

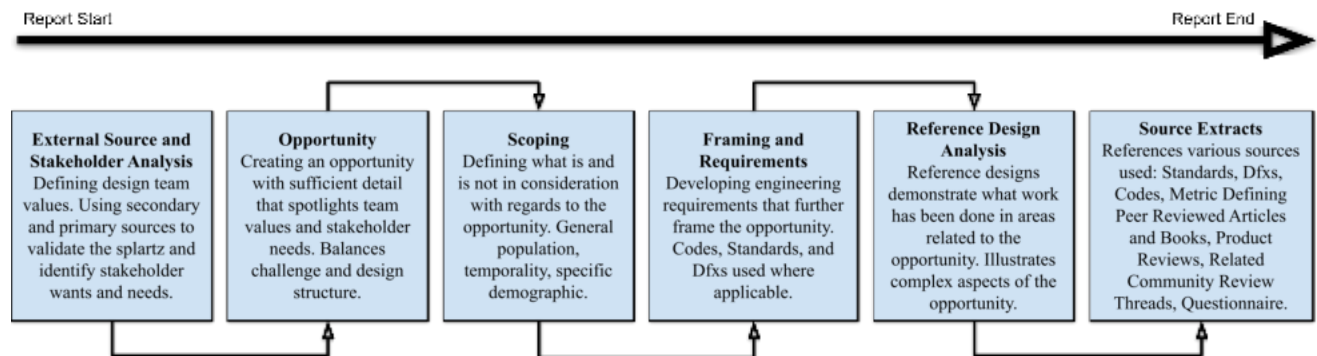
Optimizing Helmet Storage for Urban Cyclists at UofT: A Comprehensive Design Brief

Words: 3456

1. Intro:

On the UofT St. George campus, cyclist commuters face the inconvenience of carrying their helmets for extended periods. This report aims to provide the necessary information for an engineering team to successfully develop a design that can adequately fulfill the opportunity. The report commences with an analysis of secondary and primary source data to reasonably justify that carrying around a helmet is indeed a splartz. This analysis is used to gain a detailed understanding of the stakeholders' wants and needs, which are taken into consideration to scope and define the opportunity. Applicable engineering requirements are then developed to frame the opportunity and are used to analyze existing reference designs, ultimately concluding that existing solutions are infeasible.

Figure 1. An overview of the structure of this design brief:



2. Stakeholders and Background:

The central stakeholders are the design team and cyclist commuters. The core values of the design team are healthy living, environmental health, living below means, inclusion, and safety prioritization. This brief focuses on cyclist commuters at UofT (a parameter set by the extent of a questionnaire conducted [6]), though the brief findings may apply beyond.

According to the National Safety Council, as of 2015, there was a 29% helmet usage rate among US adults [1]. Health reporter Judy Siegel-Itzkovich, an expert with over 31,000 news publications, says that, “some cyclists prefer to do without helmets in town, saying they are a nuisance to carry around” [2]. Additionally, three Reddit threads regarding bicycle helmet use

and storage [3][4][5] with 306 comments support the previous two sources that it is indeed an inconvenience to carry a helmet around by hand or securing it to the backpack (the design understands that Reddit is a potentially weak and biased source). Together, these sources affirm that the challenge of carrying around a helmet for extended periods of time is indeed a splartz.

This conclusion is further substantiated by a campus questionnaire the team conducted around bike-locking lots [6] which found that 74.5% of 51 respondents had negative helmet storage experiences. The questionnaire identifies three primary issues that cyclists run into when they are not wearing their helmet: 9/9 people who put their helmet in their bags find that the helmet is too big and takes up too much space, 4/4 people who clip their helmet to their bags frequently state that the helmet “gets in the way” or is “too bulky,” 9/10 people who carry around their helmet claim that it is easy to forget when it is not secured, and 8/10 people who leave their helmet with their bike state that it gets wet and could get stolen. Interestingly, 42% of people who either do not commute or do not wear a helmet, stated in the questionnaire that they do not wear it because it is either too big, or inconvenient to store once in class. However, data from the questionnaire may be leading or biased and it is important to mention that the sample size of this questionnaire should be increased dramatically to improve the validity of the data.

3. Opportunity and Further Stakeholder Analysis:

From the questionnaire responses and secondary data, it is evident that the stakeholders desire comfort (as they dislike bulkiness, rain), security (they fear theft), and convenience (they like having free hands). Together, the design team’s values and the cyclist commuter’s wants and needs (altogether the stakeholders) introduce a possible engineering opportunity to provide a reliable, convenient, secure, and versatile means for cyclists to store their helmet without compromising comfort. Ultimately, tackling this challenge is intended to ameliorate the overall urban commuting experience and potentially even encourage more cyclist commuters to start using helmets.

4. Scoping:

The population of stakeholders that the opportunity applies to is UofT cycling commuters because all first hand data was observed solely on campus. The opportunity has no temporal limitations given tuition’s lack of seasonality and students commuting at all hours (cyclists commute all-day, year-round). The questionnaire suggests that the inconvenience of carrying a helmet deters people from wearing helmets, making all UofT commuters stakeholders (helmet wearing and non-helmet wearing alike). The opportunity is broadly inclusive, not confined to specific helmet types of storage mechanisms, aligning with the design team value of inclusivity.

5. Framing and Engineering Requirements:

Table 1 Legend: Different colours under the “detailed objective” column are sub-objectives of the higher-level objectives of reliability, convenience, security, versatility, and comfort (taken directly from the opportunity). **Green** is a sub objective under high level objective security, **blue** is under convenience, **purple** is under reliability, **pink** is under comfort, and **grey** is a sub objective under versatility.

*Table 1.*¹

Detailed Objective: (sub objectives)	Metric:	Constraint:	Criteria:
1. The helmet's storage system should be strong.	Metric 1. Yield force of security mechanism [newtons].	1. The yield Force of the security mechanism must be optimally equal to or greater than 980 N as specified by Huang [7]. This is the maximum load structural members of an average bicycle frame may bear. Additionally, a good helmet storage system should optimally be able to withstand the maximal human pulling force (\approx 1000 lbs); a testing method taken from a published Anti-Theft Bike Rack report [8]	1. The more force the storage mechanism can withstand, the stronger the storage system (and the better). Both metrics need to be featured as there are various forms of helmet storage.
2. The security, safety, and structure of the helmet should remain the same before and after storage.	Metric 1.* Gadd Severity Index score where GSI is measured as $GSI = \int_{t_o}^{t_i} a(t)^{2.5} dt$ and is a method used to test a helmet's ability to reduce impact forces against the head by integrating acceleration over time. $a(t)$ is the acceleration vector in	1. The helmet should have the same Gadd Severity Index score prior to and after storage using the official Canadian anvil-testing helmet security method delineated in 5.2.3.1 and 5.2.3.2 of CAN/CSA D113.2-M89 [9]. The Gadd Severity Index Score should be less than 1500 in accordance with	1. The smaller the change in Gadd Severity Index before and after storage, the less affected the helmet's safety is, with zero change being the most optimal.

¹ Note: some metrics may be beyond the measuring abilities of first-year Engineering Science students (such as the Gadd Severity Index testing metric). If the metric is too difficult for a design team to use, they should refer to an alternative metric under the same sub-objective that will likely be less complex.

