Anxiety Levels of the Cibitung Station Platform Users as Experience of Waiting for an Urban Rail Service (Based on the Noise Level and Passing Train Speed)

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Abstract. Waiting for services is one of the important variables in transportation. The environmental conditions of the waiting facility can be something that can influence the user's condition, such as feelings of satisfaction and security, whether they are getting worse or better. The research tries to find out what the condition of platform users is when the long-distance train passes while they are waiting for the urban rail service. An in-depth study was carried out by taking data on the noise level of the long-distance train's roar directly and measuring its speed, then conducting interviews with platform users to measure the level of anxiety that arose after the train has passed. The novelty is the using of noise level and long-distance train speed, as well as analyzing the anxiety level of the platform users, while previous research references tend to analyze the waiting activity itself which is connected to the environmental conditions of the waiting place. The result shows that the noise level exceeded the threshold value of 85 dB, which is an average of 92 dB, with the average speed of 148 kph. But of the 100 respondents interviewed, calculated according to the HARS method, 97% said they had no anxiety about being on the platform. There are contradictory phenomena between the experience of passengers on the platform with environmental conditions where the noise level exceeds the threshold value and the long-distance train passing at high speed, with the level of anxiety of the respondents.

Keywords: Waiting experience, Platform, Noise level, Train Speed, User's Anxiety.

1 Introduction

Waiting for public transportation services is one of the important variables in human transportation activities. The situation and environmental conditions of the waiting facility can be something that can influence the condition of its users, such as feelings of satisfaction and security, whether they get worse or better (Millonig, et.al, 2012). In rail transportation, waiting activities for train services are carried out on the station platform, which is one of the variables in the station building, according to the Minister of Transportation Regulation Number PM.29 of 2011 (Permenhub 29/2011) concerning

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Technical Requirements for Train Station Buildings. Apart from waiting for services, the platform also has the function of getting passengers on and off. To maintain the safety and smooth running of these activities, technical and operational requirements for platform buildings have been regulated as referred to in Minister of Transportation Regulation 29/2011, including: a. placed at the edge of the lane (side platform), or between two lanes (island platform); b. The types are high, medium, and low platforms; c. The length of the platform corresponds to the longest series of passenger trains in operation; d. the platform width is calculated based on the number of passengers, using a certain formula; e. Minimum platform width requirements; f. The platform floor does not use slippery materials; g. The platform is at least equipped with lights, lane signs, direction signs and safe platform boundaries; h. platform safe boundary lines, including: a. High platform, minimum 350 mm from the outer edge to the platform axle, b. Medium platform, minimum 600 mm from the outer edge to the platform axle, and c. Low platform, minimum 750 mm from the outer edge to the platform axle. The object of this research is the Cibitung Station platform, which is in Wanasari, Cibitung, Bekasi Regency. Cibitung Station is included in class III group based on PT Directors Regulations. Indonesian Railways (PT. KAI). Cibitung station only serves Electric Rail Trains (KRL) with the connections Cikarang – Angke, Cikarang – Kampung Bandan via Manggarai, and Kampung Bandan via Senen. Cibitung station also has long-distance trains, namely long-distance trains from various locations in the provinces of West Java, Central Java, and East Java. Therefore, when passengers wait for the KRL on the Cibitung Station platform, the long-distance train will also pass. The passing of a long-distance train at Cibitung Station, causing a loud train roaring sound, and at high speed. Meanwhile, if you look at the technical and operational requirements for platform buildings in Minister of Transportation Regulation 29/2011, platform facilities only consist of using non-slip materials for the floor and the existence of a safe limit, there is no barrier between the loud sound of a long-distance train and the speed of its passage with waiting passengers. The motivation for this research is to find out what the condition of Cibitung Station platform users is when the long-distance train passes while they are waiting for the KRL. The suspicion of this research is that the sound and speed of the long-distance train will have a certain impact on KRL waiters on the Cibitung Station platform, for example causing feelings of anxiety, as well as getting a clear picture of this. For this reason, an in-depth study of the experiences of KRL waiters was carried out by taking data on the noise level of the train's roar directly and measuring its speed, then conducting interviews with people on the platform to measure the level of anxiety that arose after passing the long-distance train. This phenomenon while waiting for transportation services has also been studied by previous researchers, such as Hagen, M.V., (2011), who stated that travelers found that train stations were the weakest point in their transportation process, so improvements needed to be made appreciation of station waiting time as one of the improvement strategies, the waiting experience can be influenced by changes in the waiting environment, events in the waiting environment can be known and their intensity influences human emotions and behavior.

