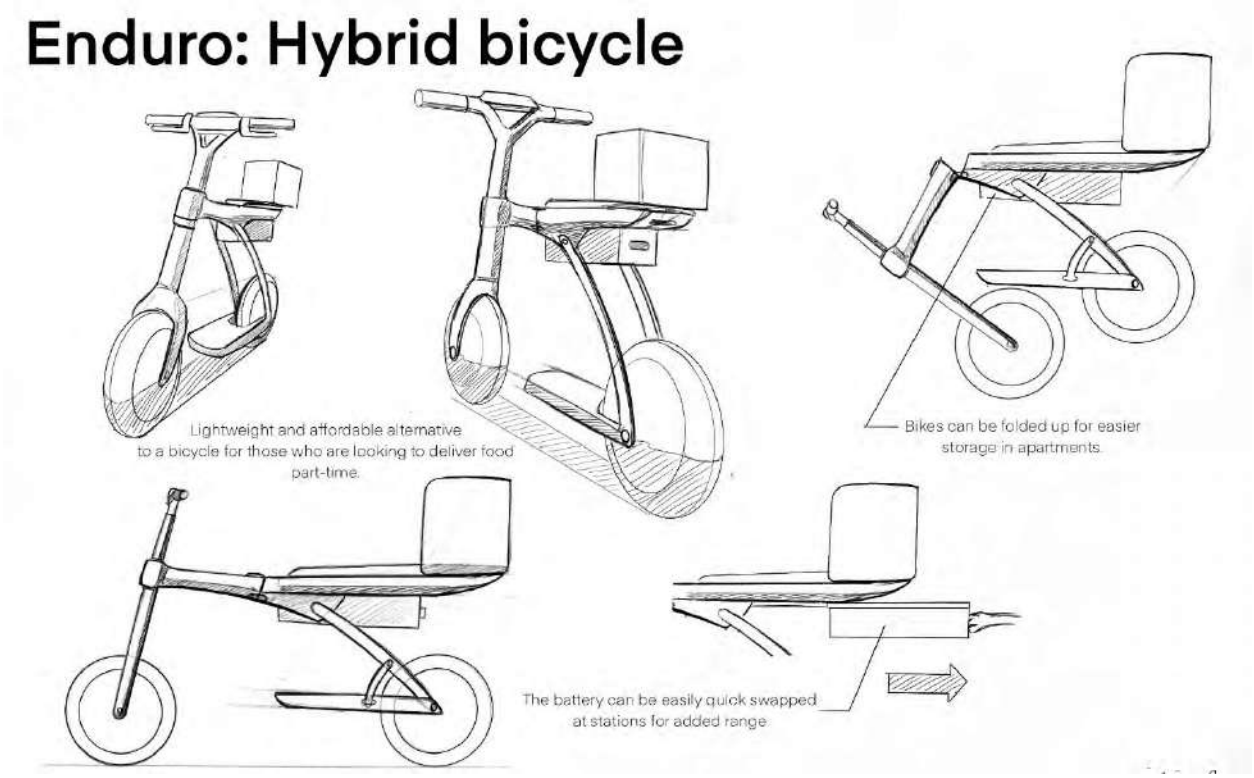


Figure 64: Enduro Hybrid Bike

The concept is a sit-down scooter with a food box in the back. It is small and compact and allows for folding so that it can easily be stored away when not in usage. There is a quick swappable battery that will allow the users to reduce their downtime, rather than wait for the battery to recharge. This will help the thesis as using small and compact modes of transportation, will help those who are living in small living quatres be able to store their bikes.

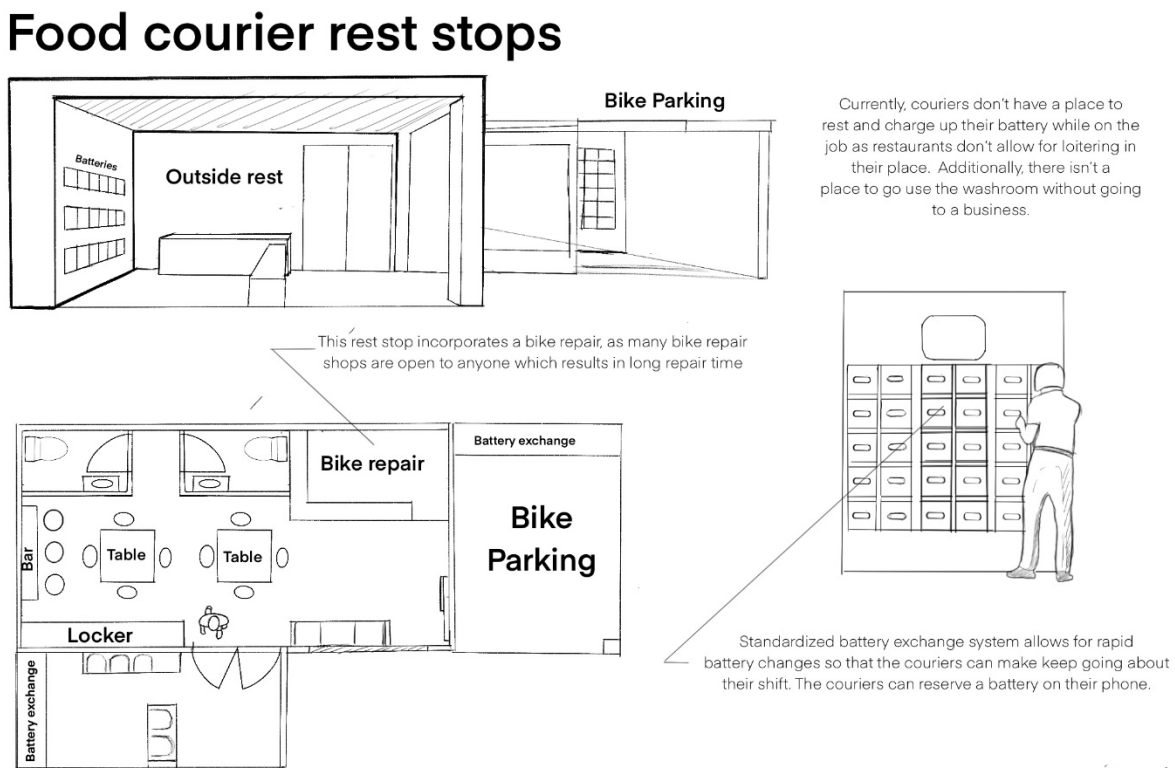


Figure 65: Food Courier Rest Stop

In this concept, the courier hub allows the user to park their bikes and recharge their bikes with a swappable battery. Inside there are tables and washrooms so that they can relax in the city where public spaces are limited. The locker system allows the user to try to avoid the Additionally, there is a space for the bike repair so that the user wouldn't need to repair their bikes offsite so that they can get back to food delivery as soon as possible. This will help develop the thesis as there is a clear need for space for the couriers in a dense metropolitan area which is fulfilled by this concept.

4.2 Concept Strategy

During this design process, three possible design briefs were created to better understand the direction the final solution should draw upon. These three sketches were derived from the previous phase and developed to create a more refined solution.

Concept 1

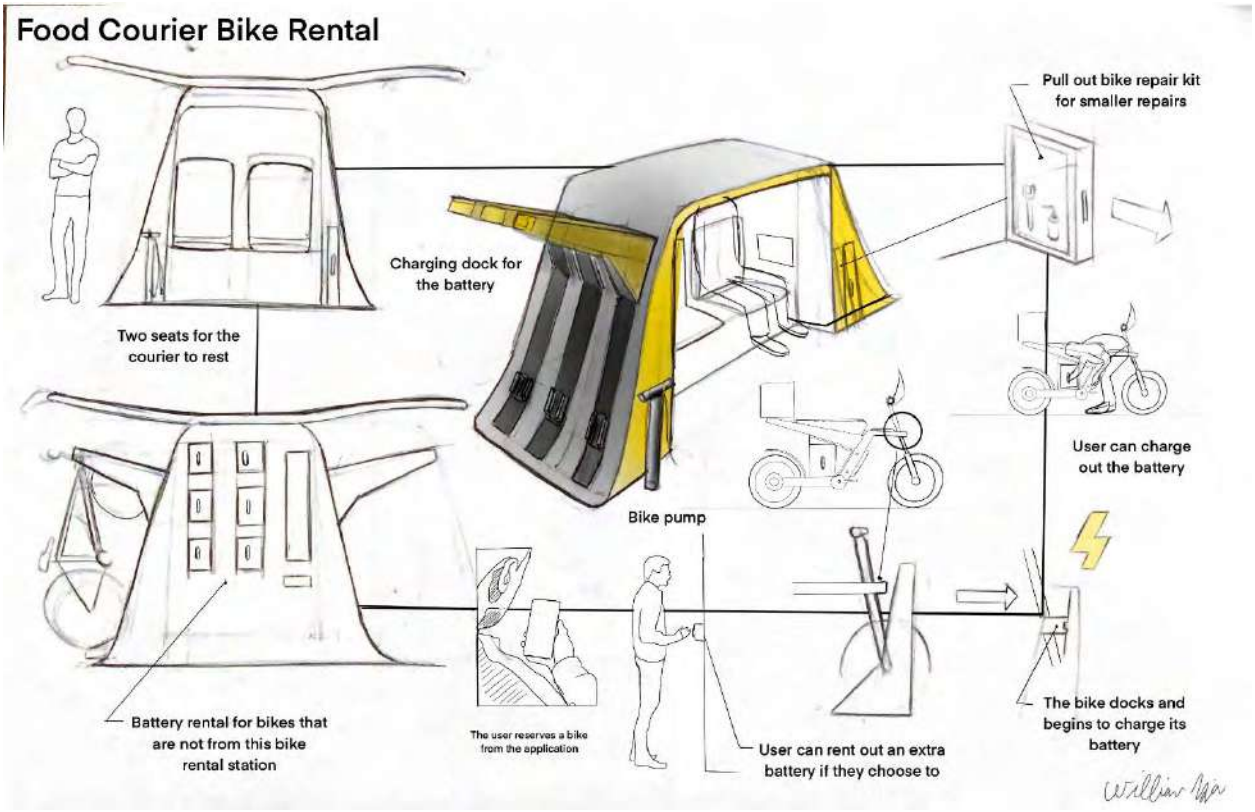


Figure 66: Food Courier Bike Rental

This concept takes concept 6 and took it further, it incorporates the use of ramps for bike storage which will make the concept much more compact that as opposed to conventional bike racks. Additionally, there is a convenient bike dock that pulls the bike into the locking mechanism so that it ensures that there is a secure connection between the bike and the dock. Additionally, there is a pull-out bike repair tool kit for whenever the user needs to make quick adjustments to their bikes. This concept helps the food delivery services like this offer a kiosk-like design that allows these kiosks to exist all around the city and allow people to participate in food delivery easily.

Concept 2:

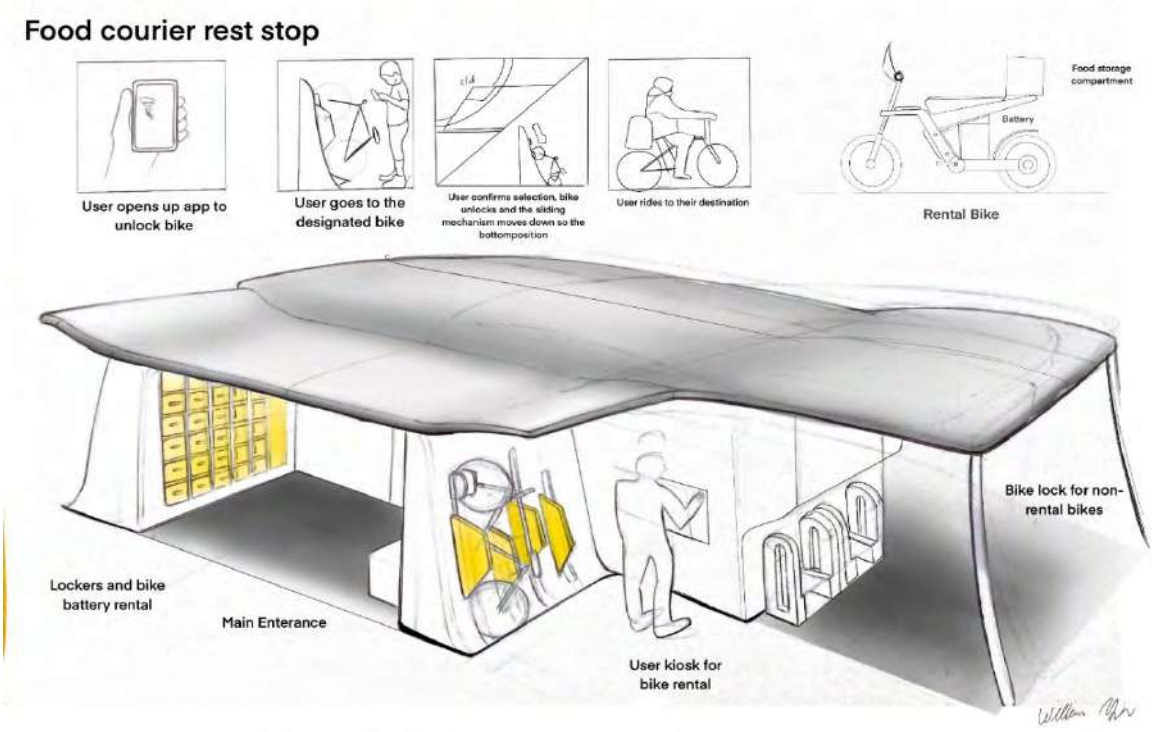


Figure 67: Food Courier Rest Stop

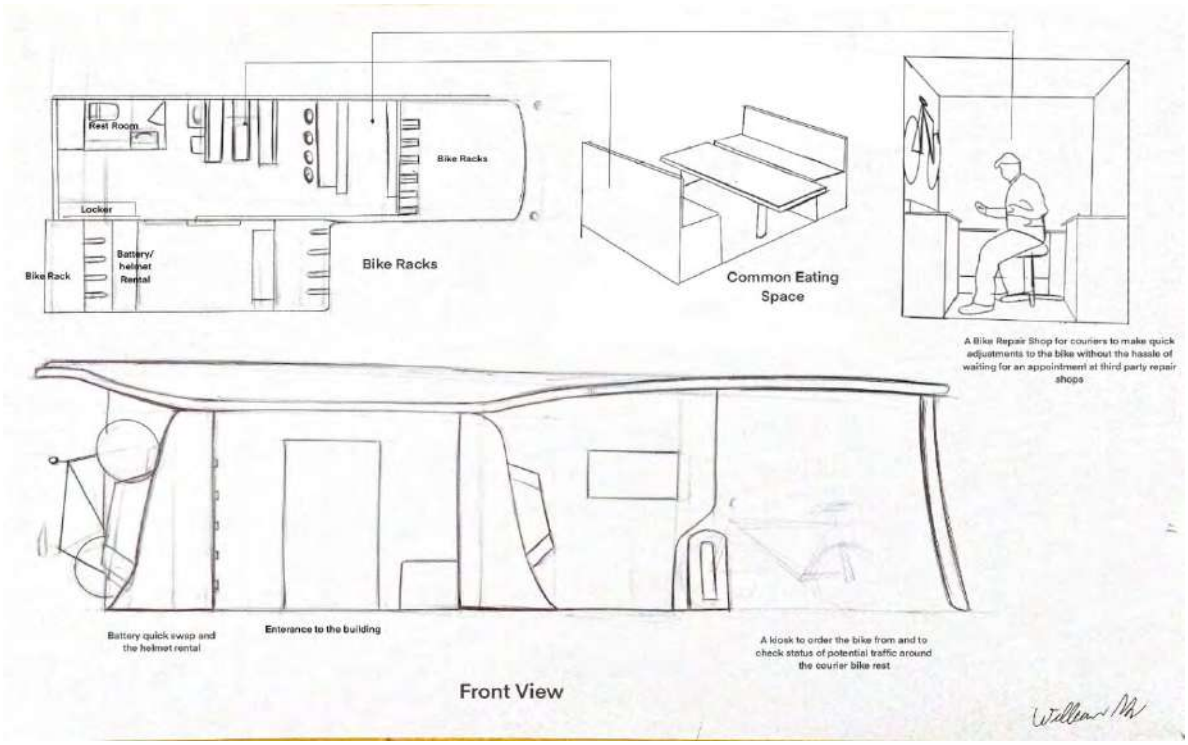


Figure 68: Interior

Figures 8 and 9 are a further development of the bike shelter and its features. It incorporates the different features such as the bike battery rentals that they can easily swap into the shared bike as well locker where the courier can store their valued goods before their shifts. Additionally, there are seating and a washroom in which the couriers can relax. This helps the courier improve food delivery services as it gives the courier a place to stay when they are in between shifts so they can work for longer periods.

Concept 3:

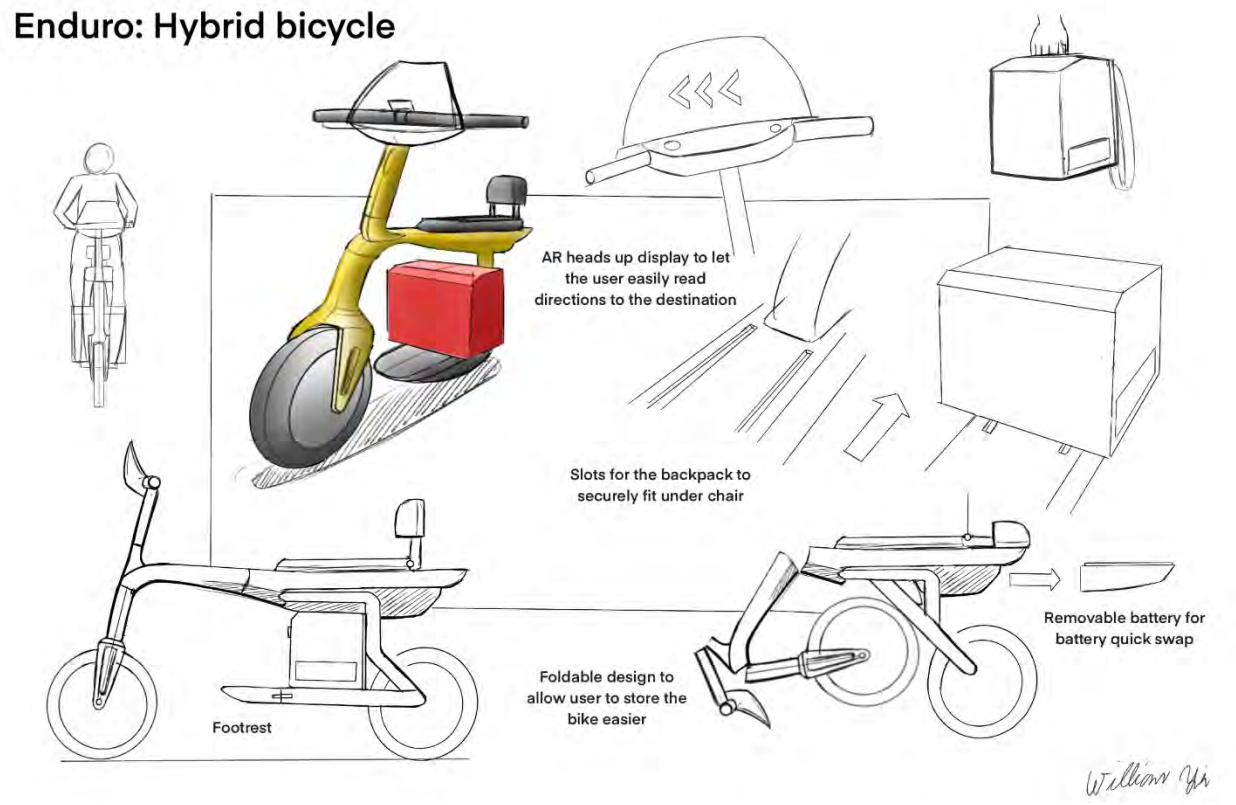


Figure 69: Enduro hybrid bike

This concept is a sit-down scooter design in which the food compartment is located under the seat which gives the courier a more comfortable ride. The food compartment can easily slide out so that the courier can easily place food items in it. Additionally, it can fold into itself so that there is extra space saved when in storage. This assisted the food couriers as they can keep this mode of transportation in a relatively compact location such as an apartment.

4.3 Concept Strategy:

From this stage, it had been decided that a more comprehensive solution can be formed through the combination of both the courier hub as well as the courier bike. Both o the solutions complement one another and used product schematics to get a better understanding of how they would work with certain components.

4.3.1 Concept Direction and Product Schematic One

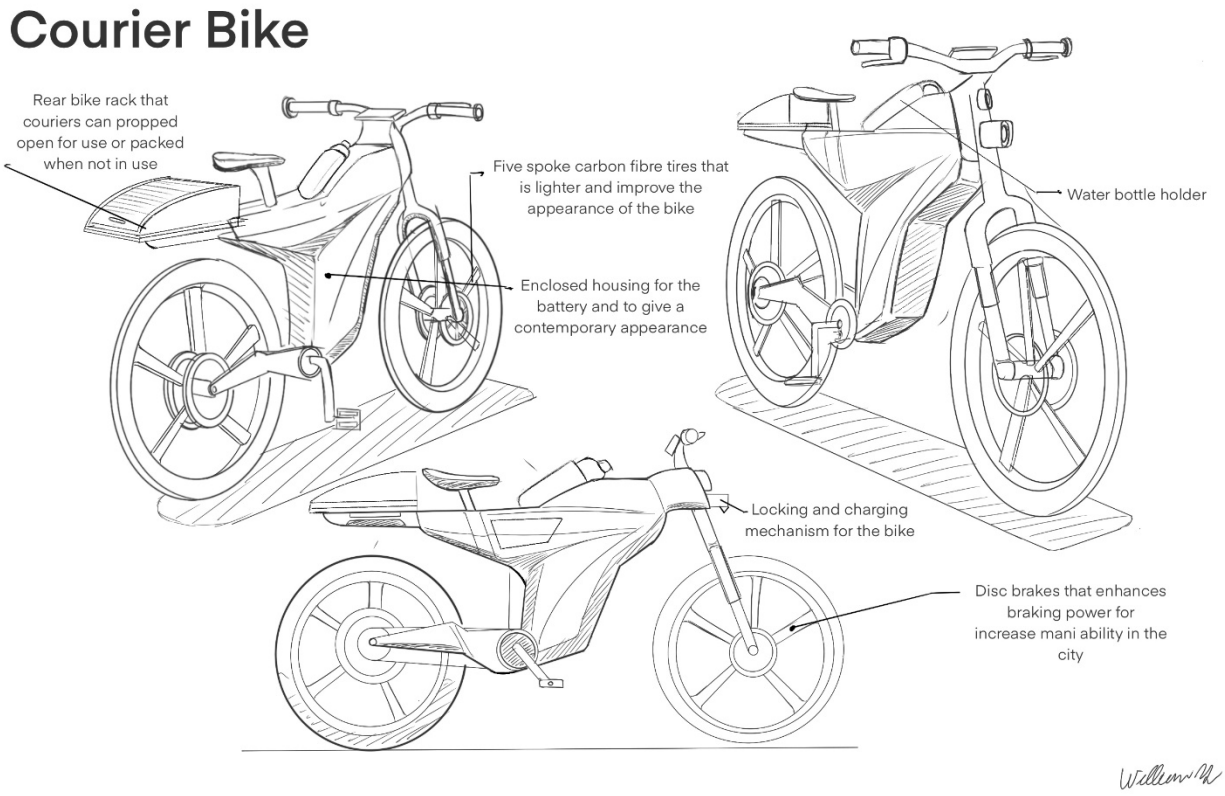


Figure 70: Courier Bike

This bike was selected for further study, it includes features such as a storage compartment, water bottle holder, cell phone holder, batteries, and food thermal bag holder. The bike features DC charging which allows for a much faster charge than regular AC charging. There is an information panel that allows the user to important information regarding the bike. The schematic diagram is significant in the further development of the bike as once these features and components are set in, further, development can be made in the design of the bike.

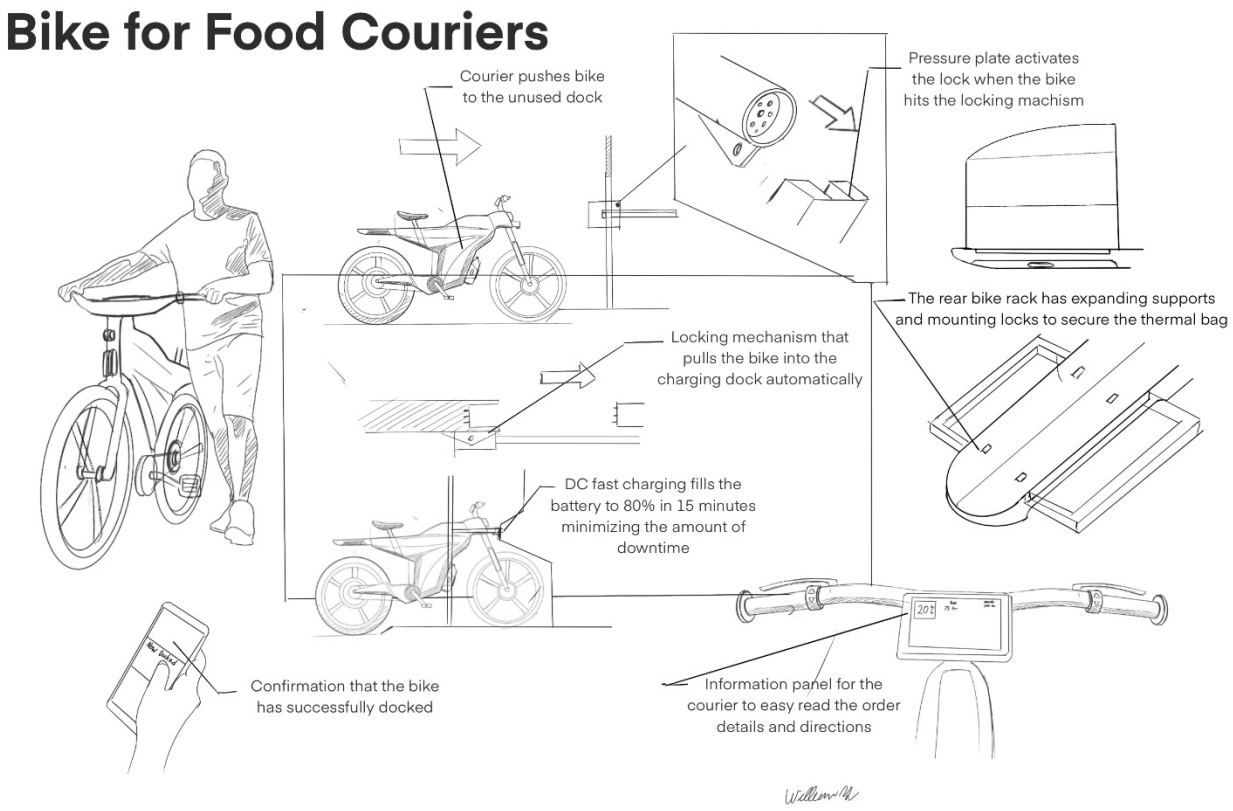


Figure 71: Bike Features

Figure 12 depicted the further development of features that can be previously refined including the fast DC charging station which allows for a quick fill-up, 80% in 15 minutes and allows many couriers to use the same bike without the unnecessary downtime of a slow charger. The foldable rear thermal bag allows the courier the ability to choose if they would like to use a backpack thermal bag or the one provided on the bike.

4.3.2 Concept Direction and Product Schematic Two

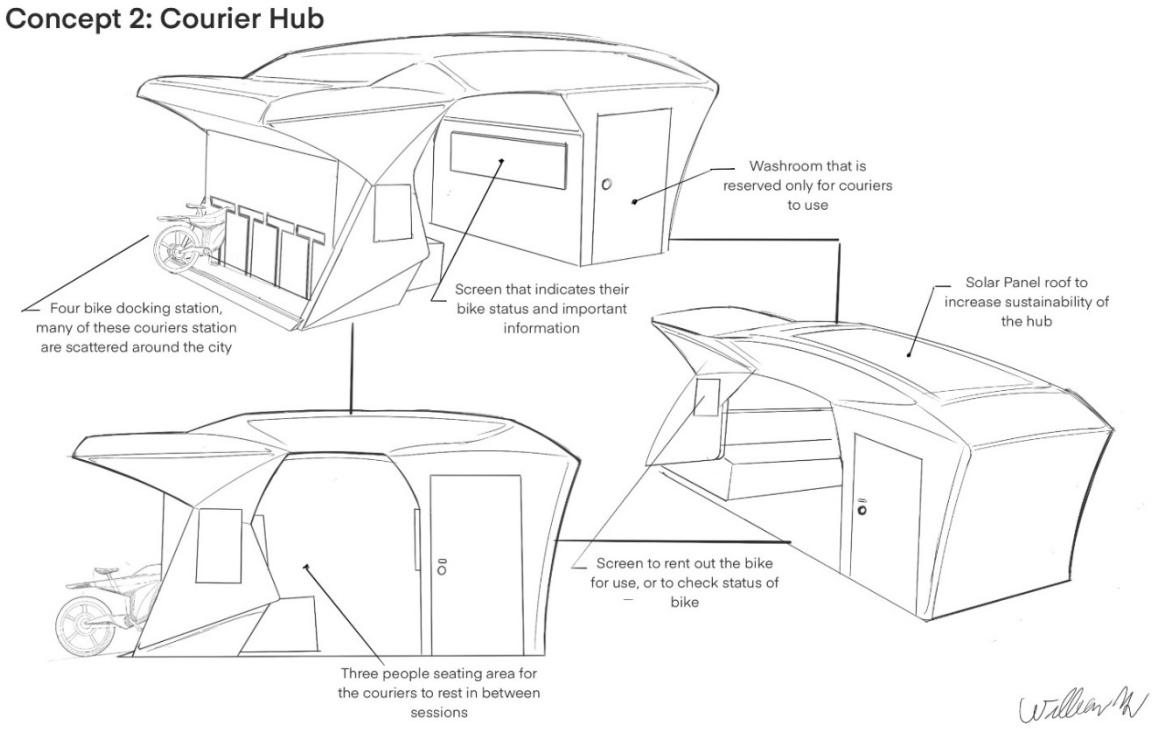


Figure 72: Courier Hub

The concept in figure 13 details the various views of the courier hub. The main features include a walk-in washroom, a main seating seat as well as a bike rental on the left side of the courier hub. The bike dock features a mechanism that pulls the bike into a charging mechanism so that it can maintain an uninterrupted charge. They are partially powered by the solar power panel on the roof, which will ensure that the courier hub is as sustainable as possible.

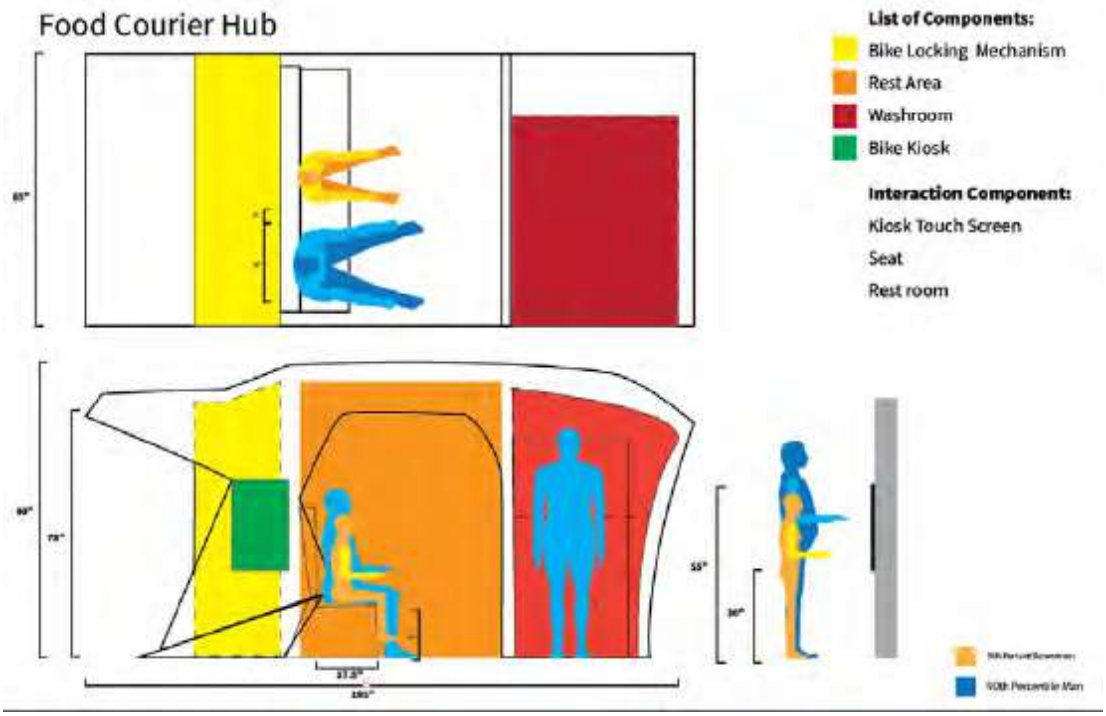


Figure 73: Schematic of Courier Hub

The schematic illustrates the three main various sections of the main features of the hub, the bike dock, the seating area as well as the washroom. This was an important step during the development phase as it allowed for the final details, to be hashed out with the dimensions.

