SURAT TUGAS

Nomor : 0832 /ST/Univ-BD/XI/2017

Rektor Universitas Bina Darma menugaskan kepada Saudara:

No.	Nama	Status	Judul
1.	Viki Sariki, Christofora Desi Kusmindari, S.T., M.T., dan Ir. Renilaili, M.T.	Mahasiswa dan Dosen Fakultas Teknik Universitas Bina Darma	*Analysis of Railway Passenger Seat Executive Using Method Quality Function Deployment (QFD)*

Sebagai Peserta dan Pemakalah dalam kegiatan *6th International Conference On Information Technology&Engineering Application*, yang dilaksanakan oleh Universitas Bina Darma pada tanggal 10 November 2017.

Demikianlah surat tugas ini dibuat agar dapat dilaksanakan dengan penuh rasa tanggung jawab.

Dikeluarkan di : Palembang
Pada tanggal : 4 November 2017

Kepala Biro Administrasi,

Muhammad Nasir, M.M., M.Kom.

Tembusan disampaikan kepada yth:
1. Rektor Universitas Bina Darma (sebagai laporoan);
2. Yang bersangkutan untuk dilaksanakan;
3. Arsip.

DAFTAR ISI

Analysis of Railway Passenger Seat ExecutiveUsing Method *Quality Function Deployment* (QFD)

Viki Sariki [1], Ch. Desi Kusmindari, Renilaili [3]
Students Universitas Bina Darma[1]Bina Darma University Lecturer[2]Lecturer Universitas Bina Darma[3]
Jalan Ahmad Yani No.12, Palembang
e-mail: vikisariki008@gmail.com 1, desi_christofora@binadarma.ac.id 2, renilaili@binadarma.ac.id[3]

ABSTRACT

The passenger seat is an important requirement in supporting services in PT Kereta Api Indonesia (Persero). Executive class passenger seats so far not been done renewal, so that should be *a redesign* of the executive class passenger seats. The purpose of this study is to give the proposed *redesign of* the passenger seat by using *Quality Function Deployment* (QFD). Difficulty: all the technical characteristics in the design of the new railway passenger seats are not hard and medium. Importance: The most important attribute in the design is the seat material coated with flocking Or Velvet degree 20.00% interest. Estimated Cost: estimated cost of the new product KA seat, all the characteristics belonging to the category of cheap.

Keywords: Seat Train, Quality Function Deployment.

1 Introduction

Railway is a means of transportation owned by PT KeretaApi Indonesia which is a State Owned Enterprise (SOE) engaged in the field of land transportation services that provide, organize, and manage rail transport services in various cities in Indonesia.Railway is a mass transportation which generally consists of locomotives and the series of train or carriage is relatively large size so as to be able to load passengers and goods on a large scale.

Passenger transport using trains includes long haul routes, haunted distances, and short distances. For long-distance passenger transport services are divided into class, business, and economy passenger transport.

The passenger seat executive class trains that exist today have not been updated for use, just do regular maintenance and repair of such repairs if there are functions of the seats can not be functioned properly. So that needs to be given the proposed renewal of the form and function of the existing seats.

Please add some paragraph to introdce yor article

Ergonomic chair designs havesome criteria can be as follows:

1. High Chairs
    Criterion which is caused by high-chairs are:
    a. The foundation is too high from the floor will cause the thighs depressed and can cause pressure on blood vessels to cause tingling feet, leg swelling or pain.
    b. The runway is too low on the floor can cause the body and legs outstretched leaning forward and make the back away from the rest, so that no sustain lumbar.

2. Seat Depth
    Criterion which is caused by the depth of the seat are:
    a. Too wide then the end will press seating area right behind the knee it poses no nyamanan. To avoid nyamanan on foot, the user will advancebutt position and this led to the backplate can not be lean. The result is the user experience fatigue, discomfort and pain in the back.
    b. Too narrow will cause feelings of fallen or toppled from the chair and be reduced laying on the bottom of the thigh.

3. Seat Backrest
    Serves as the support seat backrest lumbar region, or a small portion of the back.

4. Backrest Angle
    a. The more oblique the more weight is supported by the backrest so that the compression pressure on the spine and pelvis limit to be reduced.
    b. The greater the angle between the thighs and spine lumbar lordosis increased so that the horizontal section of the vertebrae undergo compression pressure is increasing.
    c. Optimal angle of about 100° to 110° suitable for lounge chairs.
    d. Corner of the excess is not suitable for backrest yan medium or low for causing the upper body propped become.

