

THE ERGONOMIC DESIGN OF A MINI HOTEL FOR INDONESIAN TRAVELLERS

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ABSTRACT

Indonesia, as the archipelago country, where economic activities centered in the major cities, causing the migration of people from one town to another within one island or to another, from one town to their hometown and vice versa. It takes a long and tiring trip, especially if there is traffic jam or flight delays. Moreover, the Indonesian people have a habit to go home to their hometown at certain times, such as religion festivals or new year celebrations. It necessary a practical resting places that can be used for temporary stays to reduce fatigue, with relatively low cost. The strategic location is at the airports, railway stations, bus or public transport stations or around the gas stations. For this purpose, the design of a mini hotel should be able to meet the needs to traveler, include a bed, a wardrobe for storing goods, television and electrical sockets, and air-conditioning to ensure convenience. The results of the mini hotel design is intended for two people, with two alternative types of design. The size of this room of 2.14m x 1.68m x 3.23m. This design is based on the Indonesian anthropometry data. The RULA Analysis showed value 2 which is quite good and ergonomically, thus ensuring user comfort.

Keywords : Mini Hotel Design, Ergonomic, RULA Analysis

1. INTRODUCTION

Indonesia is an archipelago consisting of thousand islands and is the world's largest archipelago country. Transportation is the most important thing and not easy to handle. This is because the islands are separated by an ocean to another island with large distances. Indonesia is also a country with a very diverse culture. In one year there are several holidays such as Eid, New Year and other festivals. In those days a lot of family is traveling by ship, aircraft, and road transportation.

Transportation is a basic requirement in the daily life of mankind. Humans must had moved from one place to another for fulfilling their individual activities and social life. During the trip, the problems often encountered that can inhibit a person to the destination. Great distances poor road conditions, traffic conditions are too crowded, and the lack of adequate transportation facilities be the cause of

fatigue during the trip. In the case of travel by ground vehicles, the main problem that occurs is they are very few hotels / motels are available near the highway, with the affordable rental price and reasonably good service. A temporary resting place is required to get fit, so that it can continue the journey to the destination. Currently is very difficult to get a hotel / motel that meet those needs. Hotel are available a great hotel, with the usual conditions till very good, and the location is not always close to the main road. The price offered is quite expensive.

Options are often taken by the traveler who prefers resting driving a car with sleep in the car because the hotel is considered expensive and far from the path to be taken by the rider. Option to rest in the hotel is considered quite expensive, what else they just want to rest for a time not too long. Hotel rental costs to be incurred become a burden. But with the rest in the car, of course, is not as comfortable and not as safe as if resting in the hotel room. Necessary to design a

mini hotel, with a simple dimensions, but still ensure comfort and security for the traveler. The hotel can be built separately, at a nearby location to the highway, or integrated with the rest area frequently visited by the traveler such as gas stations. This research was conducted for the purpose.

2. LITERATURE REVIEW

2.1 Ergonomics

Ergonomics is derived from the Greek term is Ergos and Nomos. Ergos means work, and Nomos means science or rules. Ergonomics (IEA, 2015) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. According Satalaksana (2006), ergonomics is a branch of science that systematically, to utilize information about the nature, human capabilities and limitations to design a working system so that people can lives and work at the system well, reaching the desired goal through the work with an effective, safe and convenient

2.2 Anthropometric

Anthropometry, according to Stevenson (1989) and Nurmianto (1991) is a collection of numerical data relating to the physical characteristics of the human body size, shape, and strength. The anthropometric data presents the data size of various members of the human body in percentile. Collecting data at a certain percentile would be very useful for designing a product or work facility to fit the size of the human body that will use the product or the facility. The aim of the study was to adjust the dimensions of anthropometric product or tool conforms to the shape and size of the body so as not to be a problem when it is used by the user of the facility.