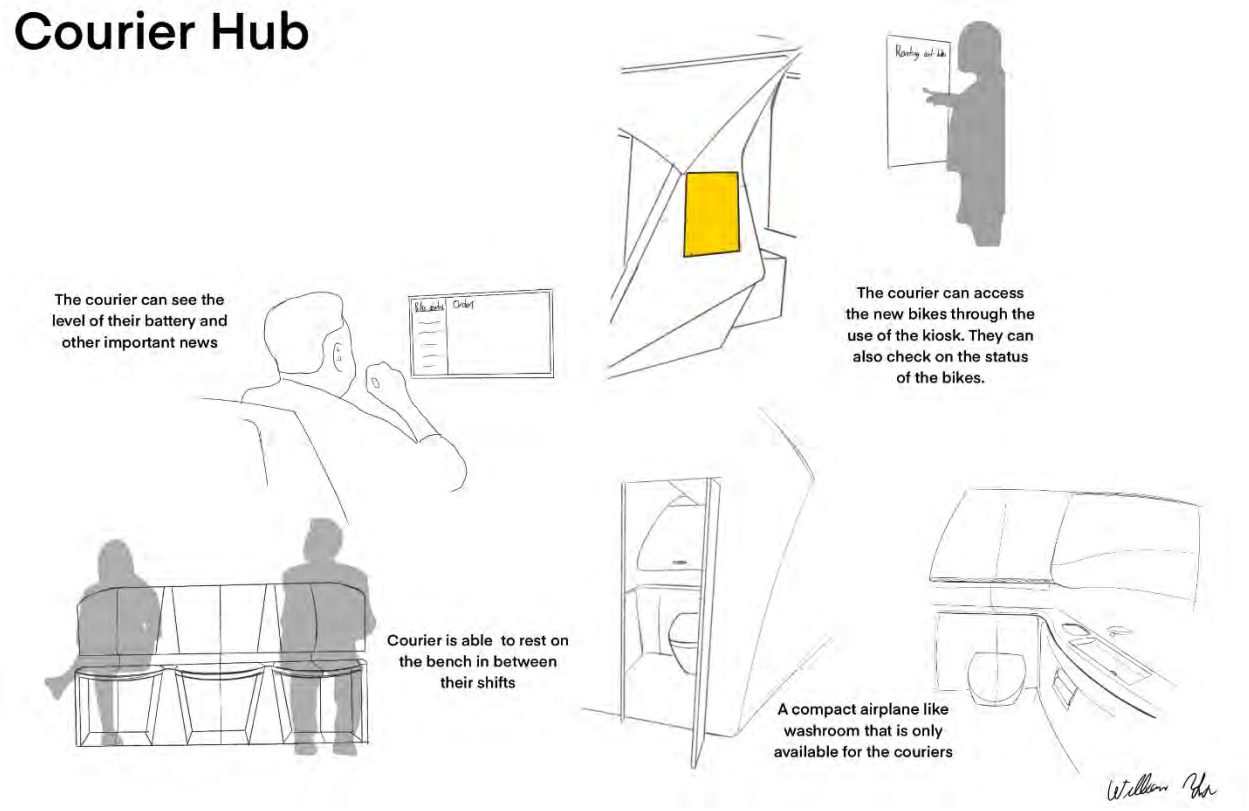


Figure 74: Hub features

Within the resting zone, the couriers can see important information such as weather, and the status of the rental bikes. This allowed the couriers to be updated with need-to-know information. The courier washroom is based upon washroom from the airplanes as there is very little space inside those washrooms and there is an emphasis on the efficiency of the location and to ensure that all the features were within reach.

4.4 Concept Refinement and Validation

Since this is both a bike and a roadside courier hub, they were both further developed. This concept went through some changes and tweaks to better serve the functionality of this solution. Further refinement of the concept was done to create more detailed drawings that the concept required and to better understand the in-depth features of the products.

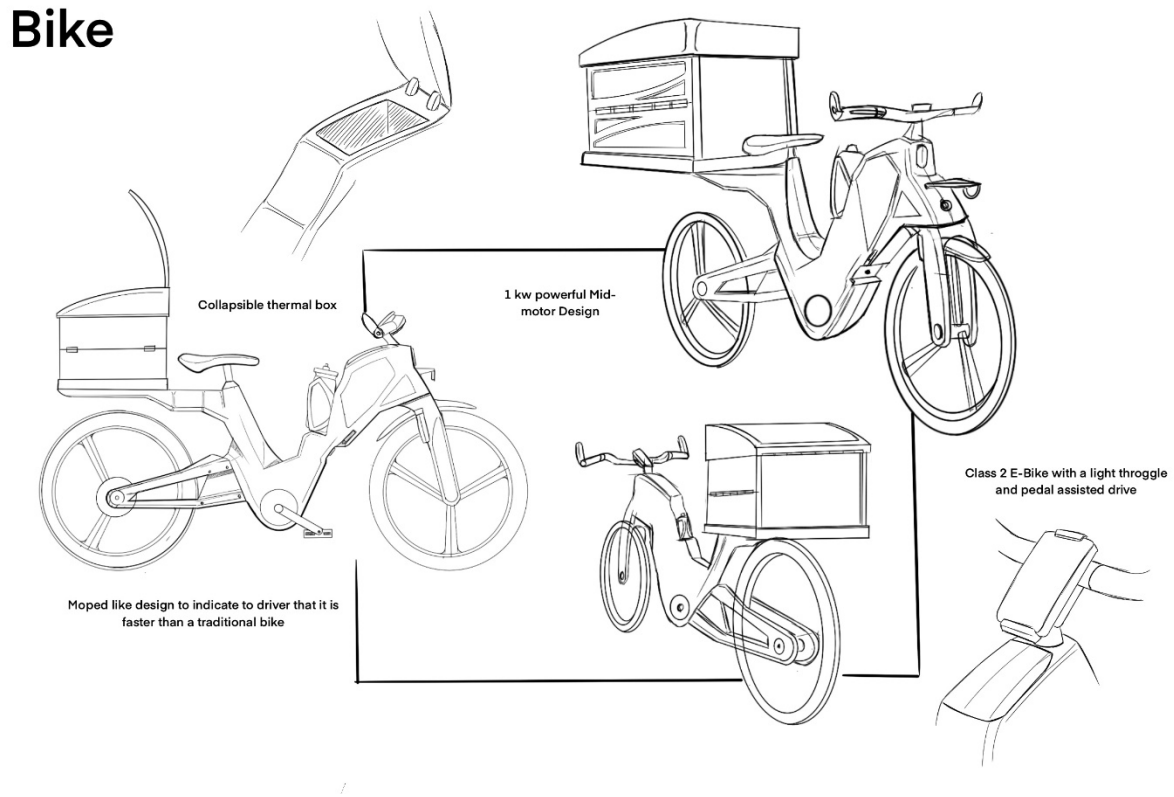


Figure 75: Bike Refinement

More features are fleshed out, which includes features such as the storage compartment, foldable bike box, and internal battery. This bike mainly has a flat body shape to try to streamline the body and indicate that this bike is an electric bike.

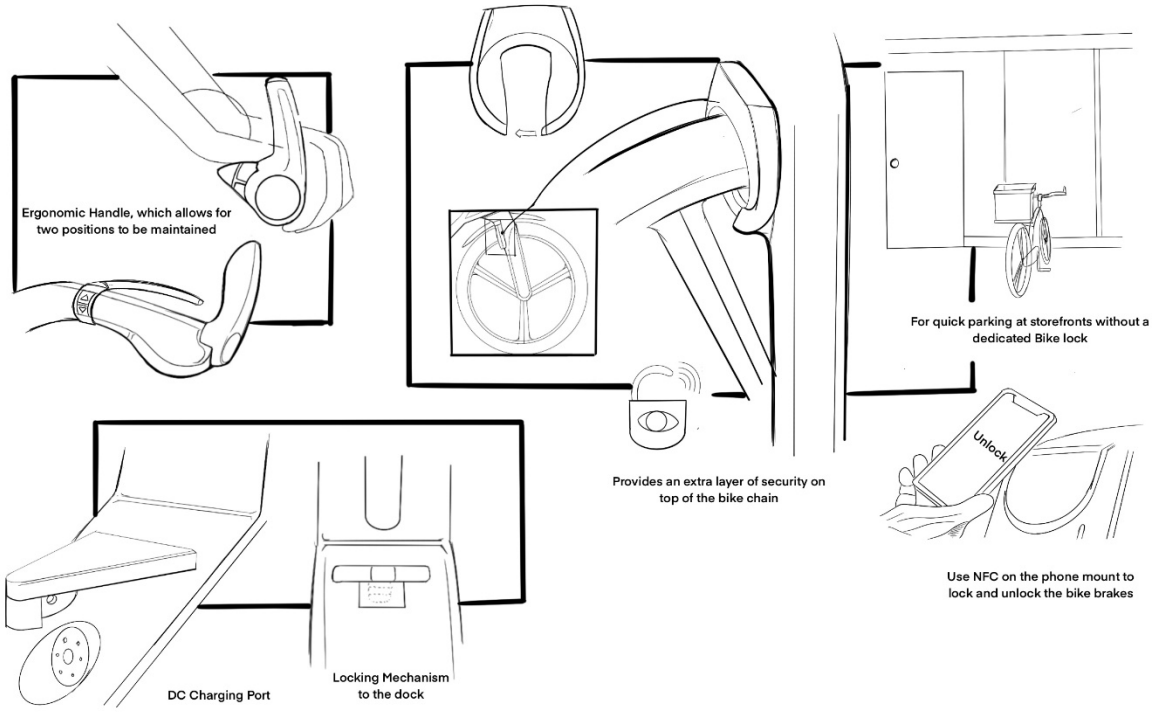


Figure 76: Features of the Bike

Different features such as the locking mechanism are depicted, it is used to quickly charge the bike from 0 – 80% in 15 minutes for a low turnaround time, this is paired with the locking mechanism where the bike can be locked into the charging dock. The bike can be unlocked using an NFC-enabled smartphone. The bike handle features an ergonomically shaped handle to allow the couriers to ride comfortably for a longer period. There is an integrated bike lock that will enable couriers to lock their bikes without needing to lock their bikes to a bike post.

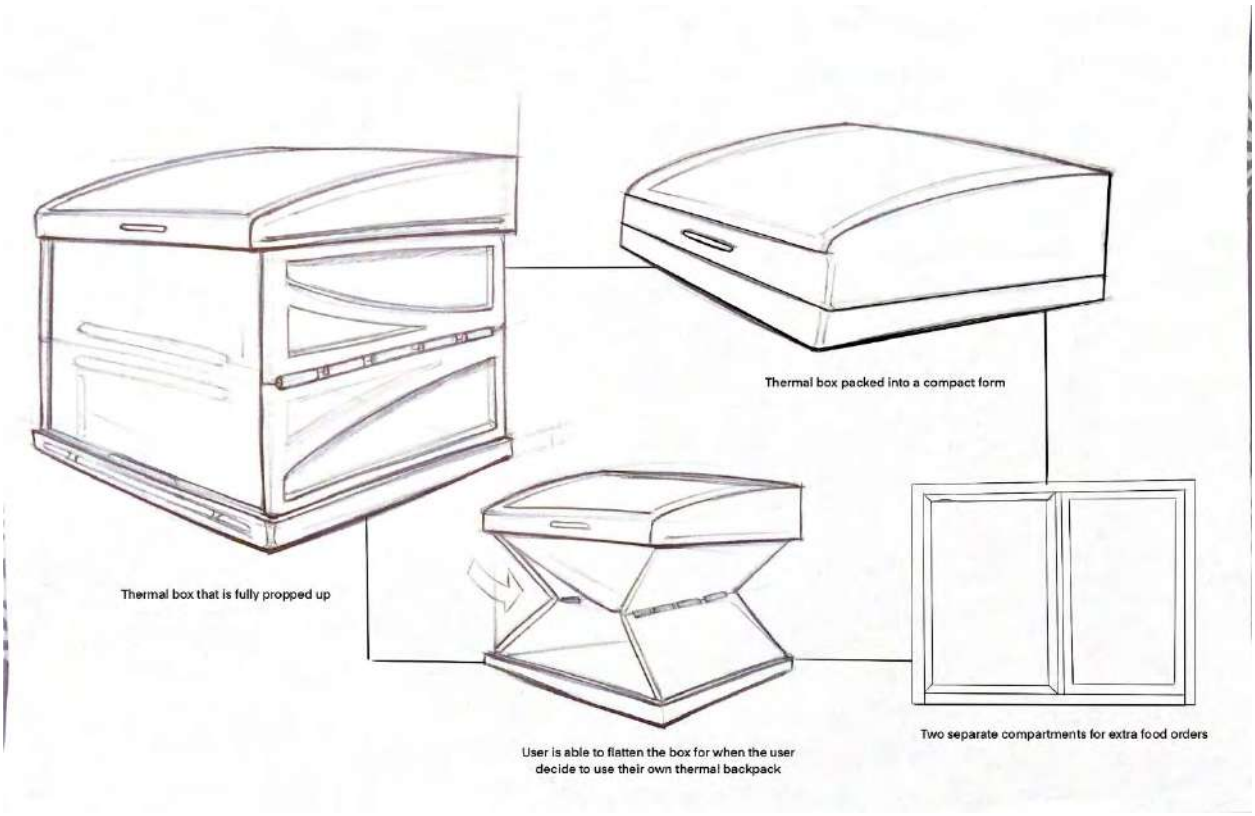


Figure 77: Bike Thermal Box

This box is a thermos-plastic box that can be folded when not in use for a more compact form factor. Additionally, it is sectioned into two different sections so that the couriers can store two different orders at the same time, saving them time on the road.

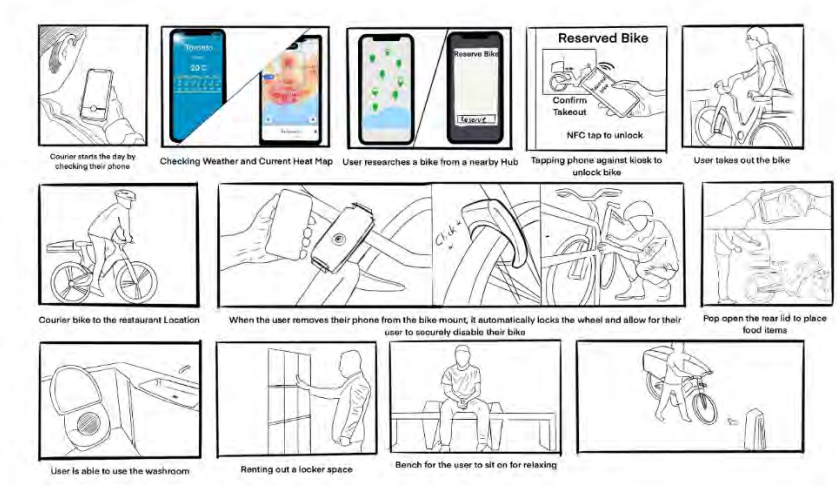


Figure 78: Storyboard

This storyboard tells the story of the day in the life of the food courier.

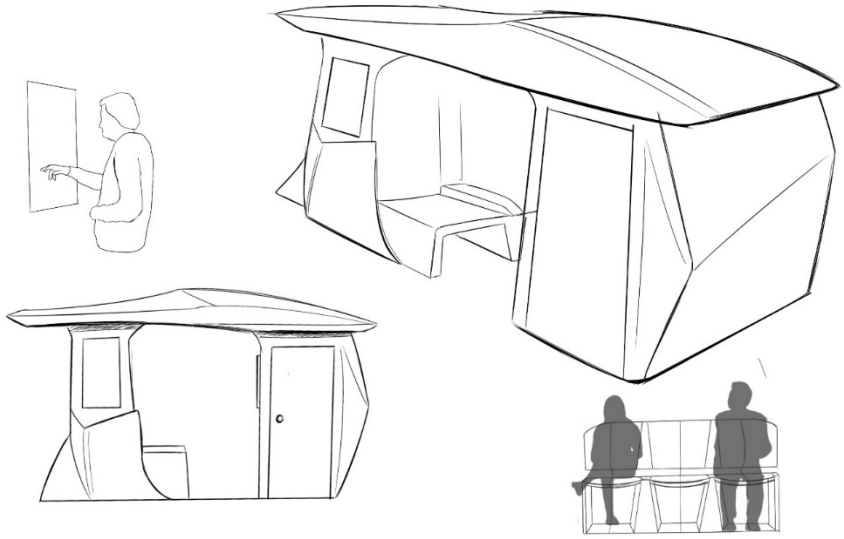


Figure 79: Continued refinement

The continued development of the shape and design of the shelter.

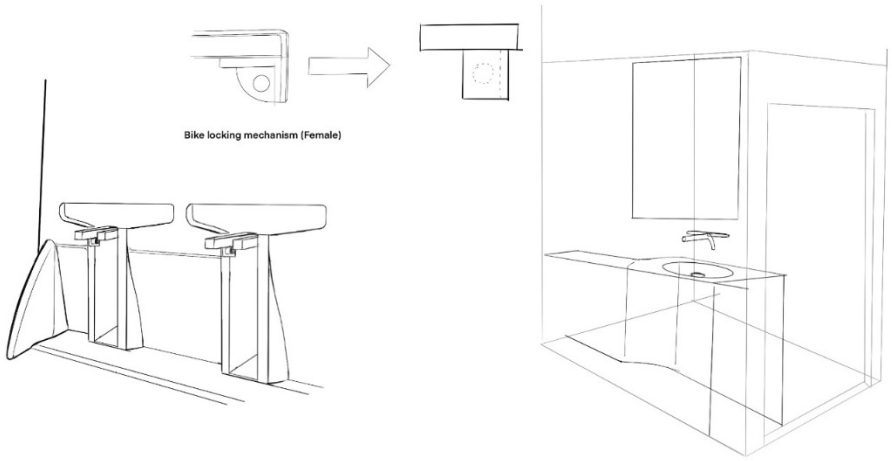


Figure 80: Bike Hub features

This includes the washroom as well as the bike docking system.

4.4.3 Refined Product Schematic & Key Ergonomics

This concept was selected for further development as it continued to offer all the features but in a more compact body and form compared to the previous design iteration. Key ergonomic considerations were considered during the development process such as the racked angle of the handles to facilitate a more comfortable riding position. The height of the seat and the storage compartment was taken into account by the different body types from the 5% woman to the 95% man so that could access the different compartments easily.

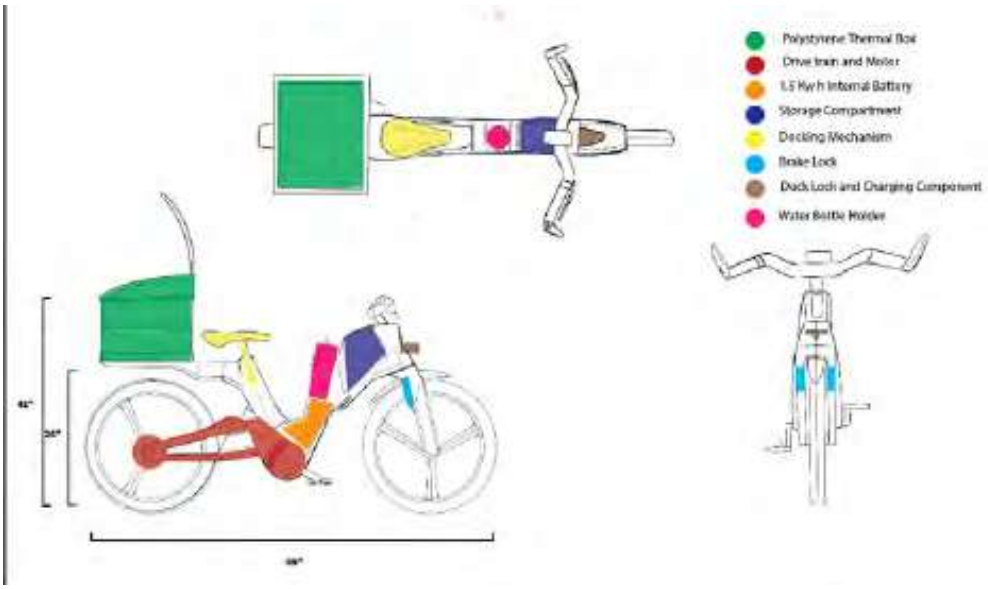


Figure 81: Bike Schematic

This is the bike schematic detailing all the different features that are essential to the functionality of the bike.

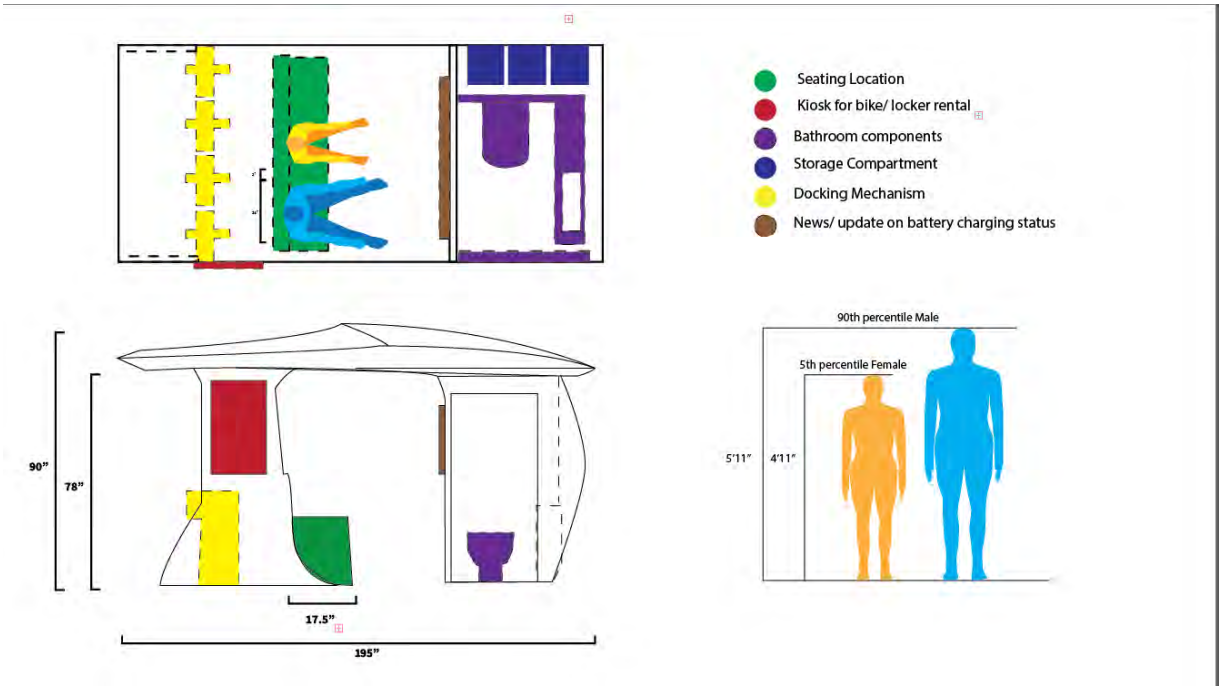


Figure 82: The schematic of the Bike Shelter

Using the 5th female to the 95th percentile male, the schematic of the bike shelter of the features are shown in different colours to understand if they would fit and work in the given dimension.

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4.5. Design Realization

4.5.1 Design Finalization

This is the finalized courier hub where all the features were finalized in preparation for the solid works CAD modelling and were created after the prototype model. The colours are finalized, which include the medium gray and gold to give a nice contrast between the different features. The design is drastically different from the earlier pieces as the roof design to better reflect the design language of the bike.