<p>(the above objective also falls under the high-level objective of reliability)</p>	<p>gravitational units (g's) of the headform as a function of time (seconds).</p> <p><i>* may be too complex for eng-sci first years.</i></p> <p>Metric 2. Difference between volume of helmet (as a percentage) before and after storage, ignoring the effects of temperature expansion and contraction</p> <p>Metric 3. Percentage difference in the surface area appearance before and after storage.</p>	<p>the CSA standard (pg. 11).</p> <p>2. Percentage is constrained to less than 100% (all volume is loss) and 0% (no volume is loss)</p> <p>3. Percentage difference is constrained to between 0% and 100%.</p>	<p>2. The difference between the volume of the helmet before and after storage should optimally be 0%, as a greater than zero percentage would indicate that parts of the helmet have broken off from structural instability.</p> <p>3. There should optimally be zero percentage difference between the initial and final states of the surface helmet in terms of surface area; a difference would indicate scratching, knicking, or decay.</p>
<p>3. The storage system should be efficient and quick to use.</p>	<p>Metric 1. Time taken to store the helmet in seconds spanning from the moment the helmet is taken off the head to the moment the helmet is fully stored.</p>	<p>1. The helmet should take less time to store than the average time it takes to lock a bike, which we observed to be 18.4 ± 0.2 seconds (0.2 seconds being the error in reaction time). Helmet storage should take less time than bike storage because 51/51 of the original questionnaire applicants reported that helmets should not take more time to store than the bike.</p> <p>This benchmark was</p>	<p>1. The less time it takes to store the helmet the more convenient it is for the stakeholder and thus the better.</p>

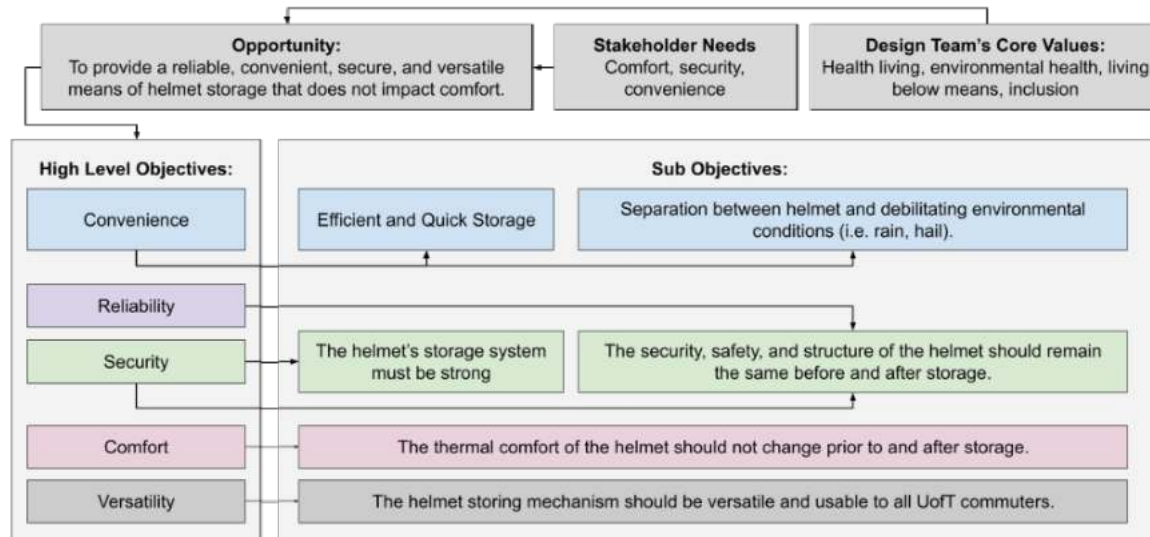
		<p>established through an observational survey of 23 individuals locking their bikes on campus [10] in which a stopwatch was used to record the time spanned between the moment they placed their bike against the rack to the point at which their bike was completely secured by the lock.</p> <p>However, a greater sample size should be reached to get a more accurate number.</p>	
<p>4. The storage system should create separation between the helmet and debilitating environmental conditions (i.e. rain, hail).</p>	<p>Metric 1. Exposure of helmet to external environment (by percentage of surface area affected).</p> <p>Metric 2. Hydrostatic pressure of water on material of storage. (minimum pressure needed for water to seep through material)</p> $p = \lambda_w gh$ <p>Where λ_w is water density [$M \cdot L^{-3}$], g is the gravitational constant [$L \cdot T^{-2}$], and h is saturation depth [L]</p> <p>Equation retrieved from the</p>	<p>1. Exposure to the external environment must be minimal (0% is optimal).</p> <p>2. The least hydrostatic pressure allowed is that from a column of height (h) of 1000mm [12].</p>	<p>1. If a helmet is fully exposed to an external environment, its state may be affected by the weather (i.e. rain or strong sun). The less exposure the better, as it is convenient and comfortable to stakeholders for the helmet to not be covered by rain, snow, ice, etc.</p> <p>2. Similarly, the material in which the helmet is covered must be weatherproof. A helmet covered in a tote bag would not satisfy the objective of ‘separating helmet from external environment’. A greater hydrostatic pressure would be desirable as it means the material is more waterproof (less likely to permeate</p>

(Also under comfort)	<p>Encyclopedic Dictionary of Hydrogeology [11] (pg. 187).</p> <p>Metric 3.* Coefficient of Water Permeability of Containment Material (measures how susceptible a material is to water permeation, assuming laminar flow)</p> $k_w = \frac{A' L}{A t} \ln \left(\frac{h_0}{h_f} \right)$ <p>A' = internal area of enclosure A = area of sample in contact with water L = sample thickness t = time h₀ = initial water head h_f = final water head [13].</p> <p><i>* may be too complex for eng-sci first years.</i></p>	<p>3. Coefficient of water permeability should be near zero: 8×10^{-12} m/s is considered to be waterproof by [13].</p>	<p>through storage apparatus).</p> <p>3. The lower the coefficient of water permeability the better because water should not penetrate the storage apparatus.</p>
<p>5. The thermal comfort of the helmet should not change prior to and after storage.</p>	<p>Metric 1. Difference in temperature between surrounding environment and helmet in fahrenheit.</p>	<p>1. The difference in temperature between the surroundings and the helmet should be $\pm 3^\circ$ fahrenheit if stored at room temperature, or more generally $\pm 3^\circ$ fahrenheit of the surrounding environment.</p> <p>This is a metric adapted from “Principles of Heating, Ventilating and Air Conditioning” [14] which states that “thermal comfort in a steady state is experienced in a still-air environment at 75°F [where] a zone of comfort extends about 3°F above and below this optimum level for a person wearing</p>	<p>1. Less change in temperature between environment and helmet is better.</p>

		trousers and a long sleeved shirt.” In this case, we extend the findings of the optimal temperature for trousers and long sleeved shirt to helmets, leading to some inaccuracy.	
6. The helmet storing mechanism should be versatile and usable to all UofT commuters.	<p>Metric 1: Success score, calculated as the number of individuals who find the engineering helmet storing method less inconvenient than their previous helmet storage method, divided by the total number using the new method.</p> <p>This success score versatility measurement is a simple yet well known usability metric used in various fields including computer science, business and engineering [15].</p>	Success score is greater than 0 and less than 1.	<p>The success score should be as close to 1 as possible (The closer to one the better).</p> <p>This is because a storing mechanism should follow the universal design principle of flexibility in use, in which the design solution should accommodate for a broad range of individual preferences and individual abilities as mentioned in the Universal Design Principles: Principles and Models book [16].</p>

The close relationship between the design team's core values, the stakeholder needs, the opportunity, the high-level objectives, and the sub objectives are shown below in figure 2. The flow chart shows the design process and train of thought in creating the requirements starting from the team core values and stakeholder needs.

Figure 2



6. Reference Design Analysis:

6.1 Thousand 'Poplock':

There have been various engineering designs targeted at fulfilling the opportunity of providing a reliable, convenient, and secure means for cyclists to store their helmet. However, this report first analyzes the validity of the "standard" helmet design [17], which is defined by "adjustable straps that pass down from the helmet body in front of and behind the ear on each side of the head, and that meet in front of and beneath the wearer's ears and pass around the chin" (pg. 13). This analysis is crucial as if the standard design fits the engineering requirements and needs of the stakeholders, there is no need for a novel solution to the opportunity.

However, an analysis of the standard design is not actually necessary as the questionnaire findings clearly indicate that the standard helmet design on its own is not a valid solution to the identified challenge. Of questionnaire respondents, 100% of the participants that cycle and wear a helmet report using a standard helmet design [17], with 40/51 respondents encountering issues with post-commute helmet storage regardless of what storage method they used. This underscores the standard helmet design's failure to provide a solution to the splartz and clearly does not fulfill the wants and needs of the stakeholders, highlighting the need for an engineering solution that surpasses the limitations of the conventional design.

Out of the products targeted at improving helmet storage that are currently on the market, this report specifically analyzes the *Thousand* helmet design [18] and the *Cappuccino Lock* [19], which both fall out of the “standard helmet design” due to having features beyond those mentioned in the CSA Helmet Standard, such as the Poplock and Sharelock features. The thousand year design has been chosen to analyze as it is a popular market item (551 reviews and five out of five stars on the buying website) and is consistently rated as a best helmet design [20][21][22], and the cappuccino lock has been chosen as it has been identified as an innovative and unique solution.