2.3 Tolerance

In addition to applying the anthropometric data in obtaining the size of the system work, should also be noted regarding tolerance, which needs to be given to these dimensions. What is meant by tolerance is a value that is given for added comfort during use of the

work system. Tolerance should be given considering that the anthropometric data were obtained by a static functional body dimensions. Tolerance value may be a negative value (-), positive (+), and also a zero (0), depending on the need.

2.4 Hotel

Hotels known since hundreds of years ago. Began when the crusade (1096 AD) the cities along the Turkish area stay named Mansions, a place to stay the pilgrims who have traveled very far away. The history of modern hotels began in the 18th century that is in 1774 built a few Covert Garden Hotels in major cities of Europe and America. These developments did not stop there, other hotels began to appear and become one of pridity. In 1794 in New York was established City hotel with 170 rooms, then in Boston with the number of rooms 270 rooms in 1829, and still growing modern hotels that trigger the development of a modern hotel.

2.5 Mini Hotel

Hotel mini initiated by a Japanese architecture that wants to design a very efficient room of the house with very little land. This idea arose because Japan is a country with limited land area, but the great need for residence, then designed the house with a small concept. From this mini home concept, evolved another idea that is the concept of a mini hotel. The concept of this hotel as a mini home, but this mini hotel does not have the usual bathroom owned by a hotel. The concept of a mini hotel is designed so that all the usual activities carried out in the room can also be done in this mini hotel, such as reading, resting, eating snacks, watching television, with a of course in comfortable circumstances. The room is designed so that it does not use a large area, but still comfortable for the user and the room quite to perform various activities.

2.6 CATIA

CATIA (*Computer Aided Three-dimensional Interactive Application*) is a program developed by the French Company Avions Marcel Dassault since 1977, and the program was further developed by IBM.

CATIA is used for 3D product development and design. CATIA also supports several programs in developing such as Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), Human Factor Modelling/Biomechanics, etc. In the field of ergonomics, the using of CATIA is very helpful in the analysis of biomechanics with a variety of analytical methods such as Rula, REBA, Force and Moment Analysis.

2.7 RULA Analysis

RULA (*Rapid Upper Limb Assessment*) analysis is the analysis used to evaluate based on posture, force / load, and repetition. The evaluation will be assessed by a variable called named MSD risk. The value of the variable becomes indication of the level of risk that may occur in a facility or product design. Here is a table of the order of MSD risk level.

Score	Level of MSD Risk
1-2	negligible risk, no action is required
3-4	low risk, changes may be required
5-6	moderate risk, further investigation, immediately changed
6+	very high risk, apply changes now