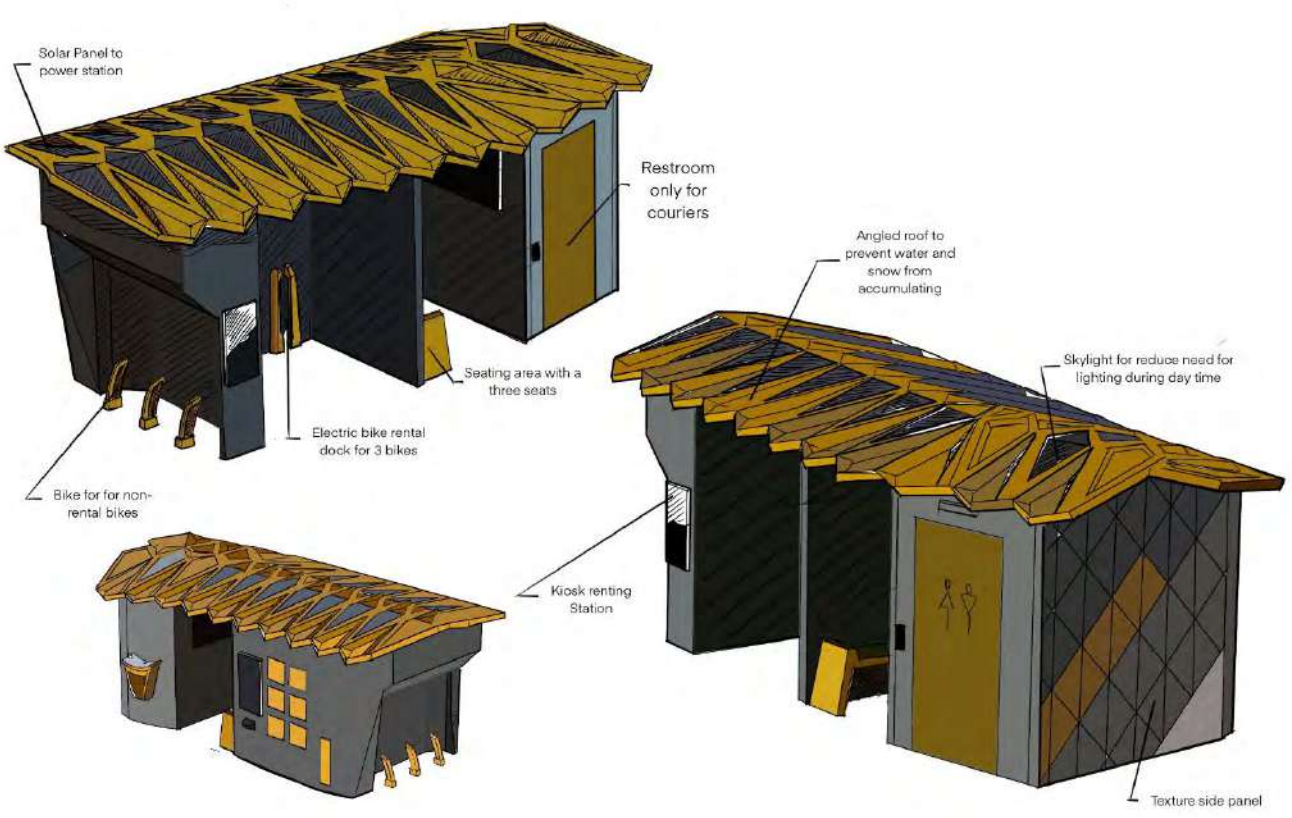

Figure 83: Finalized Visual Concept

Figure 84: Finalized Bike Design

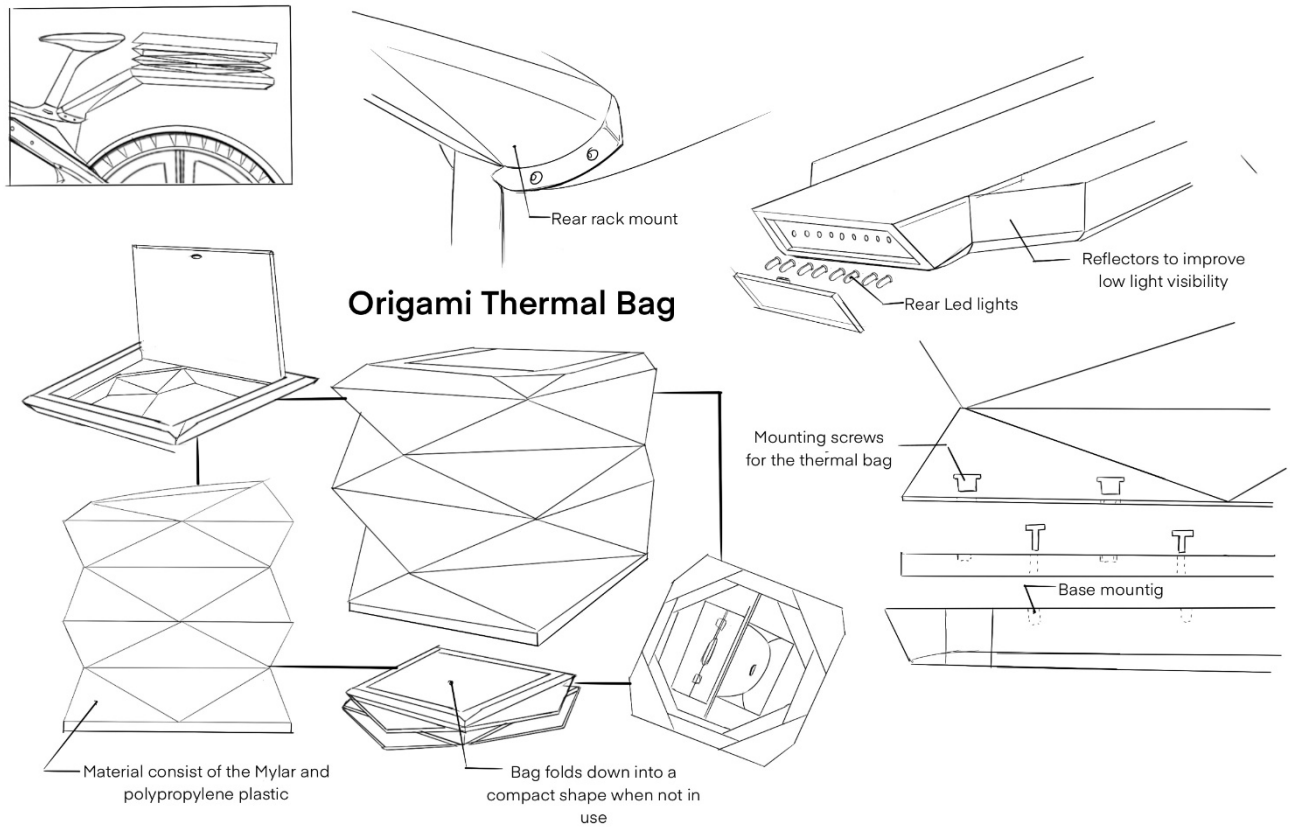

Figure 85: Thermal Box

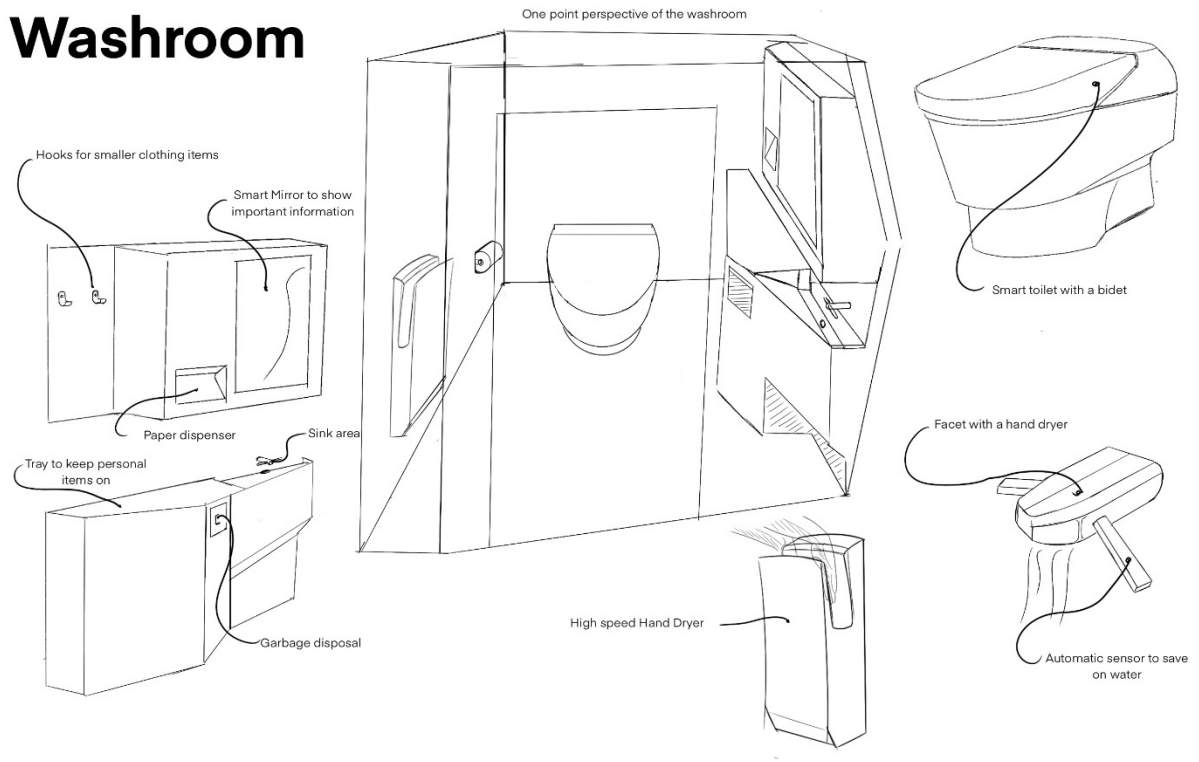

Figure 86: Washroom Details

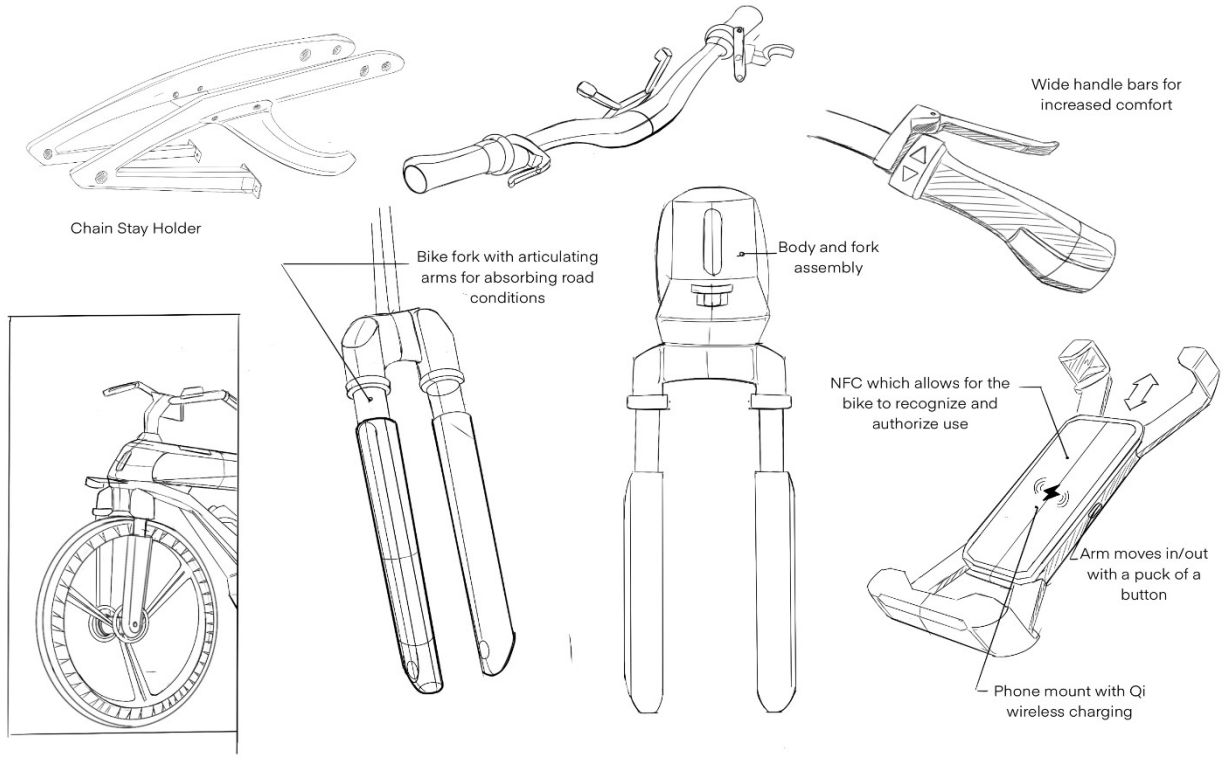

Figure 87: Bike Detailing

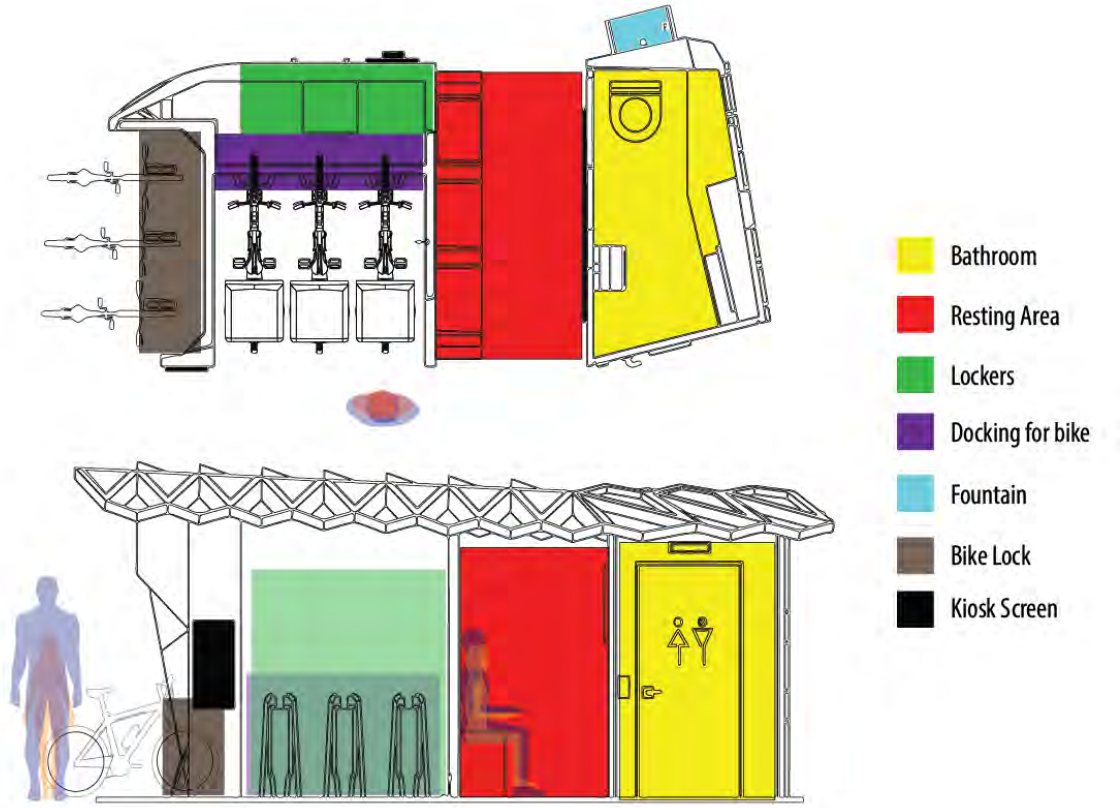

Figure 88: Schematic Diagram of the Hub

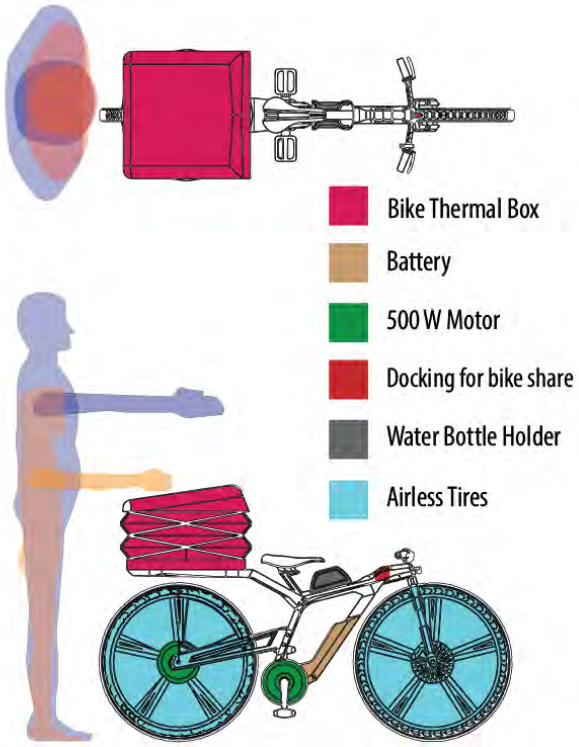

Figure 89: Bike Schematic

4.5.2 Physical Study Model

A sketch model was created to get a better understanding of the positioning of features and the surfacing of Maverick in the real world. The materials used to create the model were primarily foam core, with illustrator sheets for the smaller components with both being at 1:15 scale, attention was paid to the ergonomic proportions so that the dimension can translate well to the CAD development.

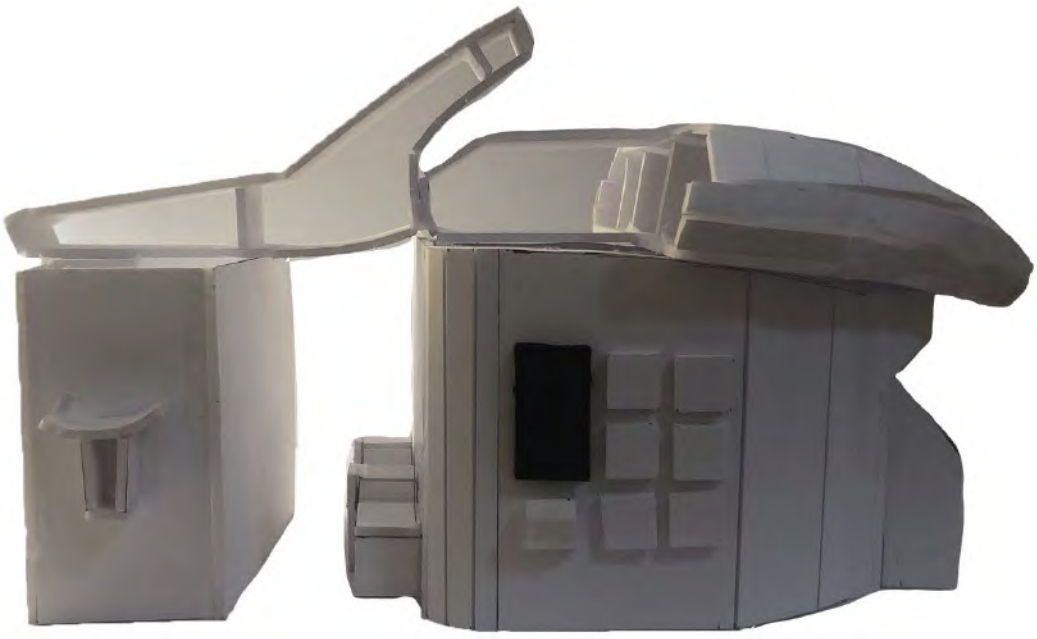

Figure 90: Locker View

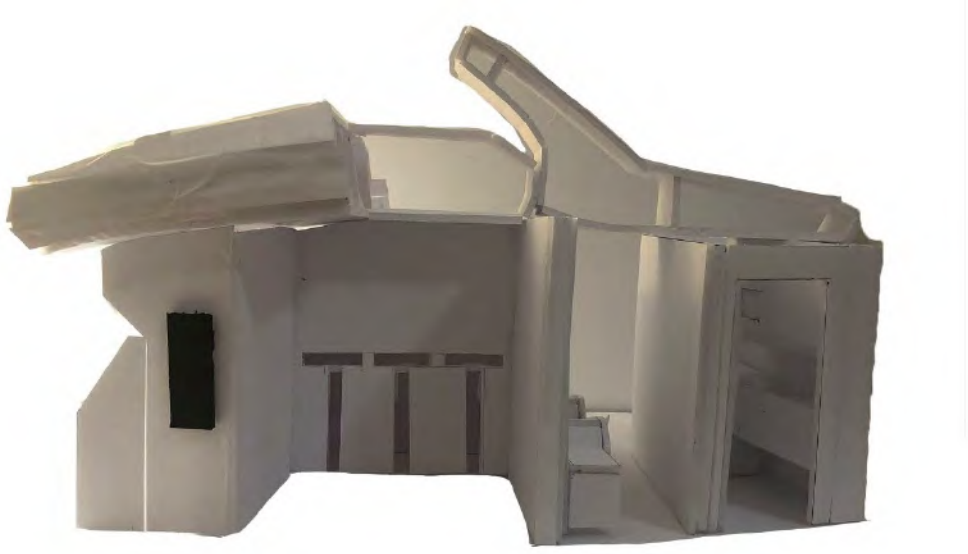

Figure 91: Bike DockSide

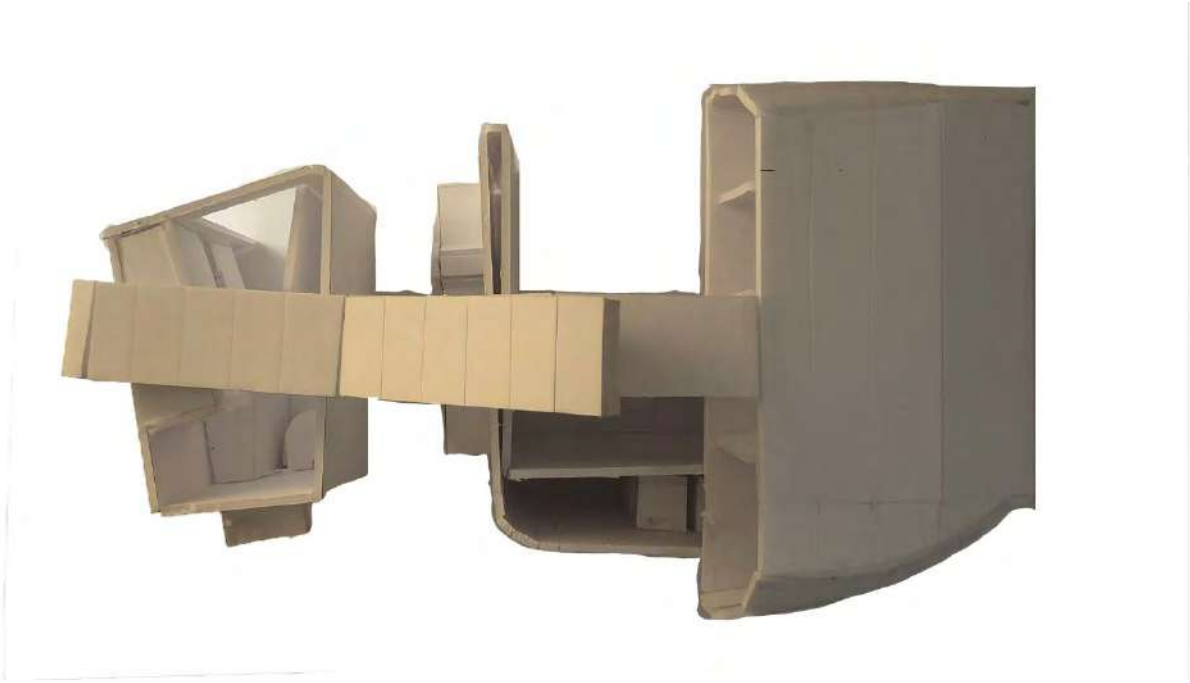

Figure 92: Overhead view

4.6 Design Resolution:

Maverick Final Design of the rental bike and courier hub takes into account the different needs and wants of the food courier so that could perform at their best. The various internal components such as the internal compartment are useful in the understanding of the materials.

Both the bike as well as the hub share a similar look and feel with one while taking into account the human proportions and ergonomic needs. During development, the design changed quite a bit from the original proposed design, as it includes new features that were not previously addressed. The design was addressing the design direction that was utilized before moving to the CAD development.

4.7 CAD Development

Figure 93 - CAD Development: Frame

Figure 94 - CAD Development: Bike Components

Figure 95 - CAD Development: Thermal Box

Figure 96 - CAD Development: Rental Bike

4.7.2 Bike Courier Hub

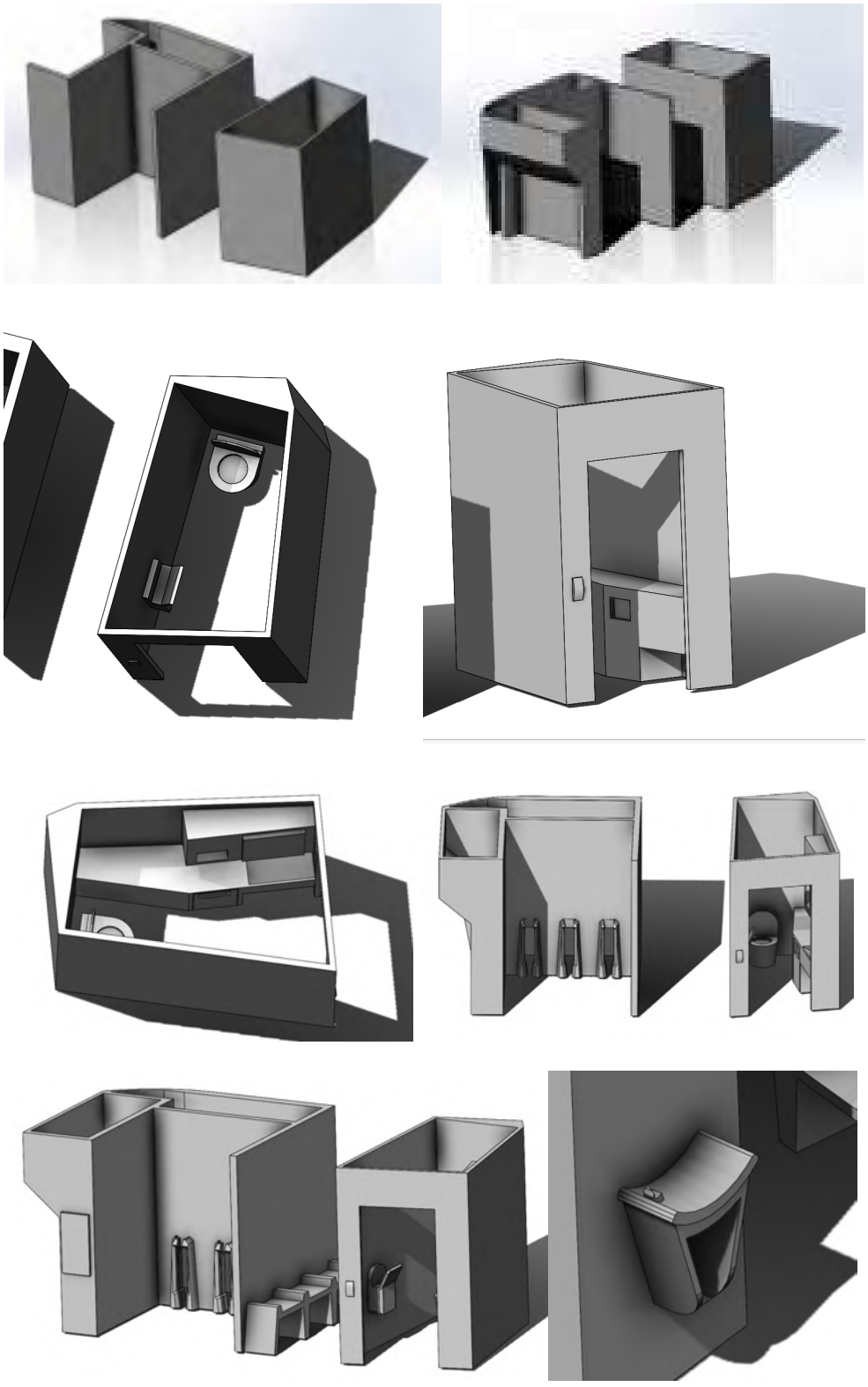

Figure 97 - CAD Development: Structure

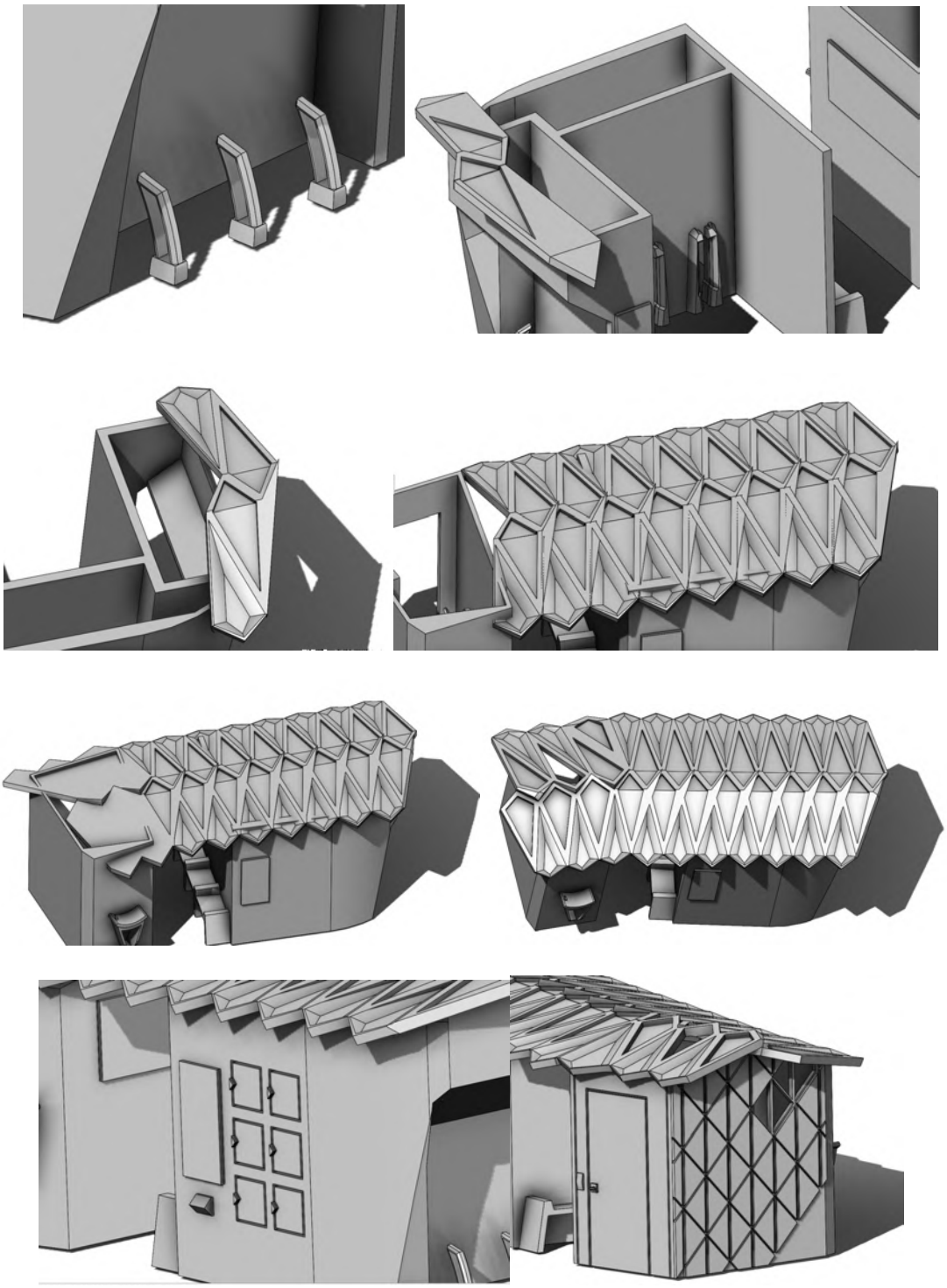

Figure 98 - CAD Development: Roof

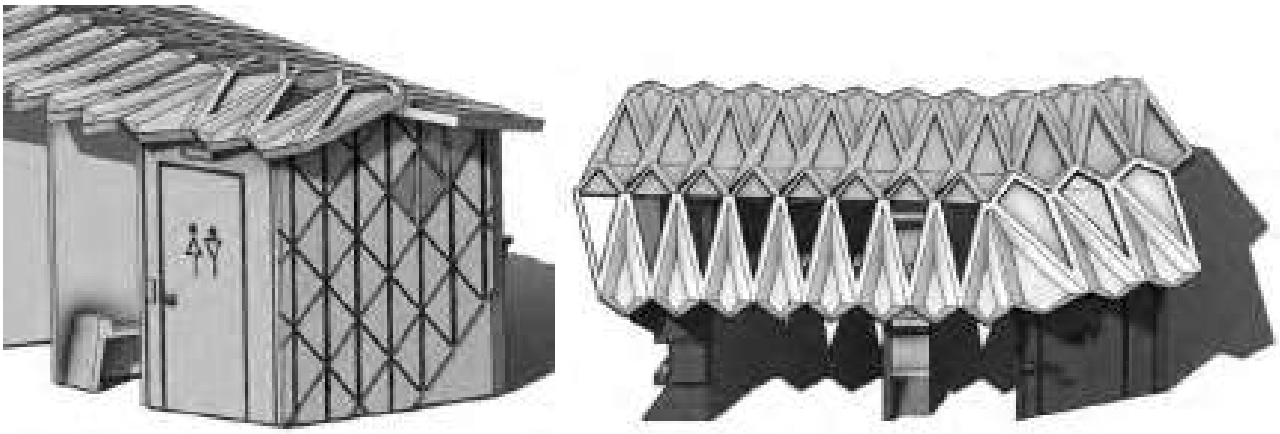

Figure 99 - CAD Development: Side Panels and Solar Panels

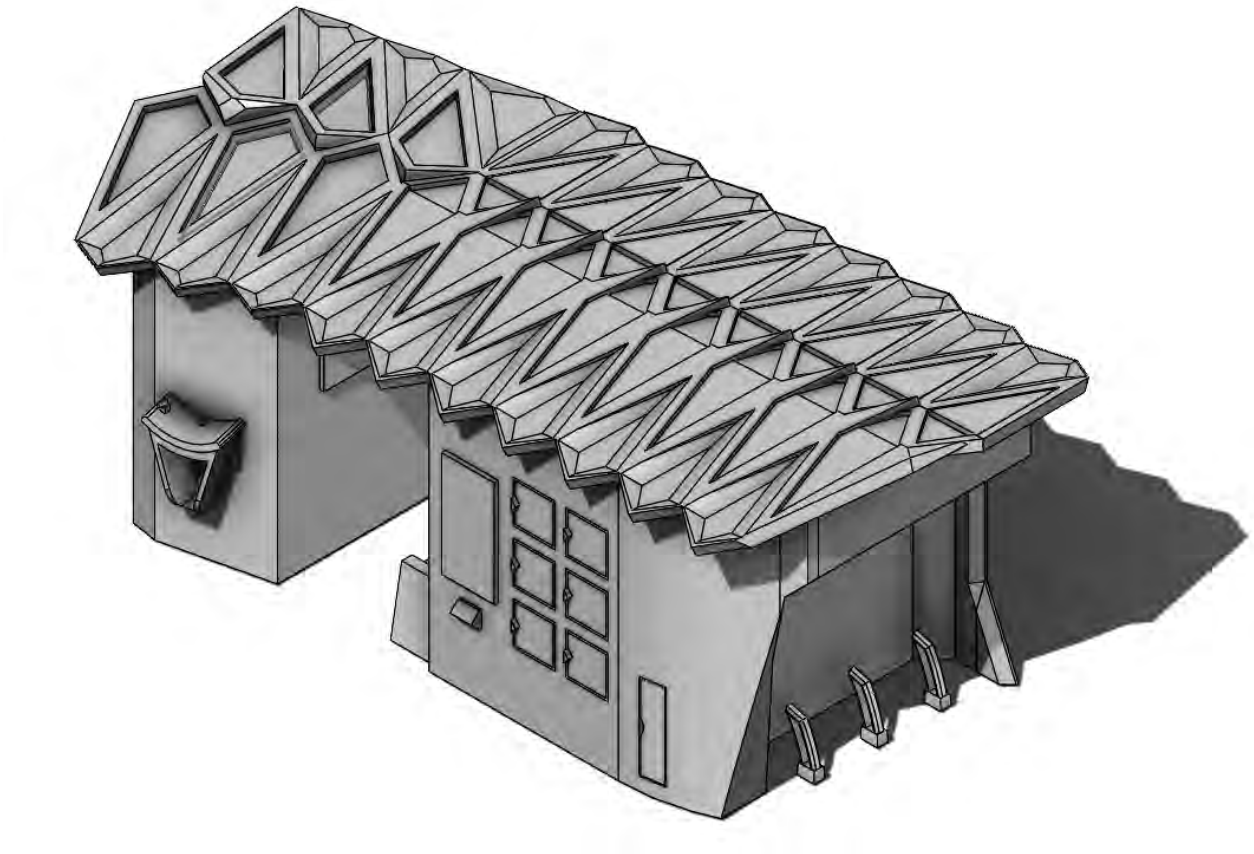

Figure 100 - CAD Development: Courier Hub

4.8 Physical Model Fabrication

The model was printed using both PLA filament as well as SLA for the larger components through the software SolidWorks. The pieces took about one day to get sanded to an acceptable level, and further refinement such as the final coat of paint will continue to be made until the thesis show. The models shown below are primed with a bit more sanding left to do.

4.8.1 Rental Bike Physical Model Fabrication

Figure 101: Final Model Side Profile

Figure 102: Three Quatre Rear View

Figure 103: Front Three Quatre View

Figure 104: Upper Side Profile

4.8.2 Hub Model Fabrication

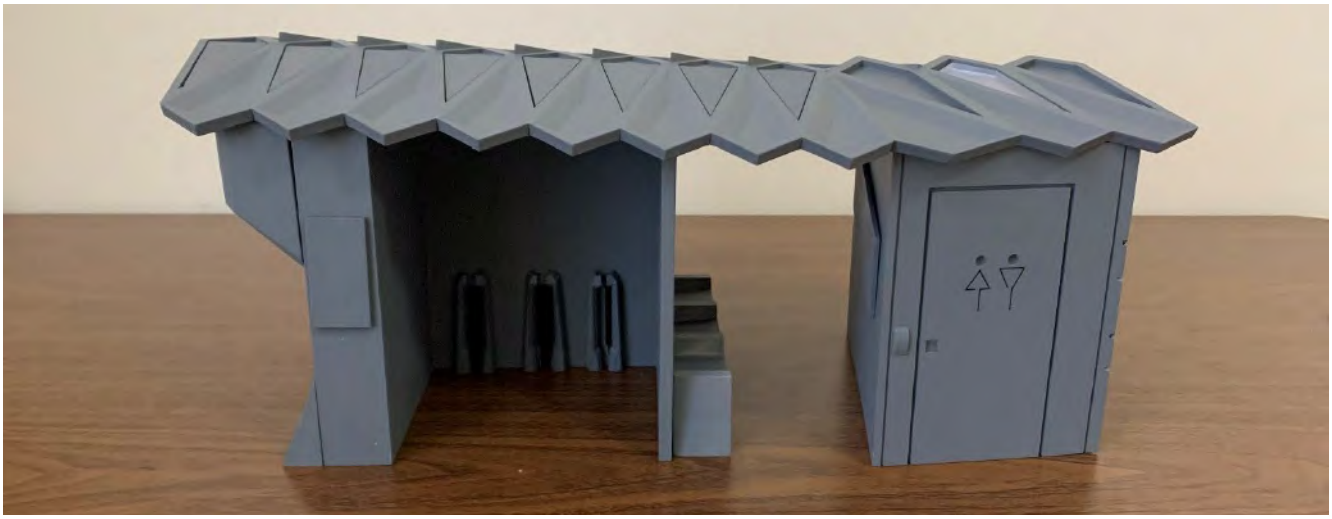

Figure 105: Dockside view

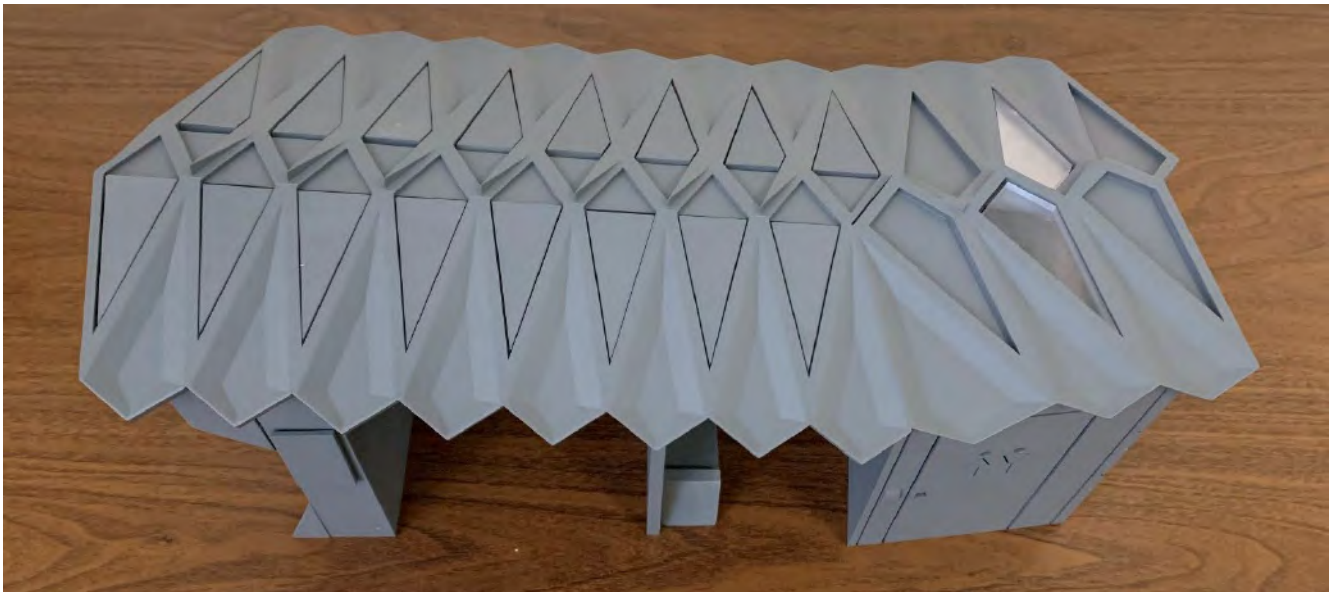

Figure 106: Top View

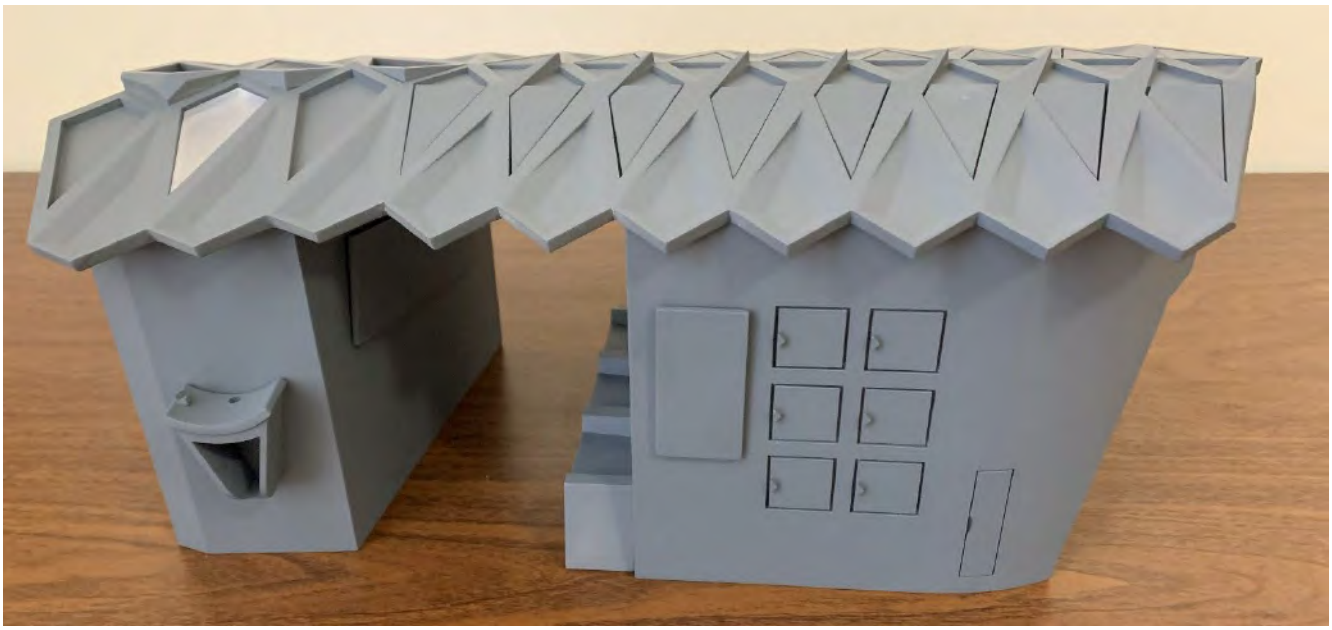

Figure 107: Locker Side View

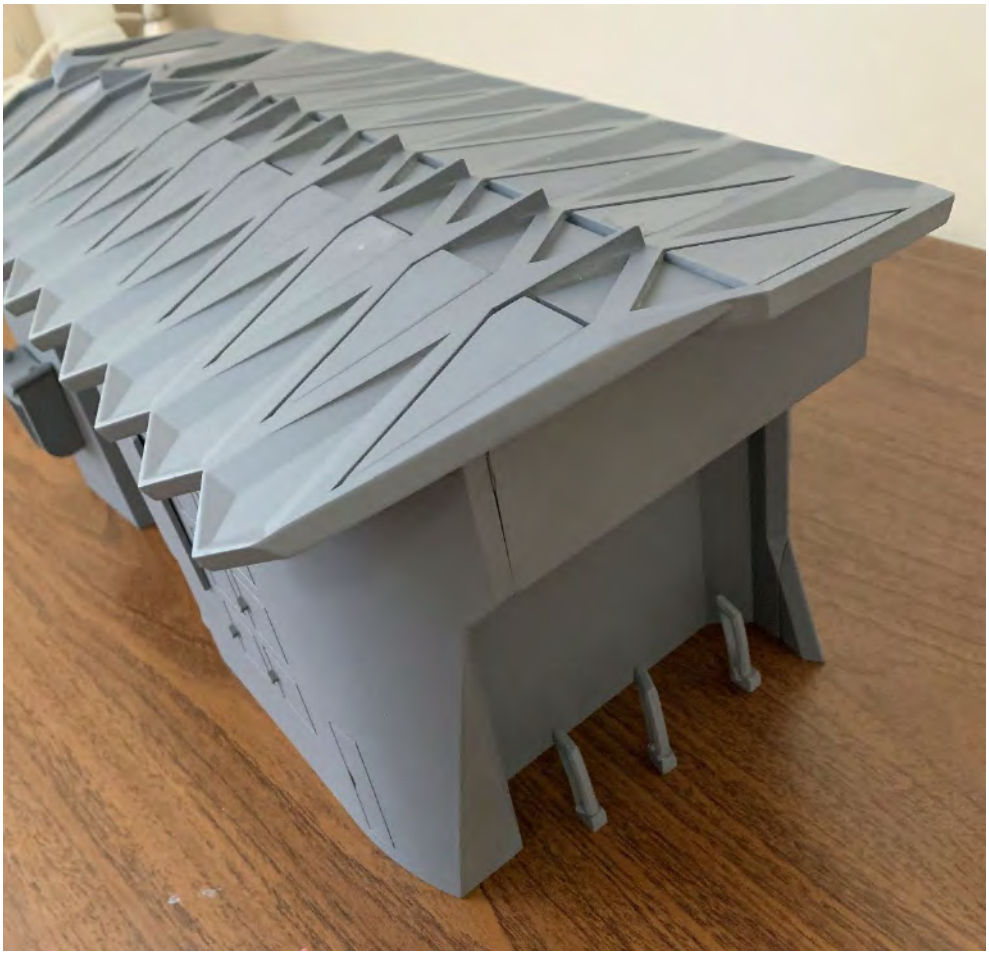

Figure 108: Non-rental Bike Lock

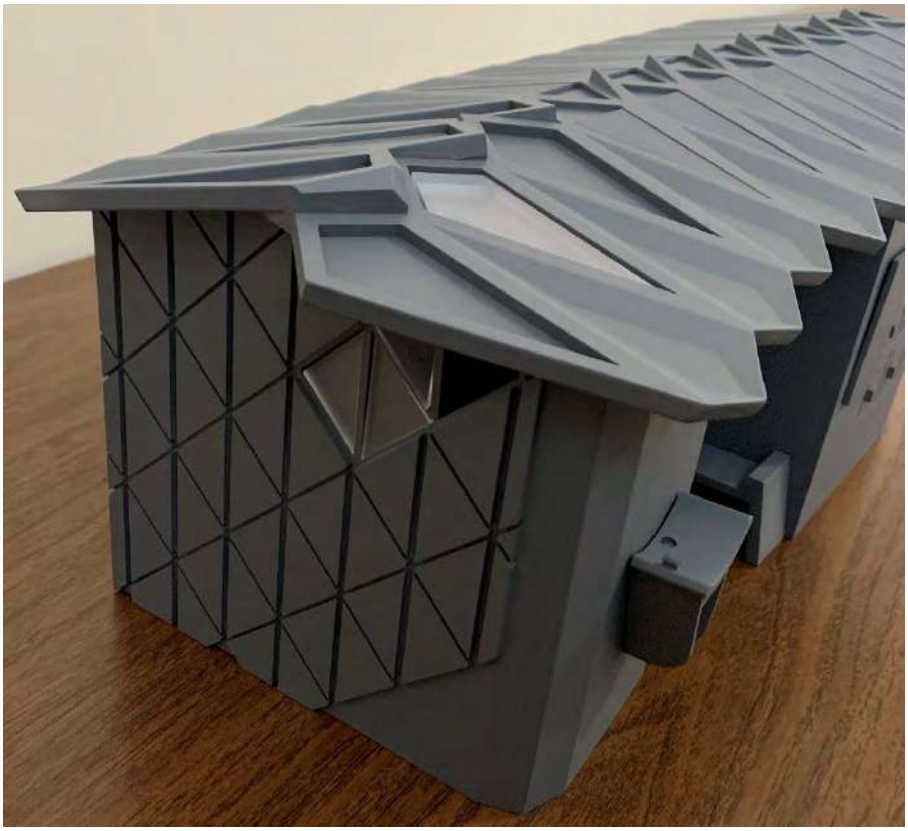

Figure 109: Washroom Wall

Chapter 5 – Final Design

5.1 Summary

Maverick is an Urban Food delivery solution that incorporates modern use of materials, manufacturing processes and technologies that improves the well-being of food couriers. It provides the user with a long-term sustainable way for them to stay healthy and safe while on the job.