The thousand year Multi-Directional Impact Protection System (MIPS) helmet design features a “secret poplock”; a hidden channel behind the logo mark of the helmet that can be used to thread a U-lock or chain through, which is backed by MIPS’s “Anti-Theft Guarantee.” The design’s patent is still pending, and there is limited information regarding the design logistics of the Poplock feature. However, an analysis may still be conducted on the Poplock design through the verified reviews on their website.



Image 1: The above image depicts the Poplock feature; essentially a hole in the helmet that can be used to thread a lock through to lock the helmet and bike together to a rack [18].

Out of the 553 reviews on the “Chapter MIPS Helmet,” 63 specifically discussed the “Poplock” feature. Of these, 54 were positive and highlighted the convenience and usefulness of the Poplock mechanism. However, the 9 negative reviews, shown in source extracts 8.2.18, underscore issues including the Poplock feature leading to damage of the helmet, the Poplock hole being too small, or the Poplock cap falling off. These negative reviews provide insight into whether the engineering requirements are followed. An aspect of the opportunity that is hard to see, but this reference design presents, is the importance of reliability in the storage system. The fact that the Poplock broke in various instances has a negative impact on their respective stakeholders. Thus, by ensuring reliability in our opportunity statement and requirements, the design team protects its stakeholders accordingly.

One specific reviewer, Melanie, reported that the helmet was scratched everywhere even though “all [they] did was lock [the helmet] to their bike.” Similarly, at least one person mentioned the

issue of the Poplock cover detaching. The criteria for metric 3 of detailed objective 2 of there being “zero percentage difference between the initial and final states of the surface helmet in terms of surface area” is therefore not satisfied as there would be a greater-than-zero percentage difference caused by scratching. Additionally, since various reviewers also reported the cover of the poplock falling off, the helmet also occasionally fails to meet the criteria 2 of detailed objective 2, as the volume of the helmet is not consistent before and after storage.

Various reviewers also reported that the Poplock was not usable for their lock, from the Poplock hole being too small. This raises an issue of versatility, challenging the requirement that the helmet storing mechanism should be usable to all UofT helmet-using bikers, as those with big locks would be barred from using the Poplock mechanism.

Based on the analysis of these individual negative reviews, it still remains challenging to determine the helmet’s compliance with the engineering requirements, as these negative instances appear to be outlier cases and the credibility of the reviews can not be ascertained. Indeed, the majority of helmet users actually expressed satisfaction with the design, suggesting that various engineering requirements were likely met. Arriving at a definitive conclusion with regards to the adequacy of the helmets engineering and compliance to the requirements necessitates hands-on testing. But despite the lack of hands-on testing, the negative feedback shows that the helmet does not sufficiently fulfill the engineering requirements, highlighting specific areas for potential improvement, such as in areas of versatility and security & storage.

6.2 Cappuccino-Lock

The Cappuccino-Lock, a locking mechanism which enables the strap of the helmet to be locked, does not fit the first requirement of safety and security because helmet straps are designed to withstand an average force of just 42 newtons, much less than the optimal 980 N [23]. Similarly, the cappuccino lock does not provide any exposure from ‘external debilitating environmental conditions.’ 100% of the helmet would be exposed to the external environment. There is also no method of storage that metrics two and three (waterproof material related metrics under detailed objective 4) can be compared against. Together, the lack of compliance between the Cappuccino-Lock and the aforementioned requirements indicates that the cappuccino lock does not fill the design space. Additionally, a review of the product states that: “the Cappuccino-Lock does not fit all helmets...It doesn't fit on older models...like my Genesis from 2011 [24].” The absence of versatility in the Cappuccino-Lock seen in the product review exhibits the need for versatility in the opportunity statement, which is an aspect that can easily be demonstrated otherwise.

Figure 2. Depiction of Cappuccino Lock in Use [24]



6.3 Collapsible Helmet-Wizmet

Another design targeted at improving helmet storage is the innovative “collapsible helmet.” This design addresses the challenge of inconvenient helmet carrying by minimizing the volume that the helmet occupies. The Wizmet, a prototype invented by Chen in 2021, is a foldable helmet that takes up minimal space in a bag [25]. This decreases the weight to volume ratio attained by the helmet and makes it more ideal for carrying around. By not offering a storage solution, the challenge of carrying around a helmet remains. An aspect of the opportunity that is hard to see, but this reference design presents, is the minimization of volume and mass in regards to a helmet storage system. This is favourable because it enables stakeholders to put less effort into manipulating the storage system (less force needed to move and easier to hold since there is less volume and it is lighter).

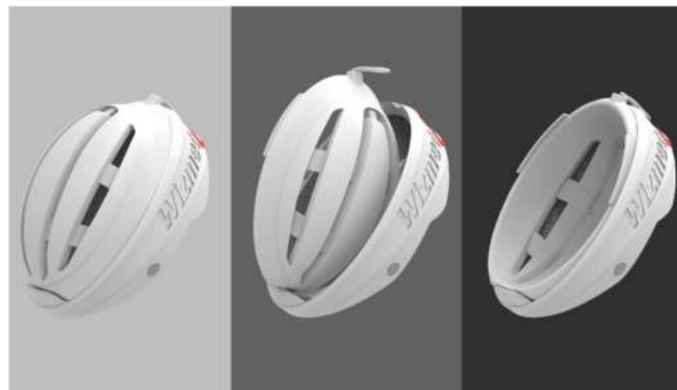


Figure 3: Wizmet collapsible helmet [25].

7. **Conclusion:**

This design brief introduces an opportunity for the identified splartz of carrying a helmet around at the University of Toronto. It first begins by validating the existence of the splartz through primary and secondary data. Then, by examining the needs of the stakeholders and aligning them

with the design team values, the brief identifies an opportunity that addresses the inconvenience. The opportunity is more specifically to provide a reliable, convenient, secure, versatile, and comfortable means for cyclists to store their helmet. To provide clear guidelines for a design team, specific requirement strings derived from the objectives outlined in the opportunity statement are then formed. These requirements are then used to evaluate existing reference designs to show what prior work has been done toward a solution. Overall, this brief establishes a framework for a design team to begin the creative process of developing innovative solutions to enhance the helmet experience for cyclists at the University of Toronto.

8. Appendix

8.1 References:

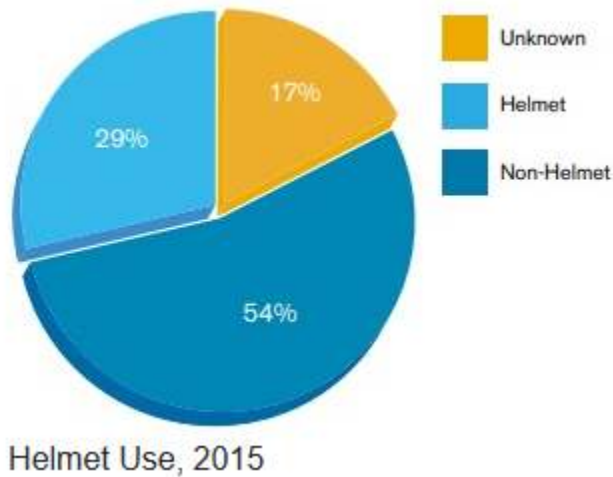
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8.2 Source Extracts:

8.2.1 National Safety Council Pie-Graph [1]:



8.2.2 J. Siegel-Itzkovich Statement On Why Some People Do Not Wear Helmets [2]:

Some cyclists prefer to do without helmets in town, saying they are a nuisance to carry around – and also mess up hairstyles. Companies that rent out bikes were concerned they would lose customers who didn't want to carry helmets to work and elsewhere.

