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RESEARCH ARTICLE

STUDI OF VEHICLES UTILITIES AND LOAD-UNLOADING FACILITIES OF CITY PUBLIC TRANSPORT BASED ON ERGONOMICS ASSESSMENT

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ABSTRACT

This study was aimed at assessing; the level of ergonomic values of public utility vehicles from the side of anthropometry, the level of ergonomics public transport from the side of anthropometry, and reviewing QFD (quality function deployment) the priority of the technical dimension based on the attributes of vehicles utilities and facilities of the public transport. Data collection is done by measuring the level of interest, satisfaction, and future expectations. Anthropometric data and the level of improvement priority are examined by modifying GFD matrix. Ergonomic level results presented that 95% of users satisfied, safe, and comfortable. Vehicles utility and load-unloading facilities of public transport with a confidence level of 95% shows the anthropometric dimensions; hangar doors 104.78 cm high, 49.53 cm tall ladder first, second ladder 49.53 cm high, 24.25 cm wide staircase, seat width of 36.21 cm, 44.45 cm seat height, backrest height 27.08 cm, length seat 224.4 cm. QFD assessment based on the attribute utility Cohen's scale and load-unloading facilities of the vehicles representing the order of improvement priorities; (1) facilities stop, (2) material seat, (3) access to up / down, (4) high chairs, (5) the sidewalk, (6) street lighting, (7) high-hangar door, (8) the quality of material , (9) air circulation, (10) the lighting in the room, (11) traffic signs.

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INTRODUCTION

Movement and rate the economy of society is determined by whether or not the transport system. The extent to which the level of importance of the new transportation system be perceived directly when one element of the system is disrupted or paralyzed. Quality Function Deployment (QFD) is a structured method that is used in the process of planning and product development to establish specification needs and desires of consumers, and to evaluate a product to meet the needs and desires of consumers (Cohen, 1995). The problems that exist in this study is about the public transport in the city of Makassar. The first issue of utility public vehicles from 140 vehicles examined have no similarity of size even some vehicle does not have facilities that should exist on public transport vehicles, including access to fluctuate like the stairs first, second staircase, wide doors, wide stairs and a hangar door. Seats system include seat height, the first long seat, the second long seat and backrest height. Second, road infrastructure which includes the criteria of design geometry, as well as stop bus facilities, waiting chair is not ideal, traffic signs are inadequate so that public transport riders to raise and drop off passengers anywhere that course on security, while the infrastructure related to the safety and comfort of illumination path less in line with vehicle users.

Objective of the study is a public utility vehicles and discharge facilities of public transport to be safe and comfortable with using Quality Function Development (QFD) to obtain quality services to consumers or users. Objective of study is analyze the value of superiority Quality Function Deployment utility and discharge facilities and to analyze the utility and value of ergonomics utility and an integrated discharge facilities.

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Literature Review

Strategy Issue Infrastructures

Bus stops in major cities in the world, the bus stop one of the public space in the city is where the bus transit and fluctuations of passenger. Each stop has two directions, namely gate transit and for pedestrians. In City of Denver, the bus stop mall shuttles have seats move, people can set their own seating relax while waiting for the bus. In Morella Mexico City, passengers can take a snack of fresh mango or pineapple at the bus stops. In Portland City, bus stops in the city has a good information transit system that each route are given a special logo color code for each direction, helping people navigate the bus network and can show the bus schedule. In Los Angeles City, passengers must wait on benches ads at the bus stop, passengers must wait on benches ads. There is a worries to the self-protection which too close to the traffic. And in the city of Barcelona, the bus stop made as thin as possible and transparently and in a beautiful shelter design and passengers can sit comfortably. (Suisman, Doug, 1997).

Studi Ergonomics in Infrastructure Transport

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MATERIALS AND METHOD

Data collection is done by measuring the level of interest, satisfaction, expectations observation data based anthropometric dimensions of vehicles and facilities utilities dismissal, the data is analyzed by anthropometric and priorities by modifying the value of QFD. Attributes of public transport service; Access up and down, hangar doors, seat system, lighting, sir circulation, smell, heat indoor, color in door, sidewalks, halte, and traffic signs.