2 Literature Review

The literature review in this research includes several themes, namely the theme of waiting for public transport, then the descriptive research theme, namely the method used to make this research, and the theme of measuring the variables used, including noise and train speed, and the theme of measurement individual anxiety level.

2.1 Waiting for Public Transportation

It was stated in the Introduction that the theme of waiting for public transportation was also researched by Zhou, M., et.al, (2020), who stated that the activity of waiting for public transportation takes up a lot of passenger's time and contributes to station operational efficiency. Zhou et.al, explored passenger waiting behavior using field observations and video recordings, both under normal conditions and when there was guide intervention. This research analyzes the distribution of pedestrians in waiting zones at different density levels, distribution of travel distance, movement speed, and average waiting time. A quantitative analysis was carried out on the behavior of waiting passengers, the percentage of waiting modes, the distance traveled, and the average waiting time, thus revealing the characteristics of the behavior of waiting passengers at the tactical and operational levels. The research results are useful for managing waiting passengers and increasing station operational efficiency.
Furthermore, Millonig, A., et.al, 2012, researched the perception of waiting time for public transport, with attention to the activities of sitting, waiting, and the expectations of prospective passengers. It is stated that there are several approaches to improving the passenger waiting experience, but little consolidated knowledge about the impact of certain offers in different conditions, for example location characteristics or group preferences. This study introduces an approach to measure the influence of different waiting activities on the perception of waiting time. The activities and perceptions of waiting time of 1,215 public transport passengers at three stations were analyzed to determine the influence of certain entertainment offers on the ability to estimate the duration of waiting time. The results of this research are that there is a strong influence of the character of the station and users on waiting activities and time perception.

2.2 Descriptive Research

Manjunatha, (2019) states that descriptive research seeks to determine and identify, while analytical research is carried out to determine why this happened. Descriptive research aims to highlight issues or problems through the data collection process to describe the situation more completely, so it is used to describe the behavioral characteristics of a population or sample. Descriptive research aims to describe, explain, and validate research findings, closely related to observational research but not limited to observational data collection methods. Case studies can also be established as a popular data collection method used with descriptive studies.
Atmowardoyo, (2018), states that various research methods include case studies, quasi-experiments, qualitative experiments, meta-analysis, descriptive research, activity theory, error analysis, research and development, and survey methods. Descriptive research is a research method used to describe phenomena as accurately as possible. Researchers collected data through tests, questionnaires, interviews, and observations.

Descriptive research systematically describes the phenomenon under study, including several subtypes of research methods such as surveys, correlation studies, qualitative studies, or content analysis.

2.3 Train Noise Level Measurement

According to research by Nemec, M., et.al, (2015), train noise is an environmental problem, its definition can be done in two ways, namely measurement in the field, or through prediction. The sound pressure level measurement methods are the Schall 03 method and the Czech method.
Quartieri, J., et.al., (2009), researching train noise emissions, said that his research considered the impact of train noise within the framework of the low-speed regime, especially near stations, from the perspective of environmental impacts around the station. used predictive software, confronting algorithmic simulations with experimental results of noise measurements detected on the facades of buildings near the station and realistic descriptions of additional phenomena.

2.4 Train Speed Measurement

Research conducted by Brant, J., and Alturbeh, H., (2022) states that speed measurements are necessary for safe train operations. certain conditions such as rain, morning dew, leaves, or grass cause low adhesion, which causes increased operation of the wheel slide protection system and can cause service delays and safety problems such as signals being passed in times of danger. trains traditionally measure their speed using axle-driven pulse generators (wheel encoders), which are less accurate in low adhesion conditions after the wheels have rolled so that the angular velocity of the wheels no longer corresponds to the train's actual speed.
in research by Trepacova, M., et.al., (2020), it is stated that train speed is one of the factors analyzed in measuring the advantages and disadvantages of rail transportation, which are received by passengers, this research in the Czech Republic uses a qualitative approach and quantitative.