8.2.3 Reddit Upvotes On First Thread Of Three [3]:



Sort by: Best ▼

8.2.4 Reddit Upvotes On Second Thread Of Three [4]



8.2.5 Reddit Upvotes On Third Thread Of Three [5]



8.2.6 Bicycle Helmet Questionnaire for Stakeholders (Responses) [6]:

Timestamp	Are you a cycling commuter that uses a helmet	How often do you commute with a helmet? (Daily, Weekly, Monthly, Rarely)	How do you store your helmet	Do you find anything annoying about storing your helmet?	Should storing your helmet take longer than the time it takes to lock your bike?	Is your helmet considered standard (no features beyond those in the CSA helmet standard)
20/10/2023 10:27:17	Yes	Daily	Lock it to your bike	Drop it often; you take the u-lock off and it falls so it is very annoying.	No	Yes
20/10/2023 10:28:41	Yes	Daily	Carry it around	Yes, its such a disturbance when my hands are full, and yet tasks must be performed. It is a true conundrum, and I wish for a solution to present itself	No	Yes
20/10/2023 10:43:56	Yes	Daily	Carry it around	yes, its annoying to carry, and i leave it in class sometimes	No	Yes
20/10/2023 10:53:12	No				No	
20/10/2023 10:54:32	Yes	Monthly	Carry it around	Not really	No	Yes
20/10/2023 11:01:21	Yes	Rarely	Put it in your bag	yee* very big so it takes a lot of space	No	Yes
20/10/2023 11:12:43	Yes	Daily	Carry it around	its too big for my bag sometimes	No	Yes
20/10/2023	Yes	Daily	Carry it around	it swings around the outside of my bag	No	Yes

11:23:49						
20/10/20 23 11:30:08	Yes	Daily	Lock it to your bike	sometimes hard to lock	No	Yes
20/10/20 23 11:37:55	Yes	Daily	Lock it to your bike	when i forget to lock helmet and have to reunlock	No	Yes
20/10/20 23 12:31:42	Yes	Weekly	Carry it around	It takes up space on my desk when I am studying and sometimes i forget it in some places.	No	Yes
20/10/20 23 13:44:06	Yes	Monthly	Carry it around	takes up space, might be easy to forget places,	No	Yes
20/10/20 23 13:44:53	Yes	Daily	Put it in your bag	It's quite bulky and basically takes up an entire pocket of my bag	No	Yes
20/10/20 23 13:46:54	Yes	Daily	Put it in your bag	takes up a lot of space in the bag	No	Yes
20/10/20 23 15:14:53	Yes	Weekly	Carry it around	can be annoying when My hands are full	No	Yes
20/10/20 23 15:18:29	Yes	Weekly	Put it in your bag	too big. can't find my pencil case sometimes	No	Yes
20/10/20 23 15:22:13	Yes	Weekly	Put it in your bag	It takes up space in my bag and its really annoying cause the helmet super fat	No	Yes
20/10/20 23 15:23:42	Yes	Rarely	Lock it to your bike	i might get stolen	No	Yes
20/10/20 23 15:25:07	Yes	Daily	Lock it to your bike	it gets rain in it	No	Yes
20/10/20 23 15:26:05	Yes	Weekly	Carry it around	it is bulky and a weird shape for storing	No	Yes
20/10/20 23 15:31:00	Yes	Daily	Put it in your bag	takes up a lot of bag space, blocks access to equipment	No	Yes
20/10/20 23	Yes	Rarely	Put it in your bag	i usually dont wear it cuz annoying to carry	No	Yes

15:36:22						
20/10/20 23 15:39:51	Yes	Daily	Put it in your bag	takes up a lot of space.	No	Yes
20/10/20 23 15:46:04	No	Weekly	Put it in your bag	yes. it's big and hard.	No	No
20/10/20 23 16:12:51	Yes	Weekly	Lock it to your bike	yes i have nowhere to store my helmet. holding it in hand is annoying i've already lost one helmet	No	Yes
20/10/20 23 16:13:50	No			where woul. i put it when i get to school	No	
20/10/20 23 16:14:32	No			Kinda clunky	No	
20/10/20 23 16:15:22	No	Rarely		Could be annoying to carry around	No	
20/10/20 23 17:11:00	Yes	Daily	Put it in your bag	It takes up too much space.	No	Yes
20/10/20 23 19:00:57	Yes	Rarely		It hits me when I'm walking (bulky)	No	Yes
20/10/20 23 19:05:16	Yes	Daily	Clip to bag	Hits my side which can get very annoying when I need to run	No	Yes
20/10/20 23 19:07:01	Yes	Weekly	Wear on head	Not really but the helmet can mess up my hair and some of my friends think it looks weird.	No	Yes
20/10/20 23 19:07:54	Yes	Daily	Lock it to your bike	Always a little worried that someone might release/cut the strap.	No	Yes
20/10/20 23 19:08:33	No			I probably should wear a helmet. Just too carefree.	No	No
20/10/20 23 19:09:07	Yes	Rarely	Wear on head	no	No	Yes
20/10/20 23 Yes	Yes	Weekly	Clip to bag	not much but it is sometimes annoying to unclip/clip in	No	Yes

19:09:53						
20/10/20 23 19:41:03	Yes	Rarely	Lock it to your bike	gets wet in the rain, sometimes i worry about it being stolen, especially at night	No	Yes
20/10/20 23 19:41:16	No				No	
20/10/20 23 19:42:36	Yes	Weekly	Clip to bag	gets in the way when in high person traffic areas	No	Yes
20/10/20 23 19:44:23	Yes	Rarely	Carry it around	annoying to hold and needs to be placed on the ground when i need both hands	No	Yes
20/10/20 23 19:45:16	Yes	Weekly	Wear on head	messes up my hair but i guess that happens anyway. its also kind of uncomfortable to wear for such a long time	No	Yes
20/10/20 23 19:46:00	Yes	Weekly	Put it in your bag	takes up too much space, stuff gets caught in the straps	No	Yes
20/10/20 23 19:46:35	No			i dont wear one because the cons outweigh the pros i think	No	
20/10/20 23 19:47:42	Yes	Weekly	Clip to bag	really bulky on the back of my bag and sometimes worried that its getting damaged everytime i drop or put down my bag	No	Yes
20/10/20 23 19:48:40	Yes	Daily	Lock it to your bike	im not sure how well locked-up it is on my bike, i wonder if i left it on my bike where there arent as many students if it would get stolen	No	Yes
20/10/20 23 19:48:54	No				No	
20/10/20 23 19:51:57	Yes	Daily	Put it in your bag	its hard to fit everything in my bag	No	Yes
20/10/20 23 19:52:08	Yes	Monthly	Lock it to your bike	no	No	Yes
20/10/20 23 19:52:16	No				No	

20/10/20 23 19:53:20	Yes	Monthly	Carry it around	just a nuisance to keep rack of	No	Yes
20/10/20 23 19:55:27	Yes	Daily	Lock To Bike	scared of it being stolen	No	Yes

8.2.7 A Study For Prevent Theft of The Bike Design and Analysis Relevant Parts [7]:

4.4 Analysis of Frame Structure Strength

Following the completion of model creation was a stress analysis to ensure the bicycle is free of safety concern under loads. To do this, an ANSYS Workbench module was run on the ANSYS 11.0 software. As the first concept herein features taking part of the top tube of a bicycle as a rod piece of the lock device, while the second concept features the adoption of existed bicycles available in market, the stress analysis will be applied only to the exclusive anti-theft bicycle of the former. We applied user's body weight on the bike frame, ignoring the stresses, distribution and variation thereof caused by the weight of the frame itself, whereby to understand whether each rod is adequately strong, as reference for designing.



Fig.15 Bike frame under load



Fig.16 Bike frame under load

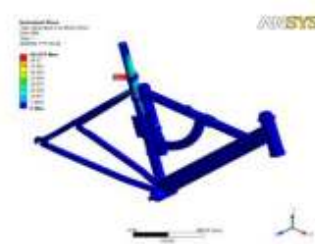


Fig.17 Diagram for stresses

We began by creating a static analytic model, which was used on the bike frame and the lock device, of the material of 7005 aluminum, in two applications of forces exerted on the frame, as Fig. 15 and Fig. 16 show. In the first application, a 980N force is exerted on the seat tube, and in the second, a 980N force is divided in 490N forces, each of which is exerted on the seat tube and the bottom bracket, respectively, for analysis. The analytic results were put to stress diagrams herein by the Von Mises

8.2.8 Anti-Theft Bike Rack Applied Research [8]:

Abstract: Bicycle rack typically consist of a base with supporting rails on the side to fit the tire of a bicycle. This rack act like a parking lot for bicycle, it is used to store and keep in the bicycle and make sure it will not fall. However, the rack available on the market today are very basic and not very secure. It is the same case for the public bicycle rack which in Malaysia, even a basic bicycle rack is hard to find as people prefer to ride a car or motorcycle. This public bicycle rack mostly can be found near public transportation stations. A bicycle rack with a built-in lock system was fabricated to enhance the security of the bicycle and will ease the user. The fabrication of an anti-theft bike rack consists of a stopper, pillar, housing, electronic box, and U-shape lock. The bicycle rack strength has been tested by forcefully pulling the U-shape lock using **maximum human effort**. The electronic locking system has been tested by attempting false trials to observe whether it will release the lock or not. The first experiment shows some deformation of the U-shaped lock, but the whole locking structure remains intact. The electronic locking system remain locking the U-shape lock when the PIN number is incorrect. The results from these experiments successfully testify to the objective which to enhance the security of the bicycle rack, when the U-shape lock remains locking after has been pulled out and the electronic locking system is fully capable to perform its duty with 0.01% of hacker ability. It can be concluded that the fabrication of this product fulfilled the study objectives. However, there are few improvements that can be considered such as adding more solenoid, hybrid power source, and add cover for the electronic box.