5. Backrest Angle *(or Angle Seat Tilt)*
    Design seating *(seating design)* have good contactsthe seat back *(backrest),*Angle of backrest for public use = $5^{\circ}$to 10°

6. Backrest Arm Hand(armrest)
    a. Supporting addition to posture
    b. Helps stand and sit to chair

7. The Support Feet
    Feet should be supported and thigh at least parallel to the floor. The purpose of this leg cantilever yuitu:
    a. Provide a foot rest for the people of short stature.
    b. Provides a variation of the position of the foot while standing
    c. Provide support on one leg at a certain time as a variation.

8. Legroom
Leg room so that users can stretch their legs occasionally when sitting for long periods.

9. Seatsurface
The purpose of the provision is an effort to cushion the pressure distribution, with respect to the weight at the point of intersection between the surface with a wider area. A mistake in the design if it considers that the more soft, and soft in a cushion, the greater the resulting comfort. The reality is not so. It is often overstuffed chair can cause fatigue, discomfort and pain. If the design is not appropriate bearing, the compressive stress generated will affect the balance of the body.

Ergonomic posture is a very important factor, one only sitting posture that everyone does every day in more than one hour.According to Dr. L. Meily K[2] The main purpose for designing ergonomic chair or seat iscreating a chair shape in such a way so as to maintain posturephysiological spine, thus expected to work the muscles do not need to contract. Posture ergonomic seats which maintain body posture is stable and meets the following matters [3]
 a. Fun in a certain period
 b. Satisfactory physiologically, by sitting us more comfortable
 c. Match / matching / matching with the work

Quality Fuction Deployment (QFD) quality is used to collect the opinions of experts and the voice of the customer to the product design [4]. This method is expected to determine priorities in rail passenger seat ekekutif class.
The purpose of this study are: (1) Redesign the seats to be more ergonomic. (2) Get a redesign proposal seat executive class train passengers using QFD.

2 Research Methodology
2.1. Sites and Objects ResearchResearch
Researchconducted at the Train Department and kertapati railway station owned by PT Kereta Api Indonesia Regional Division III Working area of Palembang.

2.2 Data Collection
Data collection was conducted two phases: an
1. interview about the actual state of the executive class train seat
2. for QFD distributing questionnaires to consumers (passengers) executive class train.

3 Results and Discussion

3.1 The characteristics of respondents

Determination of the number of samples in the study using the formula slovin, the size of the population used is the number of seats in the four (4) carriage Railways executive class in a series of one departure from the station Kertapati towards the station rock promontory 200 the passenger seat. With inaccuracy tolerance for error in the sampling used by 5%, then:

$$n = \frac{N}{1 + N.e^2} = \frac{200}{200.(0.05)^2+1} = \frac{200}{200.(0.0025)+1} = \frac{200}{1,5} = 133.33 \quad 135$$

From the above calculation, the number of samples that should be required in this study a number of 135 samples or respondent.

3.2 Questionnaire Results *Quality Function Deployment*

From the results of questionnaires by 135 to make QFD. Obtained results of the questionnaire can be seen in table 1 as follows.

Table 1. Results of The Questionaire

No	Score					Total	Percentage Score (%)				
	A	B	C	D	E		A	B	C	D	E
1	65	58	53	49		225	28,89	25,78	23,56	21,78	
2	101	34				135	74,81	25,19			
3	78	57				135	57,78	42,22			
4	89	46				135	65,93	34,07			
5	70	65				135	51,85	48,15			
6	74	61				135	54,81	45,19			
7	19	116				135	14,07	85,93			
8	30	105				135	22,22	77,78			
9	27	108				135	20,00	80,00			
10	25	110				135	18,52	81,48			
11	32	103				135	23,70	76,30			
12	36	99				135	26,67	73,33			
13	28	107				135	20,74	79,26			
14	58	77				135	42,96	57,04			
15	92	43				135	68,15	31,85			
16	88	47				135	65,19	34,81			
17	24	111				135	17,78	82,22			
18	85	50				135	62,96	37,04			
19	50	85				135	37,04	62,96			
20	59	16	31	13	16	135	43,70	11,85	22,96	9,63	11,85

Source : data processing

From the percentage score on the questionnaire results in subsequent authors analyzed attributes to each variable on the terms of the highest percentage score, the analysis results can be seen in Table 2 .. as follows:

