



The urban commuter cyclist trousers design with a sustainable design approach

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Abstract

After the prolonged COVID-19 pandemic, we have entered the New Normal phase with all adjustments and adaptations to new post-pandemic habits. Throughout 2020 and 2021 cycling has become a trend for a healthy lifestyle that people are interested in. With the rise of people cycling, sales of bicycles and their supporting equipment such as apparel have also increased. Seeing the trend of cycling and commuter bike riders who use bicycles as the main mode of transportation for daily mobilization, this becomes a potential for designing cargo pants for commuter bike riders with a sustainable design approach. Cargo pants are versatile pants that prioritize utility with various compartments that can fit various user items. Exploration of the features and systems in the design product is expected to meet the needs of commuter bike users and provide alternative products to users.

Keywords: new normal, commuter bike, cargo pants

1. Introduction

We began adopting many new habits in the "New Normal" era. According to (World Health Organization, 2020) "New Normal" is a term commonly used when entering new conditions, after or during an outbreak, as well as conditions in which we must be able to adapt to new behaviors in self-limiting to prevent the spread of the virus. Several trends developed during this pandemic, one of which is cycling, bicycle users or cyclists have experienced a rapid increase in Indonesia, based on a survey of The Institute for Transportation and Development Policy (ITDP) Bicycle use increased up to 10 times or 1000 percent during PSBB (Pembatasan Sosial Berskala Besar) Social restrictions Jakarta, compared to October 2019 (Wibowo, 2020). Cycling became a new lifestyle for people in this "New Normal" era (Alfirdaus & Susanto, 2021; Auliyah & Legowo, 2022; Darsini, 2020; Fatoni et.al., 2021; Hadi, 2020)..

The growing trend is directly proportional to the sales of bicycles and their supporting equipment. Brand Director PT. Inera Sena, William Gozali that sales of bicycles and complementary equipment such as apparel increased 50 to 200 percent in several dealers spread across various cities (Sukmana, 2020). With the increasing market demand for cycling apparel needs, one of which is trousers. Seeing the target users

who like cycling and commuter cyclists who generally use bicycles as the main mode of transportation for daily activities. Therefore, we need equipment that can support cycling activities both in terms of system and function.

Equipment such as has become a significant necessity in cycling, especially for commuter cyclists who need apparel that can be used in various activities because they will spend a lot of time traveling on their bicycles. Several types of apparel are needed such as clothes, pants, bags, jackets, etc. Exploration trousers are interesting to do, especially in cargo pants. By emphasizing utility and several parts of the compartment that can load various kinds of user belongings, thus cargo pants are considered to be able to meet user needs referring to their daily mobility.

Style experts said that cargo pants will always be a trend, as said Dr. Hancock, professor of design and merchandising (Cheadle, 2016).. Cargo pants are so closely related to streetwear and pop culture from various eras, the choice of cargo pants design is considered appropriate because cargo pants fit into all eras, also the function or utility of cargo pants themselves can meet user needs. Exploration of systems and features with a sustainable design approach, with the addition of more compact systems and features, as well as the application of a modular system, is expected to provide an alternative to existing

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products.

Based on the data and explanation above, the focus of the design is on cargo pants for commuter cyclists, based on the trends that developed during the pandemic, especially during the "New Normal" period with sustainable design approach, Changing people's views and mindsets towards environmental issues and sustainability for the better (Pambudi, 2016). Focusing on exploring product features and systems, increasing the functional value of the product itself is expected to be able to adapt to user needs. Material exploration is carried out to provide alternatives to existing materials or products (Azhar, 2020). Also with a sustainable design approach, it is hoped that product design can support user needs or alternatives for commuter bike users.

2. Method

Qualitative methods are used in designing these cargo pants, according to McCusker and Gunaydin (McCusker & Gunaydin, 2015), qualitative methods are methods used to understand communities or individuals in overcoming certain problems. Researchers use this method to interpret the data collected, so it is essential to ensure the quality of the research process. The type of qualitative method used is a centralized interview by conducting face-to-face interviews to obtain information according to (Yunari, 2016). The subjects studied were commuter cyclists. The questions are designed to find out commuter cyclists' views and needs and get the expected answers. The questions given are flexible and open.