2.5 Anxiety Level Measurement

Anxiety is part of the conditions of life, which means there is worry in humans (Hayat, A., 2014). Under normal conditions, anxiety can be a source of motivation towards progress and success, but if the level exceeds normal limits, it is called neurotic anxiety, it can disrupt personal stability and disrupt life balance. The World Health Organization (WHO) states that anxiety is a mental illness that is common in the world, where there are strong feelings of fear, worry and anxiety so that daily activities can be disrupted (Dede, E.V.B., 2022).
Furthermore, Dede, E.V.B., et.al, (2022) conducted research to determine the anxiety level of students who were writing their theses using the Hamilton Anxiety Rating Scale (HARS). Based on this research, it was found that this method was proven to be applicable and accurate in diagnosing anxiety levels in students who were writing their theses with an accuracy rate of 100%. HARS measures clinical anxiety levels on an international scale and is representative for countries with generalized anxiety. The measurement with HARS consists of 81 symptoms and is divided into 14 criteria. Each criterion will be given a symptom score with a value range of 0 - 4, which is

accumulated from the number of symptoms, where 0 means there are no symptoms, 1 means experiencing one or less than half of the symptoms. yes, 2were half of the existing symptoms, 3 were experiencing more than the existing symptoms, and 4 were experiencing all the existing symptoms. The total assessment ranges from 0 – 56 with a score of < 14 including no anxiety, a score of 14 – 20 mild anxieties, 21 – 27 moderate anxieties, 28 – 41 severe anxiety and a score > 41 including very severe anxiety/panic. Another study by Dinda, A.F., et.al., (2022) was conducted to determine factors related to anxiety levels. This research used a descriptive survey and was analyzed using the chi-square test to determine the relationship between variables. The sample was 70 respondents, from purposive sampling, using the Zung Self-Rating Anxiety Scale questionnaire. The results of the research show that there is a relationship between age, gender, education level, employment status and environment and anxiety levels.

Setyowati, A., et.al., (2019) conducted research on anxiety in adolescents, the instrument used was called the Zung Self-rating Anxiety Scale, the results were analyzed cross-sectionally and correlationally. The Zung Self-Rating Depression/Anxiety Scale was designed by W.W. Zung, to measure the level of depression/anxiety in patients with depressive disorders (Zung, W.W., (1965). This scale is a short-self-administered survey to measure a person's depression status. There are 20 questions on the scale that assess four general characteristics of depression, namely pervasive effects, physiological similarities, other disorders, and psychomotor activity. Ten questions use positive words and ten questions use negative words. Each question is given a score on a scale of 1 – 4, with a value range of 25 – 100. The scoring results are as follows: 1. Normal range: 25 -49; 2. Mild depression: 50 – 59; 3. Moderate depression: 60 -69; 4. Major depression: 70 and above.

3 Research Method

This research was carried out in the following stages:

a. Inventory of the phenomenon of waiting for a train on the platform. Previous research articles were collected to obtain the initial phenomenon of waiting for train services;
b. Determine research variables. From previous references it was found that the variables studied included the waiting characteristics of passengers, such as the distribution of waiting time and the characteristics of the environmental conditions of the waiting area. The idea of this research which is novel is to describe how passengers feel. Are you waiting on the platform if the train passes directly, where there will be the roar of the train with its noise level accompanied by its speed as it passes, does anxiety arise? Therefore, the variables studied include, noise level and long-distance train speed, as well as passenger anxiety levels;
c. Create a questionnaire measuring anxiety levels. The questionnaire was prepared based on the concept of the Hamilton Anxiety Rating Scale (HARS). interviews with passengers on the platform are carried out after every long-distance train pass;

The questionnaire form as can be seen in Table 1, is a modification of the HARS concept, for use in this research.