8.2.9 CAN/CSA D113.2-M89 Helmet Strength Test [9]:

5.2.3 Test Criteria (See Table 1)

5.2.3.1 Flat Anvil

When the helmet is tested in accordance with Clause 6.4 using a flat anvil and an energy input of

- (a) 55 J, the headform acceleration shall not exceed 200 g peak; and
- (b) 80 J, the headform acceleration shall not exceed 250 g peak.

5.2.3.2 Cylindrical Anvil

When the helmet is tested in accordance with Clause 6.4 using a cylindrical anvil and an energy input of 55 J, the headform acceleration shall not exceed a 250 g peak.

Note: When impact testing using both the flat and the cylindrical anvil, it is recommended that manufacturers also measure Gadd Severity Index (GSI). If the GSI exceeds 1500 then additional helmet impact testing should be undertaken as detailed in this Standard.

8.2.10 Time To Lock Bike Survey [10]:

	A	B
1	Time:	Average
2	26.729	18.43478261
3	37.701	
4	22.27	
5	6.659	
6	13.47	
7	15.471	
8	41.363	
9	8.762	
10	16.152	
11	18.422	
12	27.916	
13	19.801	
14	27.829	
15	9.75	
16	8.314	
17	24.052	
18	19.379	
19	29.896	
20	11.556	
21	6.666	
22	9.397	
23	13.475	
24	8.97	

8.2.11 Hydrostatic Pressure Equation [11]:

of the earth's atmosphere (out of the surface). The hydrostatic pressure is the pressure that exists on or close to the earth's surface. Cf. *Hydrologic cycle*.

Hydrostatic equilibrium In a fluid when the *gravity head* and *pressure head* are in balance. Cf. *Elevation head*; *Total head*.
Hydrostatic gradient The change in *hydrostatic pressure* over a unit distance in any specific direction. In *groundwater*, the velocities are generally low enough that the direction of steepest negative *gradient* is often assumed to be the direction of groundwater movement. Because of sedimentary layering, the assumption can often be made that horizontal gradients are much greater than vertical gradients, and therefore the *flow* is mainly horizontal. The validity of this assumption should always be carefully assessed before depending on the results of its application.

Hydrostatic head The height of a vertical column of water. If applied to a unit cross section, the weight of the column is equal to the *hydrostatic pressure* at any given point. It is the *pressure head* or, as applied to water, the *static head*. Cf. *Artesian head*.

Hydrostatic level The level to which water rises in a well or *piezometer* under its *aquifer* pressure over the *screened interval* of the well. Hydrostatic level is the defining *potentiometric surface*. Cf. *Static water*.

Hydrostatic pressure The *pressure* exerted at the base of a water column. Figure H-19 diagrammatically presents the following equation of hydrostatic pressure:

$$p = \gamma_w g h$$

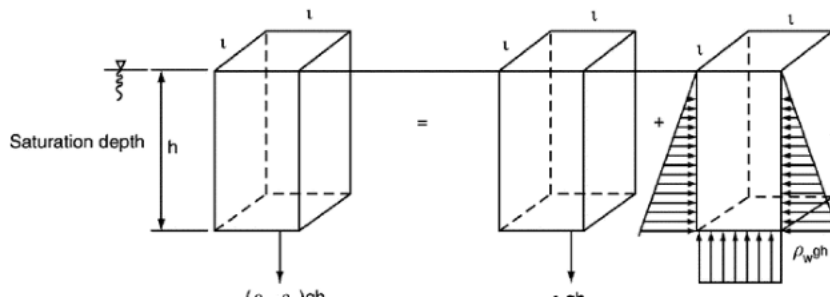
where:

γ_w = water density [$M \cdot L^{-3}$]

g = gravitational constant [$L \cdot T^{-2}$]

h = saturation depth [L].

The direction of pressure is upward if the bottom of the representative volume is horizontal. Gravity forces are always greater than hydrostatic pressures, but the hydrostatic pressure is equal and with the same magnitude in every direction.



8.2.12 Hydrostatic Head Rating Of 1000 [12]:

HYDROSTATIC HEAD

a measurement of waterproofing

For any fabric to be considered fully waterproof it must be able to withstand the pressure of a column of water 1000mm high without leaking. This is classed as a hydrostatic head rating of 1000.

To measure the hydrostatic head of a fabric a column of water is pressed against it. The height of the column is increased until the water penetrates the fabric.

The term hydrostatic head is used to denote the amount of pressure of water that is required in order to penetrate a given fabric.

Some products, such as tents and jackets are by their very nature intended to protect the user from the wind, rain, snow, sun and so on. Different conditions would require different levels of protection. A mild climate with a few light showers would require the hydrostatic head to be less than if the climate was rougher with lashing rain.

The British Ministry of Defence definition for a waterproof fabric is that it must resist a column of water at least eight hundred millimetres high.

Pressure to the surface will increase the need for a higher hydrostatic head. Examples are a groundsheet in a tent is going to expect people to walk on it. Likewise, a rucksack will increase pressure to the surface of a jacket at that area.

8.2.13 Equation for Coefficient of Water Permeability, and Acceptable coefficient Value [13]:

3.6. Water permeability

Assuming laminar flow, the Darcy's law can be applied to derive the following equation for calculating the coefficient of water permeability as:

$$k_w = \frac{A'}{A} \frac{L}{t} \ln \left(\frac{h_0}{h_f} \right) \quad (2)$$

where A' is the internal area of the tube; A is the area of the sample in contact with water; L is the thickness of the sample; t is time interval; h_0 is the initial water head and h_f is the final water head.

strength around 35 MPa at 28-day age, a kind of waterproof ECC (M14) has been developed, with water contact angle larger than 110 degree, drying shrinkage around 1200 $\mu\epsilon$ (about 2/3 that of the typical ECC M45), water absorption rate about 5×10^{-5} mm/s^{1/2} and water permeability around 8×10^{-12} m/s.

8.2.14 Principles of Heating, Ventilating and Air Conditioning Relevant Information [14]:

known, because metabolic power increases in proportion to exercise intensity. Metabolic rate varies over a wide range, depending on the activity, the person, and the conditions under which the activity is performed. Table 4-1 lists typical metabolic rates for an average adult male ($A_D = 19.7 \text{ ft}^2$) for activities performed continuously. The highest power a person can maintain for any continuous period is approximately 50% of the maximal capacity to use oxygen (maximum energy capacity).

A unit used to express the metabolic rate per unit DuBois area is the met, defined as the metabolic rate of a sedentary person (seated, quiet): 1 met = $18.4 \text{ Btu/h}\cdot\text{ft}^2$ = $50 \text{ kcal/(h}\cdot\text{m}^2)$. A normal, healthy man has a maximum capacity of approximately $M_{act} = 12$ met at age 20, which drops to 7 met at age 70. Maximum rates for women are about 30% lower. Long-distance runners and trained athletes have maximum rates as high as 20 met. An average 35 year-old who does not exercise has a maximum rate of about 10 met and activities with $M_{act} > 5$ met are likely to prove exhausting.

The metabolic activities of the body result almost com-

$I_{clu,i}$ is the effective insulation of garment i , and I_{cl} , as before is the insulation for the entire ensemble.

4.1.4 Conditions for Thermal Comfort

Environmental conditions for good thermal comfort minimize effort of the physiological control system. For a resting person wearing trousers and a long-sleeved shirt, thermal comfort in a steady state is experienced in a still-air environment at 75°F. A zone of comfort extends about 3°F above and below this optimum level.

