

THE EFFECT OF NOISE, WORKLOAD, AND WORK FATIGUE ON WORK STRESS AND ITS IMPACT ON EMPLOYEE PERFORMANCE AT PT. X YEAR 2023

Syfa Rizkiyani*¹, Dwi Sunu Kanto²
^{1,2}University of Trilogi Jakarta

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ABSTRACT

This study attempts to examine the influence of noise, workload, work fatigue, work stress and performance among variables. Employees at PT. X, one of Indonesia's top producers of cable accessories, served as the study's samples. The study adopted a quantitative methodology and employed questionnaires to gather information from 140 PT. X employees working in various divisions. The research data was obtained from the results of filling out the questionnaire and analyzed using the Structural Equation Modeling Partial Least Squares (SEM PLS) with SmartPLS program. The results showed that noise in the workplace has a significant and positive influence on the level of employee work stress. Noise that exceeds the threshold value can lead to higher work stress and lower productivity. In addition, excessive workload also contributes to increased stress and decreased employee productivity. Work fatigue also affects work stress and employee performance, where high fatigue can lead to decreased work efficiency and performance. The results show that noise, workload and work fatigue have a negative and significant effect on employee performance, while job stress also has a negative effect on performance. In conclusion, work environment factors such as noise, workload, and work fatigue affect job stress and employee performance at PT. X. Company managers need to optimize the work environment and reduce the negative impact of these factors to increase employee productivity. This research provides valuable insights for companies in developing policies that support employee welfare and achieve company goals.

E-mail:
syfarizkiyani@gmail.com

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1. INTRODUCTION

Industrialization in Indonesia is developing very rapidly, marked by the increasing number of business actors and the significant development of the manufacturing industry sector. PT. X as one of the leading cable accessories manufacturers in Indonesia has contributed to the development of the Industry with a commitment to create new jobs, expand exports, and increase technical progress. Company performance is an important factor in achieving this goal. PT. X has conducted an assessment of employee performance, particularly in the production section, using indicators such as attendance, discipline, quality of work, initiative, cooperation and responsibility. However, from the results of this assessment, there was a decline in employee performance in several production sections such as the workshop, repair shop, and injection.

Several work environment factors were identified as potential causes of decreased employee performance. One such factor is noise in the workplace, which can have a negative impact on the health and safety of employees and increase the risk of low productivity. Work atmosphere is one of the factors that can affect productivity. These elements include physical, chemical, biological, and mental components. Health and safety the presence of any kind of noise in the workplace, whether it is constant, intermittent, impulsive or repetitive, poses a risk to the hearing and attention of employees. Control is applied if the noise level is detected to be higher than the NAV or standard. In a study of 46 workers, machine noise was shown to have a negative impact on productivity (Lebu, 2020). Contrary to previous studies (Lazuardi et al., 2021), it was found that excessive production goals, broken equipment, poor relations between workers, etc., all have a greater impact on worker performance than workplace noise levels. Work can be negatively affected by any of these problems (Tarwaka, 2015).

Based on the results of noise measurements that have been carried out at PT. X in 2023 in the workshop section 1 a noise result of 88.5 dBA was obtained from production machines, likewise in the

The Effect of Noise, Workload, and Work Fatigue on Work Stress and Its Impact on Employee Performance at PT. X Year 2023. Syfa Rizkiyani, et.al

workshop section 2 a noise result was obtained of 88.2 dBA, and finally in the SUTT section a noise measurement result of 88.3 dBA was obtained. If the measured noise level is more than 85 decibels (dB) which is the Threshold Value (NAV) stipulated by the Ministry of Manpower of the Republic of Indonesia in Regulation Number 5 of 2018 concerning Occupational Safety and Health in the Work Environment, work accidents, decreased productivity, and substandard performance is likely the result of uncontrolled noise levels (Buntarto, 2015).