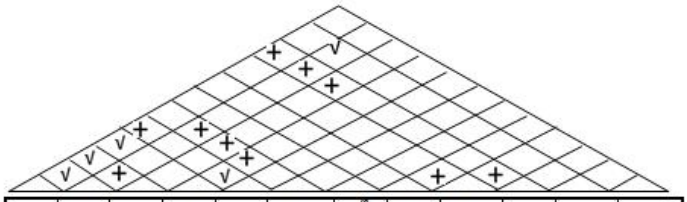
RESULTS AND DISCUSSION

Value Ergonomic Utilities and Load-unloding Facilities

Anthropometry results obtained as a reference in the design of vehicles utility and load-unloading facilities of public transport in the city of Makassar. It is obtained results as shown in Table 2:

Table 1. Response Technique

No.	*Respon Teknik*
1	The quality of material used
2	Repair of high chairs
3	Repair material of sitting place
4	Repair of up access
5	Repair of hangar
6	The addition of lights in vehicles
7	Repair of air circulation in vehicles
8	Additions & repair of sidewalk
9	The presence of the area and facilities at bus stops
10	Improved street lighting
11	Repair / addition of traffic signs
12	The presence of green space / park town



Annotatin: Assessment scale cohen (indicator color intensity)
1 no connection
3 there is a relationship
5 moderate relationship
7 strong relationship

Quality assesment / Atribut responden	Dimension Teknis												Persepsi Responden			Normalisasi rasio perbaikan			
	1 (1) * (19)	2 (2) * (19)	3 (3) * (19)	4 (4) * (19)	5 (5)* (19)	6 (6)* (19)	7 (7)* (19)	8 (8)* (19)	9 (9)* (19)	10 (10)* (19)	11 (11)* (19)	12 (12)* (19)	Impor-tance 13	Customer Perfor-mance 14	Goal 15	Improve-ment ratio 16 (14)/(15)	Sales point 17 (17)*(19)	Raw Weight 18	Normali-zed Raw Weight 19 (18)*(19)
Access up and down	0.49	0.29	0.29	0.69	0.69	0.10	0.10	0.69	0.69	0.10	0.10	0.10	4.53	2.27	4.71	2.08	1.5	14.12	0.100
Hangar Doors	0.36	0.36	0.21	0.51	0.51	0.07	0.07	0.36	0.36	0.07	0.07	0.07	4.31	2.35	4.68	1.99	1.2	10.28	0.073
Seats system	0.47	0.65	0.65	0.28	0.28	0.09	0.46	0.28	0.47	0.28	0.09	0.09	4.6	2.47	4.67	1.89	1.5	13.18	0.093
Lighting	0.08	0.24	0.24	0.08	0.08	0.56	0.08	0.24	0.40	0.56	0.40	0.08	4.29	2.52	4.43	1.76	1.5	11.31	0.080
Air Circulation	0.06	0.05	0.05	0.06	0.06	0.06	0.40	0.06	0.28	0.05	0.06	0.17	3.91	2.55	4.40	1.72	1.2	8.08	0.057
Smells	0.19	0.06	0.19	0.06	0.06	0.06	0.33	0.06	0.06	0.06	0.06	0.19	3.91	2.15	4.22	1.97	1.2	9.24	0.065
Heat indoor	0.19	0.19	0.33	0.06	0.07	0.33	0.33	0.07	0.07	0.06	0.07	0.19	3.68	1.96	4.15	2.12	1.2	9.36	0.066
Color Indoor	0.13	0.04	0.22	0.04	0.04	0.13	0.04	0.04	0.13	0.13	0.04	0.04	3.51	2.39	4.30	1.79	1	6.31	0.045
Sidewalks	0.21	0.06	0.21	0.48	0.34	0.06	0.07	0.48	0.07	0.34	0.07	0.21	4.31	2.43	4.55	1.87	1.2	9.68	0.069
Halte	0.26	0.60	0.60	0.60	0.43	0.26	0.43	0.43	0.60	0.43	0.08	0.43	4.31	2.36	4.46	1.88	1.5	12.21	0.086
traffic signs	0.19	0.31	5.00	0.32	0.06	0.19	0.06	0.19	0.32	0.32	0.44	0.06	4.56	2.74	4.49	1.64	1.2	8.97	0.063
A beautiful garden and green	0.07	0.33	0.07	0.07	0.07	0.19	0.33	0.19	0.46	0.33	0.19	0.46	4.31	2.37	4.29	1.81	1.2	9.35	0.066
Illuminating the road	0.07	0.07	0.07	0.21	0.21	0.49	0.07	0.21	5.00	0.49	0.35	0.21	4.28	2.35	4.55	1.93	1.2	9.94	0.070
fare	0.19	0.19	0.19	0.19	0.19	0.19	0.06	0.06	0.06	0.06	0.06	0.06	4.39	2.38	4.15	1.75	1.2	9.20	0.065
Weight	2.98	3.51	8.36	3.68	3.11	2.82	2.85	3.39	9.00	3.32	2.11	2.39							1.000
Priority	8	4	2	3	7	10	9	5	1	6	11	12							