Table 1. Questionnaire form

Mark √ in every answer	0	1	2	3	4
Do you feel anxious?					
Do you feel tense?					
Do you feel afraid?					
Do you feel disturbed throughout the day?					
Will your concentration be disturbed?					
Will you feel unhappy all day long?					
Do you feel somatic symptoms?					
Do you feel any sensory symptoms?					
Do you feel cardiovascular symptoms?					
Do you have respiratory symptoms?					
Do you feel gastrointestinal symptoms?					
Do you feel any urogenital symptoms?					
Do you feel vegetative symptoms?					
Behavior during the interview (restlessness, trembling fingers, frowning, or frowning, tense face, increased muscle tone and short and rapid breathing)					

Where:

- Somatic symptoms: muscle pain and stiffness, teeth grinding, unstable voice and muscle twitching.
- Sensory symptoms: prickling feeling, blurred vision, red and pale face and feeling weak.
- Cardiovascular symptoms: tachycardia, pain in the chest, hardened pulse, and sudden loss of heartbeat.
- Respiratory symptoms: feeling of pressure in the chest, feeling of suffocation, frequent deep breaths, and shortness of breath.
- Gastrointestinal symptoms: difficulty swallowing, obstipation, nausea and vomiting, stomach pain, burning sensation in the stomach.
- Urogenital symptoms: frequent urination, incontinence, amenorrhea
- Vegetative symptoms: dry mouth, easy sweating, red face, standing hair, dizziness, or headache

d. Conduct a survey measuring noise levels, long-distance train speed, and anxiety levels of passengers waiting on the platform. Noise level measurements carried out with sound level meter and speed measurements are carried out with a speed gun;
e. Analyze measurement results. The analysis was carried out to obtain the average noise level and speed of the long-distance train, to describe the noise figures and speed of the long-distance train, meaning that the characteristics of these two variables would be obtained, then in that value the level of anxiety would also be obtained respondents, so that a complete description of the noise level and at a certain long-distance train speed will be obtained, the condition of the passenger's anxiety level is at a certain position;
f. Discussion. The results of observations of the platform environment and survey results of noise levels and train speeds will be directly elaborated to describe the experience of waiting for passengers on the Cibitung Station platform;
g. Conclusion. Summing up the research results.

Figure 1 is an illustration of the research stages described above.

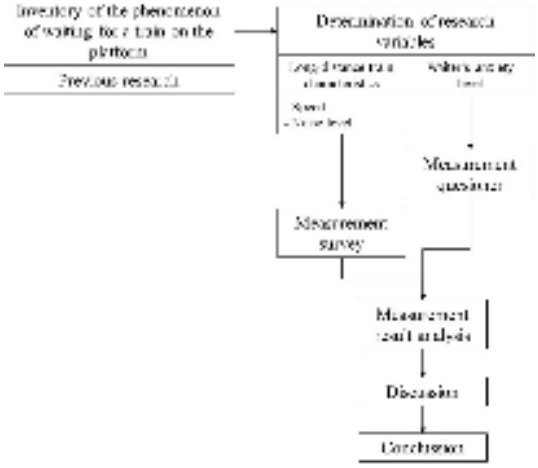

Fig. 1. Research flow chart.

4 Analysis

The analysis phase of this research will process data from surveys of long-distance train speed, long-distance train noise levels, and passenger anxiety levels on the Cibitung Station platform. The results are as follows:

4.1 Noise Level of Long-distance Train

The noise level of the train is directly measured with the help of a sound level meter which is carried in a position above the platform, so it will be assumed to be the level that is received by the hearing of the passengers on the platform. Measurements were carried out for 3 hours, from 07.00 – 10.00, taken at the time when many passengers were on the platform because it was the time to leave for work. During the measurement period, 28 trains passed directly, and the noise level of each was measured.