Excessive workload is also another factor that might affect the decline in employee performance. Large production demands and limited processing time can cause excessive workload and potentially reduce productivity. According to the definition given by (Gawron, 2000), workload is "a series of task demands, as effort and activity or achievement". The degree of difficulty, the amount of time allotted, and the desired outcome all contribute to task demands, or workload. The guilty party has too many employees. Physical, emotional, or social stress all qualify as a "burden" (Suma'mur P.K, 2014).

The burden that workers receive based on the time available cannot exceed 100% of their ability (Rodahl, 1989) (Utami et al., 2022). Work fatigue has been shown to have a negative impact on nurse productivity (Rasyidin & Nurlinda, 2019; p value = 0.000 < 0.05). Burnout is inevitable for every worker, and has a negative impact on productivity and accuracy. Different to the study by (Saputri et.al., 2022) the t test coefficient on the fatigue variable (X1) t count < t table, or 0.075 < 1.999, and the significance level is 0,940 > 0,05, then the null hypothesis (Ha) is rejected and the alternative hypothesis (Ho) is accepted which indicates that there is no significant effect between the work fatigue variable (X1) and the performance variable (Y). Work fatigue and work stress are also elements that contribute to employee performance. Work fatigue can cause a decrease in stamina and performance, while work stress can have a negative impact on productivity and performance. Fatigue is characterized by a lack of energy and an inability to focus or complete tasks, as well as a loss of motivation, activity, achievement, and morale. Workplace burnout can manifest in a variety of ways, but invariably leads to a decrease in overall productivity and resilience (Setyawati & Endang, 2006).

In the context of PT. X, a company that focuses on the production of cable accessories, employee productivity has a direct impact on the success and survival of the company. Therefore, it is important to conduct research to evaluate and understand the impact of work environment factors on employee productivity. This research is expected to provide valuable insights for companies in optimizing the work environment, reducing the negative impact of these factors, and increasing employee productivity. In addition, this research can also provide input for the development of better company policies in an effort to achieve the company's vision to support local production and meet increasing market demand.

2. METHOD

Research Frame Work

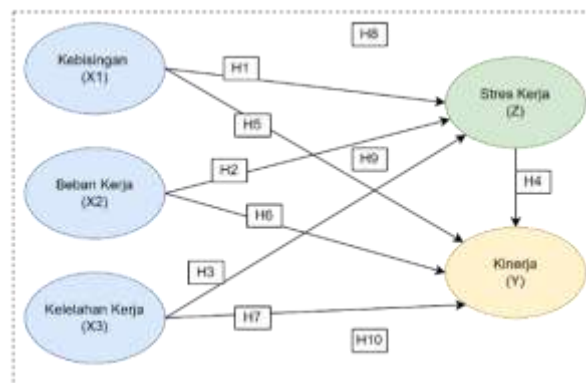


Figure 1. Thinking Framework

Source : Lebu (2020), Safitri (2021), Sofiana (2020), Diningsih (2021), Apriana (2021), Buulolo (2021), Arif (2022), Malawat (2019), Rinsa (2020) Komara (2022).

Research Hypothesis

- H1: Noise has an effect on work stress.
- H2: Workload has an effect on work stress.
- H3: Work fatigue has an effect on work stress.
- H4: Work stress has an affects performance.
- H5: Noise has an affects performance.
- H6: Workload has an affects Performance.

The Effect of Noise, Workload, and Work Fatigue on Work Stress and Its Impact on Employee Performance at PT. X Year 2023. Syfa Rizkiyani, et.al

- H7: Work fatigue has an affects Performance.
- H8: Work stress mediates the effect of noise on performance.
- H9: Work stress mediates the effect of workload on performance.
- H10: Work stress mediates the effect of work fatigue on performance.

