FACILITIES STUDY TERMINATION OF THE VALUE OF CITY TRANSPORT ERGONOMICS

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ABSTRACT: , Urban transportation bus stop systems are essential in supporting the city's ideal transportation facilities for urban communities . Technologies are developed over the years is to meet human needs . But if all that does not make people feel safe and comfortable , it means that in the process of designing and manufacturing , there has been a mistake orientation. Bus stops for public transport facilities in the city of Makassar to be made with regard to ergonomic aspects , but in fact that is not the case . For example, seating facilities at bus stops are not in accordance with the terms of ergonomics . the purpose of this study was to analyze the level of ergonomic facilities in relation to security and comfort on city transport stops facility . Data collection for this study is made by measuring the dimensions of the passenger's body and questionnaires were analyzed using house of quality and ergonomics approach. Safety level research results valuable facilities ergonomics dismissal of 95% percentile anthropometry results obtained sidewalk size 24.76 cm in high, chair seat at stop halt with the size of 36.21 cm in width, 44.45 cm seats in height and backrest in height 56.92 cm and 411.4 cm in length

Keywords: safety, comfort, amenities termination, ergonomic

INTRODUCTION

Transportation means with public transports in the city of Makassar should be made with regard to ergonomic aspects, but not the case with public transportation. Respect for human values in general seems to still come second after economic objectives. So that in many cases there are still many human values are not used as an important reference in the engineering process.

The problems available in this research is about the public transport stops in the city of Makassar. The first issue, the safety of the sidewalks as used by pedestrians have varied measure in high: there are very low, and some others are higher, and most of the roads in Makassar do not have sidewalks. Those of having no sidewalks cause the public transport users getting difficulties to get on vehicles. Secondly, lay off public transport passengers in vain place, the same thing ascending descending passenger public transportation, since the number of stops is very less, the existing facilities at the bus stop, for example: the seat is not in accordance with the dimensions of the human body, as well as the area is not adequate as a stopover vehicle.

In a research study to be achieved is a study of public transport stops to be safe and comfortable with using ergonomics. Based on the above description, the problem can be formulated in this study how to assess the level of safety and ergonomic comfort to public transport stops facility. while on the formulation of the problem, then the purpose of the study is to analyze the level of safety and ergonomic comfort to public transport stops facility

STRATEGIC ISSUES RESEARCH STUDY

Transportation is a business move, transport or transfer an object from one place to another more useful or may be useful for certain purposes. Transportation is defined as the transfer of goods and people from place of origin to destination. (Dedi S. S).

Bus stops in major cities in the world, the bus stop is one of the public spaces in the cities as the place where the bus transit, ascending and a descending passengers. Each stop has two lines, ie gate transit and for pedestrians. In the city of Denver, the bus stop mall shuttles have seats move, people can set their own seating relaxed while waiting for the bus. At stops and bus stop in the city of Morella Mexico, passengers can take a snack of fresh mango or pineapple. City of Portland, the bus stops in the city has a good information system on the transit system, ie each route given special logo color code for each direction, helping people navigate the bus network and can show the bus schedule. Bus stop in the city of Los Angeles, passengers must wait on benches ads. There is a sense of apprehension of self-protection which is

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too close to the traffic. While in the city of Barcelona, where the bus stops are made as thin as possible and transparently and in a beautiful shelter design and passengers can sit comfortably (Suisman, Doug).

Structuring the public transport system is not good to add to existing problems such as overlapping routes, the number of fleets that are too large, the low level of services, long journey times and others. This will lead to a decreased level of public transport services and can sometimes increase the level of congestion on the road.

The public transport services will be reviewed from several major dimensions such as infrastructure, facilities, and operating systems that have attributes such as Time, Cost, Safety, comfort, and performance expectations and perceptions so that users of public transportation services can be represented and accommodated (Dedi S.S).

Transportation systems

The transport system can be described in the form of macro transportation system which is divided into several subsystems micro interrelated and influence each other. The micro subsystem includes system activity (transport demand), the system of transport infrastructure networks (transport supply), system traffic movement (traffic) and the institutional system. Every system of land use activities or have certain types of activities that generate (generation) and pull (attraction) movement. The movement of people or goods that happen requires modes of transport (means) such as cars, buses, trains and transport infrastructure such as road networks, railways, terminals, airports, ports and stations. Activity and network systems will interact and generate the movement of people or goods. Changes to the system will affect the activities of the network system through a change in the service level movement system. Conversely, changes to the network system will also affect the system.

Dismissal facilities greatly affect the smooth movement of vehicles from one stopping point to the next stop. Where the bus system in the United States reduce some bus stops. Eliminating some bus stops can reduce about 40% of the time to stop. (Ranjay M. S dan Edmund J. Z).

BASIC CONCEPTS

The ultimate goal of man to always amend the design of the equipment used to facilitate the operation and impose its use. Scientific disciplines born and developed around the 20th century related to the design of equipment and working facilities considering the aspects of man as the wearer is known then under the name of ergonomics

The application of ergonomics in general is the activity of design (design) or redesign (redesign). This may include hardware, such as: working tools (benches), platform, seat, handle work tools, control systems, props, street / alley, doors, windows, and others. Still in the discussion is about the design of the work environment, because if the system hardware in the form it will also change the work environment.

RESEARCH METHODS

Qualitative data collection was conducted to determine what desires the use of public transport in the city of Makassar in a way that made the spread of the questionnaire on the use of public transportation with a variety of questions / items.

Data collection is done directly on the comfort and safety on public transport stops, especially on the facilities and infrastructure such as roads kretria geometric design.