5.2 Design Criteria Met

5.2.1 Full Bodied Interaction Design

Ergonomics is a very important consideration for Maverick as these dispatch riders spend a great deal on the road as well as resting in between their working hours. They can spend anywhere from 1 hour to a long 8 hours working their shift. The full ergonomic study is essential in trying to ensure that features can be used effectively without any strain as well as can be enjoyed by riders. The ergonomic consideration uses the measurement of men and women between the 5^{th} and 95^{th} percentile. For the washroom itself, the ergonomic consideration was considered on how a typical person would use the washroom and designed accordingly to it. Components such as cabinet height, mirror, faucet, and hand dryer were designed to maximize the ease for users to access them and centralized these features so that the user does not require to haphazardly move about the washroom. In the UX design, the application, as well as the kiosk interface, was designed to allow couriers to quickly access key information. There are large and bold icons running along the bottom of the screen which inform the user of the various functionalities such as bike rental, map location and bike monitoring. For the bike seating and handles, they are designed with an emphasis on longer-term usage as there are more cushioned for the sit bone and the handles allow the rider to be at the position of 60 degrees and the handlebars allow the arms and hand to be in a more relaxed and ergonomic position. Accessing key components such as the lock is straightforward as it is easily accessible when the couriers need to secure their bike.

5.2.2 Materials, Processes, & Technology

There have been quite a few innovations within the cycling and building industry with their use of materials. Maverick use sustainable materials for the courier hub and the bike respectively. The makeup of the kiosk is made from aluminum 6061 and stainless steel, which is almost entirely recyclable. This means that the materials can be used almost infinitely without any degradation in the strength and quality of the steel (Author Wiley., 2020). The washroom interior and the seating area make use of bamboo which is a renewable source and can be grown very quickly. Titanium is durable, doesn't rust and is easier to repair if dented (Rontescu, C., Cicic, T. D., Amza, C. G., Chivu, O., & Dobrotă, D). The increased strength and 100% recyclable nature means that it can keep up with the strenuous nature of the job while ensuring that the materials from the bike can be recovered at the end of its lifecycle. Electricity generated from fossil fuels and large qualities of water is often used during the manufacturing process, especially when created in manufacturing plants in less developed countries. The switch to renewable electricity will lower the carbon emissions during the manufacturing process. For manufacturing the courier hub, it is much more environmentally friendly to use local manufacturers, to reduce the emissions associated with transporting larger materials for extended distances. There are new manufacturing processes, such as additive manufacturing known as metal 3D printing for smaller components. This allows for more complex designs such as a bike frame to be made while also having a reduction in the number of manufacturing steps (Arvelo Rodriguez). They eliminate the use of unnecessary materials, while also increasing the structural efficiency as welding is no longer needed (Arvelo Rodriguez).

5.2.3 Design Implementation

The total cost of the materials and manufacturing will be further examined as the project further progress. This estimation is based upon online research and comparing the cost of the current Electric bikes as well as hubs that exist on the market.

Bill of Materials			
Courier Hub			
Components	**Materials**	**Description**	**Cost**
Side Panelling	Aluminum 6061	Courier Hub Wall	$60,000
Locker Door	Stainless Steel	X6	$200
Solar Panel	Solar Cells, Glass,	X12	$12,000
Battery Storage	Lithium Ion	13.5 kWh	$8,500
Toilet	Stainless steel	X1	$400
Cabinet	Bamboo	Bamboo panelled	$2,000
Faucet	Stainless Steel	X1	$50
Mirror	Glass	X1	$20
Kiosk	Glass, LCD, Electronic components	X2	$2,500
Skylight	Frosted Glass	X8 Top and side	$1,000
Bike rack	Stainless Steel	X3	$1,200
Bike Charging Dock	Stainless steel, Polycarbonate,	X3	$2,500
Water Fountain	Stainless Steel	X1	$1,800
Roofing	Aluminum 6061	Roofing structure and covering	$30,000
Estimated Cost			**$122,170.00**
Electric Bike			
Frame	Titanium	Frame, Seat Stay,	$1,200
Saddle	Dense Perforated Sponge	Waterproof, leather covering	$35
Handle	Silicon	X2	$20
Origami Thermal Bag	Thermal Lining, PET, Polycarbonate Shell	Foldable Thermal Bag for Storage	$200
LED Lights	LED bulb	Front and Rear	$30
Front Bar	Stainless Steel		$80
Tire	Rubber	Airless Tires	$300
Rim	Magnesium and Aluminum Alloy	X2	$150
Gear	Hardened Steel	Three Geared bike	$30
Hub Motor	Various	Attached to the Rear Rim	$150
Pedals	Polypropylene	X2	$20
Stand	Stainless Steel	Double Kickstand for extra strength	$20
Chain	Carbon Steel	High Strength	$15
Reflectors	Polyethlene Terephthalate	Adhesive	$20
Rear Rack	6061 Aluminum	Lightweight	$120
Estimated Cost			**$2,390.00**
Total Cost			**$124,560**

Table 15: Bill of Materials

5.3 Final CAD Modelling

Figure 110: Lock Side View

Figure 111: Dock Side View

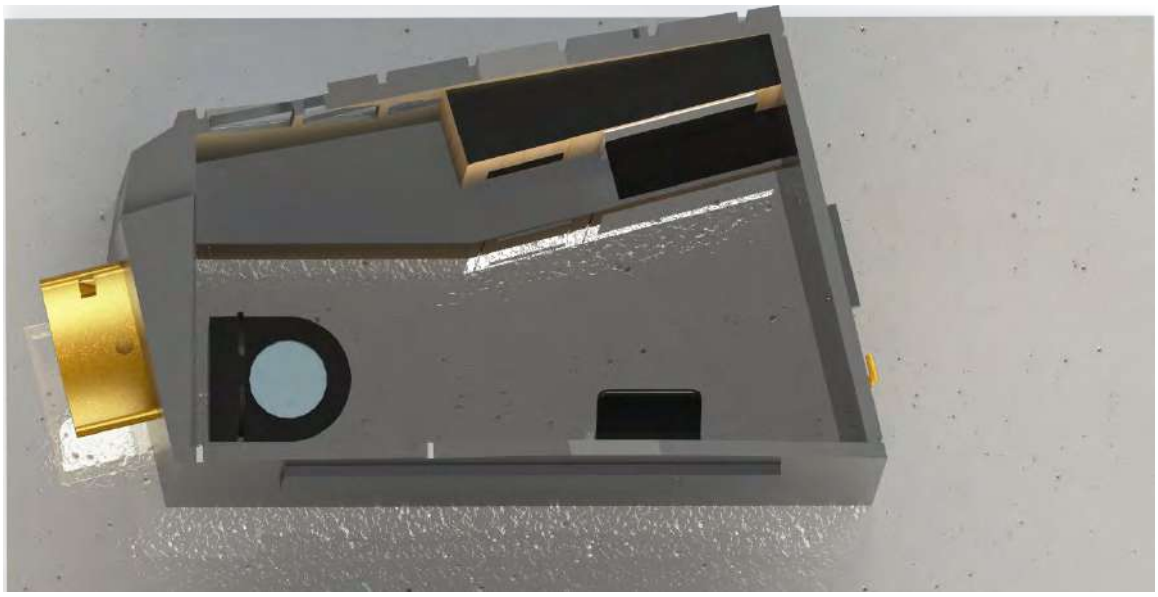

Figure 112: Washroom View

Figure 113: Rental Bike

Figure 114: Side View

Figure 115: Details of the Bike

Figure 116: Rear View

5.4 Physical Model

5.4.1 Bike

Figure 118: Front Three Quarter

Figure 119: Front View

Figure 120: Rear View

Figure 121: Rear Three Quarter

5.4.2 Bike Hub

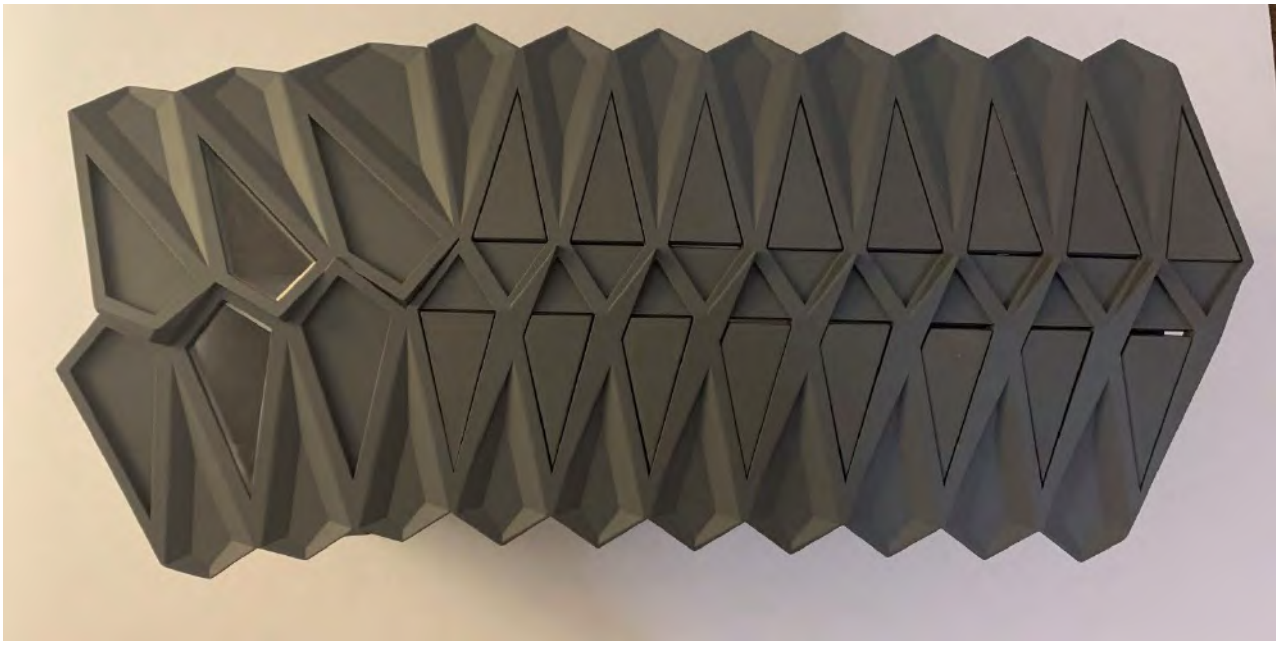

Figure 122: Top View

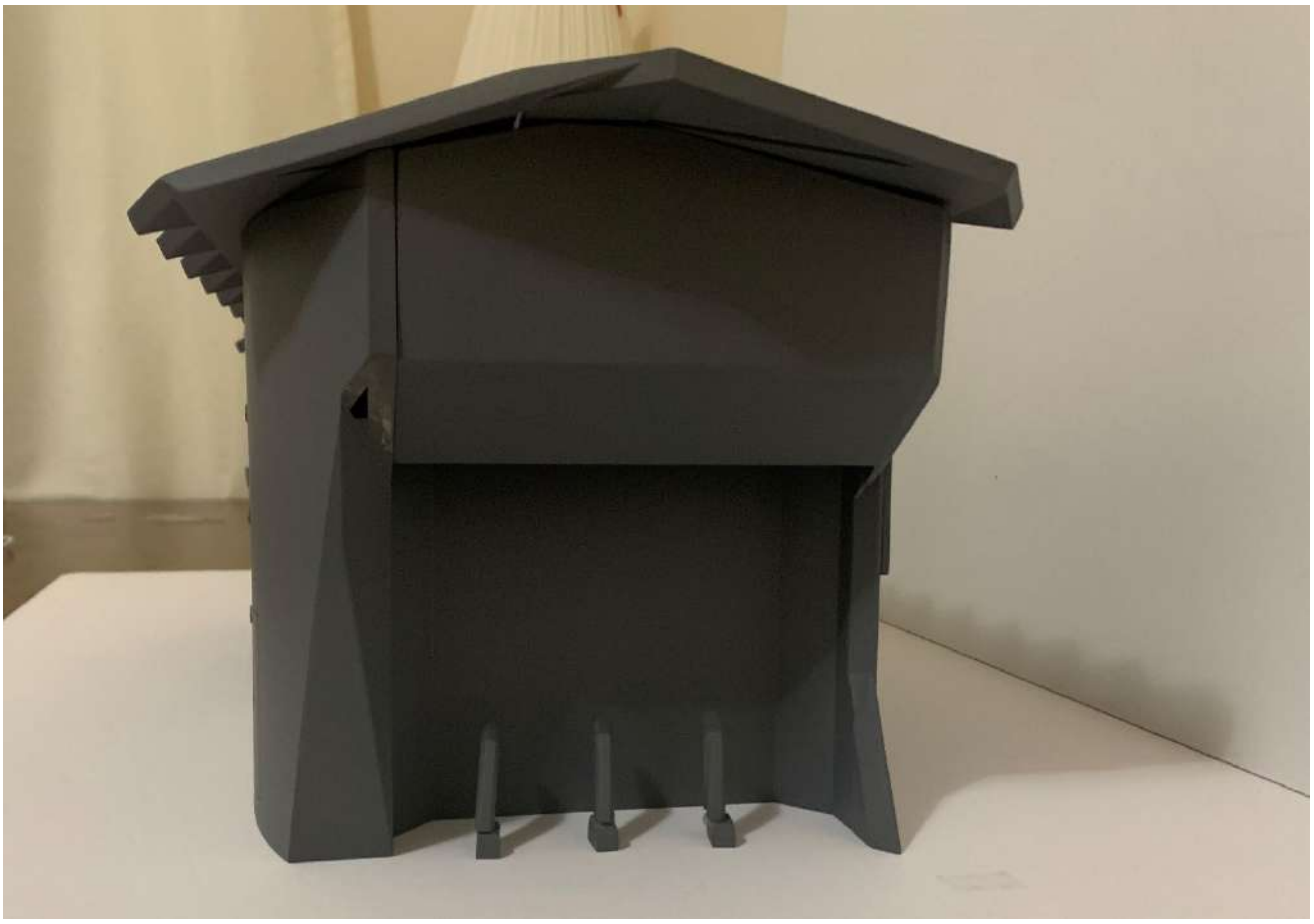

Figure 123: Non Rental Bike Rack.

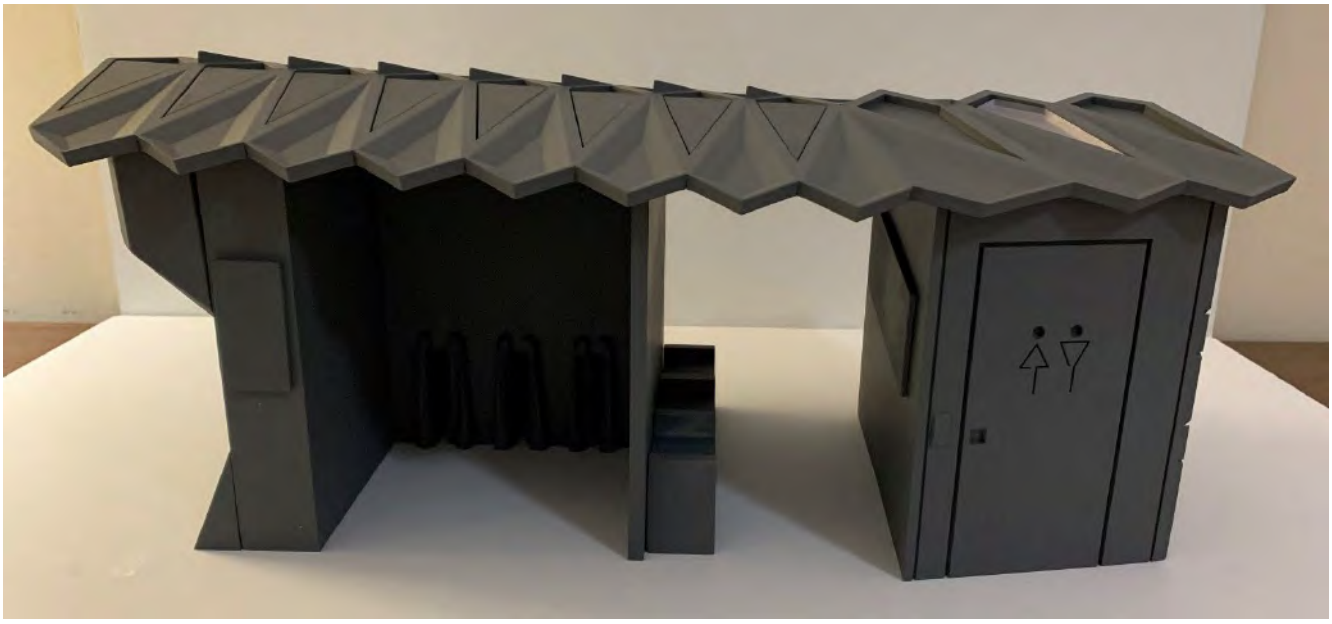

Figure 124: Bike Rental Dock

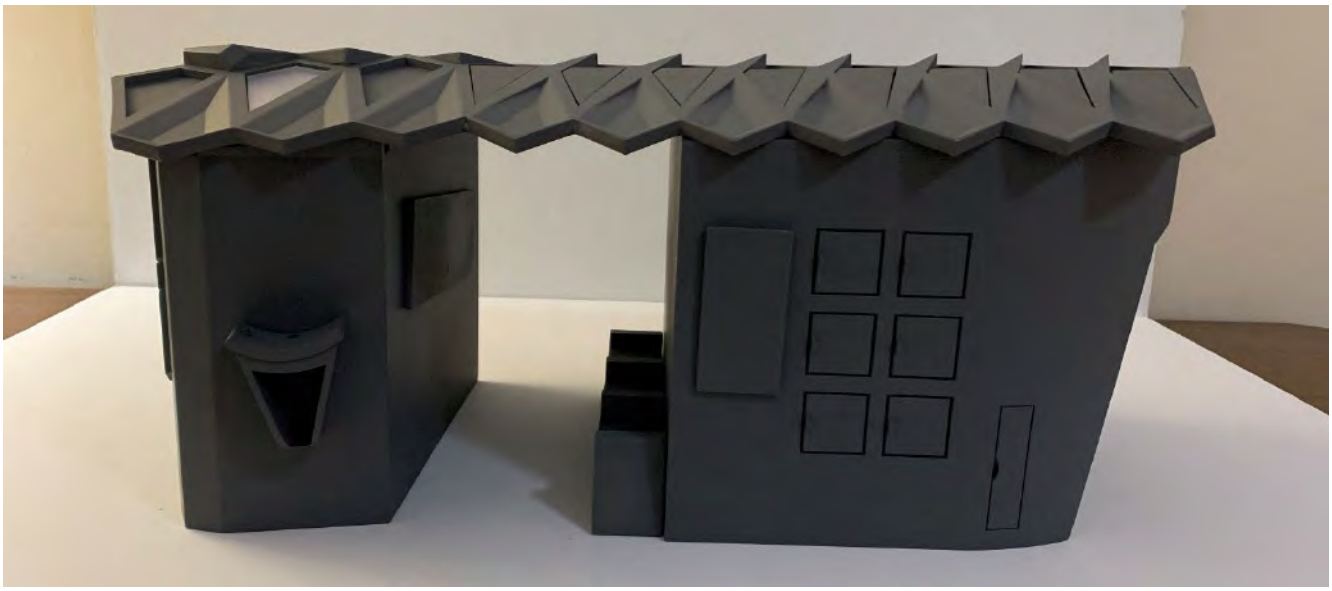

Figure 125: Lock and Water Fountain View

Figure 126: Washroom Sideview

5.5 Technical Drawings

5.5.1 Courier Hub

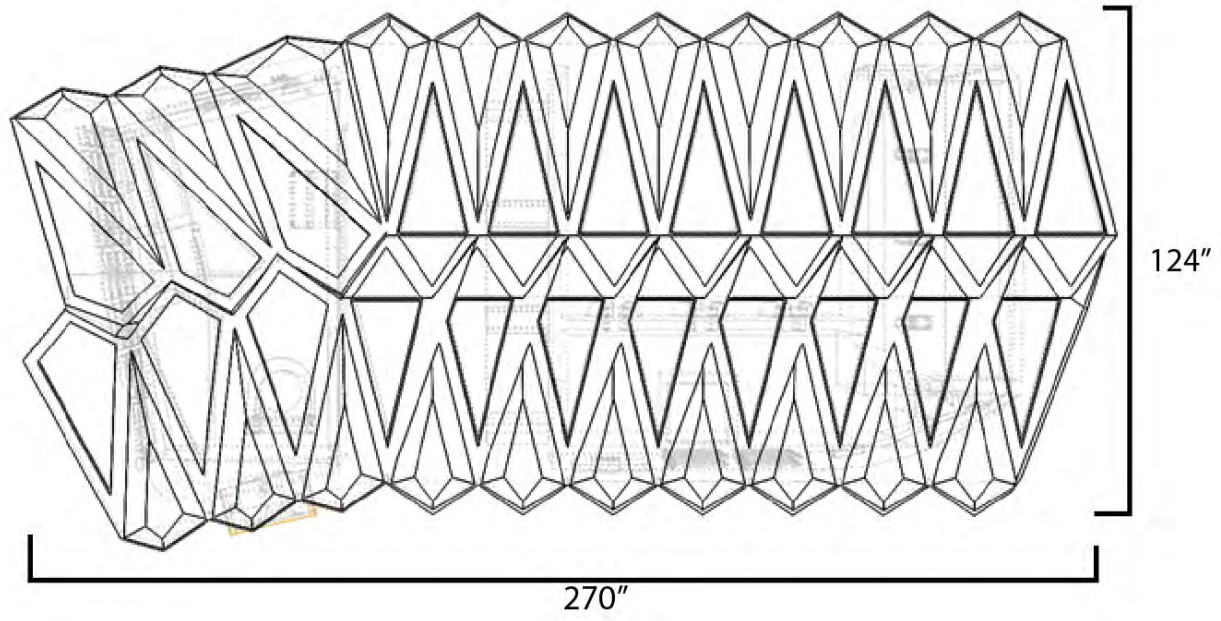

Figure 127: Over Head View

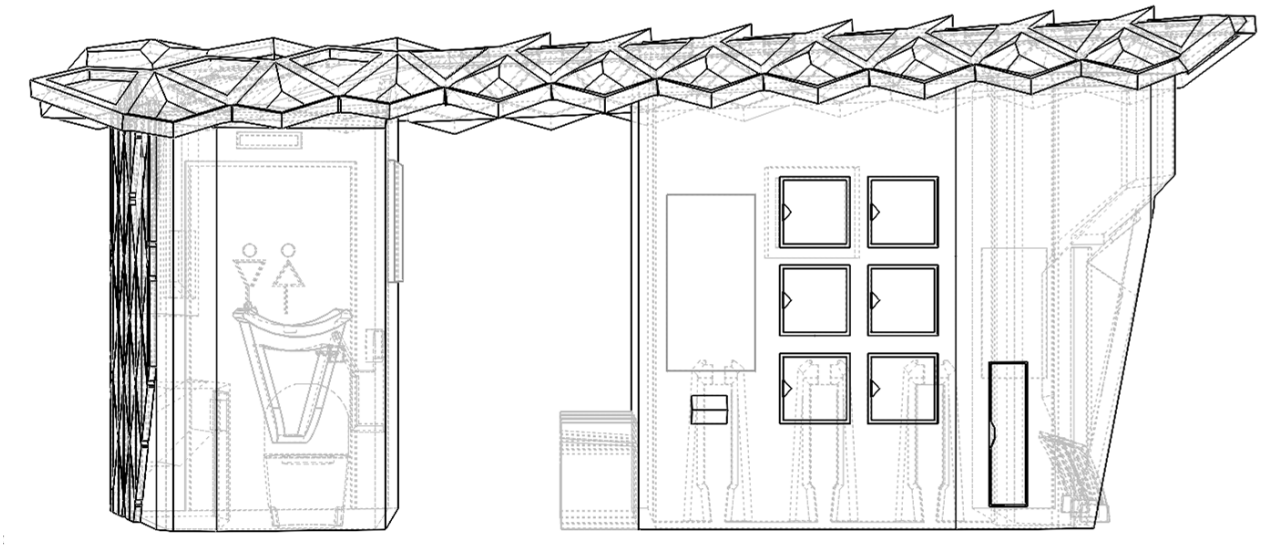

Figure 127: Lock Sideview

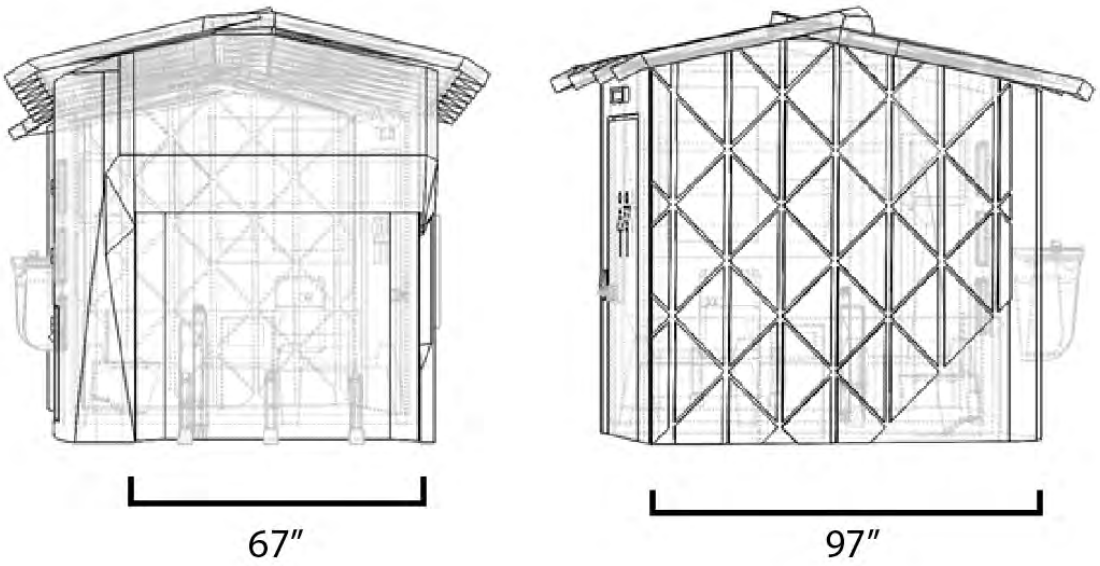

Figure 128: Non-rental Bike and Washroom Side profile

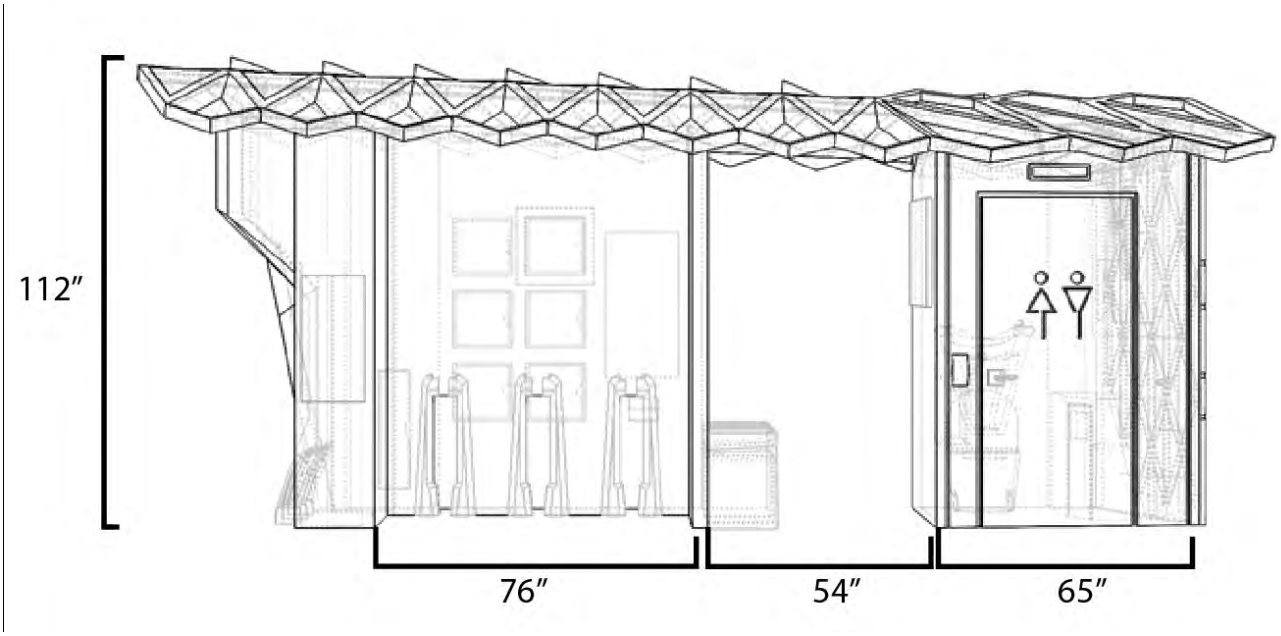

Figure 129: Rental Bike

5.5.2 Rental Bike

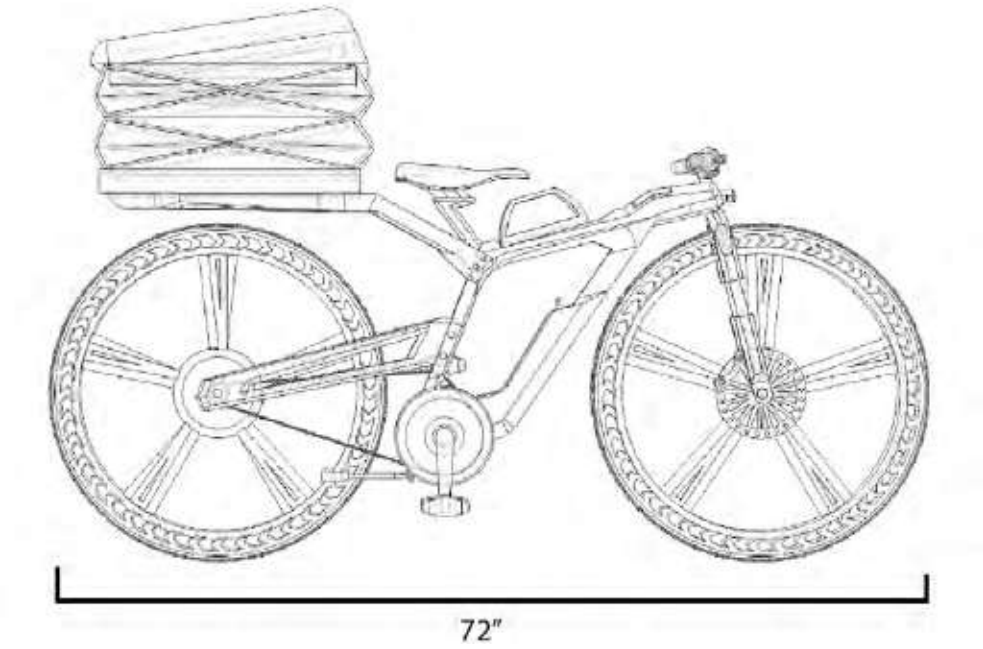

Figure 130: Bike Side Profile

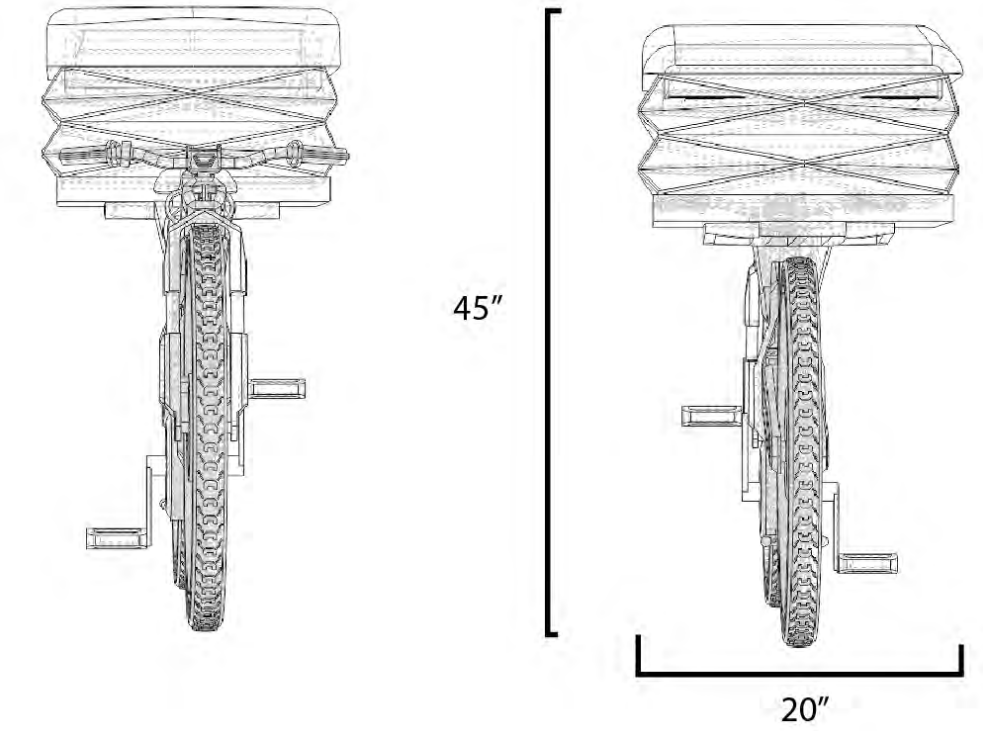

Figure 131: Front and Rear Bike View

5.6 Sustainability

Maverick incorporates sustainable materials and processes into its design, from the use of recyclable materials to the low impact manufacturing process and the health and safety. Without this consideration, it would make this design non-feasible. It is design to meet the sustainable needs of today and for the future. Through the use of local manufacturing, it reduces the need for shipping finished products from halfway around the world to where it's being used. The use of 3D printing to print out components such as the bike frame, it reduces the amount of greenhouse emissions as there is less possibility of errors as does not require the use of high energy manufacturing. The product lifecycle is also very important as Maverick utilize high quality materials that is meant to endure the food couriers' daily activities. The washroom interior makes use of bamboo to give it a more relaxing feel, titanium, and aluminum 6061 is utilized as they are very durable as well as recycle at the end of its lifecycle. These materials ensure that the carbon footprint of Maverick is lowered. The solar panel on the roof capture some of the energy that is required to power the Electric Bikes as well as power the lighting fixtures in the dock, the seating area, as well as the washroom.