Population and Sample

The population in this study are employees of PT. X works on Injection (30 people), Workshop 1 (19 people), Workshop 2 (18 people), SUTT (17 people), HRGA (30 people), CU Plating (7 people), Die Casting (2 people), Warehouse (11 people), and QC (6 people). The sampling technique in this study used a non-probability sampling method. Non-probability sampling is a sampling technique that does not provide equal opportunity/opportunity for each element or member of the population to be selected as a sample (Sugiyono, 2015: 84). The method used is saturated sampling (census), which is a sampling technique when all members of the population are used as samples. The researcher chose this method because the population size was relatively small so that the number of samples used in this study was 140 (one hundred and forty) samples.

Data Analysis Techniques

The data in this study were analyzed using the SEM PLS analysis technique which was carried out with the help of the SmartPLS version 3 program. The reason for using the SEM PLS in this study is because the research model to be estimated is quite complex because the model contains mediating and moderating variables, besides that SEM PLS also does not require a minimum and maximum number of samples, so it will be very good if the sample obtained is small, although SEM PLS also works very well on large samples (Hair, et al, 2000). Apart from these two reasons, the reason is because the researcher wants to avoid bias in the analysis results caused by abnormal data. SEM PLS with SmartPLS is a robust analysis technique for the issue of data abnormalities (Hair et al, 2000).

3. RESULT AND DISCUSSION

This research involved 140 respondents who worked in various departments such as Injection, Workshop, SUTT, HRGA, CU Plating, Die Casting, Warehouse, or QC. Respondents were divided into four categories based on gender, age, years of service and level of education. Characteristics of Respondents Based on Gender, 140 respondents 108 people (77.1%) were male and 32 people (22.9%) were female. Characteristics of Respondents Based on Age, 52 respondents (37.1%) were over 45 years old, 27 respondents (19.3%) were aged 31 to 35 years, and so on. From the tabulation, it can be seen that the majority of respondents are over 45 years old. Characteristics of Respondents Based on Education Level, the education level of respondents The majority of respondents (50%) had high school education or equivalent, followed by respondents who graduated from junior high school (30.7%). Only a small proportion of respondents (3.6%) have graduated from college. Characteristics of Respondents Based on Length of Service The majority of respondents (34.3%) had work experience between 11 and 15 years, while a small number of respondents (11.4%) had work experience of less than 5 years. This study uses three independent variables, namely noise, workload, and work fatigue, as well as one dependent variable (performance) and one mediating variable (work stress). Data was collected using a questionnaire filled out by respondents and analyzed using a descriptive analysis approach.

Verification Analysis

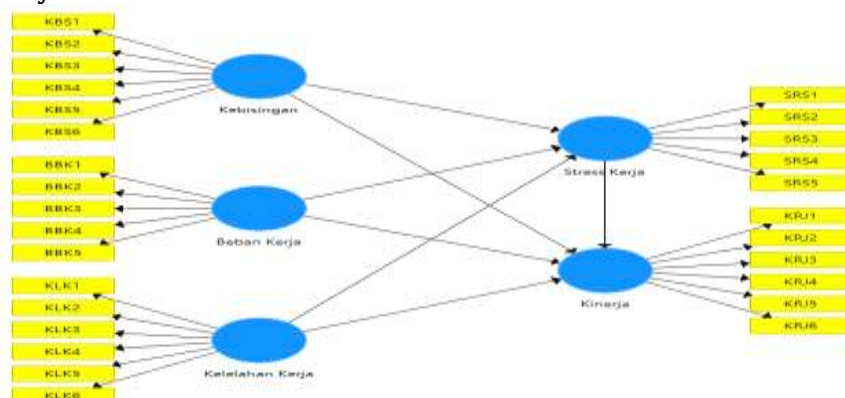


Figure 2. Research Model

Structural Equation Modeling involves two different models, namely the outer measurement model and the inner structural model. The measurement model explains how much variation in each indicator

The Effect of Noise, Workload, and Work Fatigue on Work Stress and Its Impact on Employee Performance at PT. X Year 2023. Syfa Rizkiyani, et.al

variable (manifest variable) can be explained by a hidden variable (latent variable). This model makes it possible to determine which indicators are most important in forming latent variables through measurement models. After the measurement model is developed, the effect of each external latent variable on the endogenous latent variable is evaluated in the structural model. The use of SmartPLS 3.3 results in the overall calculation findings of the two models.