Once the data is obtained and then continued with statistical testing

- In a test of uniformity of data where the data is said to be uniform if located between Upper Control Limit and Lower Control Limits using a 95% confidence level and 5% level of accuracy.
- Adequacy test data to determine the data point fairly or not the condition $N' < N$, with a confidence level of 95% and 5% level of accuracy.
- Test percentile, percentile test using 5-th percentile, 50-th and 95-th.

ANALYSIS METHOD

In this study, a population which is the object of research, to determine the amount of sample used Bernoulli equation, namely:

$$N \geq \frac{\left(Z_{\alpha/2} \right)^2 p.q}{e^2} \quad (1)$$

Correlation calculation on each variable with a total score using the formula product moment, that is:

$$r = \frac{N(\sum xy) - (\sum x \sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}} \quad (2)$$

The formula for the coefficient of variance (with cronbrach), as shown in the following equation:

$$\alpha = \frac{k \cdot r}{1 + (k - 1) r} \quad (3)$$

Testing uniformity observation data as a control tool calculated the average (mean), the upper control limit (BKA), lower control limits (BKB), using a 95% confidence level and 5% level of accuracy.

$$B = \bar{X} + 2 \sigma_x \quad \text{and} \quad B = \bar{X} - 2 \sigma_x \quad (4)$$

By using a 95% confidence level and 5% level of accuracy. Terms of body dimension data measured for each dimension will have a storage no more than 5%. Data said to be sufficient if $N' < N$, By using the formula, namely:

$$N' = \left[\frac{K / S \sqrt{N \sum X_i^2 - (\sum X_i)^2}}{\sum X_i} \right]^2 \quad (5)$$

Test normality of the data was conducted to test whether the data were normally distributed or not with the formula:

$$\chi_{hit}^2 = \sum \frac{(O_i - e_i)^2}{e_i} \quad (6)$$

$$\text{Terms normality of data: } \chi_{hit}^2 \leq \chi_{tabel}^2 \quad (7)$$

Conducted if the data is not normally distributed. Layout percentile formula:

$$L_i = \frac{in}{100} \quad (8)$$

Percentile values

$$\text{Percentile 5-th} = \bar{X} - 1.65 \sigma_x \quad (9)$$

$$\text{Percentile 50-th} = \bar{X} \quad (10)$$

$$\text{Percentile 95-th} = \bar{X} + 1.65 \sigma_x \quad (11)$$

RESULTS AND DISCUSSION

Security level facilities dismissal based on the level of interest, the perceived level of satisfaction and contentment expected then analyzed by menggunakan Quality Function Deployment (quality house) obtained the results of the first priorities and priorities fifth stop on the sidewalk, where the user needs to repair the vehicle and vehicle owners want their repair and incoming priorities. Pavement based on the results of anthropometric dimensions of the body by testing the 95-th pesentil influential knee high adalahsetengah obtained 24.76 cm. half the height of the knee is ideal in terms of the movement of users in stepping onto the road pavement.

Stop facility dismissal was based on the results of research anthropometric analysis seating is not much different from that on the vehicle seat only difference is the material while the result is wide seats with 95-th percentile is 36.21 cm, 44.45 cm high seat, high backrest 56.92 cm, and a length of 411.4 cm seat.

Discussion of the results of research that analyzes the 95-th percentile anthropometry obtained measure 24.76 cm high pavement. While the results of previous research community Anthropometrics premises obtained from the public interpolation British and Hong Kong (Pheasant, 1986) against to the people of Indonesia (suma'mur, 1989) as well as dimensional terms of (Nurminanto, 1991). knee height gained 54.4 cm or halved then obtained 27.4 cm. Whereas a seat on the seat width dieperoleh stop with the size of 36.21 cm, 44.45 cm seat height and backrest height 56.92 cm.

Previous research Nurmianto (1991) in his research Anthropometrics Indonesian society, high knees folded popliteal obtained 44.5 cm size. And a thick belly (abdominal) as a reference width of the seat with a size of 28.2 cm.

Table 1 Comparison Value Ergonomics at bus stops and sidewalk seating

Commentaries	Measurement stops in (cm)			
	Present condition	Dep. Hub. DJP. Land	Previous research	Ergonomics value
Seats Height	40 – 67	50	44,5	44,45
Seats width	30 – 70	40	28,2	36,21
Backrest height	40 – 60	50	62,1	56,92
Seats length	2,5 – 6,5	400	408,1	411,4
Pavement height	17-32	10-30	10 - 20	24,76

Fig 1. Facility stops

EMPIRICAL RESEARCH FINDINGS

Third is the empirical research findings obtained high chair 44.45 cm while the previous study Joan Duncan, Professor D. Ferguson, G. Andrews and P. Peach,) "Duncan Chair" was developed in Australia chair with seat height 46 cm. while the seat width refers to the buttocks to the abdomen 36.21 cm and 56.92 cm high backrest. While Nurmianto (1991) in his research Anthropometrics Indonesian society, high knees folded popliteal obtained 44.5 cm size. And a thick belly (abdominal) as a reference width of the seat with a size of 28.2 cm.

CONCLUSION AND RECCOMENDATION

The conclusion of the research study safety and comfort facilities public transport stops are worth ergonomics security level facility that stops the high-value ergonomics pavement 24.76 cm size. while the dismissal of the facility that is the seat stops seat width with the size of 36.21 cm, 44.45 cm seat height and backrest height 56.92 cm and a length of 411.4 cm. Level of comfort and security of public transport stops facility that is mutually teritegritasi between high pavement, facilities with public transport stops are worth ergonomic.

We recommend public transport in the city of Makassar need special attention, where many vehicles that do not fit ergonomic.

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