ANSI/ASHRAE Standard 55-2013, *Thermal Environmental Conditions for Human Occupancy* specifies conditions of the indoor thermal environment that a majority of the occupants will find acceptable. The body of the standard clearly defines "majority" such that the requirements are based on 80% overall acceptability, while specific dissatisfaction limits vary for different sources of local discomfort. A space that meets the criteria of the standard likely will have individual

8.2.15 Quantifying the User Experience Chapter 4 [15]:

Completion rates, also called success rates, are the most fundamental of usability metrics (Nielsen, 2001). They are typically collected as a binary measure of task success (coded as a 1) or task failure (coded as 0). You report completion rates on a task by dividing the number of users who successfully complete the task by the total number who attempted it. For example, if eight out of ten users complete a task successfully, the completion rate is 0.8 and usually reported as 80%. You can also subtract the completion rate from 100% and report a failure rate of 20%.

It is possible to define criteria for partial task success, but we prefer the simpler binary measure because it lends itself better for statistical analysis.

8.2.16 Universal Design Principles and Models [16]:

These principles have provided a standard against which products and environments can be measured. As the movement has grown, Universal Design principles have continually been evaluated and refined. In Japan, where the aging of the population has reached crisis proportions, the idea of Universal Design is being recognized as an essential approach. In a presentation on the necessity of Universal Design for Japan, Dr. Satoshi Kose when he was with the Building Research Institute of the Ministry of Land, Infrastructure & Transport, and an expert on Universal Design, stated that: "By the year 2020, 28% of Japan's population will be aged 65 or older, making it one of the world's oldest populations. The idea of Universal Design will become a necessity in this situation." Dr. Kose went on to say that "The ... Principles of Universal Design are primarily guidelines for designers." On the basis of these principles, Dr. Kose raised the following six general areas as necessary conditions: "Safety, Accessibility, Usability, Appropriate pricing, Durability and Aesthetics. The first three of these are close to the idea of barrier-free, while the three additional considerations go beyond this, and also the process is an important element of Universal Design" (UDF News).

The Center for Universal Design (formerly the Center for Accessible Design), represented by UD advocates Bettye Rose Connell, Mike Jones, Ron Mace, Jim Mueller, Abir Mullick, Elaine Ostroff, Jon Sanford, Ed Steinfeld, Molly Story, and Greg Vanderheiden, developed an expanded list of Universal Design principles:

1. *Equitable use.* The design does not disadvantage or stigmatize any group of users.
2. *Flexibility in use.* The design accommodates a wide range of individual preferences and abilities.

8.2.17 USOO6105176A Patent - Adjustable Straps:

The capacity of the helmet for head protection is enhanced by securely fastening it to the wearer's head so that it stays in place upon impact. The helmet is preferably held in place by an adjustable arrangement of straps that pass down from the helmet body in front of and behind the ear on each side of the head, and that meet in front of and beneath the wearer's ears and pass around the chin. Such strap arrangements are generally known in the art, and are subject to variation and improvement. The helmet body of preferred

8.2.18 Negative Reviews of Thousand Year Bike Helmet (Relevant Portions) [18]:

Review Details:	Review (*responses have been fixed for typing mistakes):
<ul style="list-style-type: none"> - Name: Melanie - Verified buyer - United States - 11/21/2022 - 4.5/5 star rating 	<p>“The helmet itself is great. It’s comfortable and it has protected my head on two falls. It does get scratched up VERY easily though. A day after I bought it it already had scratches everywhere even though all I did was lock it to my bike”</p>
<ul style="list-style-type: none"> - Name: Emma - Verified buyer - United States - 10/16/2022 - 4/5 star rating 	<p>“ . . . The poplock comes off more easily than I would like, a magnet or something to help it stay in place would be useful”</p>
<ul style="list-style-type: none"> - Name: Candice A. - Verified buyer - Canada - 06/14/2022 - 5/5 star rating 	<p>“ . . . The pop-lock doesn’t work with my chain lock, but it’s a neat feature if it works for you”</p>
<ul style="list-style-type: none"> - Name: Tom - Verified buyer - United States - 10/07/2021 - 4/5 star rating 	<p>“ . . . The good news is that the Poplock cover likewise stays put over bumps. The bad news is that my bike lock cable—a design used by millions of cyclists—is too large to fit through the poplock hole, so I’ll need to buy a more diminutive lock”</p>
<ul style="list-style-type: none"> - Name: Christy F. - Verified buyer - United States - 08/17/2021 - 4/5 star rating 	<p>“ . . . The lock hole thing is challenging to use sometimes, but I’m glad it’s there”</p>

<ul style="list-style-type: none"> - Name: Jamez - Verified buyer - United States - 07/13/2021 - 4/5 star rating 	<p>“ . . . This is my second Thousand helmet --- the first was stolen, along with my bike, u-lock, and the railing it was locked to :(</p> <p>So, yeah, this is my second Thousand helmet, and while I’m happy with the helmet, I have to wonder what is the point of the poplock hidden channel lid . . . in order to provide another spot for branding?</p> <p>Why not just have the uncovered hole? That's what I ended up with, anyway. The lid detached from the little bungee cord designed to keep it with the helmet. Same thing happened with the first helmet, as well.</p> <p>I mean, the aesthetic of the "hidden" lid is nicer than that of the hole in the side of the helmet ... but as long as functionality is not reduced, it doesn't seem a necessity.</p> <p>And, yes, I've tried reattaching it, but it just comes loose again. Eventually, it's gonna fall off while I'm riding, I won't notice, and will have lost it forever”</p>
<ul style="list-style-type: none"> - Name: Tobias J. - Verified buyer - New Zealand - 02/07/2021 - 5/5 star rating 	<p>“ . . . I had one issue with the ‘secret poplock’ cover having come unglued in transit, however Thousand were very helpful and willing to rectify the matter. I chose to just fix it myself and it was pretty easy to glue back. But obviously still disappointing, so perhaps better packing and a different adhesive might be in order”</p>
<ul style="list-style-type: none"> - Name: Maria T. - Verified buyer - United States - 12/25/2020 - 2/5 star rating 	<p>“The lock insert cap was broken. It also barely stays in place. The magnet is very weak. Almost just want to remove it. Was disappointed.”</p>
<ul style="list-style-type: none"> - Name: M - Verified buyer - United States - 11/27/2020 - 3/5 star rating 	<p>“ . . . I have never once used the popout for the U lock and mostly find that it is annoying when it flops free on its own”</p>

melanie Verified Buyer
 United States

11/21/2022

★★★★★ 4.5 rating

the helmet itself is great. it's comfortable and it has protected my head on two falls. it does get scratched up VERY easily though. a day after i bought it it already had scratches everywhere even though all i did was **lock** it to my bike.

i also have to say the customer service is fantastic with respect to their replacement policy. that just cannot be beat.

the reason i am taking half a star off though is because of the light. the light is just terrible. mine lasts the length of my 20 minute bike ride and that is it. i have received several replacement lights and all behave exactly the same. i don't get anywhere close to the promised 2 hours. it is super annoying to have to recharge it nightly. that said, because it essentially comes free with the helmet, it isn't bad enough to warrant more than a half a star off.

Chapter MIPS Helmet - Racer Black / Small

Was this helpful? 3 0

Emma Verified Buyer
 United States

10/16/2022

★★★★☆ Good but could be improved

I've had this helmet for 6 months now and wear it most days.

The good: looks great and is pretty comfortable. I like the MIPS system, although fortunately I haven't had to test it in a crash. It's fairly light and the visor works reasonably well to keep the sun out of my eyes. The magnetic catch is easy to use. The light is a great idea (but see below).

The bad: I can't wear a pony tail or have my hair up in any way that gets it off my neck. I'm often cycling in over 90 degree heat and high humidity, so this is really annoying, and my main bugbear. The poplock comes off more easily than I would like, a magnet or something to help it stay in place would be useful. Lastly, although the helmet light is great, turning it off is a pain, especially as it turns itself on if it comes close to anything metal, e.g., keys, lock etc. I curse it several times a day. I don't find it particularly breathable, although tbh I'm happier keeping the sun off my head.

Chapter MIPS Helmet - Supermoon White / Small

Was this helpful?  0  0

Candice A. Verified Buyer
 Canada

06/14/2022

★★★★★ Has gotten me back into Helmet wearing

I haven't worn a helmet in years. They are generally silly looking, uncomfortable, and a pain to carry around. This helmet has changed my mind. I've gotten numerous compliments on my "cool" helmet, it's not terribly hot to wear, and I feel safe. I have the white helmet and I feel like it is super visible to drivers. The magnetic light is awesome and super bright. The magnetic snap is great and easy to use. MIPS certified means that I feel safer wearing this helmet, however I'm fully aware that a helmet can only do so much to protect. The pop-lock doesn't work with my chain lock, but it's a neat feature if it works for you. I do find that upon removal it pulls random strands of my long hair, but it's a minor annoyance. The visor is not great in the rain, since there is a gap which allows water to fall, but that's a part of it being removable. This is a great helmet and I have been converted.