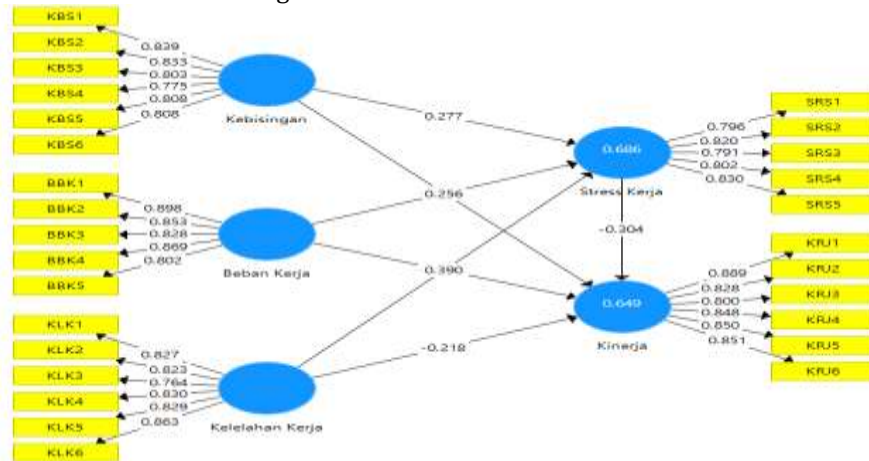


Figure 3. Complete Model Path Diagram

By comparing the results of the outer model (measurement) and the inner model (structural) of the model studied, one can test the results of the structural equation model using the PLS method.

Measurement Model Testing (Outer Model)

Convergent Validity Test, all manifest variables (Noise, Workload, Work Fatigue, Work Stress, and Performance) have good convergent validity. The loading factor value for each construct indicator is greater than 0.7, indicating a strong relationship with the observed construct. In addition, the average variance extract (AVE) value for each construct is also greater than 0.5, validating that the variability of the manifest variable is sufficient to measure latent constructs accurately. Discriminant Validity Test, Latent variables show good discriminant validity. The cross loading value for each construct indicator is greater than the correlation between the indicators and other latent variables. This shows that the different construct variables do not have excessive correlation with one another. Reliability Test, All constructs (Noise, Workload, Work Fatigue, Work Stress, and Performance) show good reliability. The Cronbach Alpha and Composite Reliability values for each construct are greater than 0.7, indicating the reliability and consistency of the measurement instrument.

Structural Model Testing (Inner Model)

Influence on Work Stress: The variables of noise, workload, and work fatigue together have an influence of 68.6% on work stress, while the rest are influenced by other factors outside the study. Influence on Performance: The variables of Noise, Workload, Work Fatigue, and Work Stress together have an effect of 64.9% on performance, while the rest are also influenced by other factors not included in the study. The variables of Noise, Workload, Work Fatigue, and Work Stress have a significant effect on Work Stress, and the variables Noise, Workload, Work Fatigue, and Work Stress also have a significant effect on performance. Thus, this study provides an understanding of the relationship between these factors in the context of the work environment.

Hypothesis Test Results

Data analysis provides conclusive answers to the main research questions. The hypothesis was tested in this study using the T-Statistics value. The research hypothesis is accepted if the t-statistic value is greater than the t-table value. The t-statistical value of the correlation between the variables, which was calculated by the bootstrap test, is shown below.