3. Results and Discussion

Study of Needs

After conducting interviews, several needs were obtained related to the design of cargo pants for commuter bike riders. The following are user needs based on interviews with resource persons: (1) Adjustable according to needs means that cargo pants can be changed from cargo pants to cargo shorts, such as multifunctional cargo pants; (2) Comfortable to use when cycling, comfortable is the material that is flexible and comfortable with the addition of padding at the crotch; (3) Used in various activities such as cycling, and indoor activities, especially in offices, for time efficiency; (4) Having good air circulation means a material that is not hot and the placement of some materials or breathable features on the pants; (5) Compartments that are suitable for the user's

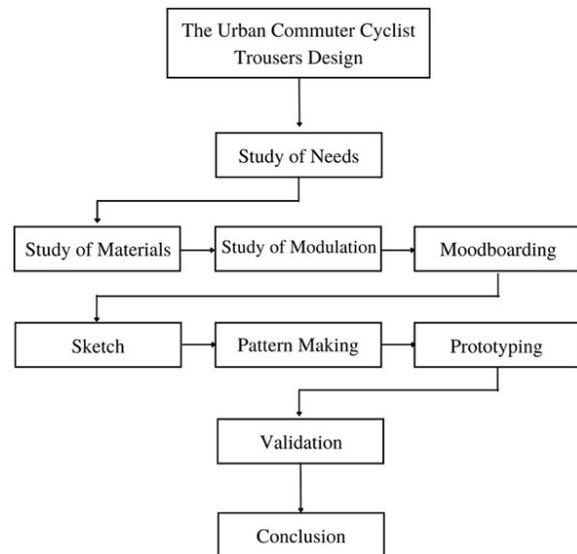
belongings. The placement and shape of the pocket or compartment are suitable for storing wallets, cell phones, and folding tools.

Study of Material

Based on the study of needs, comfortable to use when cycling means flexible material. Good air circulation means that the material is not hot and the placement of some materials or breathable features on the pants. Fabric is the same as textile and everything includes products that use textile materials or are made by textile processes (Wulandari et al., 2022). Experimental approaches with materials will provide opportunities for truly innovative ideas (Andry & Agus, 2015). Here are some materials based on the data obtained in the literature study.

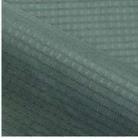
Presented in a table with a weight value of 1 to 5 (1-5) for the level of bending and air circulation. 1 very bad, 2 bad, 3 quite good, 4 good, and 5 very good. The greater the number or weight value, the more suitable for user needs.

Based on Table 1, the material follows the needs of "Comfortable to use when cycling" the intended comfort is a material that is flexible and has good air circulation which is meant is a material that is not hot or breathable, namely Ripstop Nylon Fabric material because the flexible material does not easy to wrinkle, shrink, and stretch so it is comfortable to use when carrying out movements. Material that does not absorb sweat helps the evaporation and drying process, making it comfortable to use for a long time.



Picture 1. Method (Source: Personal documentation)

Table 1. Material Study Analysis

No	Material	Flexible	Air Circulation	Score
1	Ripstop Nylon Fabric 	The character of the strong fabric is not easy to tear the material is thin and light. (Score: 5)	The character of the material is watertight and airtight. (Score: 3)	8
2	Polyester Fabric 	The material is comfortable to use when carrying out movements, the character of the material is flexible, and not easy to wrinkle, shrink, and stretch. (Score: 5)	The character of the fiber is quite strong so the air circulation is not good, and the material does not absorb sweat. (Score: 2)	7
3	Cotton Twill Fabric 	The material looks rough, but feels soft and has good flexibility because there is a mixture of spandex material. (Score: 3)	The material is cool and absorbs sweat, comfortable to use for activities. (Score: 4)	7

(Source: Personal Documentation)

Air circulation placement is on the hip's back (Table 2). Aims to help the process of evaporation of sweat, remove body heat, and keep body temperature low. Increases comfort during long-term use and keep the lower body dry. The material used is polyester woven material with an elastic character and woven fabric with cavities to facilitate air exchange and temperature which functions as air circulation. Indonesia, which has a humid tropical climate, is characterized by high rainfall, high humidity (it can reach more than 90%), relatively high air temperature (up to 38°C), little airflow, and stinging and disturbing solar radiation, can be overcome through a good air circulation system (Latif et al, 2014).

Study of modulation

Based on the study of needs, the pants have an adjustable feature according to their needs. Adjustable means that cargo pants can be changed from cargo pants to cargo shorts, such as multifunctional cargo pants. Comfortable to use when cycling with the addition of padding at the crotch. Can be used when cycling and during indoor activities, especially in offices, for time efficiency. A special compartment for

Table 2. Air Circulation Feature Analysis

No	Air Circulation Features	Material	Character	Function
1		Polyester Woven Fabric	The material is flexible and the woven fabric has good cavities for air circulation.	Air circulation helps evaporate sweat and keep the temperature low.
2		Polyester Woven Fabric	The material is flexible and the woven fabric has good cavities for air circulation.	For air circulation, there is a compartment to store small items.
	feature 1		feature 2	
Score	Wide circulation section to maximize the function of circulation. Score: 5		In the compartment, there is a compartment that is not needed. Score: 3	

(Source: Personal Documentation)

Table 3. Modulation System Analysis

No	System Modulation	Specification	Score
1		Features an overlapping zipper from the back hip to the leg opening. The pants leg can be adjusted tight or slim, straight, and split.	4
2		There is a zipper that can be converted into shorts. Adjustable drawstring at the hem of the pants. Elastic waistband with a quick-release buckle that helps to adjust the size of the waist.	5

(Source: Personal Documentation)

storing customized wallets, cellphones, and folding tools. A modular is a series of modules or certain compartments combined into a single product and

tailored to the user’s wishes and needs. In other words, the product can be easily disassembled and installed and configured (Lenawati, 2021).