Chapter 6: Conclusion

Figure 132: Food Delivery Solution

Chapter 6: Conclusion

The food delivery industry plays an essential role in the new and growing Gig economy all around the world. However, the food bike couriers are often neglected in terms of their needs and have very little control over their working conditions. The current issues are that those food couriers often find themselves in need of somewhere to rest and recover while they wait in between peak hours. Many businesses downtown do not allow for non-paying customers to use their facilities or require them to make a purchase. Additionally, if they are new to the field, they would need to purchase equipment made for food delivery and if they don't like this field, they would have wasted money. These issues will increase as the demand for these food delivery services increase. Maverick is a comprehensive food courier hub that was designed to address these issues. It utilizes more sustainable materials and new technologies to create solutions that are beneficial for the users. The full body analysis for both the equipment is utilized to ensure that any user from the 5th percentile women to the 95th percentile man can comfortably use the equipment. This design allow for the couriers to be able to hang out and relax while in between orders as well as lowers the requirement for food delivery for newer food courier personnel. This will ensure that food delivery services are sustainable in courier retention in the long terms.

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Appendix A – Discovery

How might we improve food delivery services in dense metropolitan areas?

Food couriers plays an essential role in today's economy, often finding themselves navigating traffic and road conditions. Many food couriers often find that their working conditions to be quite lacking as companies such as Uber Eats treat them as self-employed contractors. This means that their essential needs are not met which led to a very high turn over rate. By ensuring that a good level of service can be maintained, it allow food delivery company to guarantee that the customers are satisfied with the level of service of the delivery.

This topic has been chosen because of the importance of the food delivery market in world today, the workers provided an essential service during the pandemic, and will continue to play a large role in the economy of the future. By working on the issues faced by the food couriers, they will provide the necessary tools so that they are able to relax and relief themselves, as well as allow the food delivery companies in metropolitan area to better retain their workers. This will ensure that the service of food delivery remain high which is essential for the customers.

Report 1: Preliminary Information Search

The purpose of this report is to try to quickly figure out the feasibility of a thesis topic using scholarly as well as popular search tools, such as Google Scholar, Humber Library Search Engine and database. The thesis topic that is going to be discussed is that Food Delivery services in dense metropolitan areas. I will be looking at preliminary information for potential issues that a courier might face while they are on the job. I will also be looking for Full-bodied Human Interaction and design, for ergonomic and well as their interaction with the tools. Due to being in the city, there will be issues unique to this situation such as safety on the road, traffic conditions, and heavy lifting to name a few.

Search Topic

Thesis Topic: How may we improve food delivery safety in dense metropolitan areas?

Background: Due to the ongoing pandemic, the need for food delivery services has risen dramatically. As a result, there has been a spike in the need for food delivery drivers that need to fulfill a large number of orders in a short period. The increased workload means that work that they are at an increased risk of injuries on the job on the road or delivering food to the doorstep. Current delivery

methods are often too slow in the city or offer little protection against the environment and there is a potentially better method for transportation.

Need Statement:

There is a need for a product that can effectively and safely navigate and park around dense metropolitan areas, and while ensuring that food couriers can make their delivery in a timely fashion.

How is this need being currently addressed?

Some of the ways that a food courier is using to get around the city are bike, or more preferably an electric bike. They are amongst the cheapest options and easiest to park but wear down the couriers the most. Other uses motorcycle and mopeds to get around, usually, they are much faster than the bikes but are limited to parking in crowded places. Lastly, a vehicle is used to deliver the food. It can carry the most amount of weight and can be used to pick up multiple orders however, they are the hardest to find a parking space for. All of these options are not able to satisfactorily meet the needs of the couriers in the city.

Key Article 1:

Method:

This article was selected based upon its topic and the required article content is highlighted and copied.

- Search Engine: Humber Library Discovery
- Key Words: “risk food delivery couriers”

1.1. Findings

Citation:

Byun, J. H., Park, M. H., & Jeong, B. Y. (2020). Effects of age and violations on occupational accidents among motorcyclists performing food delivery. Work, 65(1), 53–61. https://doi-org.ezproxy.humber.ca/10.3233/WOR-193057

Key Content: Reproduced below:

BACKGROUND:

Risk factors for motorcycle injuries are associated with rider-related factors and crash-related factors. OBJECTIVE: This study investigates the effects of age and violations on occupational accidents among motorcyclists performing food delivery. METHODS: This study analyzed 1,317 injured couriers regarding rider-related factors and crash-related factors according to rider's age or violations. RESULTS: Among injured riders, 67.4% were temporary workers, 76.1% worked in small companies with <5 employees, 79.5% in nighttime, and 61.4% with work experience of <1 months of the temporary worker, of 'head/face/neck' injury, or of the 'concussion/hemorrhage' type of injury all decreased with age. However, the proportion of 'fracture,' 'rider alone,' or 'death or disability' accidents increased with age. Furthermore, the violation rate was high in teens (17.4%), at night (15.4%), or in type of 'crash with a car' (26.2%). The violation rate decreased with age. CONCLUSIONS: The results are expected to be useful for injury prevention policies and guidelines in the food delivery industries.

Introduction:

Because of the convenience in the congested traffic and the ease of parking in narrow streets, the use of motorcycles in commercial transportation has been rising in Asian Countries [1]. However, motorcyclists are especially vulnerable to injuries because of its small vehicular structures that offer poor protection, coupled with the high speeds they can acquire, and their difficulty to be seen in traffic [2–5]. Motorcyclists accounted for 12% of all traffic-related fatalities in the Americas [2], and motorcycle crashes accounted for more than 50% of the total number of traffic deaths in some Asian countries [1]. Motorcycle crashes are related to the age, lack of protection, riding speed [2–6], helmet wearing [4, 7], alcohol and other drug use [4, 8], licensure and ownership, inexperience, driver training [4, 9–10], risk-taking behaviors [11–13], and driving conditions or nature of the roads [1, 4]. Food delivery workers in the Korean Standard Classification of Occupations [14] refer to persons who deliver restaurant foods to the home. Some restaurants have offered home delivery services for many years. This traditionally involved receiving orders by telephone and then dispatching these orders by staff on motorcycles. Some pizza and chicken restaurants have based the majority of their business around in-house home delivery service provided by food delivery staff using motorcycles [1, 15]. In recent years, delivery specialists have taken the role of intermediaries between the restaurant and customer in the provision of home-delivered foods. They provide websites and mobile phone apps for ordering foods [15]. The motorcycle rider performing food delivery is a poorly paid job in South Korea. The motorcyclists usually work as temporary workers, and the majority of them work in small-sized firms with less than five employees [15]. A person aged 16 or older can acquire a motorcycle driver's license under 125cc in South Korea. Because of low barriers to entry even for teenagers, the proportion of teenage workers is high. The motorcyclists performing food delivery must work in a wide range of temperature and humidity depending on the season. Although food delivery services often commence at lunchtime and continue throughout the day, the most significant period of food delivery activity takes place during the evening [15]. Weekend delivery is usually higher in demand than that on weekdays. Development of

preventive measures require a systematic analysis of occupational accidents. Risk factors for motorcycle crashes are associated with rider-related factors and crash-related factors. The analysis of human factors in traffic crashes usually reference the theory by Reason et al. [16], who analyzed the human errors of traffic crashes regarding mistakes, slips, lapses, and violations [17, 18]. Risk-taking behaviors among motorcycle riders may include speeding, alcohol and other drug use, not using a helmet while riding, unlicensed riding, running red lights, and driving the wrong lane [4, 5, 16–18]. Delivery motorcyclists traditionally work under time pressure, and in poor and unsafe working conditions leading to a significant increase in rider's violations or risk-taking behaviors [2]. However, there are only a few studies on the aspects of occupational motorcycle crashes caused by rider's violations [2, 11, 12]. This study used the occupational compensation records to investigate the characteristics of occupational crashes caused by motorcycle riders. The workers' compensation records for work-related traffic crashes are based on police reports and drivers' interview [15, 16, 19–21]. Thus, this study aims to investigate the characteristics of occupational crashes and work-related injuries of motorcyclists performing the food delivery. This study also examines the characteristics of motorcycle crashes caused by rider's intentional violations

Conclusion:

This study analyzed the characteristics of occupational crashes of motorcyclists performing motorcycle food delivery according to age or rider violations. This study showed that 67.4% of injured riders were temporary workers, and 75.4% of injured riders had <3 months of work experience. The problems of frequent labor turnover and part-time or temporary employment are common in motorcycle riders performing food delivery [15]. It is difficult for new riders to recognize the hazards. As a part-time job or temporary job, new riders sometimes work without proper education or training on motorcycle safety [12, 15, 19]. It is important to ensure that motorcyclists who work outdoors have access to safety information as well as training during regular working hours. Therefore, general safety training, as well as training on the use of a motorcycle, is essential to improve the novice rider's health and safety. In this study, 76.1% of injured riders worked in small companies with <5 employees. The delivery riders, working in small restaurants, may be more likely to be using a motorcycle that is old, poorly maintained, and lacking a protective structure [15]. Thus, they work in workplaces where the necessary protective devices are relatively insufficient. This study found that the proportion of 'fracture,' 'rider alone,' or 'death or disability' accidents increased with age. Motorcycle riders work under time pressure, and require high speeds on congested or narrow streets. Older workers have a relatively poor sense of balance, perceptive ability and lack of judgment in the dark [23–24]. Increases in the number of deaths among the elderly may reflect their greater likelihood of serious complications and poorer prognosis after injury [25]. Also, because traffic crashes of older riders can cause serious injuries, it is necessary to develop means to motivate and train older workers. Because of low barriers to entry even for teenagers,

the proportion of teenage workers in delivery service is high in South Korea [15]. However, this study showed that 93.5% of teenage injured riders were temporary workers, 87.0% in companies with <5 employees, and 79.5% during the night-time. That is, teenage injured riders worked under more severe working conditions. Younger workers are more likely to commit violations because of inattention, impulsiveness, overestimation of capacity and pride, recklessness, and lack of family responsibilities [23, 26]. Accordingly, the violation rate was highest in teens (17.4%) and decreased with age in this study. Also, the injuries on the 'head/face/neck' were common in the teenage group, and the proportion of the 'head/face/neck' injuries decreased with age. Furthermore, the proportion of 'concussion/hemorrhage' decreased with age. Thus, it is necessary to introduce appropriate support policies tailored to teen riders. The results of this study also showed that the most common injured body part was the lower limbs (leg/feet), and the leading type of injury in all age groups was a fracture. Corresponding reports have also documented that the lower extremity was the most common site of an injury in all motorcycle crashes [27], and fractures were most frequent [28]. Protective clothes seem to reduce the risk of soft tissue injuries among motorcyclists. Heavy boots and work shoes are effective in protecting against ankle and foot injuries [4], and crash bars on motorcycles protect riders' lower legs when impacted from the side [29]. Compared with helmeted riders, non-helmeted riders are at higher risk for severe head injuries of all types, as well as facial injuries and high-severity facial fractures [4]. Comprehensive helmet laws are significantly associated with an increase in helmet usage followed by declines in the total number of motorcycle deaths, head injuries, days of hospitalization [4]. A high proportion of motorcyclists incorrectly use motorcycle safety devices possibly due to inadequate education and lack of law enforcement; for example, about one-third of motorcyclists had their helmets fastened improperly or were wearing non-standard helmets [30]. It is necessary to have an adequate helmet law, and requirements for helmets to meet specific safety standards. Finally, the results of this study align with the Haddon's matrix for risk factors for motorcycle crash injuries [4]. Some risk factors such as age and nighttime cannot be directly modified to prevent motorcycle crash injuries. Their effects can be accounted for the riding hours as well as modifiable factors such as helmet wearing, inexperience and driver training, conspicuity of the motorcyclist, driving licensure, riding speed, and risk-taking behaviors. These modifiable factors have more relevance in developing and designing prevention programs [4]. In South Korea, there is no limit on consecutive driving hours per day and break time for the motorcycle riders performing food delivery [15, 20–21]. Thus, legislative frameworks will likely need to address issues going beyond protective gear use [15], driving hour limits [20–21] and motorcycle driver's licensing procedures [4, 15] to include motorcycle industry responsibilities and occupational safety provisions for workers. This study has some limitations: (1) minor accidents are not included in the analysis because we used compensation records, which is documented for > 4 days of absence from work; (2) the accident rates reported in this study show a lower frequency rate than those reported in traffic accident analysis; and (3) violation rates may be underestimated due to data set. Despite these limitations, the results of the present study illustrated the actual safety problems experienced in the food delivery industry of

South Korea. The results of this study are expected to be useful for injury prevention policies and guidelines in the food delivery industries.

Summary Statement:

- Most of the injuries occur due to low experience, are mainly from temporary workers
- Motorcyclists are vulnerable due to the poor structural protection, high speed and it's harder to see in traffic and at night.
- Motorcyclist need to work in various weather conditions starts during the afternoon and gets very busy during the evenings, weekends are busier than weekdays
- They are working under intense pressure, which increases the likelihood of riskier behaviours
- Older workers are at a higher risk of getting into an accident due to reduce low light ability and reaction time

1.2. Key Article 2:

1.3. Method

This article was selected based upon its topic and the required article content is highlighted and copied.

Search Engine: Humber Library Discover

- Key Words: "Food Delivery cities injuries"

1.4. Findings

Citation:

Lachapelle, U., Carpentier-Laberge, D., Cloutier, M. S., & Ranger, L. (2021). A framework for analyzing collisions, near misses and injuries of commercial cyclists. *Journal of Transport Geography*, *90*, 102937. https://doi.org/10.1016/J.JTRANGEO.2020.102937

Key Content: Reproduced below:

Abstract

Jobs using bicycles have diversified beyond bicycle messengering and seen a recent surge, especially with respect to the delivery of prepared food and the provision of services such as moving companies. Freight companies are also increasingly using cargo bicycles for last mile logistics. Yet little is known on the risks of injuries and collisions for commercial cyclists.

Using 36 interviews of commercial cyclists, employers, contractors and entrepreneurs in the Montréal metropolitan area, Canada, we develop a framework for occupational safety factors related to risks of near collisions, collisions and injuries for different types of cyclist workers.

The framework presents 21 factors organized in 4 large categories that may be associated with safety and health issues: individual characteristics and traits (experience, risk-taking behavior), work type and working conditions, exposure levels, and external factors (not related to workers or companies). Workers have different backgrounds and working conditions, use different bicycle types

and other equipment and are accordingly potentially exposed to distinct and varying levels of risk. Many injuries are reported. Personal health issues including repetitive stress injuries, mental exertion and food intake emerged from interviews as a potentially risk-enhancing feature.

Commission-based work performed in crowded business districts during peak traffic periods are likely the three highest road-related injury risk given exposure levels. Experience of cyclists and the promotion of safe practices by employers are key protective factors, but pay structure may be the single most important features to improve the safety of workers. Because using bicycles as work tools is likely to grow over time, it is important to understand how city planning, work organization, industry regulation, and education of workers and employers may reduce risks to commercial cyclists on the roads. The framework can serve future inferential studies.

1.5.

1.6. 1. Introduction

The development of small scale entrepreneurial projects and of gig economy platforms for food delivery has led to increased opportunities for work conducted on bicycles. In Montreal, entrepreneurs have developed mobile coffee shops, ambulatory grocery stores, fresh produce delivery in food deserts, bicycle tour guides, and even short distance moving companies. Because documentation is scarce or even non-existent, we know little about these new jobs, with the exception of couriers, last-mile logistics and food delivery.

In urban centers, logistics companies that use bicycles to complete last mile parcel deliveries have contributed to a growth in commercial cyclists (Maes and Vanelslander, 2012; Conway et al., 2017; Marujo et al., 2018). Published research has focused on identifying appropriate geographical and business contexts, and on measuring the volumes of goods moved, emissions, congestion and noise reductions that can be anticipated (Koning and Conway, 2016; Marujo et al., 2018). A growing industry of altered bicycles with cargo spaces or hitches, including tri- or quad cycles is enabling such developments (Walker, 2011; Blue, 2016; Rudolph and Gruber, 2017).

The prepared-food delivery (on bikes) industry has arguably grown much faster than other businesses involving cyclists, and is led by international gig economy platform such as Deliveroo, Foodora and Uber Eats. There are increased tensions in Europe over the working conditions of their workers including questions of pay structure and benefits such as insurance policies, sick leave and vacations (Tassinari and Maccarrone, 2017; Pilorget-Rezzouk, 2017; Booth, 2018). The death of a gig economy cyclist delivering food for Caviar in 2018 brought media attention to the safety of these workers in North America (Fox Parry, 2018). More broadly, gig economy platforms are being criticized for many of their practices (Azaroff et al., 2004) even though the associated flexibility of work schedules remains appealing to some cyclist workers (Manyika et al., 2016).

Several issues related to commercial cyclists have been discussed in the occupational health, labor, logistics and sociology literature. However, no clear framework has emerged to evaluate the health and safety impacts of commercial cycling. This paper seeks to provide such a framework to understand the factors potentially contributing to, or inhibiting the safety of commercial cyclists. It does so using the results of semi-structured interviews with workers, business owners, entrepreneurs and community organizers. Future research may use this framework to structure inferential inquiry and identifiy areas of needed research.

Discussion and Conclusion:

In the CDC's (2020) inversed pyramid of hierachy of controls (HOC) to prevent or reduce occupational injuries in workplaces, the least effective approaches are the provision of personal protective equipement (e.g. helmets for cyclists) and changing working practices and administrative rules (including training, pay structure and safety protocols). This is achieved by some companies and should likely be generalized. Following the proposed framework based on commercial cyclists' experiences, it seems clear that fair working conditions and safety concerns should guide the development of commercial cycling in the near future. Legislation of employer practices and training and education programs may be the most feasible occupational health tools available.

More effective HOC methods include controlling risk exposure by isolating individuals from it and eliminating risks altogether. The urban context where commercial cyclists' work takes place makes it hard to eliminate all risks, since it would require removing other road users from the streets. This working environment is distinct from an industrial environment, which can be more easily modified by employers and task givers. However, if implemented, city road configuration and cycling infrastructure planning, as well as bylaws and general education programs supporting safety of cyclists and roadsharing can benefit both commercial and non-commercial cyclists.

While risky cycling behavior can at least be partially modified by workers and task-givers, risks associated with other road users, road-related rules and infrastructure are largely outside of the hands of riders and companies. They are also difficult to address by occupational health organizations. These require collaboration with multiple parties including cities, their infrastructure departments, corporations responsible for traffic safety codes and police forces.

Some workers report fairly safe working conditions and a general feeling of satisfaction with their working conditions and treatment. These workers typically receive an hourly wage, use larger and slower bicycles and travel shorter distances as part of their work. As for the employment model of commission-based work, while some interviewees appreciate how it rewards extra effort and abilities, most recognize that it favors speed maximization and stimulates unsafe practices in various ways. We also found evidence of some responsible employers in the Montréal region with a strong focus on safety. Protecting workers may be easier when equipement is provided and checked by employers, or when employers ensure verification of personal equipement. Evidence points to the need to further generalize these practices, especially for large-scale, sometimes internationally-owned food delivery plateforms and courier companies. To our knowledge, apart from New York (NYCDOT, 2012), few cities have enacted bylaws requiring provision and use of safety equipment and developed training material for commercial cyclists.

These qualitative results derived from a small sample should not serve to make direct inference to a broader population. Similarly, as this study was conducted in only one city, we cannot assess how external factors can impact perceived and actual risks to commercial cyclists in other cities. Factors external to riders and commercial cycling companies should be compared with existing situation in other cities and countries. Some factors such as weight of loads or air pollution were not mentioned by interviewees but may be important in other settings. Finally, because we interviewed current workers, our interview process likely missed reports of more serious injuries that led workers to terminate activities altogether.

This paper sought to enhance our understanding of the factors influencing the safety of commercial cyclists through detailed interviews. Four groups cumulating twenty-one factors have been identified and described by interviewees as potentially directly or indirectly influencing the likelihood of health and safety issues.

In their report on safety issues related to driving for work to the UK parliament, Christie et al. (2017) presents a series of problems related to Management of Occupational Road Risk (MORR). In the changing context of increased gig economy jobs, this report points to lack of good quality data, low level of knowledge on intervention effectiveness, and weak regulation and enforcement with respect to occupational health. These are important areas to improve injury prevention. This study contributes to this emerging body of knowledge and draw similar conclusion specifically for commercial cyclists. There is currently a lack of data on the working conditions, exposure to risks and safety of commercial cyclists. What we know about commuter cyclists is likely an inappropriate proxy. The proposed framework serves as partial evidence of the need for action and inferential research. It can guide the development of survey instruments and safety data collection protocols that can be used to assess working conditions, risks, and the circumstances surrounding injuries and fatalities. It can also inform the development of workplace policies, legal requirements and appropriate training programs in order to ensure safe working conditions. As cyclist workers are now part of a growing and diversifying set of industries, improving their safety is increasingly important and request responses from actors within and outside of the profession.

Summary Statement:

- The rise of the gig economy has seen a rise large increase of commercial work on a bicycle
- Many couriers report better working conditions when they are travelling shorter distances, and using larger, safer bikes.
- Prepared food delivery has grown the fastest amongst the businesses that rely on cyclists
- There have been some deaths that delivering food which increases the need for cyclists' safety

Preliminary Video Research:

How may we Improve food delivery services in dense metropolitan areas?
Video 1: URL: The Invisible 65,000 - YouTube Title: The Invisible 65,000 Length: 6:14 Brief Description: Video following a food courier making his delivery around New York City during the Pandemic. Tries to uncover the issues that 65,000 food couriers have in common as they are a neglected part of society. Relevance to the topic: I am looking for food courier's pain point while they are hurrying around the city. This video tries to undercover what task they are expected to do while on the job such as making deliveries to hard to access buildings and quickly navigating the crowded road. While off the job, they ran into the issue of robbery due to lack of protection from equipment. Additionally, this video this video help raises that issues that due to the cut throat nature of food deliveries, they are issues that can be further looked upon in the business plan and product used in this industry.
Video 2: URL: How To Carry Food and Drinks as a Bike Food Courier - UberEats, DoorDash, Caviar, Postmates, GrubHub - YouTube Title: How to Carry Food and Drinks as a Bike Food Courier – UberEats, DoorDash, Cavier, Postmates, Grubhub Length: 21:12

Brief Description: The Youtuber, Wilcer discuss different methods that he uses to make delivery of various food and drinks while he is on the bike.

Relevance to the topic: This video highlights the different methods that were used to try to ensure that the food is in good condition when making deliveries. Due to the constraints of only using a thermal food box, he utilizes different methods of arrangement to make certain deliveries work. This issue is a relevant to my topic as I can see how an average food courier usually load up their bike in order to get food delivered. Additionally, I'm able to see some problems of using the thermal bag for food items that are irregular in size.

Video 3:

URL: Food Delivery Toronto - (Post Lockdown) | The Cycling Courier - YouTube

Title: Food Delivery Toronto – (Post Lockdown) l The cyclist Courier

Length: 31:26

Brief Description: A Day in the life of a Torontonian food courier as The Cyclist Courier makes his delivery around town.

Relevance to the topic: This video shows a first-person experience of The Food Courier making his deliveries. The Youtuber in the video has comprehensive about his experience as he explains the downs and upside of tools that he used while making deliveries and their issues in certain as weather conditions. It video is relevant as I can get a good understanding of what the food delivery person is expected to do while on the job.

Preliminary Video Search Product – 33L Insulated Food Delivery Bag

URL: 33L Insulated Food Delivery Bag, Food Delivery Backpack, Leak-Proof Thermal Backpack, Soft Sided Cooler Backpack（Black） : Amazon.ca: Industrial & Scientific

Amazon Search: Delivery Bag Backpack

Figure 4: https://www.amazon.ca/Insulated-Delivery-Backpack-Leak-Proof-Thermal/dp/B08B3KJQ2Z/ref=sr_1_5?dchild=1&keywords=Delivery+Bag+backpack&qid=1633283283&sr=8-5

Description and Features: The thermal bag is rather large at 33L, it is black and grey. The interior divider separates the two different layers, which allows the couriers to carry multiple orders such as food and drinks. However, it is not designed for Pizzas due to its backpack nature. It keeps the food around the temperature they were made as well as maximizes the amount of interior space inside of the backpack. There are three sides backpack which can be used for accessories, mobile phone, and coupons. It also can be folded flat if it isn't in use. Inside, it is lined with a 7 mm EPE foam which provides great thermal isolation as it provides all side insolation, additionally it is leakproof as well. There is a coating that will make the bag easy to clean. This bag is designed for a large variety of situations such as food delivery, picnicking and camping. The bag isn't waterproof but many couriers still say that it works in inclement weather. The is a reflective strip that allows for good visibility in low light.

Specifications:

- Dimensions: 13" x 10" x 16" (33 x 25.4 x 414.2 cm)
- Weight: 3.09 Pounds (1.39 kg)
- Pockets: 3 Side Mesh Pockets
- Colour Black
- Capacity: 33 L
- Manufacturer: Qichebox
- Brand Name: OGEFOTED

Product 2 – Ledivo Adult Bike Helmet with Rear Light

URL: Ledivo Adult Bike Helmet with Rear Light, Cycling Helmet CPSC Certified for Urban Commuter Adjustable for Men/Women : Amazon.ca: Sports & Outdoors

Amazon Search: bicycle helmet

Figure 5: https://www.amazon.ca/Ledivo-Cycling-Certified-Commuter-Adjustable/dp/B087FD1ZXF/ref=sr_1_5?dchild=1&keywords=bicycle%2Bhelmet&qid=1633285307&sr=8-5&th=1

Description and Features: The Ledivo Adult Bike Helmet is a unisex helmet designed for an urban commute. They have a medium and large size in stock with different prices in various colours. This helmet has nine streamline air vents which allow for air to go through the bike helmet to cool the head while remaining aerodynamic. There are breathable helmet pads which are to help absorb the sweat to keep the head dry during the cyclizing activities. The pads that can be removed are machine washable. On the outer shell, it is made from advanced PC and Acrylonitrile Butadiene Styrene and on the inside, it uses high-density EPS foam, together to help reduce shock. There is a built-in rear LED light to provide increased visibility at night with three warning light modes, steady light, flashing light and slow flashing light. The light can be fully detached and charged in 2 hours. It is sold for roughly $40 to $70 depending on the size.

Specification:

- Colour: Black
- Built-in detachable light
    - 2 Hour charging
    - 3 Flashing Modes
- 9 Air vents for circulation
- Detachable padding that can be washed
- (M size) Helmet circumference: 21.65 to 22.83 Inches (55 - 58cm)
- (L size) Helmet Circumference: 23.22-24.01inches (59 - 61cm)
- Material: EPS+PC, nylon

- Adjustable Chinstrap and rear dial adjustment
- Comes with a charging cable

Product 3 - RadCity 4 by RadPower

URL: [RadCity 4 - Electric Commuter Bike | Rad Power Bikes]

Google Search: Electric Bike

Figure 6: https://www.radpowerbikes.com/products/radcity-electric-commuter-bike?avad=225073_f23f8d851&utm_source=avantLink&utm_medium=affiliates&utm_campaign=176565&utm_content=225073

Description and Features: Iconic commuter bike that comes with a single, 18.5” frame size. The handles are swept back to provide extra comfort on longer commutes and can come with a built-in wheel lock. It comes with features like lights, fenders, and a heavy-duty cargo rack all as a standard feature. The integrated bike rack can support weight up to 45 lbs. This bike is well-suited for any kind of riding. The ride is smooth, quiet and comfortable with its front suspension and comfortable saddle which is perfect for long-distance travel. It can perform well at low speed as well as high speed. The tires are puncture-resistant and prove grip for various surfaces. The bike however weighs 63.3 pounds which means that if the battery dies, it will be very hard to use the bike. It comes with 5 power-assist modes, Eco, std, Power and speed and the delivery of the power comes on very smoothly. The control on the unit is very intuitive and allows the user to quickly make changes on the fly. The bikes come 80% preassembled, and the other 20% are relatively easy to assemble. It is one of the cheapest yet one of the best-rated bikes on the market. It is sold on the market for $1,600.

Specification:

- 750-watt Shengyi direct-drive hub motors – To provide smooth acceleration and features regenerative braking
- 180 mm Mechanical Disc Brakes
- Integrated Brake and Head Lights – Use Battery as a power source
- Integrated Rear Rack – Can attach basket, cargo or a child seat
- 7-Speed, 11-34 Tooth Freewheel – Extra power when climbing hills
- Puncture-Resistant Tires – Layer of Aramid and Ceramic articles under the tread
- Battery: 48V, 14 Ah (672 Wh) rated for 800 cycles
- Over 45 miles of ranges
- 48 V, 14 Ah
- Frame: 18.5 inches and made from 6061 aluminum
- Hand bar Height: 45”
- Payload: 275 lb load
- Radpower Unit – Speedometer, battery life, odometer, wattmeter, and power assist level
- 14-day free trial
- 1 Year Warranty

Product 4 - 2021 Honda PCX

URL: 2021 PCX OVERVIEW - Honda

Google Search: Scooter for food delivery

Figure 7:
https://powersports.honda.com/street/scooter/pcx

Description and Features: Honda PCX is affordable, able to navigate tough terrain, and get great gas mileage. It has been redesigned for the year 2021 with a new and larger engine, a new frame structure, and new styling. It uses the 157 ccs, liquid-cooled four-valve for the engine which is designed for lower emissions and increased performance power. The chassis is well-tuned, and the rear suspension can travel up to 3.7 inches. The seats as long and plush for both the passenger and for the driver. The seat can flip up to allow for a full-face helmet, it locks for security and is weather-resistant as well. It has a curb weight of 286 pounds, 5.7 inches wheelbase and a low 30.1-inch seat. The headlights have a running daytime light for added visibility, and a large wind blocker to improve wind protection. There is a USB-

C charger to allow users to charge their phones on the go. The gauge setup allows for high visibility of the clock, speedometer, odometer, etc. It is currently on the market for $3,800.