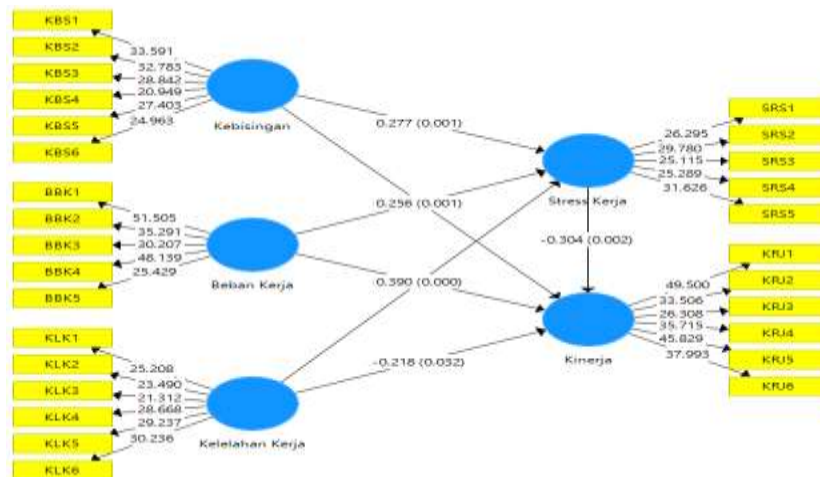


Figure 4. Bootstrapping Test Results

Table 1. Hypothesis Test Results

Hypothesis	Influence	Path Coefficient	T-Statistic	P Values	Decision
Direct Influence					
H1	Noise → Work Stress	0.277	3.433	0.001	Positive and Significant
H2	Workload → Work Stress	0.256	3.374	0.001	Positive and Significant
H3	Work Fatigue → Work Stress	0.390	5.410	0.000	Positive and Significant
H4	Noise → Performance	-0.191	2.216	0.027	Negative and Significant
H5	Workload → Performance	-0.189	2.085	0.038	Negative and Significant
H6	Work Fatigue → Performance	-0.218	2.151	0.032	Negative and Significant
H7	Work Stress → Performance	-0.304	3.078	0.002	Negative and Significant
Indirect Influence					
H8	Noise → Work Stress → Performance	-0.084	2.210	0.028	Negative and Significant
H9	Workload → Work Stress → Performance	-0.078	2.325	0.020	Negative and Significant
H10	Work Fatigue → Job Stress → Performance	-0.119	2.491	0.013	Negative and Significant

Based on the table presented above, the results of the research can be described as follows:

- H1 : The Effect of Noise on Work Stress
Based on statistical parameters, it shows that the path value of the noise coefficient on work stress is 0.277 and tcount = 3.433 > ttable 1.96 at a significance level of 5%. Thus H1 is accepted, this means that noise has a significant and positive effect on work stress.
- H2 : Effect of Workload on Work Stress
Using these values, we determine that the workload coefficient on work stress has a path value of 0.256 at a significance level of 5%, and tcount = 3.374 > ttable 1.96. Consequently, we find H2 to be true; increasing workload reduces stress at work.
- H3 : The Effect of Work Fatigue on Work Stress
Based on statistical parameters, the route value of the work fatigue coefficient on work stress is 0.390 at the 5% confidence level and tcount = 5.410 > ttable 1.96. Work fatigue has a big and beneficial effect on work stress, so H3 is accepted.
- H4 : Effect of Noise on Performance

The Effect of Noise, Workload, and Work Fatigue on Work Stress and Its Impact on Employee Performance at PT. X Year 2023. Syfa Rizkiyani, et.al