Presented in a table with a weighted value of 1 to 5 (1-5) for the modulation feature. 1 very bad, 2 bad, 3 quite good, 4 good, and 5 very good. The greater the number or weight value, the more suitable for user needs.

Based on Table 3, the modulation system that suits the needs is the number 2 modulation system, with the product being able to change from cargo pants to cargo shorts. But also, the implementation of several modulation systems in number 1. With product differentiation, namely applying the overlapping zipper feature at the leg opening, the pants leg can be adjusted tight, slim, and straight.

Compartment system study

According to Joseph Hancock, a professor of fashion design and merchandising at Drexel University, the silhouette of cargo pants has become slimmer, and more fashionable, and has undergone many changes in terms of design and aesthetics (Edelman, 2021). Cargo pants are specially designed with various features that prioritize utility, and efficiency with compartments to accommodate the needs of outdoor activities. Multifunctional cargo pants can be used as cargo pants or cargo shorts, more flexible by adjusting the situation when the pants are used (Fitinline, 2016).

Presented in a table with weighted values of 1 to 5 (1-5) for the compartment system features. 1 very bad, 2 bad, 3 quite good, 4 good, and 5 very good. The greater the number or weight value, the more suitable for user needs.

Based on Table 4, the compartment system that suits your needs is the number 1 compartment system, because the pants are slimmer but can store wallets, cellphones, and folding tools comfortably. It also doesn't interfere with the user's movement when cycling or doing activities in the office.

Bearing feature study

Presented in a table with weight values 1 to 5 (1-5) for bearing features. 1 very bad, 2 bad, 3 quite good, 4 good, and 5 very good. The greater the number or weight value, the more suitable for user needs.

Based on Table 5, the pads that will be used are gel padding. It is applied directly to the main product, so it is more efficient without the need to use additional pants. Materials that are light, soft, and dry quickly provide comfort during use, and reduce irritation to the skin.

Table 4. Compartment System Analysis

No	Compartment System	Specification	Score
1		Geo panel cargo pockets on the front and back of the hips. There is a small hidden zipper pocket on the front of the waist for storing small items. Make pants slimmer.	5
2		It has multiple storage options, with two zip pockets and multiple mesh cargo pockets that allow water drainage to keep things dry.	4

(Source: Personal Documentation)

Table 5. Bearing Feature Analysis

No	Bearing Features	Material	Character	Function
1		Bearing Chamois	The material is made of dense foam, soft, and flexible.	Provides comfort when used, especially when cycling.
2		Padding Gel	The material is light, soft, and dries quickly.	Provides comfort while cycling, and reduces irritation to the skin.
		feature 1	feature 2	
Score		The material is comfortable, but because it's made of foam, it doesn't dry out easily. Score: 3	The material is comfortable and dries quickly, so it is comfortable to use for a long time. Score: 5	

(Source: Personal Documentation)

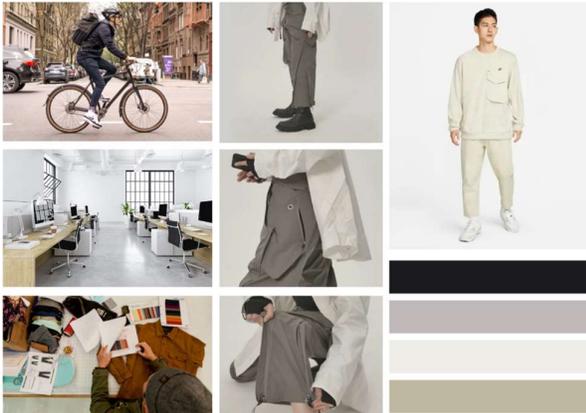
Trend study

Minimalist performance is predicted to be one of the trends in 2022. Minimalism is considered a modern design, and if you look at apparel products that are spread in society, apparel designs become simpler, playing on patterns and colors. Many products or brands prioritize comfort and simplicity but still consider aesthetic values. Color choices focus more on

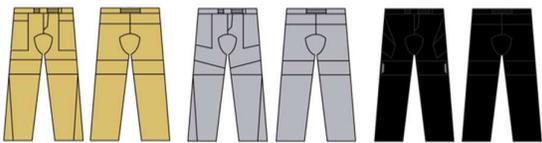
neutral or "timeless" colors, which enter all eras and times such as black, white, gray, and brown (Gutsche, 2021).