3. RESEARCH METHOD

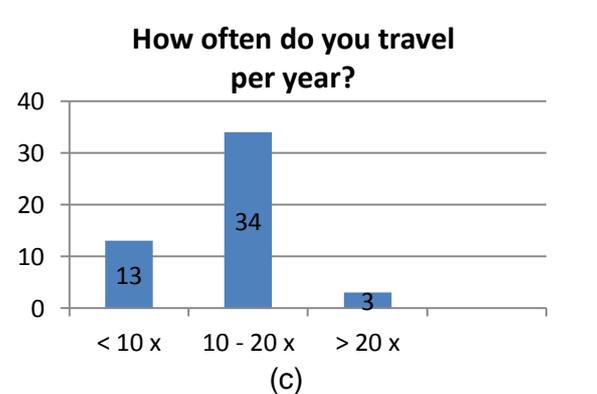
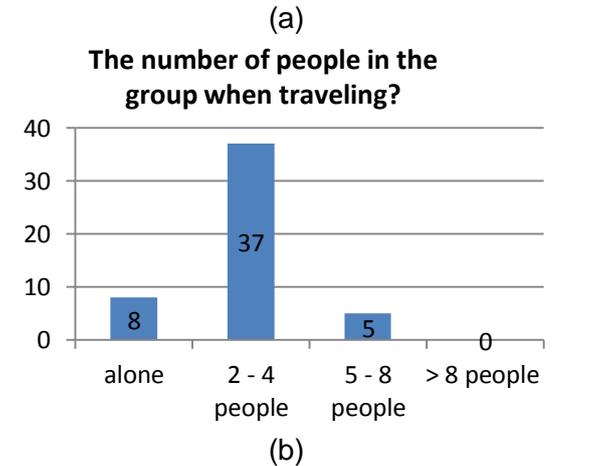
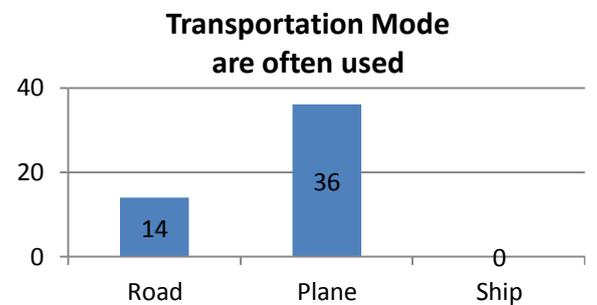
Study started with a literature study on ergonomics and product design. Then conducted a preliminary study to look at the various problems that occurred during the trip, specifically the use of road trip. From these preliminary studies, the problem can be identified that is the needs of the mini hotel / motel around the main road. In order to become more focused, the scope of the problem is limited. The next stage is making of a research questionnaire to find out the perceptions and willingness of the respondents that is the traveler. After doing fieldwork, data is processed, be analyzed statistically, and used as a reference in designing ergonomic mini hotel. The design of the mini hotel using CATIA software, a design software that combines images with biomechanical analysis. The results of this

study is final draft form 3-dimensional working drawings, and Rula analysis for software-based hotel users.

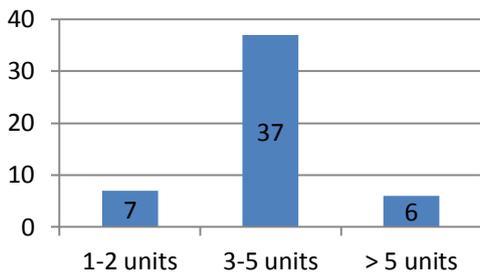
4. RESULT AND DISCUSSION

Here is the data from the questionnaire results obtained from the respondents drawn area of Jakarta.

Type of Data	Research Tools	Respondents
Primary Data (respondents fill out questionnaires directly)	Questionnaires with 50 items	50 traveler from jakarta who frequently travel far away



How many electronic instruments are often carried in a long trip?



(d)

Figure 1. The chart of respondents questionnaire results (a) – (d)

From the questionnaire that was distributed data be obtained support for the design to be created. Here is mini transit hotel design.



Figure 2. Mini Hotel Model 1



Figure 3. Mini Hotel Model 2

The dimensions of the hotel mini-design is 1.63m X 3.23m X adalah.14m. In the hotel there are facilities such as two beds, one cabinet, one small cupboard and two large size cupboard located in each bed. Air conditioning is also provided. Beside each

bed mounted small table that is embedded in the wall. This table is intended for users of the transit hotel that still wants to do his job when resting. Thus, the function of the hotel is not only to rest but is also to perform work activities. For security purposes, on the top of the bed fitted with a safety that is a small frame, which is used to protect people who sleep on top does not fall during sleep. Inside this transit hotel also installed two lighting lamps, which was first installed in the room from the ceiling, serves to light up the entire room, and the second is placed at the bottom of the upper bunk. The second lamp is used the user to read at rest time without disturbing the sleeping roommate, by turning on the lights. At the end of the room mounted a stairs that is useful as tool to climb to the upper part of the Bed