- Based on statistical parameters, it shows that the path value of the noise coefficient on performance is -0.191 and $t_{count} = 2.216 > t_{table} 1.96$ at a significance level of 5%. Thus H4 is accepted, this means that noise has a significant and negative effect on performance.
- H5 : Effect of Noise on Performance
Statistical parameters show that at a significance level of 5%, the path value of the workload coefficient on performance is -0.189 and $t_{count} = 2.085 > t_{table} 1.96$. This provides support for H5, which suggests that excessive workload severely hinders effectiveness.
- H6 : The Effect of Work Fatigue on Performance
The work fatigue coefficient route value on performance is -0.218, and $t_{count} = 2.151 > t_{table} 1.96$, according to these data it is statistically significant at the 5% level. Therefore, H6 is accepted, work fatigue has a significant and negative effect on performance.
- H7 : The Effect of Work Stress on Performance
The results showed that the route value of the work stress coefficient on performance was -0.304 and $t_{count} = 3.078 > t_{table} 1.96$ at a significance level of 5%. As a result, we accept H7, which means we recognize evidence that job stress greatly reduces productivity.
- H8 : The Effect of Noise on Performance Through Work Stress
Based on statistical parameters, it shows that the path value of the noise coefficient on performance is through work stress of -0.084 and $t_{count} = 2.210 > t_{table} 1.96$ at a significance level of 5%. Thus H8 is accepted, this means that noise has a significant and negative effect on performance through work stress.
- H9 : The Effect of Workload on Performance Through Work Stress
Based on the statistical parameters, it shows that the path value of the workload coefficient on performance is through work stress of -0.078 and $t_{count} = 2.325 > t_{table} 1.96$ at a significance level of 5%. Thus H9 is accepted, this means that workload has a significant and negative effect on performance through work stress.
- H10 : The Effect of Work Fatigue on Performance Through Work Stress
With a path value of -0.119 and $t_{count} = 2.491 > t_{table} 1.96$, statistical characteristics indicate that work fatigue has a negative effect on performance. Workload has a significant negative effect on performance in terms of work stress, so H10 is accepted.

Discussion

Effect of Noise on Work Stress

Based on the findings of the study, it is only natural that if the noise level in the workplace increases, the stress level of PT. X will also increase. It can be seen that 51.4% of employees experience stress because the noise level in the rice mill room is above 87 dB(A), in line with previous research by Safitri, (2021) entitled Effects of Noise on Work Stress in employees in the Rice Mill Industry. Age, gender and environmental noise have all been associated with increased workplace stress. Reducing background noise, giving teams opportunities to build activity can help reduce stress in the workplace.

A noisy workplace can negatively impact employees' ability to concentrate and listen, which will increase their work stress. Excessive noise levels can have both short and long term effects on hearing. The louder the noise, the more likely it is to cause various disturbances. Noise in the workplace can cause minor distractions such as difficulty concentrating and carrying on a conversation, or more severe disturbances such as hearing loss.

Exposure to high noise levels in the workplace is positively correlated with work stress, which in turn has a negative impact on employee concentration and focus, productivity, adequate rest ability, sleep disturbances, risk of physical health problems such as hearing loss, headaches, digestive disorders, and risk of mental health problems such as anxiety and depression.

Effect of Workload on Work Stress

Based on the results of research on the workload of employees of PT. X has a significant effect on the level of work stress of employees. This means that an increased workload will cause increased stress for workers. The results of this study corroborate Tazkiatun Nafs' research, (2020) with the title The Effect of Workload on Tahfidz Teacher Work Stress in the Integrated Darul Qur'an Mulia. Islamic boarding schools, which found a positive relationship between workload and stress factors. Gain experience in the field of tahfidz by working as an assistant at the Darul Qur'an Mulia Integrated Islamic Boarding School.

Employees' workload is the responsibilities that have been assigned by their superiors and are expected to be carried out within a certain period of time, making the most efficient use of their abilities. The research findings are unambiguous: when leaders increase the workload of their workers, they also increase their stress levels. When workers take on too much work, it can have negative effects on

The Effect of Noise, Workload, and Work Fatigue on Work Stress and Its Impact on Employee Performance at PT. X Year 2023. Syfa Rizkiyani, et.al

workers' bodies and minds, including fatigue, digestive problems, and irritability. On the other hand, if there isn't enough work to do, the person doing the work will become bored.