According to the Decree of the Minister of the Environment Number 48 of 1996 concerning Noise Level Standards, noise is unwanted sound from businesses or activities at a certain level and time which can cause problems with human health and environmental comfort. Excerpted from Aspiani, R.Y., (2021), according to Buchari, (2007), there are several types of noise, namely: a. continuous noise with a wide frequency spectrum, b. continuous noise with a narrow frequency spectrum, and c. Intermittent noise is noise where the sound increases then weakens slowly. Long-distance train noise belongs to the type of intermittent noise. Based on its effect on humans, noise is divided into: a. annoying noise, b. covering noise, and c. destructive noise. the effects of high intensity noise (above the threshold value) are: a. damage to the sense of hearing, b. physiological influences, such as increased blood pressure, pulse rate, peripheral blood vessels, sensory and heart rate disorders, digestive disorders, c. Community reaction, in the form of rejection, or demands to reduce the level. Physiologically, noise intensity that is still below the threshold value does not cause hearing damage, but can be a cause of stress and other health problems. stress caused by exposure to noise can cause: a. irritability, headaches, sleep disturbances, nausea and shortness of breath, b. psychomotor reaction disorders, c. loss of concentration, d. impaired concentration, e. decreased work performance.

The noise level threshold value used in this research is regulated in the Decree of the Minister of Manpower Number Per-51/MEN/1999, because the highest noise threshold value that can still be accepted by humans without losing hearing power is noise that occurs in workplace, namely 85 db. For this reason, the measurement results and information regarding the noise level thresholds are presented as in table 2.

Table 2. Result of Measuring the Noise Level of Long-distance Trains.

No	Train name	Departure time	Noise level (dB)
1	Bengawan	07.02	85,1
2	Go Par	07.08	90,5
3	Go Par	07.11	95,7
4	Go Cher	07.19	89,4

No	Train name	Departure time	Noise level (dB)
15	Parcel	08.39	90,5
16	Go Par	08.42	90,3
17	Dharmawangsa	08.47	90,5
18	Argo Bromo Anggrek	08.50	93,7

5	F.U YK	07.21	93,6
6	Kertajaya	07.45	88,3
7	Argo Muria	07.46	90,6
8	Sawunggalih	07.51	91,9
9	Majapahit	07.52	90,5
10	Go Par	08.03	93,7
11	Jaka Tingkir	08.09	86,1
12	Tawang Jaya	08.09	93,7
13	Go Par	08.17	96,8
14	Go Cher	08.28	80,7

19	Go Cher	09.05	95,5
20	Parcel	09.11	88,7
21	Argo Dwipangga	09.21	92,4
22	Dharmawangsa	09.30	101,1
23	Taksaka	09.40	97,5
24	A.P. Cargo	09.43	95,5
25	Sembrani	09.52	94,8
26	Tegal Bahari	09.57	88,6
27	Serayu	10.09	94,7
28	Go Cher	10.22	95,6

According to Table 2 above, it is known that in almost all long-distance trains measured during the survey, the noise level exceeded the threshold value of 85 dB, which is an average of 92 dB. So, this is an indication of the problems experienced by passengers on the Cibitung Station platform. This intermittent noise occurred with an average headway time of 7 seconds.

4.2 Long-distance Train Speed

The speed of the long-distance train needs to be measured because it is thought to have an impact on the anxiety level of passengers on the Cibitung Station platform, namely being close to a large steel object traveling at a certain speed. Measurements are assisted with a speed gun for direct trains that pass from 07.00 – 10.00. From 28 speed data, the average value was taken to produce a speed value of 148 km/hour.

4.3 Anxiety Level of Cibitung Station Platform User

In addition to the characteristic data from 100 respondents, data were collected using interviews to obtain a variable measuring the level of anxiety based on HARS. The results are as follows:

a. Respondent characteristics

the proportion of respondents according to gender was 54% male and 46% female, the largest age range of respondents was the adult group 21 - 50 years, namely 72 people, of all respondents those who often used the train were 86% and those who said sometimes is 14%.

b. Measure of anxiety level

Of the 100 respondents interviewed, calculated according to the HARS method, 97% said they had no anxiety about being on the Cibitung Station platform, another 2% said they experienced mild anxiety, and 1% said they experienced severe anxiety.