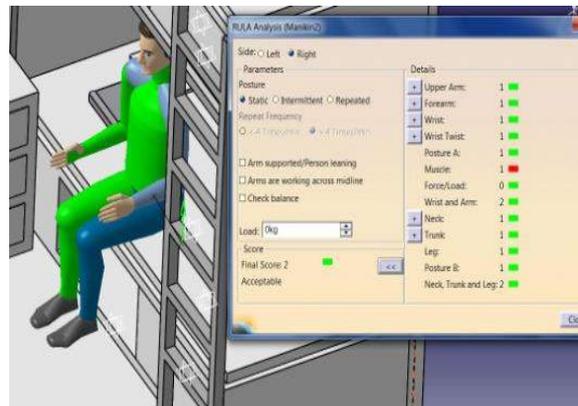


Figure 4. RULA Analysis when sitting on the edge of bed

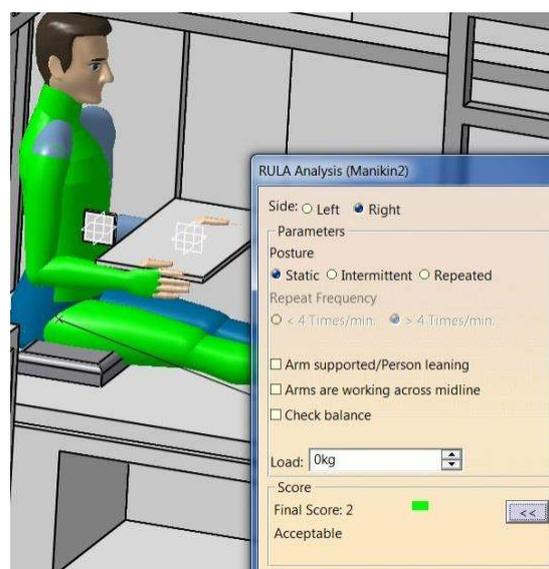


Figure 5. RULA Analysis when sitting inside



Figure 6. RULA Analysis when climbing stairs (1)

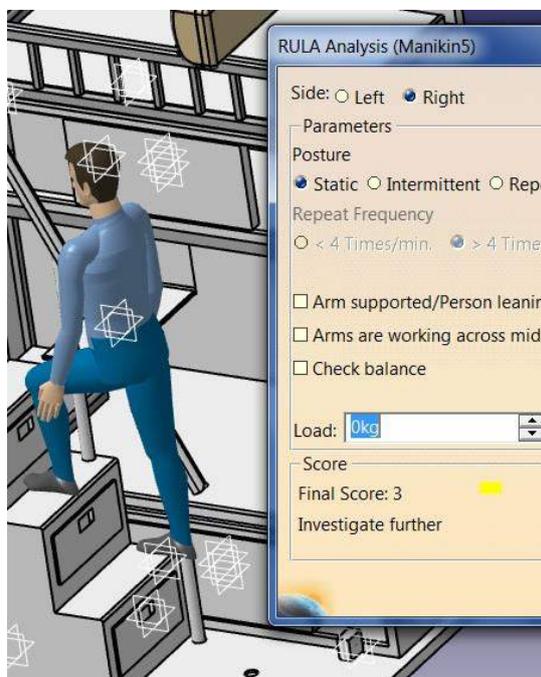


Figure 7. RULA Analysis when climbing stairs (2)

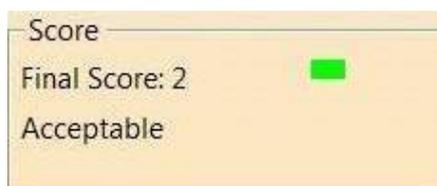


Figure 8. Final Score of RULA Analysis

Rula simulation results show the value of the end of 2, meaning that the design is in compliance with ergonomic requirements. Score 2 is a quite good value in accordance with the table Rula. Score 2 means very low risk and no need to mention the re-design.

5. CONCLUSION

1. According to the results of the questionnaire respondents, this transit hotel should be built in place of rest at the main highways and airports.
2. The size of a mini hotel room design results is 2,14m x 3,23m x1,68m. The room size is based on the calculation of data antropometri Indonesian people, added the size of the required interior.
3. Final score from Aalisis Rula is 2, which means very low risk and no need to mention the re-design
4. There are two different alternatives design of ergonomic mini hotel.

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