The Effect of Work Fatigue on Work Stress

The results of the study show that work fatigue causes workers to experience work stress. The more work fatigue increases, the more work stress also increases on employees at PT. X. Ramadhan's research, (2022) entitled *The Relationship between Work Fatigue and Employee Stress at PT. Tugu Mas Bima* produced table data of the Pearson product moment correlation coefficient which is comparable to that observed in this study. There is a relationship between work fatigue and stress at the level of 0.000, with a correlation value of 0.800 (80.0%). The correlation matrix between job burnout and job stress is quite high, with values ranging from 0.80 to 1.000.

Inefficiency and incompetence at work, together with emotional and mental sadness and boredom, are all symptoms of job burnout, the research findings significantly show that the increase in job burnout experienced by respondents will lead to increased work stress, and vice versa with the ability to avoid and reduce job burnout felt by respondents, it will significantly reduce employee stress levels. Work fatigue includes a variety of conditions that involve decreased efficiency, increased anxiety, decreased performance, feelings of tiredness, and physiological conditions resulting from excessive work activity, both physically and mentally, which can lead to negative consequences such as decreased work quality, increased work errors, decreased welfare, and decreased physical strength and endurance needed to continue work.

Effect of Noise on Performance

The results of the study show that noise has a major impact on the efficiency of PT. X as a consequence of the increased ambient noise experienced by PT. X employees, we anticipate a loss of productivity. Hardianti's research, (2022) *Noise Intensity and Its Influence on the Performance of Blacksmith Employees at the Sungai Baru IKM Blacksmith Center*, found similar results, indicating that the noise level of the workplace has a significant effect on efficiency has a T-Value greater than 1.96 and a P-Value of 0.000. The R-Squared figure shows that the noise level has an impact of 61.6% on worker productivity.

The research findings show that noise has a significant negative effect on employee performance. This finding means that with increasing noise in the work environment, it will significantly reduce employee performance. Noise has various definitions, including sound that disturbs and damages human hearing, air pollution that is spread through air or solid structures, and sound or sounds that are pressure deviations or particle shifts in an elastic medium such as air. Noise can cause human health problems and environmental discomfort, especially if it is not appropriate to the place and time. It is an environmental pollutant during the day that has very little impact at night. In general, human-made noises such as those made by engines or electricity are more disturbing than natural sounds such as wind, rain, or waterfalls.

Effect of Workload on Performance

Based on the results of research on the workload of employees of PT. X has a significant and detrimental effect on their productivity. This shows that worker productivity will decrease with increasing workload. The findings of Apriana et al., (2021) which are summarized below are in line with his research entitled *Effects of Workload and Burnout on Employee Performance with Job Satisfaction as Intervening Variables (Case Study of Community and Village Empowerment Service Employees in Rembang Regency)*. Based on the results of this study, it is clear that workload has a significant and negative impact on productivity in the workplace. There is a positive correlation between reduced fatigue and greater efficiency at work. Workload that is too heavy has a negative impact on employee morale. Burnout has a major negative impact on happiness at work. Workers who like their jobs are more productive.

When the amount of work an employee has to do increases, productivity falls. The amount of work that must be completed in a certain amount of time can affect employee productivity. The more burdens to carry, the more likely it is that productivity drops and responsibilities are not fulfilled as promised. Overloading workers with too much work may have a negative impact on productivity due to increased time and effort required to complete tasks.

Effect of Work Fatigue on Performance

The results showed that fatigue had a large and negative effect on productivity at PT. X. Therefore, as fatigue increases, productivity at work also decreases. Likewise, Komara, (2022) *Effects of Work Stress, Fatigue, and Motivation on Nurse Efficiency and Effectiveness: A study found that nurses who experienced high levels of work stress, fatigue, and motivation were more productive. Nurse productivity*

is not negatively correlated with work stress; however, it is negatively correlated with job burnout and positively correlated with work motivation.