Table 2. Results of Analysis Questionnaire

No.	Variable	Atribute	Percentage (%)
1	The parts are not as you wish	Backseat	28,89
2	Backrest is less high	Yes	74,81
3	Your back shapes are too flat	Yes	57,78
4	Your Backrest is too narrow	Yes	65,93
5	Your seat and backrest is too narrow	Yes	52,85
6	Your seat is too narrow	Yes	54,81
7	The chair you are sitting on is now too low	No	85,93
8	The distance between the feet with the chair in front is too narrow	No	77,78
9	Liked to turn the chair into sitting position opposite	No	80
10	Your armest is too low	No	81,48
11	Your armest is too short	No	76,3
12	Footrest too narrow	No	73,3
13	Footerest too low	No	79,26
14	Calf needle shape need to change	No	57,04
15	Requires headrest	Yes	68,15
16	Requirest a calf rest like a bus	Yes	65,19
17	Requires seat belt	No	82,22
18	Requirest a dinning table	Yes	62,96
19	Rolling board material and executive rail seat passenger seat	Velvet	62,96
20	The color of the executive rail passenger seat	Blue	43,7

From the results above, the percentage of questionnaires obtained several complaints and needs of the technical response to the Executive KA chair available today, can be seen in Table 3 as follows:

Table 3. Response Technique

No.	Atribut	Persentase (%)
1.	The unsuitable part is the backrest	28,89
2.	The backrest is higher	74,81
3.	Backrest is more soft	57,78
4.	Awareness of the back expanded	65,93
5.	The pedestal more soft	52,85
6.	The pedestal is expanded	54,81
15.	The presence of headrests	68,15
16.	The existence of a calf rest like a bus	65,19
18.	The presence of a dining table	62,96
19.	Seat material seats velvet	62,96
20.	Blue Exclusive Class KA chair	43,7

After receiving the results of the percentage of complaints against executive ka seats that are currently available, for the results of the product QFD passenger seat can be seen in Figure 1 below.
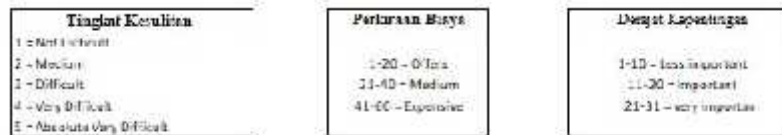
Figure 1. Passenger Seat QFD

QFD Based on the results in Figure 1 above shows:
1. Difficulty: all the technical characteristics in the design of the new railway passenger seats are not hard and medium.
2. Importance: The most important attribute in the design is the seat material coated with flocking Or Velvet degree 20.00% interest.
3. Estimated Cost: estimated cost of the new product KA seat, all the characteristics belonging to the category of cheap.

4 Conclusions

The results of this study are:
1. Based on calculations using the acquired design QFD passenger train new executives as follows: seat depth plus the length of one passenger plus seat, backrest height plus width plus backrest. Given headrests, given the backrest calves, were given a table, material backrest, cushion, headrest and backrest shank is spongy foam, which is wrapped with the material fabric lining velvet, the color of the seat (backrest, cushion, headrest, and backrest calf) is a combination of blue-gray.
2. Based on the results of QFD method in Figure 1 above shows:
   a. Difficulty: all the technical characteristics in the design of the new railway passenger seats are not hard and medium.
   b. Importance: The most important attribute in the design is the seat material coated with flocking Or Velvet degree 20.00% interest.
   c. Estimated Cost: estimated cost of the new product KA seat, all the characteristics belonging to the category of cheap.

References

[1] Cahyaditha, A. ayu, 2013, Perbaikan Fasilitas Penumpang Kereta Api Pada Stasiun X Denagn Pendekatan Ergonomi Makro, *Jurnal Teknik Industri*, Universitas Sumatera Utara.

[2] Hutasoit, F. 2015. Ergonomi Tempat Duduk (Seating). https://Shefocus.Wordpress.Com /2013/10/02/Ergonomi-Tempat-Duduk-Seating/. [Diakses Tanggal 2 april 2017 Jam 09:00 WIB]

[3] Nurmianto, E., 2004, *Ergonomics, Basic Concepts andApplications*,Jakarta, PT Guna Widya

[4] Ginting, Rosnani 2010, *Product Design,* Yogyakarta: Graha Science, First Edition, Second Printing, 2013.