Specification:

- 156.9cc liquid-cooled 80º single-cylinder four-stroke
- Compression Ratio: 12.0:1
- Seat Height: 30.1 inches
- Fuel Capacity: 2.1 gallons
- Curb weight: 288 pounds with a full gas tank
- Wheelbase: 51.7 inches
- Height: 43.6 inches
- Length: 76.2 inches
- Width: 29.2 inches
- Front Brake: Hydraulic 220 mm disc brake
- Rear Brake: 130 mm drum
- Top Speed: 118 km/hr
- 0 – 100 km/hr in 17.2 seconds
- Fuel Economy: 2.5 L/ 100 km

Product 5 – Urban Arrow Family

URL: Urban Arrow Family | Propel Electric Bikes | Urban Arrow Electric Bikes | (propelbikes.com)

Google Search: Cargo Bikes

Figure 8: https://propelbikes.com/product/urban-arrow-family/

Description and Features: The Urban Arrow is a Dutch company that specializes in a front-loading cargo bikes. The cargo bike allows for a large amount of gear to be transported easily as

has a large front container. It is very easy to steer as the cargo box sits much lower to the ground than other cargo bikes ensuring stability. The cargo box is about 27.5 inches and is easy to clean. It is powered by a Bosch CX drivetrain, which is controlled by the CVT which makes it much easier to shift gears. This allows cyclists to easily cycle up hills of 20 degrees due to its four levels of assistance. It has comfortable seating, curved hand bars and a sit-up style frame. The bike includes a small Bosch Intuvia display that enables odometer, light and battery light. There are two tones for the bike bell, one for the pedestrian and another for the vehicles on the road. The Riese and Muller full suspension at the back and front allows for a smooth ride throughout. On a 500-Watt battery, one can travel 30 rather short miles. It is currently on the market for $7,000.

Specification:

- Heavy Duty Expanded Polystyrene Foam
- Two-Tone Bike bell
- 500 kWh battery rated for 30 miles
- Two Lines:
    - Performance Line Gen 3 – All-mountain riding or commuting, top performance and sporty handling,
    - Cargo Line Gen 4 – Has increased torque from a standstill to transport heavy loads.
- Built-in lights are controlled by the Bosh Head Unit
- Sidestep and kickstand that is quite useful or loading or unloading cargo or passengers
- Built-in Abus lock prevents the rear tire from spinning.
- Weighs: 50 Kg
- Bosch Performance Line Cruise mid-drive and an Enviolo by NuVinci CVT
- 2 years Comprehensive, 5 Year Frame
- Model Year: 2019

Product 6 – Segway KickSCooter G30P

URL: Ninebot by Segway KickScooter G30P MAX Electric Scooter - 65km Range - 30km/h Top Speed - Dark Grey | Best Buy Canada

Google Term: Electric Kick Scooter

Figure 9: https://www.bestbuy.ca/en-ca/product/ninebot-by-segway-kickscooter-g30p-max-electric-scooter-65km-range-30km-h-top-speed-dark-grey/14361142

Description and Features: The Ninebot by Segway KickScooter MAX electric scooter can reach a top speed of 18.6mph (30km/h) and can go 40.4 miles (65 km) on a single charge. It's equipped with 10" pneumatic tires with shock absorption to ensure a super-smooth ride. It can go on a 20-percent hill grade allows you to go uphill easily. Rear-wheel drive distributes your weight evenly and makes accelerating and braking easier and smoother. The 551Wh lithium battery charges in just six hours with the built-in charger. The Front LED lights provide good visibility in poor lighting conditions. The IPX54 has water-resistant construction and is durable to ensure that it can survive in the day-to-day task. It only takes one step to fold the scooter for easily handling. It can support the maximum weight capacity of 100kg (220 lb) and is rated for 14 years and up.

Specification:

- 1 Year manufacturer warranty, parts and labour
- Skill Level: Beginner
- Weight Capacity: 100 Kg maximum
- Appropriate Age: 14 Years old and up
- Foldable
- Bluetooth Capabilities and cruise control
- Folded Height: 53.4 cm
- Colour: Dark Gray
- Weight: 18.7 Kg
- IPX54 rating
- Wheel Size: 10 Inches
- Material: Aluminum and Plastic
- Maximum Climbing Slope: 20%
- Maximum Power: 800 kWh
- Nominal Power: 350 kW

Product 7 – Honda Civic

URL: [The all-new 2022 Civic Sedan | Honda Canada]

Google Search: Honda Civic

Figure 10:
https://www.honda.ca/civic_sedan

Description: One of the most popular vehicles in North America, was a redesign for 2022. Canada's best-selling passenger vehicle for twenty-three years. Built-in Alliston Ontario. Features either a 2.0 litre DOHC engine rated for 158 hp or a touring 1.5-litre model that is rated for 180 hp. Features drive-by-wire, idle stop and a CVT transmission. Redesigned to reduce the amount of cabin noise and vibrations on the road. Comes standard with Honda Safety Sense suite of driver-assisted tools such as Adaptive Cruise Control, Blind spot monitoring, lane keep assist, to name a few. Built-in Apple Car Play and Android Auto on a 7-inch display. It is rather affordable while keeping a rather large range of standard features. It takes roughly 7.5 seconds to reach 100 km/hr. The fuel economy is rather good at 33 mpg in the city and 42 on the highway.

Specification:

- 0 – 100 km/hr in 7.5 seconds
- Built in Alliston, Ontario
- Engine: 2.0L 158 hp @ 6500 rpm and 138 lb. ft @ 4300 rpm
- Engine: 1.5 L 180 hp @ 6000 and 177 lb. ft @ 1700 – 4500 rpm
- Front Wheel Drive
- CVT engine
- Standard Safety features such as Blindspot mentoring, lane keep assist, etc.
- Built-in Apple Car Play and Android Auto
- 32 Mpg in the city and 42 on the highway

Product 8 - Giant Escape 3

URL: Escape 3 (2021) | Men City & Hybrid bike | Giant Bicycles United States (giant-bicycles.com)

Google Search: Commuter Bike

Figure 11: https://www.giant-bicycles.com/us/escape-3

Description: A great beginner bike to get the users to use to riding on the road, it is affordable and can be used on rougher terrain. There are puncture-resistant tires and thicker sidewalls to ensure that the cyclist can make their trip safely. The bike's saddle is in an upright position to have a commanding sense of the road. The bike is designed for users between 5'3" and 6'5" and stands over the height of 28.1 to 33 inches. It is designed with comfort in mind and costs around USD 800. It comes in a plethora of colours, ranging from charcoal to flash green and black. The Shimano gear allows for quick changes between the different gears so that the cyclist always remain in control of their speed.

Specification:

- Brakes: Tektro TK937 for increased stopping power
- Front and Rea Derailleur: Shimano Tourney
- Shimano ST-EF41 shifter
- Aluxx Grade Aluminum forks
- Crankset: Forged Allow, 28/28/28 with chainguard
- Giant S-X3 700x32 tires with puncture-proof technologies
- Top Speed: 48 km/hr
- Weight: 11.1 kg
- Cassettes: Shimano CS-HG200 11-36

Product 9 – Hover Glide

URL: Hot-NewTech

Google Search: Floating Backpacks

Figure 12: https://www.kickstarter.com/projects/lightningpacks/hoverglide-worlds-first-floating-backpack

Description: It is the world's first floating backpack, the backpack rides on a track that moves up and down independently from the person. It can reduce the impact on the users using the revolutionary suspended load technology which reduces the impact on the back, neck, knees and ankles as they walk and run. It increases the stamina of the users as they don't need to control the movement of their backpack. Four different versions can handle anywhere from 28L to 55L. It is currently being tested by the US Army and the US Marine Corps. Contain multiple pockets and sleeves for versatile storage. Material is lightweight and made from 3D Air mesh to wick away moisture.

Specification:

- Military-grade Plastic Frame
- Durable Water-repellent finish to protect against light rain
- Breathable moisture-wicking 3D "air-mesh"
- Empty Pack weights 9 lbs
- Can carry up to 50 lbs, more can be carried but it has to be locked
- Nylon ripstop pack material

Features:

- The sleeve that works as a hydration revivor (2L)
- Hip belt and hip belt pockets for digital devices, snacks
- Features main and bottom compartment
- Reduces physical exertion on the body
- Internal security pocket
- Compression strap to reduce the amount of movement

Product 10 – Square Register

URL: Fully Integrated POS Register | Square Register (squareup.com)

Google Search: Point of sale system

Figure 13: https://squareup.com/ca/en/hardware/register#panel-restaurants--5Pc9fxAUruyIRu7RFITRRw

Description and Features: A fully integrated point of sale system that allows the register to manage card and contactless payment, online sales, in-store pickup and delivery. Everything comes in the box with no extra tablet, apps or card terminal. There are two screens, one for the customer who can see what they are buying as well as let them a tip, pay and enter their pin. The other screen is for the cashier, where the touchscreen allows for all information to de readily displayed. It accepts payments at a flat rate and supports major debit and credit cards. Pay around 2.65% for all credit cards and 10 cents on Interac and pin. Phone support is available 24/7 in English and 2-year limited warranty. Able to run both the front and back house from one location. Able to manage multiple menus, locations and team members. It cost around $75 per month for a year or $899 outright.

Specification:

- Connectivity:
  - Wifi or ethernet
  - USB Hub with five ports
- Register Display: 13.25”
- Customer Display: 7”
- Register Weight: 3.9 pounds
- Customer Display Weight: 1.2 Pounds
- Payment Type:
  - Magnetic Strip, EMV chip card, Apple Pay, Google Pay, Samsung Pay, NFC cards
- Mounting Options:
  - Drill Mount
  - Adhesive mount
- Inventory Management

Interview Questions:

Questions for empathy mapping

My name is William Yin, a 4th year industrial design student. The date is Wednesday September 22nd and I'm sitting here with Matthew on a Google Meets, to do an industrial design thesis project interview. The research pertains around food couriers and potential issues while on the job. This interview is voluntary and can be stopped at any time. There is no consequence for withdrawing from the interview. This participation is anonymous and confidential and at no time will their identity be revealed. This conversation is recorded to be transcript. Do you agree to be recorded and consent to the research participation? Please answer yes or no. “Do you still consent to a interview without recording.”

Who are we empathizing with?

To start this interview off, can you tell me a little about yourself?

Can you tell me the average task of a food courier is?

What is your work schedule?

How has the experience change from when you first work as a courier and now?

What is the typical background of people who works as a bike courier?

Working Conditions

Can you talk about what kind of vehicle is being used for delivery and what do you prefer to use?

What tools do you use while working and how is it lay out?

How do you typically park your bike and is it safe?

Have you ever worked in a different city as a courier, and how has that experience been like?

What kind of weather condition are you typically working in?

What do you hear?

What do other think about your work?

Do you listen to any music or podcast while on the job, does it increase your productivity?

What do they say?

What are you typically thinking when you are completing your tasks?

Do you need to communicate with others?

What do they need to do?

Does Uber Eats provide you with any equipment, or training?

How do you prepare for your work?

What is usually going on when you are completing your tasks?

Where do you go to get your bike repaired?

What do you see?

Do you know any current tool or vehicle that serves you better than the tools you are currently using?

Is there any safety equipment that your regularly use?

Where do you usually work at?

What is your typical distance from a pick-up location to a drop off location?

Pains:

Can you tell me what are the challenges you face everyday?

What are the risks that comes with the current equipment you are using?

Have you been involved in accidents during your time as a bike courier?

Are there any painpoints that stems from using the current equipment that you are using?

Is there anything that you could change to improve your experience while working?

Describe any fears, frustration, anxieties while doing out and about?

Gains:

What do you enjoy about you work?

What are your goals at work?

Can you describe the best experience you had when you were delivering the food?

Is there anything that will help you improve on your working experience?

Follow Up Questions:

Can you see what the industry will look like in the next 5 to 10 years?

Are there any questions that you think I should have asked?

Do you know any other couriers or companies that I can follow up on?

I hope you have a wonderful day and look forward to keep in touch with you?

Appendix B – Contextual Research (User)

Video Observation:

Preparation/ Setup

Step 1

The bike courier goes to the counter top with the the Ubereats customer order. They talk to the cashier to see if their order is ready to be picked up. The user waits by the pick up zone.
The User interacts with his smartphone, the cashier.

Step 2

The bike courier is handed the food packaging. He takes off his thermabal bag and set it in the ground. He places the food item puts it in his bag.
The User interacts with his smartphone, the restaurant worker and the food item.

Step 3

The courier starts riding towards the destination. As he navigated the road uses the cyclist lane, the open road and sometimes on the sidewalk.
The cyclist interacts with pedestrians, smartphone for navigation, and other motorists around the city.

User Observation by video

Step 4

The bike courier gets off his bike, and places the backpack on the ground. He locks up his bike and the checks that he is at the right address. He takes out the food from his thermal bag.
The User interacts with his smartphone, bike, thermal bag and food packaging

Step 5

The bike courier reads the instruction for the order. He leaves the food item on the ground and then proceeds to take a picture of the food
The User interacts with his smartphone, as well as the food item

Completion

User Interview on Reddit:

Found User from r/askTO

Interview Date: October 13th, 2021

User Name: 416Friendly

Question: What is your age?

- 35 living with a significant other

Question: What is your work schedule?

- Has a full time job (Retail)
    - Work evening for Uber Eats
    - Lunch and Dinner rush on days off

Question: Which area of the city do you typically work from?

- Downtown Core
- Start from home
- Typically make around $100 from 3 – 4 hours' worth of work

Question: How much do you usually make?

- On a bad day around $23 per hour
- On a good day, $35 per hour
- Don't get EI and taxes are not deducted

Question: What is the most enjoyable part of the day?

- Explore the city freely
- Earn some extra income

Question: Any problem with current equipment?

- Equipment was expensive to get
    - Miami Vice by Epic Bikes: $ 2,799
- Low battery range in terms of value
    - 40 km maximum

User Observation with User:

Note made on phone:

- coffee is a no go
- Not worth the trip,
- Burger no standard for packaging, paper bag
- McDonald good packaging
- insidious ux design
- Swipe to accept order
- Accidental click
- Bikes stolen, poorer place
- Quick turn around time, bon fire in don valley

- Community spirit
- Nice to have a job in the server, make a living
- Jobs that can be rotated if injured
- Peak of lunch 3 - 4 dollars
- Friday Saturday
- Friends and family,
- have gear for the winter, less comfortable limited by climate.
- Have a Courier a place to put food in front
- Elevators can be jammed
- Winter, need thicker jacket
- Scooters don't deal with potholes, illegal
- Bike seats and leaning over hurts
- Bottom out back
- Making sure that people are aware of your presence
- Turn in front of the car, assholes on the road
- Non armoured vehicle
- Torontonians are better on the road, /spaces on the road
- Foodora, not just bikes, infrastructure changes how people behave
- Strouds: roads that are slows, a lot of space
- Bikes are at a disadvantage because of slower speeds
- Faster traffic, is more dangerous
- Headphone one in for order
- Biking with both headphones are dangerous
- Shoulder check for cars
- Bikes for radar, are bad, need to know when cars are approaching
- Bikes mirrors are too large might hit objects
- Electric bikes don’t need to care about terrain
- What long batteries last: can’t fully drain battery
- Fast charge battery, module can switch out battery, ideal situation
- Battery only lasts a certain period of time
- Bike shoes, can’t provide with much power can pull up pedals
- Winter bike shoes is $300
- 

- Stiffness of soles,
- Two types of couriers, find and single gear. Requires a lot of power

- People who are south Asian, minorities and lower English skills, free English lessons. Driving or electric bikes
- People have $7,000 bikes too expensive, not optimizing cyclists. Better use of tools
- Bike lockers in union station
- Uber doesn’t have a community
- Foodora offers a community arrangement
- Union bike, member appreciation

Work In Progress:

Appendix C – Field Research (Product)

Products and Benefits

Benchmarking Products

1	2	3	4	5	6	7	8
							
RadCity 4	Honda PCX	Step-Through Compact Cargo Bike	GoPlus Road Bike	Urban Arrow Family	Kent 24" Bayside	Honda Rebel 300	Deliverator

Benefits

1	2	3	4	5	6	7	8
• Comfortable • Smooth and Quiet • Display easy to use • Long battery life • Powerful for uphill rides	• Affordable • Comfortable seats and suspension • Underseat storage • Weather Resistant • Reliable	• Ability to be Stowable • Nimble around obstacles • Easy to climb hills • High load Capacity	• Durable • Comfortable • High top speed • Lightweight to be easily stowed away • Stable and Smooth	• Effortless pedalling • Comfortable • Can carry passenger and items • Lower centre of gravity for agility • Agile	• Easy to use as riders are always stable • Smooth over rough terrain • Sporty Fee around obstacles • Superior Strength	• Low Seat height for accessibility • Great Handling • Reliable • Low torque for quick takeoffs • Unique Look • Comfortable riding position	• Maneuverable • Large load carrying Capacity • Minimal Maintenance • Sleek Design • Protects the user from the elements

Products and Features

Benchmarking - Feature/ Function Comparison Table

Products								
Wheel Size	26" x 2.3"	90/90 R14	24" x 2.4"	26"	17 x 1.5"	24"	150/80 R16	N/A
Weight	63.3 lbs	286 lbs	60 lbs	32 lbs	51 Kg	70 lbs	364 lbs	350 lbs
Range	45 Miles	320 km	25 - 40 Miles	N/A	20 - 50 Miles	N/A	200 Miles	100 Miles
Max Payload	275 lbs	397 lbs	400 lbs	440 lbs	180 kg	300 lbs	374 lbs	350 pounds
Material	Aluminum	CNC Aluminum Alloy	EPP, Aluminum	Aluminum	EPP, Aluminum	Aluminum	N/A	N/A
Motor	Electric	Gasoline	ELectric	None	Electric	None	Gasoline	Electric

Comfort	11
Comfortable	
Comfortable	
Comfortable	
Comfortable	
Comfortable	
Comfortable	
Smooth	
Smooth	
Smooth and Quiet	
Predictable	
Plush	

Useability	11
All rounder	
Easy to Park	
Easy to Use	
Effortless experince	
High Capacity	
Intuitive	
Light	
Lightweight	
Lower centre of gravity	
Maneuverbility	
Pedal Effortlessly	

Durability	10
Reliable	
Reliable	
Safety	
Stability	
Stable	
Superior Strength	
Versitile	
Weather Resistant	
Storable	
Durable	

Stylish	6
Stunning	
Stylish	
Sylish	
Unique Look	
Attractive	
Iconic Design	

Fun	6
Speed	
Sporty Feel	
Powerful	
Easy to climb hills	
Agile	
Nimble	

Affordable	3
Affordable	
Affordable	
Economical	

Features	
Easy To Use	10
Power	8
Ergonomic	7
Carrying Capacity	7
Safety Feature	4

Takeaways:

What Worked?

- Comfortable - for long distance commutes
- Adjustable - equipments with the user's needs in mind
- Durable - can withstand hard road conditions

What can be improved?

- Food Courier's need in mind
- Designing for ride-sharing/ co-op

Converge or diverge?

- Colour coding help make benefits easier to understand
- Converge on the mobility of the food delivery services

Needs statement for a New Product

How may we improve food delivery services in dense Metropolitan areas?

Bike Share Toronto E-bike (Shared)
E-Bikes - Bike Share Toronto | Bike Share Toronto

Zygg E-bike (Personal)
E-bikes for Food Delivery | Ride Zygg

Needs Statement:
Rentable bike for food couriers

Needs statement for Bike Rental

Benefits of both:

- **(Affordable):** Bikes that could rented out for a duration of time
- **(Efficiency)**: Couriers don't need to exert too much effort
- **(Convenience)**: Both bikes are readily available

Benefits of Each:

Product A: Bike Share Toronto

- Multiples locations for easy pick up and drop off
- Allows for different levels of subscription
- Highly durable

Product B: Zygg Shared e-bike

- Designed for long term bike rental
- Quick swap batteries, for extended range
- Lightweight
- Long range batteries
- Smooth ride

Needs Statement

Needs Statement-1 (Before research):
Rental bikes for food couriers

Needs Statement-2 (Benchmarking benefits):

- A transportation vehicle that give food courier the flexibility to pay as they go for bike and battery rental.
- Need to provide a location for a potential place for courier to rest.
- Need to focus on comfort and the usability.

Needs Statement-3 (Benchmarking Benefits AND linking with fundamental needs):
The food courier transportation is based upon the activity of transporting food orders from the restaurant to the customer, while providing them with courier with **comfort and security.**

The courier needs to have **control and mastery** of the rental bike as their performance often is indicative of how much they can earn in a day. The styling of the bike fulfills the couriers **esteem** needs.

Appendix D – Result Analysis

Key Benefits and Features for Products

Comfort	11
Comfortable	
Comfortable	
Comfortable	
Comfortable	
Comfortable	
Comfortable	
Smooth	
Smooth	
Smooth and Quiet	
Predictable	
Plush	

Durability	10
Reliable	
Reliable	
Safety	
Stability	
Stable	
Superior Strength	
Versitile	
Weather Resistant	
Storable	
Durable	

Fun	6
Speed	
Sporty Feel	
Powerful	
Easy to climb hills	
Agile	
Nimble	

Features	
Easy To Use	10
Power	8
Ergonomic	7
Carrying Capacity	7
Safety Feature	4

Useability	11
All rounder	
Easy to Park	
Easy to Use	
Effortless experince	
High Capacity	
Intuitive	
Light	
Lightweight	
Lower centre of gravity	
Maneuverbility	
Pedal Effortlessly	

Stylish	6
Stunning	
Stylish	
Sylish	
Unique Look	
Attractive	
Iconic Design	

Affordable	3
Affordable	
Affordable	
Economical	

Benefits and Features

RadCity 4 by RadPower

Features: Red
Benefits: Green

Description and Features: Iconic commuter bike that comes with a single, 18.5" frame size. The handles are swept back to provide extra comfort on longer commutes and can come with a built-in wheel lock. It comes with features like lights, fenders, and a heavy-duty cargo rack all as a standard feature. The integrated bike rack can support weight up to 45 lbs. This bike is well-suited for any kind of riding. The ride is smooth, quiet and comfortable with its front suspension and comfortable saddle which is perfect for long-distance travel. It can perform well at low speed as well as high speed. The tires are puncture-resistant and prove grip for various surfaces. The bike however weighs 63.3 pounds which means that if the battery dies, it will be very hard to use the bike. It comes with 5 power-assist modes, Eco, std, Power and speed and the delivery of the power comes on very smoothly. The control on the unit is very intuitive and allows the user to quickly make changes on the fly. The bikes come 80% preassembled, and the other 20% are relatively easy to assemble. It is one of the cheapest yet one of the best-rated bikes on the market. It is sold on the market for $1,600.

Specification:

- 750-watt Shengyi direct-drive hub motors – To provide smooth acceleration and features regenerative braking
- 180 mm Mechanical Disc Brakes
- Integrated Brake and Head Lights – Use Battery as a power source
- Integrated Rear Rack – Can attach basket, cargo or a child seat
- 7-Speed, 11-34 Tooth Freewheel – Extra power when climbing hills
- Puncture Resistant Tires – Layer of Aramid and Ceramic articles under the tread
- Battery, 48V, 14 Ah (672 Wh) rated for 800 cycles
- Over 45 miles of ranges
- 48 V, 14 Ah
- Frame, 18.5 inches and made from 6061 aluminum
- Hand bar Height, 45
- Payload, 275 lb load
- Radpower Unit – Speedometer, battery life, odometer, wattmeter, and power assist level

Products and Benefits

Benchmarking Products							
1	2	3	4	5	6	7	8
							
RadCity 4	Honda PCX	Step-Through Compact Cargo Bike	GoPlus Road Bike	Urban Arrow Family	Kent 24" Bayside	Honda Rebel 300	Deliverator
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Max Payload	275 lbs	397 lbs	400 lbs	440 lbs	180 kg	300 lbs	374 lbs	350 pounds
Material	Aluminum	CNC Aluminum Alloy	EPP, Aluminum	Aluminum	EPP, Aluminum	Aluminum	N/A	N/A
Motor	Electric	Gasoline	ELectric	None	Electric	None	Gasoline	Electric

User Observation by video

Title: This is what working at UBER EATS is like, Date: October 11th, 2021 URL: This is what working for UBER EATS is like. - YouTube

Preparation/ Setup

Step 1

The bike courier goes to the counter top with the the Ubereats customer order. They talk to the cashier to see if their order is ready to be picked up. The user waits by the pick up zone.
The User interacts with his smartphone, the cashier.

Step 2

The bike courier is handed the food packaging. He takes off his thermabal bag and set it in the ground. He places the food item puts it in his bag.
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Step 3

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User Observation by video

Step 4

The bike courier gets off his bike, and places the backpack on the ground. He locks up his bike and the checks that he is at the right address. He takes out the food from his thermal bag.
The User interacts with his smartphone, bike, thermal bag and food packaging

Step 5

The bike courier reads the instruction for the order. He leaves the food item on the ground and then proceeds to take a picture of the food
The User interacts with his smartphone, as well as the food item

Completion

	Preparation	Set Up	Task 1	Task 2	Task 3	Task 4	Task 5	Completion
User Goals	Getting Ready	Getting to the store	Picking up the order	Putting it into the bag	Riding the bike	Unloading from the bike	Handing the food, the customer	Checking for new orders
User Actions	Looking at the Uber Eat Heat Map	Pulling up to the store	Asking the cashier about the order	Taking it from the worker	Looking at traffic	Need to lock up the bike	Taking a picture of the packaging	Checking the phone for a new order
	Weather Map	Locking the bike	Waiting on the side	Setting bag on the ground	Navigating around pedestrians and cars	Taking it out from the bag	Ensuring that it is at the right address	Unlocking bike
		Looking at the address	Looking at order	Loading the packaging into the bag	Looking at the phone for the directions	Ensuring that they don't forget anything	Looking for delivery instruction	Making way to major intersection
User Thoughts		Where do I park?	I don't want to wait here for too long	Will this fit in my bag?	Need to watch out for road hazards	Hope it didn't melt/ get cold	I need to wear my mask	Should I take this order
			Are they done yet?	I don't want it to spill	Where do I need to go?	Did it spill?	Where do I put this?	It is far away from me
			Did I get all the orders?	It smells pretty good	I need to watch out for traffic	Did I forget to get any order?	Hopefully no one steals it	
Storyboard/ Photos								
User Experience								
+								
-								
Takeaway/ challenges		User must find a place to lock up the bike	Don't know if the order is ready	Food might spill	Not taking orders that are further out	Need to lock up the bike	Delivery instructions are sometimes not clear	Finding way back to major intersections
		Need to find the place quickly	Long wait period	Food might not fit	Need to avoid pedestrians and traffic	Products might have shifted around		Don't know if they should accept the order
Ideas/ Takeaways		Improve ability to securely lock bike Onboard navigation system	POS that is integrated with UBER Eats	Carrying equipment that suppresses movements and adjustable	Self powered delivery vehicle that is safe	Ability to dismount the bike with the food products	Designated procedure to drop off food	POS that indicate if it is worth it to try accept the order

User Experience Mapping

	Preparation	Set Up	Step 1	Step 2	Step 3	Step 4	Step 5	Completion
User Goal								
Takeaway/ Challenges		User must find a place to lock up the bike	Don't know if the order is ready	Food might spill	Not taking orders that are further out	Need to lock up the bike	Delivery instructions are sometimes not clear	Finding way back to major intersections
		Need to find the place quickly	Long wait period	Food might not fit	Need to avoid pedestrians and traffic	Products might have shifted around		Don't know if they should accept the order
Ideas/ Takeaways		Improve ability to securely lock bike Onboard navigation system	POS that is integrated with UBER Eats	Carrying equipment that suppresses movements and adjustable	Self powered delivery vehicle that is safe	Ability to dismount the bike with the food products	Designated procedure to drop off food	POS that indicate if it is worth it to try accept the order

Major Takeaway

For thesis topic

- Further develop and refine direction of possible solution
- Better understand the user needs and behaviours

For in-person User Observation

- Able to compare the video with the in-person user's action
  - Video: First person view vs In-person: third person view
    - Can see how the user act in real life
- Can ask question that the video observation did not show
- Help understand the environmental characteristics

Appendix J – Approval Forms and Plans

PANEL ON RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE

Certificate of Completion

This document certifies that

William Yin

has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)

N01171165

Date of Issue: **29 August, 2021**

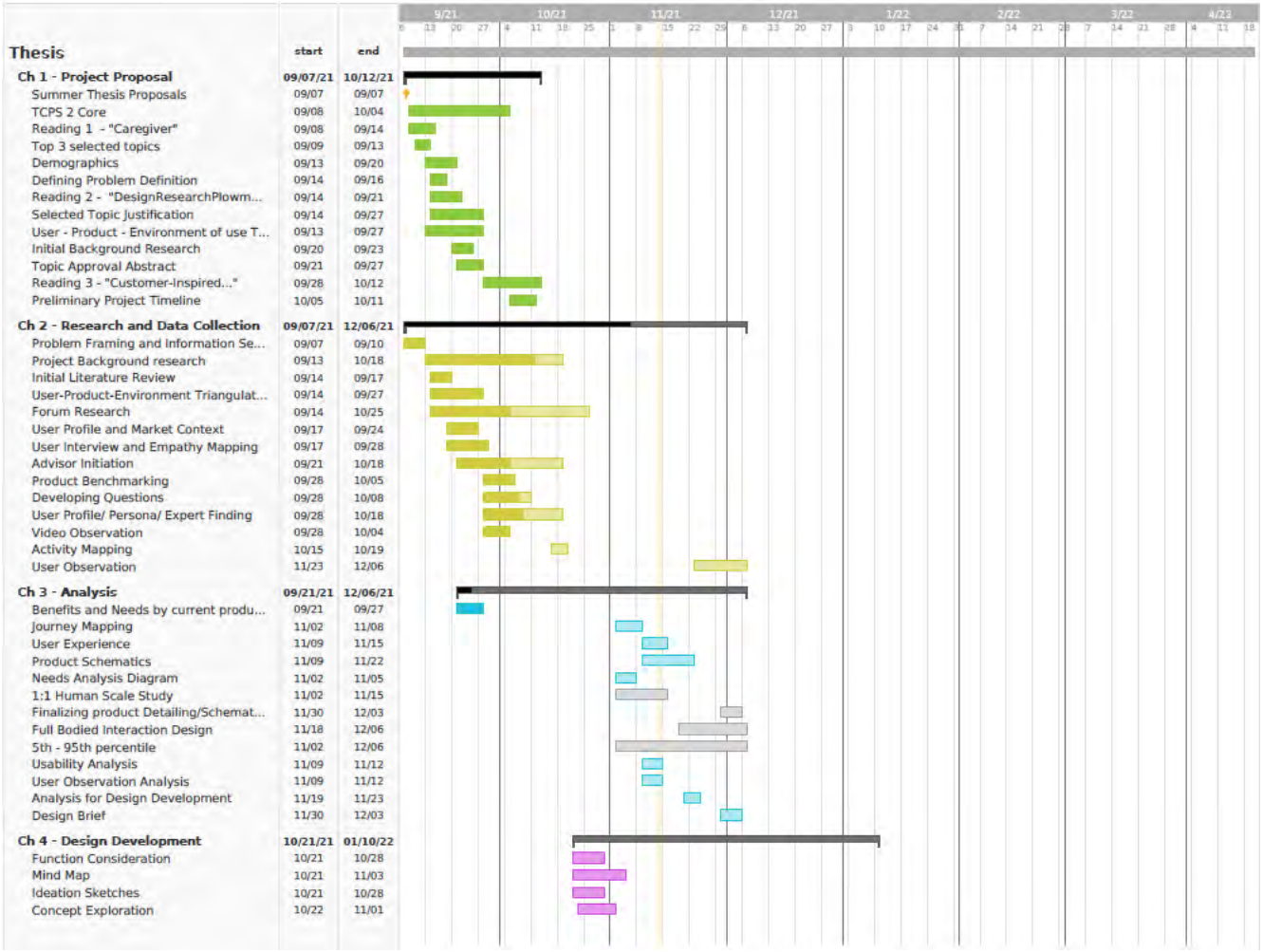
Student Name:	William Yin
Topic Title:	How may we improve food delivery services in dense metropolitan areas?

TOPIC DESCRIPTIVE SUMMARY (Preliminary Abstract)

There has been a gradual shift towards Gig-economy jobs over the past few years. The pandemic has only accelerated this trend predominately in food delivery services. This has become a problem in cities as there isn't an easy and convenient way to deliver food to customers. For the delivery couriers, they have a limited selection of methods for transporting food while restaurant owners have limited control over their delivery process. How do we rectify issues stemming from urban food delivery services for both the food courier and restaurant owners while ensuring that they can deliveries are made safe and efficient? This thesis proposes an in-depth study through an analysis of their daily activities and challenges faced by metropolitan food couriers through the use of interviews, surveys and user observations. There will be a full detailed study on improving the working condition of food couriers through literature review and peer review papers. There will be a one-to-one scale ergonomic study to fully establish a full-bodied human interaction design. The goal is to develop a product that takes into account all of the research to improve food delivery service which will enhance the customer experience while lessening the burden on metropolitan food couriers.