5 Discussion

The facts obtained from the results of observing regulations, observing the condition of the Cibitung Station platform, measuring noise levels and train speeds directly as well as measuring the anxiety level of passengers on the Cibitung Station platform are that

there are contradictory phenomena between The experience of passengers waiting on the Cibitung Station platform with environmental conditions where the noise level exceeds the threshold value and the direct train passing at high speed which is only close to the waiting position on the platform, with respondents' anxiety level (97% respondents stated there was no anxiety). The respondents' lack of worry is possible because the majority of respondents often use the Cibitung Station platform (86% of respondents said they often use it). This situation has the potential to ignore existing conditions, making it prone to the risk of unnoticeable losses due to noise levels that exceed threshold values and the absence of physical barriers between the direct train track and the position where passengers are waiting. At least mitigation needs to be carried out to reduce noise levels which can have a negative impact on human health, for this reason the discussion is based on the existence of an equation that connects the level of risk with the causal variables, namely the presence of threats (hazards) and vulnerabilities(vulnerability), with the capacity factor as a risk reduction variable, as in the following equation (Melianita, R., et.al., 2021):

$$R = H \times \frac{V}{C}$$

Where:
R : Risk
H : Hazard
V : Vulnerability
C : Capacity

The risk level is directly proportional to the Threat and Vulnerability variables, and inversely proportional to the Capacity variable. A threat (hazard) is a physical phenomenon, phenomenon or human activity that has the potential to cause damage that can cause loss. Vulnerability is a condition determined by social, economic, physical, and environmental factors or processes that increase a community's tendency to be affected by hazards. while capacity is a combination of all the strengths and resources available in a system that can reduce the level of risk (Melianita, R., et.al., 2021).

The risk level model works by considering the real existence of hazards and vulnerabilities which must be understood by the public and other stakeholders. So in the case of this research, even though 97% of survey respondents thought there was no anxiety, dangerous factors still exist, namely in the form of noise levels that exceed the threshold value, and the absence of a physical barrier between the passenger waiting position on the platform and the direct train high speed. This research can be developed to obtain a risk level value through analysis of the risk level model mentioned above, because many stations have the same conditions as Cibitung Station, so that it can be a reference for engineering the capacity needed to obtain a level value this risk can be reduced.

6 Conclusion

The conclusion of this research is that in almost all direct trains measured during the survey, the noise level exceeded the threshold value of 85 dB, namely an average of 92 dB, with an average speed of 148 km/h. The proportion of respondents according to gender was 54% male and 46% female, the largest age range of respondents was the

adult group 21 - 50 years, namely 72 people, of all respondents those who often used the train were 86% and those who said sometimes is 14%. Of the 100 respondents interviewed, calculated according to the HARS method, 97% said they had no anxiety about being on the Cibitung Station platform, another 2% said they experienced mild anxiety, and 1% said they experienced severe anxiety. The facts obtained from the results of observing regulations, observing the condition of the Cibitung Station platform, measuring noise levels and train speeds directly as well as measuring the anxiety level of passengers on the Cibitung Station platform are that there are contradictory phenomena between the experience of passengers waiting on the Cibitung Station platform with environmental conditions where the noise level exceeds the threshold value and the direct train passing at high speed which is only close to the waiting position on the platform, with respondents' anxiety level (97% respondents stated there was no anxiety).The respondent‘s lack of worry is possible because the majority of respondents often use the Cibitung Station platform (86% of respondents said they often use it). This situation has the potential to ignore existing conditions, making it prone to the risk of unnoticeable losses due to noise levels that exceed threshold values and the absence of physical barriers between the direct train track and the position where passengers are waiting. At least mitigation needs to be carried out to reduce noise levels which can have a negative impact on human health, for this reason the discussion is based on the existence of an equation that connects the level of risk with the causal variables, namely the presence of threats (hazards) and vulnerabilities (vulnerability), with the capacity factor as a risk reduction variable. The risk level model works by assuming the real existence of hazards and vulnerabilities which must be understood by the public and other stakeholders. So, in the case of this research, even though 97% of survey respondents thought there was no anxiety, dangerous factors still exist, namely in the form of noise levels that exceed the threshold value, and the absence of a physical barrier between the passenger waiting position on the platform and the direct train high speed. This research can be developed to obtain a risk level value through analysis of the risk level model mentioned above, because many stations have the same conditions as Cibitung Station, so that it can be a reference for engineering the capacity needed to obtain a level value this risk can be reduced. A practical example of capacity mitigation for Cibitung Station is the procurement and construction of a guardrail to replace the existing yellow line. The guardrail will be able to reduce noise levels and reduce the level of risk on the Cibitung Station Platform.

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