Future 1. House of Quality Utilities, Minibus in Makassar

Table 2. Hasil uji persentil antropometri

No.	Dimension	Value of Ergonomic body, anthropometry (cm)		
		5 $^{o}/_{oo}$	50 $^{o}/_{oo}$	95 $^{o}/_{oo}$
1	Elbow to the Floor	97,66	101,22	104,78
2	High Knee	45,47	47,50	49,53
3	Half of High Knee	22,74	23,75	24,74
4	Foot length	22,75	23,75	24,25
5	seat width	26,97	31,59	36,21
6	High chair	37,67	41,06	44,45
7	High backrest	22,87	36,35	29,84

Ergonomic level research results (presented 95% of users; satisfied, safe and comfortable) public utility vehicle (minibus) and the dismissal of the facility with a confidence level of 95% shows the dimensions of the body; hangar doors 104.78 cm high, 49.53 cm tall ladder first, second ladder 49.53 cm high, 24.25 cm wide staircase, seat width of 36.21 cm, 44.45 cm seat height, backrest height 27.08 cm, length seat 224.4 cm.

Results of the response technique in Figure 1. House of quality utilities, minibus in Makassar, QFD study technical dimension values based on the attribute utility Cohens scale and facilities dismissal of the vehicle, showing the order of priorities of repair; (1) facilities stop, (2) material seat, (3) access to up / down, (4) high chairs, (5) the sidewalk, (6) street lighting, (7) high-hangar door, (8) the quality of material, (9) air circulation, (10) the lighting in the room, (11) traffic signs.

Conclusion

Ergonomics assessment conducted is based on the anthropometric dimensions of the user's body. Improvement of technical dimensions of utility and load-unloading facilities is categorized into eleven priorities on the QFD matrix. Ergonomic level results presented that 95% of users satisfied, safe, and comfortable. Vehicles utility and load-unloading facilities of public transport with a confidence level of 95% shows the anthropometric dimensions; hangar doors 104.78 cm high, 49.53 cm tall ladder first, second ladder 49.53 cm high, 24.25 cm wide staircase, seat width of 36.21 cm, 44.45 cm seat height, backrest height 27.08 cm, length seat 224.4 cm. QFD assessment based on the attribute utility Cohen's scale and load-unloading facilities of the vehicles representing the order of improvement priorities; (1) facilities stop, (2) material seat, (3) access to up / down, (4) high chairs, (5) the sidewalk, (6) street lighting, (7) high-hangar door, (8) the quality of material, (9) air circulation, (10) the lighting in the room, (11) traffic signs.

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