Chapter MIPS Helmet - Supermoon White / Small

Tom Verified Buyer
United States

10/07/2021

★★★★☆ First Thoughts on Chapter

Unboxing and first-try-on reactions:

1. This thing has darn near as many "lawyer stickers" as the last stepladder I bought.
2. It fingerprints easily. I wiped with a specialty polycarbonate cleaner to see if that will help.
3. It seems built for a rounder head (I don't have one) and I agree with other reviewers that the brow needs additional padding; I may Velcro a thicker pad into the brow.
4. While my head measures at the upper range of this helmet's size, I have to set the adjustment at maximum tightness to get it to fit. Another reason for a thicker brow pad.
5. The strap fastener seems deceptively simple, although no amount of yanking or twisting succeeded in getting it to unfasten prematurely, so perhaps it is just inspired engineering. That said, the mechanism does employ two tiny and fragile-looking moving parts. Time will tell. If it gives me trouble, I will replace it with a European-style motorcycle helmet ratchet release.
6. "MIPS protection" appears to be a liner—about the thickness of a six-pack carrier, maybe less—loose-fitted to the inside of the helmet. Really? I paid that much of a premium for this?
7. My other helmet is one of those looks-like-a-spider-is-giving-birth-to-your-head bike helmets. The Thousand Chapter is 3.5 ounces heavier (4.5 with light attached). It does not feel appreciably heavier when you wear it, though.

First-Ride Reactions:

I tried the helmet on a ride over a mixture of pavement, broken pavement and unpacked paths on my fat-tire mountain bike. Total distance was 9+ miles over 58 minutes (this bike is a sluggish 7-speed that weighs in above 50 pounds).

1. The helmet stays put and does not bobble over rough terrain.
2. Like every helmet I have owned, the Thousand Chapter was a hot mess three miles into a ride in 93 degree heat and 50% relative humidity (typical Florida early autumn conditions). Airflow was marginally better if I bowed my head, but if I did that, forward vision was affected and the light was only signaling aircraft. I may buy a evaporative cooling cap to wear under the helmet.
3. Speaking of light, it stayed magnetically attached to the helmet over bumps that twice dislodged the clip-on light on my rack bag. I like too the fact that the helmet does not look incomplete with the light removed. It is not blindingly bright, but bright enough to be noticed and it lasted through my one-hour ride and recharged in the time it took me to shower, which tells me it was not deeply discharged. Some reviewers complain that it lights immediately upon attachment to the helmet. I think that is a good feature (on my other, bought-from Amazon helmet, I have attached my own light, which I forget to turn on at least half the time).
4. The strap stayed fastened until deliberately unfastened. Some reviewers complain that there is only an O-ring to gather the excess strap, but I have used this system on other helmets and it works fine year after year. Eventually, though, I will probably trim off the excess strap with a hot web knife.
5. I like that this does not have the weird, tentacled appearance of most bike helmets. This looks more like a skate or equestrian helmet.
6. The good news is that the Poplock cover likewise stays put over bumps. The bad news is that my bike lock cable—a design used by millions of cyclists—is too large to fit through the Poplock hole, so I'll need to buy a more diminutive lock.
7. The bag is a nice touch, but it needs a separate pocket for the light. If that light gets anywhere near the back of the helmet, it turns on, so it cannot just be loose in the bag with the helmet.

Is the Thousand Chapter the perfect helmet? No.

Is it better than most? Probably. I intend to keep using it.

Chapter MIPS Helmet - Racer Black / Large

Was this helpful? 12 0

Christy F. Verified Buyer
United States

08/17/2021

★★★★☆ Cute, comfortable

I like it so far. I like the magnetic closure. I was curious how it worked when I bought it, but it is secure. The visor isn't really functional, so I wear a cycling cap under it anyway. This is pretty normal with most helmets, so I didn't deduct a star. The lock hole thing is challenging to use sometimes, but I'm glad it's there. I like the added safety of MIPS, but I was disappointed the MIPS versions didn't come in more colors.

Chapter MIPS Helmet - Club Navy / Small

Jamez Verified Buyer
United States

07/13/2021

★★★★☆ What's the point?

Overall experience is great. This is my second Thousand helmet --- the first was stolen, along with my bike, u-lock, and the railing it was locked to :(

So, yeah, this is my second Thousand helmet, and while I'm happy with the helmet, I have to wonder what is the point of the poplock hidden channel lid ... other than to provide another spot for branding?

Why not just have the uncovered hole? That's what I ended up with, anyway. The lid detached from the little bungie chord designed to keep it with the helmet. Same thing happened with the first helmet, as well.

I mean, the esthetic of "hidden" lid is nicer than that of the hole in the side of the helmet ... but long as functionality is not reduced, it doesn't seem a necessity.

And, yes, I've tried reattaching it, but it just comes loose again. Eventually, it's gonna fall off while I'm riding, I won't notice, and will have lost it forever.

Again, I'm happy with the helmet overall. I also love the Thousand gloves ... and will probably purchase a bell in the future.

Chapter MIPS Helmet - Club Navy / Large

Tobias J. Verified Buyer
 New Zealand

02/07/2021

★★★★★ A helmet that actually looks and feels good!

I'm loving my Chapter MIPS Helmet! It's beautifully retro, comfortable, light, and not too bulky! It means I don't feel ***** on my vintage bike with a big futuristic piece of nonsense on my head! And because it's comfortable I'm not constantly aware of it and fighting to adjust it right.

It does seem a little loose side to side, which I could pad out, but the integrated dial fit system makes getting a perfect fit front to back really easy, and that's probably more important.


The 'Multi-Use Magnetic Light' is pretty awesome too! It switches on as soon as you attach it (which, with the strong magnetic attachment, again couldn't be easier!) It can be switched off while on the helmet by pressing and holding the mode button, and of course it switches off when removed from the helmet. I've seen complaints about battery life and the light switching itself back on, but I haven't had any issues like this so far. It's also super bright! So much so that you don't want to be looking at it when you put it on! Hopefully I haven't blinded anyone behind me.

I had one issue with the 'secret poplock' cover having come unglued in transit, however Thousand were very helpful and willing to rectify the matter. I chose to just fix it myself and it was pretty easy to glue back. But obviously still disappointing, so perhaps better packing and a different adhesive might be in order.

That aside, my experience has been wonderful! Thanks so much for making a stylish, comfortable helmet! And one that's relatively affordable, even with the weak exchange rate here in New Zealand!

Chapter MIPS Helmet - Club Navy / Medium

Was this helpful?  0  0

Maria T. Verified Buyer
 United States

12/25/2020

☆☆☆☆☆ Broken

The lock insert cap was broken. It also barely stays in place. The magnet is very weak. Almost just want to remove it. Was disappointed.

Chapter MIPS Helmet - Racer Black / Small

Was this helpful?  0  1

M Verified Buyer
United States

11/27/2020

★★★★☆ Premium pricing for an average product

I purchased the Thousand Chapter helmet out of a desire to upgrade to one with MIPS certification. That's about the only aspect of this helmet that I would call an upgrade of any kind. Coming over from a helmet of similar style that I'd had for a number of years, the Thousand is poorer by most measures.

The plastic of the helmet is substantially thinner. Now perhaps it is just as stable and protective — I assume they have to pass the same tests — but not a confidence builder. The helmet also cuts substantially shorter behind the neck, a fashion choice, I guess that also saves them some money.

The padding on the Chapter is also very insubstantial. Coming from a model with cushy, sewn headband, with great quilted padding that included surrounding the size adjustment twister, the flat, cheap, uncomfortable padding in the Chapter was a real, can I say, head scratcher.

They are heavily advertising the swappable visor for this helmet but, again, the reality of what you get is disappointing. Seventeen dollars to swap out one of these is totally insane. These are truly insubstantial pieces of plastic.

Unlike the visor on my previous helmet, these seemingly offer no structural protection, no meaningful sun protection, and don't even block rain because of the gap between the visor and the helmet. The plastic attachments are very, very flimsy. One knock and you've lost your visor and the ability to replace it.