Student Signature:	
William Yin	
Date:	04/10/2021

Instructor Signatures:	
Date:	07/October 2021



Thesis	start	end
Ch 1 - Project Proposal	**09/07/21**	**10/12/21**
Summer Thesis Proposals	09/07	09/07
TCPS 2 Core	09/08	10/04
Reading 1 - "Caregiver"	09/08	09/14
Top 3 selected topics	09/09	09/13
Demographics	09/13	09/20
Defining Problem Definition	09/14	09/16
Reading 2 - "DesignResearchPlowm...	09/14	09/21
Selected Topic Justification	09/14	09/27
User - Product - Environment of use T...	09/13	09/27
Initial Background Research	09/20	09/23
Topic Approval Abstract	09/21	09/27
Reading 3 - "Customer-Inspired..."	09/28	10/12
Preliminary Project Timeline	10/05	10/11
Ch 2 - Research and Data Collection	**09/07/21**	**12/06/21**
Problem Framing and Information Se...	09/07	09/10
Project Background research	09/13	10/18
Initial Literature Review	09/14	09/17
User-Product-Environment Triangulat...	09/14	09/27
Forum Research	09/14	10/25
User Profile and Market Context	09/17	09/24
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Advisor Initiation	09/21	10/18
Product Benchmarking	09/28	10/05
Developing Questions	09/28	10/08
User Profile/ Persona/ Expert Finding	09/28	10/18
Video Observation	09/28	10/04
Activity Mapping	10/15	10/19
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Ch 3 - Analysis	**09/21/21**	**12/06/21**
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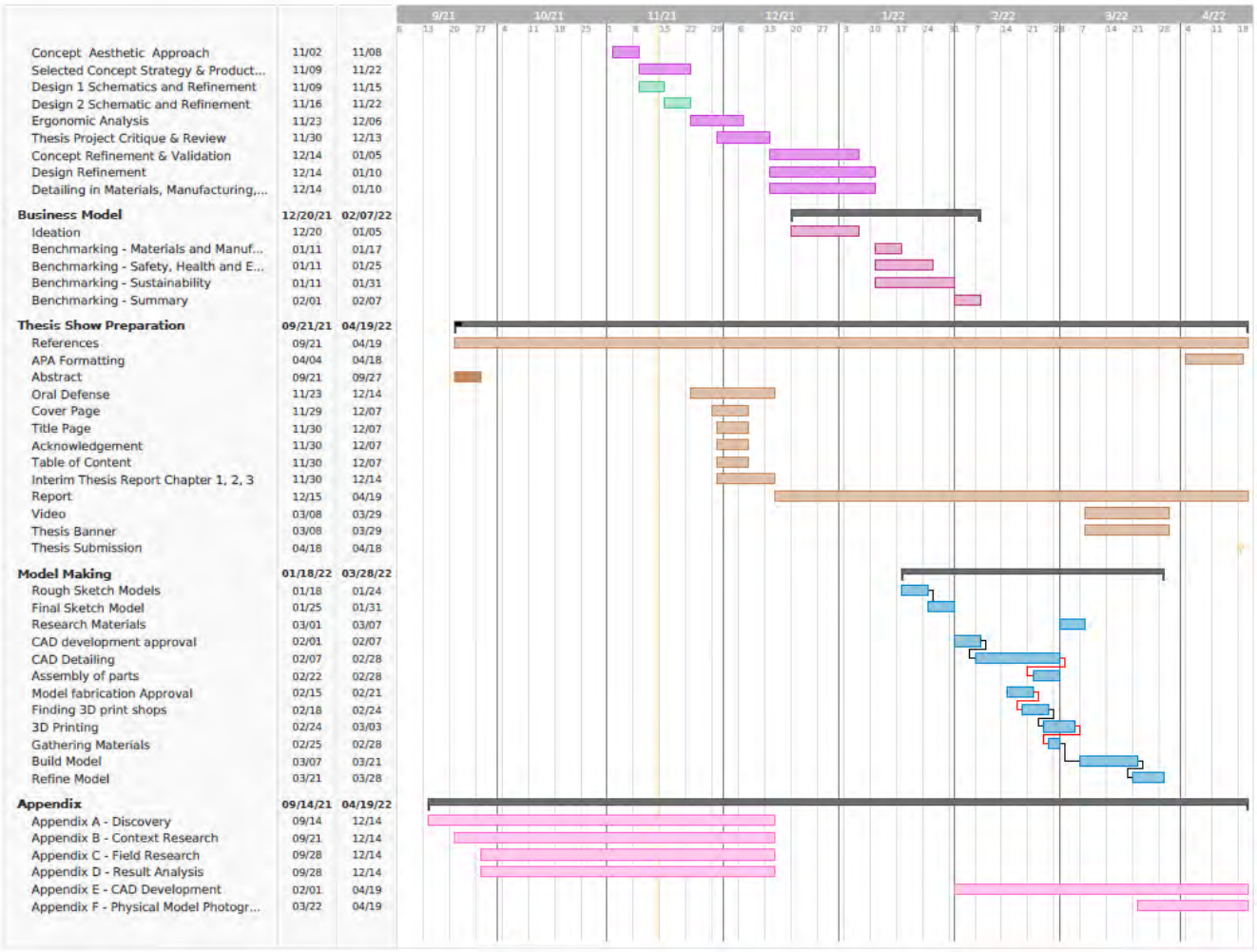
Usability Analysis	11/09	11/12
User Observation Analysis	11/09	11/12
Analysis for Design Development	11/19	11/23
Design Brief	11/30	12/03
Ch 4 - Design Development	**10/21/21**	**01/10/22**
Function Consideration	10/21	10/28
Mind Map	10/21	11/03
Ideation Sketches	10/21	10/28
Concept Exploration	10/22	11/01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Concept Aesthetic Approach 11/02 11/08
Selected Concept Strategy & Product... 11/09 11/22
Design 1 Schematics and Refinement 11/09 11/15
Design 2 Schematic and Refinement 11/16 11/22
Ergonomic Analysis 11/23 12/06
Thesis Project Critique & Review 11/30 12/13
Concept Refinement & Validation 12/14 01/05
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Detailing in Materials, Manufacturing,... 12/14 01/10
Business Model 12/20/21 02/07/22
Ideation 12/20 01/05
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Benchmarking - Safety, Health and E... 01/11 01/25
Benchmarking - Sustainability 01/11 01/31
Benchmarking - Summary 02/01 02/07
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APA Formatting 04/04 04/18
Abstract 09/21 09/27
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Cover Page 11/29 12/07
Title Page 11/30 12/07
Acknowledgement 11/30 12/07
Table of Content 11/30 12/07
Interim Thesis Report Chapter 1, 2, 3 11/30 12/14
Report 12/15 04/19
Video 03/08 03/29
Thesis Banner 03/08 03/29
Thesis Submission 04/18 04/18
Model Making 01/18/22 03/28/22
Rough Sketch Models 01/18 01/24
Final Sketch Model 01/25 01/31
Research Materials 03/01 03/07
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Assembly of parts 02/22 02/28
Model fabrication Approval 02/15 02/21
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Appendix B - Context Research 09/21 12/14
Appendix C - Field Research 09/28 12/14
Appendix D - Result Analysis 09/28 12/14
Appendix E - CAD Development 02/01 04/19
Appendix F - Physical Model Photogr... 03/22 04/19


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Appendix K - Advisor Meetings & Agr... 09/28 12/14
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Appendix M - Topic Specific Data, Pa... 09/14 12/14

IDSN 4502
SENIOR LEVEL THESIS TWO

Humber ITAL / Faculty of Applied Sciences & Technology
Bachelor of Industrial Design / WINTER 2022
Catherine Chong / Sandro Zaccolo

CRITICAL MILESTONES: APPROVAL FOR CAD DEVELOPMENT & MODEL FABRICATION

Student Name:	William Yin
Topic / Thesis Title:	IMPROVING FOOD DELIVERY SERVICES

THESIS PROJECT – DESIGN APPROVAL FORM

Design is reviewed and approved to proceed for the following: [X] **CAD Design and Development Phase**

Comment:
- Initial CAD started well as of week #7/February 22nd, continue with detailing and refinement.
- Refinement CAD progress well as of week #8/March 8th, require to complete some of the detailing and finishing.

Design is reviewed and approved to proceed for the following: [X] **Model Fabrication Including Rapid Prototyping / 3D Printing and Model Building Phase**

Comment:
- Once CAD is completed, can move forward to model fabrication from week #9 onward.

Instructor Signature(s):

Date: 8th March, 2022

Chong, Kappen, Thomson, Zaccolo

Appendix K – Advisor Meeting and Agreement Form

HUMBER
Faculty of Applied Sciences & Technology
Bachelor of Industrial Design / FALL 2021 & WINTER 2022

IDSN 4002 / 4502
SENIOR LEVEL THESIS ONE & THESIS TWO

INFORMATION LETTER

Research Study Topic: How may we improve food delivery services in dense metropolitian areas?
Investigator: William Yin / (647) 915-2689 / WilliamYin369@Outlook.com
Sponsor: Humber ITAL, Faculty of Applied Sciences & Technology (IDSN 4002 & IDSN 4502)

Introduction
My name is William Yin, I am an industrial design student at Humber ITAL, and I am inviting your participation in a research study on various problems that food couriers may encounter with their current equipments while they are making their deliveries. These problems include issues with bikes that are ill suited for food deliveries, lack of public infastructure to rest in between deliveries and equipment/ mainataince cost to enter and stay in the field. The results will be contributed to my Senior Level Thesis project.

Purpose of the Study
This study is being conducted as an aid in designing a product or equipment that assist with the food courier while they work in metropolitain areas that is capable of reducing some barriers that a bike courier may encounter in the field. The product to be designed is inspired by the current food courier bikes and lack of current public infastructure where there are many issues that revolve around them. With your help, I plan to address problems that food courier could encounter with their current cycling equipment on a regular basis. This study is primarily based on understanding ergonomics, human interaction design activities, and user experience aspects of the research area.

Procedures
If you volunteer to participate in this study, your activities with interacting with your current bike courier equipments will be observed and documented. Your activities will be documented by the means of a phone camera while you make your deliveries around the city. You will be asked questions pertaining to your food courier equipments and how you use it.

Confidentiality
Every effort will be made to ensure confidentiality of any identifying information that is obtained during the study. In the case of being recorded visually, your face will be masked /blurred or hidden. The information and documentations (photographs) gathered are all subject to being used in the final presentation of the study.

Participation and Withdrawal
Your participation in this study is completely voluntary and you may interrupt or end the study and the session at any time without giving a reason or fear of being penalized.

If at any point during the session, you feel uncomfortable and wish to end your participation, please let the moderator know and they will end your participation immediately.

Humber Research Ethics Board
This research project /course has been approved by the Humber Research Ethics Board. If you have any questions about your rights as a research participant, please contact Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, **Lydia.Boyko@humber.ca**

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HUMBER
Faculty of Applied Sciences & Technology
Bachelor of Industrial Design / FALL 2021 & WINTER 2022

IDSN 4002 / 4502
SENIOR LEVEL THESIS ONE & THESIS TWO

INFORMATION LETTER

Conditions of Participation

- ✓ I understand that I am free to withdraw from the study at any time without any consequences.
- ✓ I understand that my participation in this study is confidential. (i.e. the researcher will know but will not disclose my identity)
- ✓ My identity will be masked.
- ✓ I understand that the data from this study may be published.

☑ **I have read the information presented above and I understand this agreement. I voluntarily agree to take part in this study.**

Click or tap here to enter text.		Click to enter a date
Matthew Ham	Matthew Ham	November 12, 2021
Participant's Name	Participant's Signature	Date

Project Information

Thank you very much for your time and help in making this study possible. If you have any queries or wish to know more about this Senior Level Thesis project, please contact me at the followings:

Phone: (647) 915-2689

Email: WilliamYin369@Outlook.com

My supervisors are:

Prof. Catherine Chong, **catherine.chong@humber.ca**

Prof. Sandro Zaccolo, **sandro.zaccolo@humber.ca**

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HUMBER
Faculty of Applied Sciences & Technology
Bachelor of Industrial Design / FALL 2021 & WINTER 2022

IDSN 4002 / 4502

SENIOR LEVEL THESIS ONE & THESIS TWO

PARTICIPANT INFORMED CONSENT FORM

Research Study Topic: How may we improve food delivery services in dense metropolitain area?
Investigator: William Yin / (647) 915-2689 / WilliamYin369@Outlook.com
Courses: IDSN 4002 & IDSN 4502 Senior Level Thesis One & Two

I, Participant Matthew Ham *(First Name/Last Name)*, have carefully read the Information Letter for the project food delivery services in dense metropolitain areas, led by William Yin. A member of the research team has explained the project to me and has answered all of my questions about it. I understand that if I have additional questions about the project, I can contact William Yin at any time during the project.

I understand that my participation is voluntary and give my consent freely in voice recording, photography and/or videotaping; with the proviso that my identity will be blurred in reports and publications.

Consent for Publication: Add a (X) mark in one of the columns for each activity

ACTIVITY		YES	NO
Publication	I give consent for publication in the Humber Library Digital Repository which is an open access portal available to the public	☒	☐
Review	I give consent for review by the Professor	☒	☐

Privacy
All data gathered is stored anonymously and kept confidential. Only the principle investigator /researcher, William Yin and Prof. Catherine Chong or Prof. Sandro Zaccolo may access and analyze the data. All published data will be coded, so that visual data is not identifiable. Pseudonyms will be used to quote a participant (subject) and data would be aggregated.

I also understand that I may decline or withdraw from participation at any time, without negative consequences.

I understand that I can verify the ethical approval of this study, or raise any concerns I may have by contacting the Humber Research Ethics Board, Dr. Lydia Boyko, REB Chair, 416-675-6622 ext. 79322, **Lydia.Boyko@humber.ca** or William Yin/ (647) 915-2689 / WilliamYin369@Outlook.com.

Verification of having read the Informed Consent Form:

☒ I have read the Informed Consent Form.

My signature below verifies that I have read this document and give consent to the use of the data from questionnaires and interviews in research report, publications (if any) and presentations with the proviso that my identity will not be disclosed. I have received a copy of the Information Letter, and that I agree to participate in the research project as it has been described in the Information Letter.

Click or tap here to enter text.		Click to enter a date.
Matthew Ham		November 12, 2021
Participant's Name	Participant's Signature	Date

3

Advisor Interview: Matthew Ham

Retrieved from Otter.ai

September 22nd, 2021 @ 1:00 pm

Matthew Ham 0:00
I am a half Mexican, part Swedish, mechanical engineering dropout who eventually graduated from Humber industrial design. And I hate it so much. I didn't go into shows as I as a job. So I ended up being a bike career. As it turned out, I actually liked it. I don't it's not my I don't want it to be my career, anything like that. But I think it's I think the logistics of it, I think just the the area of society of logistics via bike is something that is gaining more and more traction. And I think it's going to be more important in the future, because book, climate change is a big one. And also just the mobility of cycles versus cars. Especially in the downtown core. You can move so much faster and a bike that you can, especially an electric bike. No, that's true.

William Yin 1:17
Can you tell me the average tasks of a food carrier, like what they do on daily tasks like this, walk me through it?

Matthew Ham 1:32
Let's see. Well, most people would start by going to an area where there's actually orders your bike out from where it's been securely locked, because you can get it stolen, and I had one complaint stolen. By leaving it out on the street overnight. It was a rental. But still. So you need to take your bike out if it's secure location, hopefully, it's because of maintenance issues. You don't want to leave the bike outside because cold wet, temperature changes all that will increase your maintenance costs. And then you go downtown to where there is a good bunch of orders. In Toronto, specifically, you're going to want to be around like Bathurst in college, Medina in college, but I'm done das, that sort of area between like, basically that square between Spadina and Dundas and college and bachelors that's a pretty good area to start. That's usually the dead center of town. I actually see Union Station has a whole bunch of electric bikes and backpacks all in like their little area. So you can tell that there's a lot of people who come out of town, don't live in the downtown, actually come downtown to do their deliveries and then go back home. So that's your first thing. Then you sign on you have to do your silly thing where you whilst on silly. You show that you at least when I work with Uber Eats right now just because they're the most consistent. And they make you do like, you know, I don't have COVID here's a picture of me wearing a mask. I wash my hands and my stuff. And then, you know, yes, I'm riding a bicycle again today. And then you can go when you can start. And then you just wait for an order. And then you David, sorry, my cat.

William Yin 3:40
No worries.

Matthew Ham 3:44
It's impossible to leave him with any food around the remnants of food because he immediately goes as far as licking it. Worth Catterick just couldn't give us sufficient. You're getting fed and 20 minutes machines. So you get an order, you get an order, at least on Uber right now, after years of not really given you much of a choice because you're independent contractors, or we're considered independent contractors. So it will show you the pickup point the drop off point, and then how much you expect to get paid for that trip. Not including to the factors with that caught the factors and now they're going to terminal like we're in town you are. So with Uber Eats there's like a cloud, I guess they call it kind of the cloud where there's a certain circle under which you get extra amount. And that's going to be determined by the time the day the party town you're in. So for example, if there is present

the last night it would have been an extra $4 per delivery if you were in like the dead center of town. Delivering while it was raining, because fewer people are out. So the demand is higher, the supply is lower. So they give you more money. And so you look at the order and then determine whether it's worth your time. At least that's what I do. Because sometimes you'll see an order and it's like bubble tea six kilometers away, and you realize, like, I don't know how big the order is, but there's a good chance someone's already like one or two bubble teas. So the possible tip on that is really low. And so to deliver it that far, to an area where there's no restaurants anywhere in here, that's not worth my time. For example, I just, I flat out reject any order, that's coffee, like from Tim Hortons or Starbucks, because it's very easy to spell. And it's not worth very much. So it's both the hardest thing to transfer, to transport, and also the least valuable in the terms of like, what your potential tip is. So this gets into the whole, like, there's, like, I know, I realize if Humber is anything now, like it was when I was they want you to design a product and not a system because I got in trouble for that. Yeah, I

William Yin 6:15
didn't want a product.

Matthew Ham 6:17
Yeah. So I'll try to make things easier to sort of guide you towards a product because there are a whole bunch of other things in the system like Uber as a company, the very foundations of how that works. None of these are things that are going to be solved with the products. But I'll sort of tangentially mentioned them as we're going along. We can move on to curiosity, like, what what drew you to the food craving?

William Yin 6:54
Because I was thinking of like, because, you know, we're supposed to create like nine different thesis topics, right? I was thinking of something that like, kind of use a lot or like complete a lot, because I also tried to do some sort of life going thing, but turns out like someone else is doing it. That topic, really. So. Yeah, this wasn't like,

Matthew Ham 7:13
some sort of way what

William Yin 7:15
life coding like, like, because I was a lifeguard before and they had experienced in that before. So I didn't think they didn't choose. lifeguard. Yeah. lifeguard. Yeah. Okay. Yeah. Yeah. So this was kind of like second choice. And yeah. I think we can probably move on to the next question. So like, what is your work schedule? Like? Like, how many hours a day do you think,

Matthew Ham 7:43
oh, I don't work enough. But when I was doing it, you're scheduled like the scope, the ideal schedule to be running is usually something like 11 to to take a break, and then five to nine, five to 10, six to nine. And that that area, because those are the those are the peak hours. And there is there are bonuses, for sure after midnight. So there is like the the overnight crew, I don't tend to work that because I want to stay somewhat with my partner. intense. So I end up trying to finish work when she does. So I end, I can end up like, close to 11 or come home early. With the kitchen or whatever. It's pretty, it's flexible in the sense that like, and that's a that's a double edged sword, in the sense that it's, it's easy to put as many hours and then there's also easy to put as few hours in as you can. So yeah, the downside is definitely that the most profitable hours works that food courier are the hours that everyone else wants to have fun. Yeah, I mostly work just the lunch shift, because between two and five is pretty dead. And especially in the summer, you're gonna be working during the hottest part of the day for the least amount of money. And so that's not exactly like super awesome time. Also, there's the issues of batteries. I was renting an electric bike for over a year. And very few commercial

electric bikes have enough battery to properly last day. So charging systems don't charge very fast. So you end up being limited. If you ever wanted to do like a like some some of my friends when when they used to be more serious and divide careers would run like an 11 to six or 11 to five shifts. So they would do all of their stuff in the middle of the day so they could hang out their friends at night. But you need a regular bike for that, or you need to buy two batteries, batteries are really expensive, like, solid, but like battery will cost you $400. And then you need two of them because you need to have one in the charger, this one's not gonna last for seven hours unless you gigantic one that will cost you $100. Anyway.

William Yin 10:18
So like, what's the typical range of it, like 50 kilometers,

Matthew Ham 10:24
I don't really measure it in kilometers and hours. I think that I was doing somewhere between 10 and 15 kilometers every hour. And I would be an I would could run it between three to five hours. So if you had it on the lower settings, now the one I was renting towards the end was a little frustrating because how the battery how they decide to do the power levels to make a difference. So there is simply increasing the power level just gives you more assistance at all cadences. And then there's another one where, which is the one that I was renting, which frustrated me which is this suddenly just cuts off at a certain speed. So you know, the One Power Level would cut off 10 and then two with 15, then three at 20 and 425. And then five would cut off somewhere about 32. And if you wanted to go really fast, I could do I could bring the whole battery in three hours. And this was two batteries. Actually two batteries was like the one this was like the one that was built into the down tube, and then one that was on the back rack. And you can burn through those. And because the thing is batteries have as a career, it's in your interest to ride as far as the battery will take you. But it's in the batteries interest for you to ride it only between 20 and 80%. Because if you if you charge it above 80%, or discharge or below 20%, you're limiting the life of the battery. And they're expensive. So you'd need to get a battery that was almost comically large by commuter standards for career. And then you have the issue of like bike balance, I didn't like I wanted to go I think the reason I returned my rental was because I want to build my own bike and use all custom parts for it. Because I want a little more control over what it does, how it charges where the weight is. Ideally, I have like a belt on there. Because so when it comes to bike design, bikes for careers, the number one issue is maintenance, by far. So that's why you have a lot of bike couriers who run single speeds. It's not because I mean, some of them are like just they're super into like hardcore, old school messenger culture. And they ride like no break big seas around town. That's a lifestyle choice. That's not a practical choice. You don't write a fixie, because it's practical, because it's not. You're familiar with a fixie

William Yin 13:17
is actually not too familiar with that.

Matthew Ham 13:22
Okay, so on most bikes, you can pedal backwards. Like if you stop pedaling, the wheels, like the wheels keep turning on a fixed gear, you're actually locked into the cadence of the back wheel. So if you stop pushing the pedals, keep going and your feet keep going with them. So even so when you're making for example, sharp turn, maybe you have to lean over, the pedals are still moving, you can click the paddle, okay. Or if you're close to a curve, for example, there's no way for you to just keep the left pedal down and the right pedal up because the pedal is just going to keep moving. Now, a lot of people like the feeling of that just because it gives you like this nice sense of being connected to the bike, so you can break with your feet. But not like those old BMX bikes where if you pedal backwards, it breaks, like pushing backwards, just pushes back on the wheel and slows it down. So some people can get away a little crazy, but they can get away with no brakes. But it does require like

a very, very heightened sense of awareness because you have to know where you're getting to get into trouble. So further ahead of time,

William Yin 14:36
so the pedals keep moving even though you stop pedaling, right. Is that what you mean? Yeah. Okay,

Matthew Ham 14:41
the pedals moving. Like, there's a gear ratio, of course, but they move with the back wheel. So what's the difference between a fixie and a single speed and often there are. There are wheels where you can just flip it around and it turns from fixie to single speed. So you don't have to buy like two different But the reason a lot of people, a lot of multiple careers ran steel frame road bikes with with a single gear is not because a single gear is the ideal solution for a city. Toronto is flat as it is still has a ton of Hill, if you're running an order from Front Street to bluer, or Davenport, for example, which is, you know, when I have the electric bikes like Okay, fine. But when not now that I'm back on my regular bike, I'm like, now, I didn't waste a lot of energy. Because that's a whole it's entirely uphill. And so you're running this, you're constantly running this math in your head is the white whether the next delivery is worth it. Because you have to consider on like your electric bike is secondary switch battery, am I going to end up in this area with no one to deliveries, there's not like you get like this drop off schedule where you just sign on and you do plenty of deliveries that are all lined up for each other. So the app, for example, will give you if you already have a delivery, it doesn't show you a map of where your next delivery is that Google will give you an order before you've completed the current one. But it'll just give you cross streets and often the most obscure cross streets, they could figure it's like, yes, it's done to us and ronsis fails. But actually, we're just going to pick off like the tiniest cross streets that are vaguely in the area, and that I've never heard of. And so I don't know where they are. And so it's a lot of saying no, until you find something that you're like, I can do this. Right? maintenance. That's probably your number one issue with the bike is that anytime you can't use your bike as money you're looking. So flat tires, they're not very common, but they're an issue derailleurs are their own issue. Sorry, how familiar are you with like bike terminology?

William Yin 17:28
I know, not that much, to be honest.

Matthew Ham 17:33
Do you know what the derailleur is? Yeah,

William Yin 17:35
it's like, there's a two gears, the one the front one back, right, there's like to move Yeah,

Matthew Ham 17:40
those, those are your those your bike does your chainrings. So the derailleur is the thing that moves was on the back here that moves the little up and down, up and down like a series of gears. And those things can be like just a pain in the ass. Chains can be a pain in the ass, but they're cheap, and they're easy to replace. So things that are becoming more common on commuter cycles are belts. So belts don't require any oil. They don't require barely any maintenance. But they do require a various different frame, they do require a specific frame where you can actually break out the back end of the bike to actually thread the belt in because the belt is one piece. The advantages is that once it's on there, it's not affected by salt. It's not affected by water. It's not affected by mud. It's a more ideal. It's slightly less efficient at certain speeds, but it's a more ideal solution for couriers. It's just very expensive right now. And there's not a lot of solutions for couriers that implemented at a price that careers are usually willing to pay.

William Yin 19:10

I was wondering like how much is usually the average cost of a bike, like for a courier?

Matthew Ham 19:17
So that's going to depend highly on the kind of bike for example, I built my bike up with with a series of use parts over years. So I nicknamed my bag Theseus. Because Are you familiar with the Ship of Theseus?

William Yin 19:37
Theseus? I think I've heard of it, but I kind of forgot about it.

Matthew Ham 19:41
So the Ship of Theseus was this thought experiment where you have this general Theseus and he wins this great war and he comes back and he parks his ship in the harbor. And it becomes a museum where everyone goes to each ship, but the ship because it's in the harbors that's rotting, and they start replacing according to time, and eventually, they replaced every single board from the original ship and the question Is it still the same ship? And if not, was there a point where it wasn't the same ship? It's like a thought experiment about like, you know,

William Yin 20:10
especially pretty good known for the bike.

Matthew Ham 20:13
And because yeah, so the frame is actually is actually a different frame from, like, all those other parts of that bike are actually in a previous frame. And then I cracked it during, like a courier race, and called alleycats. Slightly aggression. alleycat is like a is like a race where you show up at some point, at some point in town, everyone gets together, and then they give you a manifest. So they give you a bunch of points throughout town. And then your goal, and there's no order to these points. By the way, your goal is to look at the map and determine what is the fastest route between all of those points to take in, like, you know, one way streets into account and what shortcuts you can take and what's going to be the fastest in terms of like up and down hills. So it's partially how crazy Are you willing to ride? and partially like, How good are you at navigating the city? And of course, well, they can get competitive and people can go pretty crazy in terms of how they ride. You can also just take a really, really chill. There's usually a talented everyone, like, write a poem, do some push ups dance with this person. Eat a spicy pepper. Yeah, we had one. And then one time, we then broke into a public pool and drank beer in it. Oh, yeah, that was that was a good one. So the Kurt,

William Yin 21:44
I can ask you a great question.

Matthew Ham 21:47
I'll finish the bite one shirt. So mine probably would it cost me like a grand total of like $300 $400, when you actually factored all in the parts, because a big part of my life for the career is actually the dude was well, less so now because of the pandemic. But like when they were open was Do It Yourself bikes basis. So bike pirates, bike chain, and bike sauce, the main ones in town, I don't know of any others. But those are the three spaces where they have a whole bunch of us parts and people who know how to fix your bike, but they're not going to do it for you, they're going to tell you that. That's cool. And then you and then you learn how to do it. So eventually, over time, there's a whole bunch of things that you will learn. It's like, Oh, this is this is this is going wrong, this is the adjustment I need to make, I don't need to take it to a professional. And that. And usually that's not only cheaper, but faster too, because especially during months where everyone else is writing in dropping your bike off to get it repaired, can take a while. Whereas going to a DIY place can be like you can be out in a few hours longer than professional. But it's important that you're able to do it. So in terms of like, so

the thing is like $300 on a loan, because if you buy a bike that I would recommend for being career you're spending the first of all, I would probably recommend that you if you're not buying an electric bike, I would recommend that you buy a used bike and have it tuned up. Because new bikes are going to be too easy to like high targets for getting stolen. And anything from like a department store is going to break down really fast. And like new bikes that are decent, are like $500 at the bare minimum. But I've also seen when you start talking about electric bikes, then you're talking about multiple 1000s of dollars, you'd be lucky to find an electric bike for 1500 that's worth anything unless you were to build it as a kit. Because that's an option, you can take a regular bike and then you can replace the bottom bracket with like a mid drive, or you can put a hub motor on it. And you just put a battery like you have a lot more flexibility there. But it is definitely more hands on approach thing. And you don't get like a warranty quite in the same way that you would with like a regular bike. But I've seen people on $7,000 bikes doing courier work. And that just makes me nervous because I realized that like I left my bike overnight and it had a chain on it and they cut it with a with a grinder. So there is no there is no chain that is invincible to bike thieves if you leave your bike out in a place where no one's going to battle like in a place where there's no one around to bat an eye at someone breaking up a disc grinder. So break out an electric disc grinder and then sometimes they'll have a towel with them. So that takes care of the sparks so it's not obvious from a distance. what's what's going on. And he also has a sound.

William Yin 25:03
So I was wondering like, doing you like doing your routes and stuff like that, like how, like, what's the security of the locking mechanism like the final place to like pocket like a few likes, stores over where you parked right in front of the store and kind of leave your bike in pickup?

Matthew Ham 25:22
That depends on a couple of factors, how risk averse you are, and what kind of bike you're riding? Sure. So for example, there was a company that I was using for rent my bike, and they technically require the picture of the bike every time it's locked, and you're out of sight of it. Because if it ever got stolen, they needed a picture to show that you actually unlocked the biker property. Okay, I stopped doing that real fast, because I realized, like, I just, they give you a chain log, and they give you an there's like a cafe block, which is a little lock box, just the back wheels.

And I realized very quickly that I wish I had gotten a team locked in my other bike, because chains are wonderful, for a couple reasons. First, they can just reach around a whole bunch of different things that like a regular EU law can't. And they're also harder to cut. Because the chain links are flexible. They're actually harder to cut than a thing with the, with the integrated chain and locks are actually that they they have a weak point right at the frame, where there's like this nice flat surface for them to cut against. That's exactly what they cut against. Because when I had the bike stolen, I could actually see that they had tried to cut the chain itself and failed. So they decided to cut the thing that was right against the bike, where like the little, I guess, plug goes into the, into the locking mechanism. And that was the weak point. So heavier duty chains, like from kryptonite, for example, will not have those exactly points. And they're a lot harder to cut. But in general, if you lock a, if you lock an electric bike out in front of a place that's reasonably public, with a chain, no one's gonna really steal like it's very rare to have it stolen. Now, if you lock it to itself, that's a different thing. Because someone, someone could theoretically pick it up, walk around the corner and then have their way with it. I have heard of people actually having their bikes picked up and tossed in a truck. So it's kind of important to have it tied to something it's not going to move away. However, I haven't really moved the bike that I'm back to using is very cheap. So I can just lock the front wheel to the frame, and know that no one's gonna mess with it, because it's just not worth enough to be worth the hassle of picking it up and running away with it. Because if you know, if someone sees someone carrying a bike that's Glock to itself, it's going to be a little suspicious. Unless of course, they have some sort of hiding spot on the corner. But I've never had a problem with it. I'm still a little nervous about it. But if it's like in front of a restaurant,

and I'm just going inside the lock into itself, it's fine. I'm going up like 50 floors of an elevator that's a little different. I'll try to find something to walk into.

William Yin 28:34
Do you listen to any music or podcasts while doing the job or kind of always,

Matthew Ham 28:39
but I only keep one headphone Okay, so only keep the right headphone in and I get anxious whenever I see people with two earphones in. Because like the right headphone, the sound that you're getting from there is like the sound from the sidewalk. And so I'm always almost always on the right on the right side of all the cars so the cars are coming behind them my left so I can hear them because being able to hear is really really important. And headphones at this point to my knowledge, don't do like their microphones and there. And also just like the sound court, he just isn't good enough to give you a true sense of where things are. Like my girlfriend has a pair of like jobra 75 teeth which are pretty decent bluetooth headphones and she says that you can really only determine whether the sound is coming from your left side or right side. But you can't determine where it's bass coming from. And determining where in space something is going is really important. I've definitely had close calls where I have for some one reason or another was on the left side of the road making a right turn for like crossover and almost at a car the Cuz I just didn't hear it because my right headphone blocked that for me. And so I like Yeah, one of the things that I love about the job is I get to listen to a lot of podcasts and a lot of audiobooks. So I can burn through books pretty quickly. On audiobooks. I have a lot of podcasts that I love that I get to listen to all the time. And over time, I would say that when you're starting, don't listen to anything. Don't have any music don't have any anything just like get really used to riding with traffic because that's a skill on its own. You eventually get very good at reading cars. Like I've done it I've done I don't know how many 10s of 1000 kilometers in Toronto. Phil never had a serious accident that I broken my arm before but that was my own dumb asphalt on some streetcar tracks. When it was bone dry. It was kind of a freak accident. I just I took it to shallow and angle and my front tire slid out Monday. That would normally not happen. That's the only time I've ever had an issue with streetcar tracks. To be honest, as as much as a lot of riders in Toronto hit streetcar tracks. I prefer streetcars to buses. Because I know where streetcars always going to be. I know a streetcar can't make a turn into me. Knowing like I like the most important thing about a vehicle is whether or not it's predictable. Doesn't matter where it's going. It's like so long as I know where it's going. And it can't go anywhere like a street car. Yes, like just put big enough tires on your bike. And you don't have to worry about streetcar tracks anymore. Really, that's the solution is that physical big tires on your bike.

William Yin 31:48
I was also wondering what kind of weather conditions you work under, like sunny is raining. Stuff like

Matthew Ham 31:57
I. So since the pandemic, it's become a little more of a pain in the ass to ride in the wet, just because your mask gets wet, too. Oh, no, I buy my own masks that like the ones that Uber supplies are horrible. And I would never recommend using I get some from a company called mask lab. And they're FFP t certified. So they're like in 95 plus oil. But it also means that they work really well with the with the web. But the thing is my bike right now is not. It's got fairly skinny tires. And just in general, I'm not super. At my age, I'm now a little much, much more cautious about how easy it is to slide. Because it's not like whether or not I could stop in time for a stop or whatever. It's more like if someone pulls out.