Job burnout, which is characterized by constant fatigue, loss of enthusiasm, and disinterest in one's work, can have a negative impact on productivity. Burnout is the result of excessive effort to achieve unrealistic work goals. The essence of burnout is physical and mental fatigue, which can occur in three contexts, namely personal, client, and workplace. Performance, on the other hand, involves individual actions and behavior in carrying out job duties and responsibilities. Performance is the result of actions taken to achieve individual and organizational goals. The importance of the human aspect in employee performance is also emphasized, because employees' abilities, skills and responsibilities are valuable assets for the continuity of the company.

Effect of Job Stress on Performance

The results showed that work stress significantly reduced output at PT. X, employees will be less productive if their stress levels increase. Safitri's findings, (2022) are in line with this research, finding that "The Effect of Workload and Work Stress on Employee Performance with Job Satisfaction as an Intervening Variable" examines the relationship between employee productivity and workload, stress, and job satisfaction. The effects of stress in the workplace are well documented. Research shows that high levels of stress in the work environment can lead to decreased productivity, more work errors, and decreased motivation and job satisfaction. Job stress that is not managed properly can interfere with the ability of employees to carry out their duties effectively and efficiently, which in turn has a negative impact on their overall performance. Thus, it is important for organizations to manage work stress in order to minimize its negative impact on employee performance.

Effect of Noise on Performance through Work Stress

Research has shown that noise levels in the workplace have a substantial and detrimental effect on productivity, the findings of this research mean that with high levels of noise and work stress, it will cause a decrease in the performance of employees at PT. X. Through the impact of noise on job stress, the negative effect mediates on performance. Worker stress levels have been shown to increase in correlation with the amount of noise present in the workplace. Workers are less productive when they are under pressure at work, such as decreased concentration, more work mistakes, and decreased productivity. Therefore, noise in the workplace can be a significant disruptive factor affecting employee performance through its effect on work stress levels. It is important for organizations to manage noise in the work environment to reduce work stress and support optimal performance.

Effect of Workload on Performance through Work Stress

The results of the study show that workload has a significant and negative effect on performance through work stress. The findings of this research mean that with high workload and work stress, it will cause a decrease in the performance of employees at PT. X. Workload has a negative relationship to performance which is mediated by work stress. Workers are more likely to feel stressed when they have a lot going on, according to available data. Workers are less productive when they are under pressure at work, such as decreased motivation, fatigue, and decreased quality of performance.

Thus, excessive workload can be a significant inhibiting factor in achieving optimal performance, through its effect on work stress levels. It is important for organizations to pay attention to and manage the workload assigned to employees in order to reduce work stress and support better performance.

The Effect of Work Fatigue on Performance through Work Stress

The results of the study show that fatigue has a significant and negative effect on performance through work stress. The findings of this study mean that high fatigue and work stress will cause a decrease in the performance of employees at PT. X. Work fatigue has a negative relationship to performance which is mediated by work stress. Worker stress has been associated with high levels of job burnout. Workers are less productive when they are under pressure at work, such as decreased productivity, increased work errors, and decreased motivation. Sustained work fatigue can lead to a decrease in the quality of overall performance. Therefore, it is important for organizations to pay attention to and manage work fatigue experienced by employees in order to reduce work stress levels and improve performance optimally.

4. CONCLUSION

Research has found that noise, workload, and work fatigue have a positive and significant impact on the work stress at PT. X. The more noise, workload, and work fatigue faced by employees, their work stress also increases. In addition, noise, workload, and work fatigue also have a negative and significant impact on the performance of employees at PT. X. Work stress acts as a mediator linking the negative

The Effect of Noise, Workload, and Work Fatigue on Work Stress and Its Impact on Employee Performance at PT. X Year 2023. Syfa Rizkiyani, et.al

effects of noise, workload, and work fatigue on employee performance. The results of this study highlight the importance of managing the work environment and psychological conditions of employees to improve their performance and welfare in the company. Based on the results of the research above, there are several suggestions that researchers can provide that might be useful.

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