The other upgrade I was excited for was the magnetic light. The advertised battery life was pretty poor and if anything, it's worse in actual use. So frustrating to not get through a single ride without this thing crapping out. Given that you can purchase similar unremarkable lights on Amazon (minus a magnet) for next to nothing, this is another flash over substance choice for Thousand. I've already stopped using it because the poor battery life is so frustrating. Cheap, cheap, cheap! And the charging process is that the light stays on and blinking until charged, at which point it just stays on endlessly. So find a place in your house where a bright blinking red light won't be another because you'll be charging this all the time every day if you intend to get any use out of it.

And the magnetic switch (it clicks on when you attach it) sounds great in theory but since I am rationing my light time for busier roads, it just ends up a major inconvenience because I don't know whether the light is on or what setting it's on. A regular switch would be so much better. You just end up struggling with this thing to get it to do what you want.

I personally do not find the Thousand signature magnetic clasp to be much of an advantage. It is enormous and uncomfortably with inexplicably sharp edges. It is not particularly conducive to one handed closure. Some people seem to love it but I don't find that it adds any meaningful utility.

The first helmet they sent me was not the size I ordered and the visor screw attachment on one side was already stripped and broken (hence my skepticism above). They were very kind and prompt about the change.

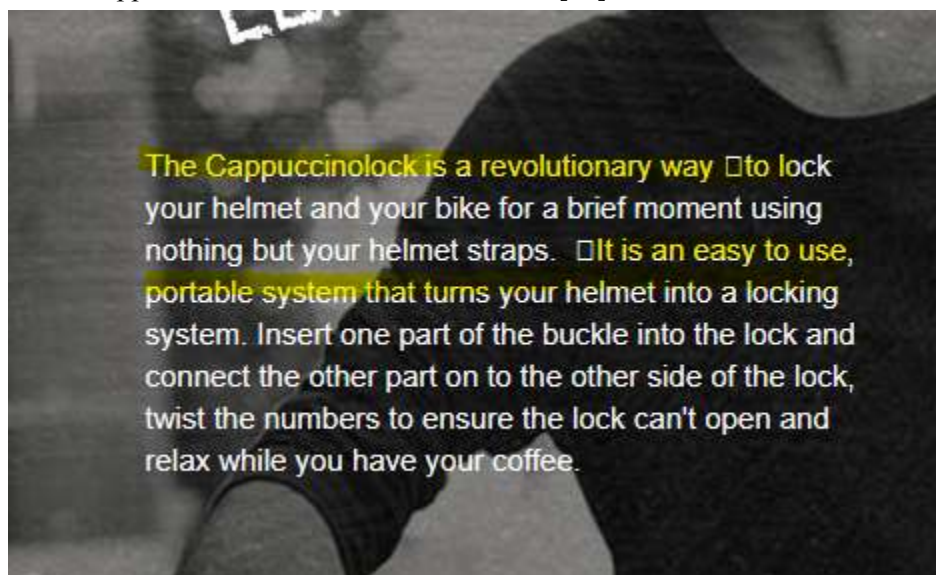
I have never once used the popout for the U lock and mostly find that it is annoying when it flops free on its own.

All in all, I've made my own modifications to the helmet padding to make it comfortable enough and continue to use it but I would not recommend it to anyone. I feel like I took some major trade-offs for pursuing MIPS protection that I would not make again.

A lot of marketing, not a lot of value.

Chapter MIPS Helmet - Racer Black / Medium

8.2.19 Cappuccino Lock Relevant Information [19]:



8.2.20: Best Commuter Helmet MIPS Thousand Chapter [20]:

Best commuter helmet



Thousand Chapter MIPS Bike Helmet

~~\$145~~ now 35% off

\$123

Intended uses: Commuting / Safety: MIPS / Comfort and aesthetics:
Pinch-free strap, round silhouette

8.2.21 Best Commuter Helmet MIPS Thousand Chapter [21]:

The Best Helmets You Can Buy Right Now

- Tested Protection for Just \$25: [Schwinn Intercept](#)
- Best Value Road Helmet: [Specialized Echelon II](#)
- Best Value Mountain Bike Helmet: [Bell Spark MIPS](#)
- Awesome Ventilation: [Specialized S-Works Prevail 3](#)
- Best for Young Kids: [Giro Scamp MIPS](#)
- Best for E-Bikes: [Specialized Mode](#)
- Best Racing Helmet: [Giro Aries Spherical](#)
- Best Mountain Helmet: [Lazer Coyote Kineticore](#)
- **Stylish Commuter: Thousand Heritage 2.0**
- Most Comfortable Aero Helmet: [Trek Ballista MIPS](#)

8.2.22: Best Commuter Helmet MIPS Thousand Chapter [22]



Thousand Chapter MIPS

[View at Amazon](#)

Locks to your bike

A stylish helmet with an included light, a visor you can swap, and a place to thread a lock through when you park your bike.

[Read more below](#)

8.2.23 Chin Strap Forces in Bicycle Helmets [23]:

The objective of this experimental investigation was to find out what dynamic forces a bicycle helmet's retention system is subjected to when head impact accidents take place. Different helmet models were subjected to simulated accidents, of the type with the head first (with vertical and horizontal velocity) against a rigid asphalt surface. The chin strap forces developed in the accident simulations of the present study were low compared to the requirements of most of the existing standards for bicycle helmets. The arithmetic mean of the chin strap peak forces of all impacts was 4^2 N.

8.2.24 Lazer Cappuccino Lock Combination Lock for Helmets [24]:

Average: ★★★★★ (1 Rating)

[Rate this product](#)

ⓘ We cannot ensure that reviews are from those customers or consumers who have actually purchased or used the goods.

★★★★★

5/31/2016 Anonym

Cleveres Zubehör, leider nicht mit allen Lazer-Modellen kompatibel

Wichtig: das Cappuccino-Lock passt nicht bei allen Helmen. Merkmal passender Helme ist eine Aussparung in Form eines Z in der Helmschnalle (wie auf dem Bild mit Helm zu sehen). Bei älteren Modellen (ich nehme an, dass Lazer inzwischen alle Helme mit dieser Schnalle ausliefert) wie meinem Genesis von 2011 passt es nicht.

German (detected)

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English

Clever accessories, unfortunately not compatible with all Lazer models. Important: the Cappucino-Lock does not fit all helmets. A feature of matching helmets is a recess in the shape of a Z in the helmet buckle (as seen in the picture with the helmet). It doesn't fit on older models (I assume that Lazer now ships all helmets with this buckle) like my Genesis from 2011.

8.2.25 Concept Design For a Folding Bicycle Helmet [25]:

4.2.2. Folding Process

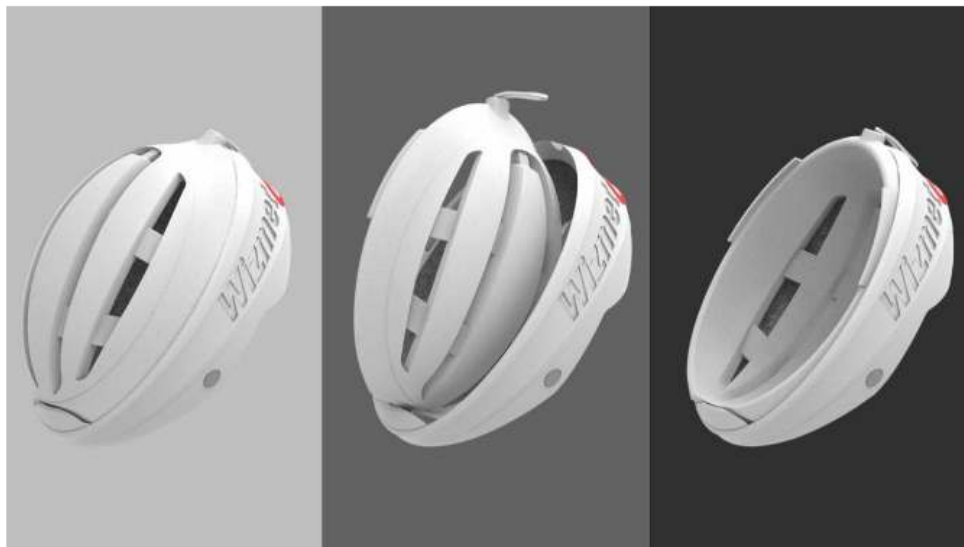


Figure 42: Folding method of Wizmet