Make and I stopped in time. So super rainy is for conditions for example, where if like when it's fresh fallen snow, like a thin layer, that's actually much more dangerous than just like a snowstorm. Because even during a snowstorm, but eventually they will put salt on the roads and then you can just

take the main roads. So I've written in all sorts of weather down to like negative 15 negative 20 on Sundays, but like, it gets a negative he really gets below negative 10. I'm kind of like

William Yin 33:35
and is it really worth it at that point.

Matthew Ham 33:39
A lot of it just comes down to like your gear to be honest, because there's nothing really bad about negative. Anything below that so much of this, can you stay warm for long enough. And then there's the issue of like, depending on where you are. For example, if you're downtown, you're gonna be asked to go into a lot of elevators, which is something we should never had go into an elevator ever but especially during the pandemic, it's annoying. You can wait for like 20 minutes at some elevators. I've definitely had deliveries where it took me longer to get from the lobby to the person and back then it took me to get them the restaurants will lobby

William Yin 34:23
just because of elevator right? Yeah, just because

Matthew Ham 34:25
it's a huge lineup for the elevator because you can't fit enough people in there. But I've done it in freezing rain. I mean I have to angele downpours but I don't anymore.

light rain is fine. It's more about can the phone survive and for that I just the best solution is just a little plastic sandwich bag at certain points In the winter, you have to keep your phone, you can't really put it on your bike anymore. Because the cold will kill the battery and the phone will shut off. But yeah, it's pretty much all the weather except for the really super extreme stuff. But yeah, it can suck if you like, for example, this week, there's a lot of rain. I'm like,

William Yin 35:21
Yeah, you've been reading quite a while now. He said something else.

Matthew Ham 35:28
But yeah, it's just gonna be like, well, I guess I'm just gonna have to find the right gear to be able to do it. So probably means contacts and rain jacket.

William Yin 35:38
Because it eats or any of the courier companies provide you with any of the tools like safety equipments, like,

Matthew Ham 35:47
okay, in theory, you can go, they can mail you masks. Those masks are so awful, the only thing I ever used them for was to put over a regular mask in the winter, to provide more protection. Because if you ride with just one layer of mask, the heat from your breath and the cold from the outside creates like this really super soggy anxiety your mouse. And so the only thing I ever used those masks for was as a cover over a better mask. Because, yeah, I just like I don't like I mean, so many elevators, that people that I don't want to deal with a shitty mask. So that's, uh, yeah, pretty much it's all an expense. My my bag, for example, is actually a hiking backpack with a thermal box attached to it via webbing and buckles. And so, because wearing a bag on your back for a long period of time can be a strain. One thing that I discovered, kind of by accident when I was doing a delivery for bike brigade was that if you put a box in the back here on your bike, you can actually rest your backpack on it while you're biking. And then if you you know, if you see like a big pothole ahead that you can avoid, you could just

stand up and use your feet to absorb the shock, but then just go back to sitting down and then have the box actually hold your, your bag up, which is kind of nice.

William Yin 37:34
What do you mean by the box.

Matthew Ham 37:37
So you know, the penny rack on the back of a bike. If you strap a box. This was for like a food delivery box. There's just like we're delivering like vegetables and grocery stuff to people. If you put a box there, because you have like a higher surface behind you, you can actually rest the bottom of your bottle. Okay, on that. And that takes some the strain off. Because Yeah, like sometimes I for example, I have a smart surface, if it gets I can deliver alcohol. And I have delivered 215 packs or like four, eight packs of beer. a crock. And that can get heavy. So it's important to have something on your back that is like, very supportive. And there's a trade off between very supportive and very like. So my backpack is currently very is this relatively much heavier than other courier backpacks, but it's much more supportive because it has a frame and it has ventilation like a space for ventilation. Find it.

William Yin 38:57
It was wondering if like some, like food might get soggy bacon fries or any like hot, really hot, crispy food. So I go But yeah, you can do with that.

Matthew Ham 39:08
There's, there's not a whole lot that you can do as a career. Because Because the thermal box works to keep the heat in only if it's closed. And if it's closed, like we're not going to put a heat exchanger like a complicated eat exchanger in a backpack. We're extracts the heat pumps off the back end but allows you know, it's like it's hard. What I have seen for companies, for example, is pG clucks. now serves their their fried chicken in these buckets. The buckets have a piece of paper at the top of them with holes in it. So it allows the stuff to breathe because it's really about having its own moisture trapped in there with it. So there are ways to avoid that by having just like different packaging. But it is pretty challenging to transfer something in a sealed container that is crispy and to have it stay completely crispy. That's just the like, I'm sure there could be something that would be good for keeping crispy things crispy. But then you would run into the issue of well, then what do you do when the next order sushi?

William Yin 40:29
Yeah, I think no one universal solution for it. That's why

Matthew Ham 40:34
there's there's no clear solution. And it would be kind of expensive to create, like a very expensive to create, like, do all solution because sometimes you get two orders and one of them is crispy chicken and the other is sushi. Yeah, so there's no like. So in that. In that case, it's like I have a thermal like the back of the box that I have like those delivery boxes. It comes with its own divider. And so you just divide the foods so that they're not spoiling each other.

William Yin 41:07
Let me check out some other questions.

Matthew Ham 41:12
By the way, that's not the only interview to like, if you're serious about doing a product, but I can do more interviews. They also introduce you to a lot more people because

William Yin 41:21

Yeah, that'd be great. Yeah. So what's your typical distance from the pickup to the drop off location?

Matthew Ham 41:34
Oh, well, that ranges pretty significantly, I have literally had McDonald's deliveries across the street. And I've also had deliveries that were like six kilometers away. I've seen deliveries were like the block that they're like, I hear drivers north of the city get like 10 kilometer 12 kilometer deliveries. I would never do that on a bike as 20 per delivery basis, anything past four kilometers, starts getting a little iffy as to whether it's worth it. The only cases where it would be worth it from pickup to drop off. And that's not counting the distance from acceptance to pickup. Because I've definitely had deliveries where I'm actually delivering it right next to where I am, but the pickup is far away. So he's going back and forth. Uber now pays you slightly a little bit for your pickup distance. I think in fact, is that into the overall cost, how long it takes you to pick it up. It didn't used to. Okay. Always companies rarely profitable. Now, the breeds, but they're pretty much all losing money.

William Yin 43:00
sucks, though, like this, you're getting paid slightly more for like, at least picking up the order. Right. So that's,

Matthew Ham 43:06
that's true. So what happened is that they started paying you less per kilometer, but they need you for the pickup as well. Okay, so like the overall is roughly the same. But they tend to sort of like drop the amount they're paying you and so the floor gets lower and lower. But if you're efficient with things and you know what you're doing, you know what, like, if you were to accept every single order they gave you regardless of what it was, you would make a lot less than if you're picky with orders. And when I realized now that I'm not actually making a whole lot more, and I'm not making any less on the regular bike, being pickier about what I take than I was in an electric bike where I could be less picky because a four kilometer five kilometer drop off didn't matter because I wasn't doing the work was the bike doing the work. But the distance is because I can go with 35 kilometers an hour consistently, I'm still going furthers but overall time for delivery isn't any more or any less.

William Yin 44:09
So you just have to wait which one you want to do more right? This to me or whether or you can be more picky.

Matthew Ham 44:16
Because for example, if you were close to Ross's fails, there are a series of condos down on the Queensway southwest of that. But there's almost there's no restaurants around that area. So if you drop off to those condos, you then have to bike back another like two or three kilometers, just to get back into town. And you just have to hope that the next delivery is going to take you into town rather than away from that. So it's just easier to to to ignore those deliveries. Then it would be to like that's, that's the delivery that a car should do because there's parking there. It's not that hard to park and it's further out of town or If you have a delivery that goes north of Davenport, for example, the hill between Davenport and Sinclair is miserable on a regular bike. And I know because my friend lives at the top of Bathurst on St. Clair. So you sort of have to pick how much energy you're willing to expend. For example, if I wouldn't do it on an electric bike, the amount of battery that I burned to go up to St. Clair, even if I didn't have to use any battery to go back down would be like, maybe two or three orders worth of battery. So I'd have to consider it like is that order worth it for me to burn that much battery to get to do it. So this is whole, like math that you're constantly kind of doing to. But if you get good at picking what's worth it, you can make a good amount of money per hour. But you have to be very picky about it. So

William Yin 46:01

where do you see the industry within the next 510 years? Like will it be more like automated? Will it have more? Because the pandemic is going to be maybe over in one or two years. So yeah, then at this point.

Matthew Ham 46:19
I mean, I don't know where it's going to go. Automation still has its pitfalls. There is a company called tiny mile that is currently already doing automated food delivery. Semi automated, they're there. I'm not sure. Do you live anywhere on downtown on the line, they've been gone. So put up north. Okay. They have these little pink robots that do deliveries, food deliveries, and just other deliveries around town. And they're remotely piloted. So if you look up, if you google tiny mile, there is adorable pink robots with hearts for eyes, their screens, but their hearts so they can actually blink at you. And they're like these little disabled little pink boxes with wheels that just drive around mostly spinners where I see them is going up and down, spit on. Slow?

William Yin 47:20
Is it a really easy thing. It's a good thing. The other thing that's happening or was it like a happen for three years now?

Matthew Ham 47:26
It's happened for a couple years now you just see more of them now. It used to be that I'd see them like maybe once a month and I see them like every other day. If you go if you go up and downs to dine, I almost guarantee to see at least one beach Spadina between like college and Queen. You'll see at least one. Okay, yeah, it's usually like a herd of them it's. And so the thing is, they have to take the sidewalks. And so they go pretty slowly. And so for speed, they're fine. They're they're, they're slow there. And so as of now, I think they're limited to two kilometer deliveries. And then the time that that one of those would do a two kilometer delivery mark up courier can do two or three deliveries in that time. Okay. So bikes are still going to be way faster, because we can take roads, automation. And so like automation right now is pretty limited to sidewalks. Because if you have an automated car, you're stuck in traffic, you're not really gonna be all that fast. And if you have an automated no one's got an automated bike. At least they can ride in the city. And then yeah, sidewalks are gonna limit your speed. So you have a kind of low radius at that point. That gets more into the issue of bike. Yeah, I think self driving cars are one of those things that are going to be it's like nuclear fusion is going to be perpetually five or 10 years away. I think it is because that last mile of technology required isn't really is way harder than anyone thought it was. And so, my hope and, for example, this gets into more like the political goal, economic things about the UberEATS model as a model that makes basically no one happy except two breeds and not even them, I don't think because they're the middleman and they take somewhere between 15 and 30% of the restaurants Cut, and they're already running very, very low profit margins. And then they use that to pay to career. But if it's a low value order, that's not enough money, so then that money has to come from somewhere. So there's like the delivery fees that they add now. Stick the service fees on top of the delivery fees, I think. And then the customer is basically responsible for paying the rest of it and tip. And I think it's kind of a shitty situation, because that tip goes on to the career. And now that's good for me. But that should be for the kitchen that is not getting. First of all, getting like 15 to 30% taken off the top, and then also not getting the tip that they normally would from a walk in. I would hope that the future has more to do with CO Ops, I'm planning to reach out to federation of cyclic cooperatives in Europe, they have cool software that's open source and available only for cycle cooperatives. So I know the food, what is the gig Workers Union had someone reached out to them, but I guess never went anywhere. So I want to try that. Because I had actually, I'd actually done some work on mapping out, you know, how Korea is working, what a nice software would be for Korea for food careers. That's been some some years ago. And so if I can help with their development a little bit, that would be cool. But I think that's going to that would I hope be more common model in the future. Like there are a lot more places in Europe that are adopting this. where, you know, it's, it's cooperative of food careers. And then if you add, like

cooperative restaurants, for example, you can get, you could maybe get some sort of services that would be different, like I have a hole, I know you got to go to class.

I think there's a lot of room for improvement in the space. And a lot of it has to do with the fact that on demand is really, really hard. And I think if people were willing to be a little more flexible in terms of when things got delivered, you could actually have a more humane overall system. Because on demand delivery requires that there constantly be for on demand delivery to work well for the customer, there has to be a surplus of riders, this surplus of riders that mean someone's not getting work. And if you're stretched, there's not enough riders, that means the customers are not getting their orders fast enough, which means we didn't get cold. So if customers were more willing to to a order ahead and then be come down to get their orders. Because we do waste a lot of time in elevators. And the people in condos don't pay any more for that delivery than people in a house where I'm like, just dropping out the door and leaving. So like they pay me the same to go up 50 floors on an elevator than they do to give me just like dropping the first floor of the house. And that limits the amount of deliveries that I can do now. So if they were to say it's like, oh, so we've got, you know, some people order their food ahead of time. And then you can do a whole bunch of deliveries all at once, knowing the day ahead what your route was. And so you don't have to worry about and you know, you can look the restaurant now and be like, Look, we need, we're gonna need 25 orders of pad time 6pm and then they can know that ahead of time instead of because right now restaurants are being stressed by supplying customers, we're actually making them less money in terms of takeout or just for the food apps. So my hope would be some sort of more cooperative model where the restaurants get paid fully. The tips go to them or ideally we just don't just do away with tips all together and it's all just like one price that you see and But yeah, I I don't think automations a serious considering in the short term, like within the next five years, 10 years, maybe certain things I could see. But that's going to require a lot of work on like the political side of things because the you know, most of the barriers to automated deliveries are large scale. ELLs are really going to be more of a political thing. And they are going to be like a technological thing. Because those tiny mile robots they are, they're pretty limited.

William Yin 55:19
Do you use any external equipments now we're taking care of them.

Matthew Ham 55:24
And within elevators to get no service and within the hallways of a lot of condos, you get no service. So I mean, yes, it could work, but then you'd end up. It's a bit like the idea that Uber would make cities have less traffic because people wouldn't need to take their cars out. And instead, what happened is there was more traffic because there was all these Uber drivers waiting for people to get them rides. So you know, if if everything went automated, right now, in the short term, what that would mean is, you'd have streets flooded with little delivery robots, which might be adorable when there's only a couple of them, but it'll be kind of a in the ass and there's a whole bunch of them.

William Yin 56:12
Make sense? Let's see if the equipment that you regularly use, like helmets or anything else.

Matthew Ham 56:20
helmets. Yeah. Right now, I think a concern is that helmets are generally rated to 20 kilometers and 20 miles an hour. I think that's their standard is, but he bikes are making it to the kids way easier to go faster than that. Okay. And so, to mine, like, there are helmets that are rated for crashes, like a full face helmet feels excessive to be riding on a bicycle. Even electric one, it feels excessive. It's probably what a lot of people should be wearing, considering what you could get into as a career. There's nothing really, there's nothing that really appeals to couriers or like, Yeah, that would be like, I mean, maybe there is maybe there is any bike helmets that are like rated for higher than

William Yin 57:11
maybe like moped helmets or something.

Matthew Ham 57:13
Yeah, moped helmets might might work. A lot of it comes down, just ventilation to riding because on a moped, you're not exercising, and in a bike you are, and so the sweatiness factor can be really important. So you have to consider like ventilation. Back to ventilation requires batteries requires lithium next to your head. And then passive ventilation. Well, yeah, I guess you could like, certainly make a passive ventilation. But I think that's just the that's just the standard. I think it's just gonna happen. At some point when ebikes become this is gonna be more and more Evie helmets. I haven't I haven't also haven't looked they might exist already. safety equipment. Good brakes. Really important. This brakes would be generally better because they're last less affected by by wet. But then, you know, like a bike mechanic tool, but you're always at the end of the day by how much your tires can stop. So it doesn't matter how good your brakes are, if they lock out the wheel. And that doesn't stop you then you've got to ask that well. Mirrors aren't a thing that I use. I tried using years. And they were more of a hassle than a help. Often, I mean, just because my style of writing, I often squeezed between vehicles close enough that if I had a mirror sticking out at any significant distance, they just clipped the vehicle. But that's when they're like they're, you know, practically parked. So yeah, I saw someone do a review of mirrors and in general, like shoulder checking and using your fingers, which is better than mirrors in most cases, because like you're looking, otherwise, you're looking at a very tiny target and you're looking down so you're looking away from in front of you anyway. And at that point, it's just faster to turn.

William Yin 59:27
Do you think that there's anything that like any equipments that you can add to your like, as your job that would actually help you, like, help you improve your experience while working? Like any Oh, yeah,

Matthew Ham 59:39
I mean, it's just that I can't afford them right now. Honestly, like, as someone who went to design school and still loves doing design, I just go to the makerspace I'm making a hexagonal keyboard. I want to build my bike up slowly. Like I'd love to have just a better, like a hybrid, somewhere between my system of backpack and my backpack couriers currently use something that has very good support. And also shock protection, there are these backpacks, I'm not sure if you saw them where the whole backpack is actually mounted on a rail, like the pack part of it is mounted on a rail and the strap part of it. It's the rail system on the back. And so if you jump up and down, the backpack doesn't move with you. Oh, I

William Yin 1:00:38
think I've seen that one before. Oh, yeah, that? Yeah, yeah.

Matthew Ham 1:00:41
Yeah, that'd be really cool. If you could make it light enough so that it wasn't like a super heavy thing. And it was durable enough. And especially if it's not, if there's a risk of durability, then you have to make it modular, because like, again, it goes back to repairability. That is super important that things are easy to repair. That would be really helpful. Because So the thing is, Toronto is just not a very good city in terms of road maintenance. There's a lot of potholes you just can't avoid because if you avoid the pothole, you'd get a car. And so, yeah, I mean, like shocks would be great. Those are just on bikes. Electromagnetic shocks we awesome. Stupid, expensive, but awesome. Because then you could sort of adjust them based on what your needs were, and you wouldn't be losing as much power and you already have a giant battery in your bike, why not use it as like an electric bike that had an

extreme range. That would be awesome. Honestly, you know, Google, Google Glass for riders would be great. Because the pain in the ass looking at my phone all the time. And, you know, having it out or having it on the bike or whatever, it's like, it would just be nice to have Google Glass. I've just loved that so much more. Just to have the information right there available for me, instead of having to fiddle with my phone all the time.

William Yin 1:02:24
It's too bad that they actually canceled the project. So yeah,

Matthew Ham 1:02:28
well, the project still exists. It's just only for commercial purposes. So it's largely used just for like, training employees and certain niche commercial applications. I just wish that one of those commercial applications have been carriers, because the awesome we use our phones all the time, and it's really important that we don't look away. Because they'll give you like, I mean, this is like a software issue as well. But Uber Eats will give you an order while you're riding down the side of the road, like in traffic and you're like, well, I can't see what's going on, like I have to pull over and then pulling out back into traffic, if you're just is can be dangerous on its own. And so it's like, yeah, it's if you do your due diligence as to whether or not the order is worth it. You have to look down while you're riding a bike in traffic. or pull out your phone or even even on the handlebars is like, still at risk. He's still not paying attention. So yeah, I mean, something to help me carry things more comfortably. That would be cool, both on the bike and on my body because for example. So cargo bikes would be great if you're talking about stuff, not food, like heavier things, groceries and whatever, you would need a cargo bike for that because doing grocery runs with a backpack would be the end of your back. But for like food deliveries Yeah, something that would be maybe even a combination of using like the spring support and then also something that would hold it up from the frame. Because if you have something that's attached to the frame of the bike itself there's the risk that you can have it spill by simply hitting a pothole which is why a lot of people use their their backpacks, it's just because it's easier. You don't have to worry about some people will use actually like a like a milk crate and then put their backpack inside the milk crate or inside the basket. That can be a nice combination like having a backpack that could then just like attach to the back of your bike or whatever, for when you don't want to for when you haven't ordered the you know is not really much of an issue for spelling. You just need a break for your back. That would be super nice.

Modular, you know, modular courier bike. Of course, it's always fun. If you're I mean, I did look at your profile a little bit said you were in the vehicle design.

William Yin 1:05:17
Yeah. Can't do that right now as my

Matthew Ham 1:05:22
I know, I know you're not allowed to. But as someone who ended up doing a thesis project they didn't like actually, they didn't actually like doing can tell you that, like, what you should do is like, I can leave breadcrumbs for you, to let you do a vehicle. There's a whole bunch of problems that you could solve in the food, food, courier space, and a vehicle is one of them. So it's like, if you're passionate about designing a bike, it's better than it's better that you do that, and then find a job designing bikes, then you are to do the thing, the way that they want you to do it and end up designing some product that if someone hired you to design, you know more of those products, you'd be unhappy. That would be that would be my advice is like, find something you're passionate about. And do that because your thesis project is going to be your biggest project. So do something that is like because my mind is a project and that being in healthcare, and I specifically didn't want to work in healthcare, because there's so much red tape there that it is, is really expensive to test. I just did it because it happened to be really easy to enter who my dad is a doctor. Right. And so I didn't like a project. And I didn't I

couldn't use the project to get jobs afterwards. It's like, if you want to design a bike, you just tell me, I can leave the breadcrumbs so that you can design a bike because there's definitely things that could happen in the courier space. In bikes, but there's definitely things that aren't really available. Like there are, there are courier bikes that have just like giant ass batteries on them. They're missing a few other things, though. And I think a lot of it just comes down to making something that is affordable, durable as hell and super easy to repair. Think of something like the framework laptop laptop,

William Yin 1:07:24
yeah, that he can just put everything. Yeah, but like

Matthew Ham 1:07:27
a button bike, I think that would be the future, personally, because distances are getting longer. And it's it's tiring. to ride a regular bike, it doesn't number in your body makes you in great shape. But it's the kind of shape that you like your older self will probably not appreciate. Because of all the aches and pains that you get. So that's why you see, e bikes are kind of the future at least and I think of delivery. And so something something modular, something easier, something modular is making repair, and as big as battery that is centered awaited as a personal preference of mine. But, for example, the electric bike that I had back end had a battery in the back end. And that meant that if I ever tried to the weight was very back heavy, which meant that I ever tried to ride no handed, which sometimes I would do just to like do or undo a belt buckle or something like that. Hard to do a belt buckle that I forgot, the front of the bike was shaking, like really, really seriously. As in if I didn't put my hands on it, it would literally fall over. Which is not a problem with a properly weighted bike. So center weighting is great for maneuverability to big ass tires. I think you should know that. If you're not into bikes, it has only been relatively recently learned is that fatter tires aren't necessarily slower. The common knowledge for years with a thin skinny high pressure tire was the fastest you could get. But be more efficient, because like you know steel on steel is more efficient than rubber on pavement. However, as it turns out that there are a lot of efficiency losses from the vibrations of like on a perfect road that is true. But on a bumpy road. There's actually a lot of efficiency loss just from the vibration. And so having a wider tire with a wider contact patch is actually in some cases faster. The only difference is that you have to move the mass of that tire. So there's those efficiency losses, but those from people who ride them generally feel much more confident having the big ass tire on the bike because you have a much bigger contact patch And then once you have those big tires, then of course, you could just switch them for like, big novelty ones that needed to end up in the winter.

William Yin 1:12:16
Yeah, I think I was thinking of either have some sort of bike or vehicle, like, both things are kind of fine for me. So

Matthew Ham 1:12:25
yeah, I mean, like so delivery vehicles, you could definitely do a delivery vehicle. The one issue you're always gonna run into with these in the city is going to be just traffic, and traffic

William Yin 1:12:43
and yeah, sizing and stuffing down. Yeah.

Matthew Ham 1:12:47
I could probably think it's like it's the bike courier stick together. And the drivers are sort of like their own individuals. So I don't know a whole lot of like people who did driving. But one thing is that like parking tickets add up real fast. And traffic is absolute hell. I have actually seen people do deliveries in pairs, where one person runs into pick up the food and the other person drives. That's pretty smart. Now, it's smart, and less than that, but now per person, you're earning half as much.

William Yin 1:13:20
Yeah, that's true. Unless it's your partner, I guess.

Matthew Ham 1:13:25
Yeah, I guess if you're doing it together, but you could also just be doing it separately or in twice as much. True. Yeah. And the thing is, like in the city electric bike, couriers are the top burners, it's only when you get to when you get outside of the Corps. That being an electric bike, that at that point, biking is kind of dangerous, because the speeds are higher for traffic and then and then at that point, cars make sense. But a lot of it just comes down to traffic and parking. And that's not to be underestimated. Because in the downtown during rush hour, it's just like, slow it's really really really slow as a car. And you know, when you consider that you're burning gas need to pay car insurance. or none of those things are concerned with careers especially as like since most careers are going to be renting. A lot of times utilities are included so they're not paying for the electricity and the batteries whereas they would be paying for gas. And if you like obviously you're gonna be paying for an electric but you think that this point pretty much any design is going to be electric. So saves electricity. That's still for vehicle size thing going to be a fair amount of electricity. And then you have to consider you have to consider you do have to specify who exactly you're doing this for because the bike career Like, I'm a bike curious, I know but by creative stuff. If you ask me, it's like, would you like a vehicle? Like, would you like a small, portable, much smaller vehicle for downtown deliveries and be like, No, I want a bike. Because I can still ride it in the bike lanes?

William Yin 1:15:17
Yeah, I guess that's a problem with doing a one on one interview, because you don't want to get one perspective, right?

Matthew Ham 1:15:27
yeah, you could also find if you, because you're interested in vehicle design, if you want to do a vehicle, you could talk to a car driver. Sure. But I can also just, if you want me to ask some of my career contacts I have if they would

William Yin 1:15:47
show Yeah, that'd be great. Can you send that through? Like maybe email? Or like, yeah,

Matthew Ham 1:15:54
I could I could reach out to them. And ask them, how they feel about that. And if then that I can give them I can give you their email.

William Yin 1:16:04
Yeah, that'd be great. They appreciate that.

Matthew Ham 1:16:09
Mike? Yeah. I mean, it's nice to it's nice to have, you know, food craze to get some attention. Just want attention.

William Yin 1:16:22
Yeah, I was looking at other people's like thesis and stuff now, like, no one has been like doing this. So I think that would be a very unique problem solving.

Matthew Ham 1:16:36
Yeah, I think the one thing that they might is going to be there's always going to be the issue of cost.

William Yin 1:16:48

Yeah, that's an issue.

Matthew Ham 1:16:52
designs that Humber likes to do that, like, they like their, like their vehicles. They really like their vehicles. And they really like their vehicles to be like, super forward looking things and careers might look at that and be like, well, how much is that gonna cost? Yeah, that's the issue.

I think if you made like repairability, and anything at scale can be brought down in cost. And if you design something that was really good for couriers, you could theoretically have

William Yin 1:17:28
that was maybe thinking of the maybe the kind of ride sharing, but for the couriers sharing the bike, yeah,

Matthew Ham 1:17:36
I know, I have considered that to like, the rental system of Zig is nice, except it's too expensive, and you don't get any equity. If you were to do like a ride sharing thing, that would almost be like, the probably the best way to do it. But I think, and I know, it's not really part of the Industrial Design thing. But if you're going to put in there, you might as well, I will say that like for careers. Because I was paying like, the highest $250 a month or so in four months, that's $1,000.08 months. That's $2,000. And in a year, I could have bought my own bus.

William Yin 1:18:20
Yeah, that point is nice.

Matthew Ham 1:18:23
Right, except that they did all the they did all the maintenance for you. So it was a flat tire, they fixed it for you. If your brakes were being weird, they fixed it for you. If your battery didn't work or something like that, they just like if something was wrong, they couldn't be fixed immediately. They just give you a new bike.

And that is definitely worth something. ride sharing would be a really great idea. I think just she could make it if you can make it a little more cooperative.

Yeah, because I think Yeah, for bike couriers have to consider it's like they're not as terribly affluent group. Exactly. But also, like, it would be really nice to have like that barrier to entry not be like I committed to buy a three $4,000 bike. Yeah, but also knowing that like, three years from now, I've been putting in as much money like, I have a stake in this now. It's not just like money I've could have spent on a bike. You know, I mean,

William Yin 1:19:28
so maybe some sort of entry level or something that they get their feet wet, I guess.

Matthew Ham 1:19:37
Yeah, yeah. I think but yeah. Ultimately. It's going to be it's going to be tough, but if you can thread the line between being practical for bike couriers and something you're passionate about. I think that's a winning combination.

William Yin 1:19:53
Yeah, that's probably yeah, that's pretty, pretty good option. A few more questions like What does like other people think about your work as a food carrier? Like, have you had any opinions?

Matthew Ham 1:20:15
You do need to see like news articles. Like I have friends. Like, I think the toughest thing for me is that no, I graduated near the top of my high school class. I got into mechanical engineering, with a scholarship. And now I'm about a career and that doesn't exactly have a huge social cachet. It's kind of like, pizza delivery driver. And so how we're not terribly respected, I feel. And you feel like a lot of people feel like it's just like a job you do on the side. And eventually get another job. I was always thought of as a temporary job. Yeah, like nothing I'm thinking you might ever want to do as like, your side hustle for a long time. Because right now I'm using it as my side hustle. Because it means that I can work when I want to, and then spend the rest of the time doing stuff like design. Where I can do the design that I want to rather than design someone's wanting to pay before. And then hopefully turn that into a business someday.

William Yin 1:21:26
Okay. So it's kind of like a temporary thing. Like in between, like,

Matthew Ham 1:21:31
it's temporary. But the thing is, like, if if I were able to, if I could do like 20 hour a week, 24 hour a week design job or something like that, and then make up the rest of that money being career. Like, I would have no issue with that. Especially like, of course, you know, I don't want to work once a month if I don't have to. But you hear a lot of people complain about their boss, or you can hear them complain about all the office politics. And all I can think of is like, well, these are the podcasts I listened to today. I almost got hit by a bus. Like I mean, I really get almost hit by buses, buses are good. But yeah, like the dramas just not there. And so the amount of emotional stress to bring home is just not there.

William Yin 1:22:30
So like physical versus emotional. Yeah.

Matthew Ham 1:22:35
It's a different kind of labor and with electric, like the physical if it was always taken care of. So then you were just like, it was just an issue of, do you have the discipline to just put yourself out there for enough hours? And also does your bike last long enough? Because I would have loved to do like an 11 to five shift or 11 to seven shift or something that just one big long trip, but maybe a break in the middle of food? But I can't because my bike won't like the battery system won't do that. Yeah. with electric bike, it was it's, it's, uh, you know, everyone in my family told me that, like, when I was a bike career, I was the happiest. Because it just was like, I got to exercise all the time. I got to be outside all the time, I

William Yin 1:23:32
guess, less responsibilities, I guess? Like, it's not really?

Matthew Ham 1:23:36
Yeah, it's like, on the one hand, you're totally replaceable. And that's makes you not feel that important. And on the other hand, you're totally replaceable, which means that no one cares if they've gone. Yeah, it's kind of like, it's a double edged sword, right? That's a vacation. You don't have to ask anyone for permission for vacation, you just go. And you can make a decent like, you can make a good living if you're efficient with it. You know, I talked to one guy who was making, he said he was making 16 to $18 an hour. And I was like, really, because like, electric, like I was making like a minimum of 25. And sometimes, you know, on a week where I went work only 15 hours that week, I could make $30 an hour on the average on a regular bike. But that's being that's cherry picking orders and being very, like efficient. If you Yeah, if you accepted every order that they gave you, regardless of where it was, you might make like low 20s you have to consider that that's like, that's no no dental

that's not healthcare that's not much left on your own really this instead of having to save that money yourself to, you know, if you get injured, which does happen, you know, I broke my arm on an unrelated thing and couldn't work work for two months and not like how I think it would be nice because there are, there are, there's a small group of people who would love to do this for their entire life, because it's just like, a certain freedom to it and a culture to clearly enjoy. And most people are always just going to be, it's going to be their temporary work. And it would just be nice to have room for both.

William Yin 1:25:22
Okay, so yeah, take into consideration how other people so

Matthew Ham 1:25:28
in terms of how other people tend to view it. Yeah, it's not exactly looked on as like a as like a career. No one thinks you're, you know, that's your career. So,

William Yin 1:25:39
yeah, that's sure. Yes. I've been watching. I think like one my prof sent me a video of like, careers in New York City and like holy shit, I think is like, really intense. is like 60 hours a week that he was an immigrant or something that and he has applied in so many hours and stuff. Like this, he can like issues like, half the chapter like Ed blocks just for when I scream with something that on the extreme men.

Matthew Ham 1:26:09
Yeah, so that is that is where the frustration kind of wise because and that's more of a systemic thing. No one pays any more to deliver a single ice cream across town than they do to deliver like, a $300 sushi platter. Yeah,

there's no difference in the delivery fee for either of those orders. And it's a bit of an issue, like the pricing for items is just kind of wonky. Because, you know, for someone to say like, Oh, it's 11pm on a Friday night, I really need a bottle of wine on Davenport. But I live. But the only place that sells wine around near close, I'm gonna order one from Queens. And I'm like, No, are these I'm not delivering it. Because, like, at basketball, get adult a $2 tip all the way from the water to like north of where I want to be. And the fact that that that that makes economic sense for them is kind of broken.

William Yin 1:27:23
Yeah. That's kind of more of a systematic problem with Uber.

Matthew Ham 1:27:29
That's a systematic problem. Yeah, there's no real product to solve that. Exactly.

William Yin 1:27:36
I think that's I think question I have. Seems like it. Yeah. Most like Do you know any other careers of companies that can make follow up on for this topic?

Matthew Ham 1:28:02
Oh, yeah. Yeah, I know if you I can I can reach out to them and see if they'd be interested.

Matthew Ham 1:28:32
Right. It's, it's kind of late to go out for it was raining. I was too late to go up for work. So I was just gonna sit here and wait. So I don't mind. If you're going to spend plenty of money if you end up doing a vehicle you're gonna spend plenty of money on 3d printing. Yeah, plenty of money. So yeah. I mean, hopefully, fingers crossed. Maybe maybe by the time you actually need 3d printing services.

Well, I can convince the to a library to to get a resin printer. Because then you don't have to spend like $2,000 on 3d prints, which some people did.

William Yin 1:29:34
Yeah, I think we spend our money on 3d printing I call the most fun even have.

Matthew Ham 1:29:40
Well, it's also just like using if you spend $2,000 on 3d printing, you save yourself like two dozen hours on sanding. Yeah, sure. Because like, yeah, some of those 3d prints. Can you order them far enough you can order them from like, some place far away. That doesn't really cheaply and really high quality And then you spend way less time then because bondo and sendings probably already knows. Not a good time for a long time.

William Yin 1:30:08
Imagine that. Yeah. That's pretty much it for me. So, I guess

Matthew Ham 1:30:17
yeah, I'll send a message right now to some friends to let you know,

William Yin 1:30:22
let's look for a way to keep in touch with you. And

Matthew Ham 1:30:29
like, Hello is not the right place for me. But if I can help someone, I have a little less miserable at time. And thank you so much. endorsement. Alright, well, we'll talk to you later.

William Yin 1:30:47
Yep. Catch you later.