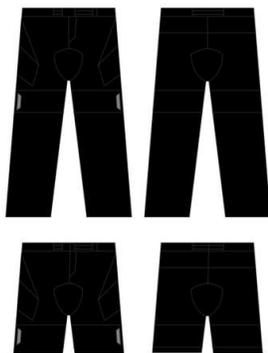
Picture 2. Minimalist Performance
 (Source: Trendhunter.com)



Picture 3. Moodboard
 (Source: Personal Documentation)



Picture 4. Alternative Sketch
 (Source: Personal Documentation)



Picture 5. Final Sketch
 (Source: Personal Documentation)

Alternative Sketch

Alternative 1 has a geometric design with a khaki color and a zipper on the edge that can be adjusted

according to user needs. There is a zipper on the knee so the pants can be removed into two parts and put in the compartment provided. Some pants pads aim to increase comfort when cycling. Compartments or pockets to store cellphones, fooling tools, and wallets (Picture 4).

Alternative 2 sketches with gray color, there are zippers on the knees and sides of the pants, so the pants can be adjusted to the user's needs. The pants are converted into shorts and the bottom can be inserted into the compartment provided. Some pants pads aim to increase comfort when cycling. Compartments or pockets to store cellphones, fooling tools, and wallets (Picture 4).

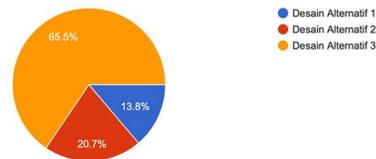
Alternative 3 sketches with black color, there are zippers on the back and sides so that the pants can be turned into shorts, by folding the back and front of the pants and putting them into the compartment provided. Some pants pads aim to increase comfort while cycling. Compartments or pockets to store cellphones, fooling tools, and wallets (Picture 4).

Final Sketch

At the alternative sketch stage, there are ten alternative sketches from which the three best alternative sketches will be selected. The sketch is distributed to commuter bike users or riders in the form of questionnaires or polls. Aims to get the final design or selected to be the final product or prototype.

The selected design features a compartment to store cellphones, fooling tools, and wallets (Picture 4). There are zippers on the back and sides of the pants so that the pants can be turned into shorts, by folding the back and front pants and putting them into the compartment provided.

Here are 3 alternative designs of Cargo Pants for Commuter Bike Riders. (Choose an alternative design)
 29 responses

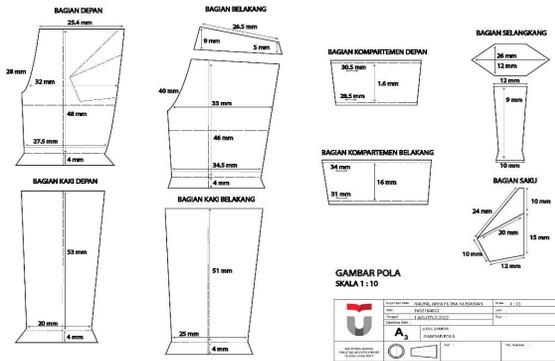


Picture 6. Questionnaire Results Chart
 (Source: Personal Documentation)

Based on questionnaires or polls that have been distributed, related to alternative designs of product designs. Then the chosen alternative design is

alternative design 3 based on the choice of most respondents. With a total of 29 respondents, 13.8% for alternative design 1, 20.7% for alternative design 2, 65.5% for alternative design 3.

Pattern Making



Picture 7. Pattern Drawing
(Source: Personal Documentation)



Gambar 8. Prototype
(Source: Personal Documentation)



Gambar 9. Prototype
(Source: Personal Documentation)



Gambar 10. Prototype
(Source: Personal Documentation)



Gambar 11. Prototype
(Source: Personal Documentation)

Prototyping

Cargo pants for commuter bike riders feature a strap buckle fastener that functions to tighten the waist, there is a compartment to store cellphones, fooling tools, and wallets (Picture 8-11). The zippers on the back and sides of the pants serve as a pants modulation system so that the pants can be turned into shorts by opening the zipper, folding the front and back of the pants, and putting them in the compartment provided. The addition of pant pads aims to increase comfort when cycling. Bringing the concept of modular clothing to provide emotional value to the user for the design product. The product's modular system can make it easier for users to adjust to their style, taste, size, and clothing length (Greeners. co, 2015).

Validation

After testing the prototype on the user, it was found that the product already has good comfort with the addition of padding on the inside (Table 6). However, there are still aspects that can be improved such as a more efficient modulation system, product materials that have better air circulation, and pants patterns that are more suitable for the user. The following are the details of the test results that have been carried out.

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