



The Impact of Stress and Workload on Performance Moderated by Work Shift

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Abstract: *The objective of this research is to investigate the impact of stress and workload on the performance of PT Cheil Jedang Feed Medan's employees, moderated by work shifts. The study is explanatory and employs a quantitative approach. Primary data was collected by distributing questionnaires to a sample of 101 employees. The sample size was determined using the saturated sampling technique. The data was analyzed using multiple linear regression and moderation regression analysis. The study found that workload has a significant negative impact on employee performance, but work stress does not. Furthermore, the work shift variable has no significant moderating effect on the impact of stress and workload on employee performance at PT Cheil Jedang Feed Medan. Based on the results of this research, it turns out that these variables contribute minimally to employee performance. Practical suggestions that need to be perfected by PT Cheil Jedang Feed Medan are improvements in the aspect of the speed of rotation of working hours between employees and the provision of rest periods according to the relatively high level of stress and workload felt by employees.*

Keywords: *work stress; workload; employee performance; work shift*

Introduction

Performance is a description of the effectiveness of implementing an activity program or policy in an organization in realizing the goals, vision, and mission outlined in an organization's strategic planning (Badrianto & Ekhsan, 2019). Improving the quality of human resources is expected to occur through increased employee performance. Good performance does not appear by itself but is optimized with various organizational practices (Junita, 2016) and factors from within the employee (Junita, 2017).

Stress and workload are factors that have implications for the level of employee performance. Stress is an individual factor that can arise due to uncondusive working conditions or individual factors, while workload represents an organizational factor that is borne by employees. Stress is an individual condition that results in physical and psychological imbalances that can affect thought processes, emotions, and conditions for employees (Veitzhal, 2004). In essence, the stress experienced by employees can have a positive effect namely, it forces employees to achieve high achievements (Junita, 2011).

Meanwhile, the workload is the capacity and ability of employees to carry out the tasks assigned by the company and the demands faced by employees (Tarwaka, 2015). Several previous studies have proven that stress and workload have a significant effect on employee performance (Leonardo & Ida, 2018; Amandasari, 2018; Zagladi, 2019; Rahmi, 2019; Kadaryat, 2020; Alpin et al., 2021; Nabila, 2022; Indah et al. al., 2022; Aulia, 2022; Anitha et al., 2022; Tinambunan et al., 2022).

To reduce stress levels and employee workload, several companies implement a shift work system that regulates working hours in a balanced manner according to the capacity and number of workers involved in completing the work targets set by the company. Shift work is a form of work time that is applied by the company to employees to carry out work which is usually divided into working hours in the morning, afternoon, and evening (Supomo, 2014). Shift work is also a form of division of labor aimed at increasing maximum and sustainable production and optimizing the working power of industrial machines to increase company profits. In research related to work shifts, it was found that work shifts have

a significant effect on improving employee performance (Syahri, 2021; Dony & Asri, 2019; Yulianti, 2019; Hendrawan et al., 2020; Kadaryat, 2020; Erwina et al., 2022; Maulana & Subhan, 2022). This result is different from the research by Fitriani (2018), and Ratih et al. (2020) state that work shifts have no significant effect on employee performance. With the contradiction of these findings, the work shift variable has scientific arguments to be placed as a moderating variable that not only strengthens but can also weaken the relationship between two or more independent and dependent variables. In this case, the impact of stress and workload variables on employee performance is moderated by work shifts. This is also a novelty of research that has not been tested in previous research.

Research conducted at PT. Cheil Jedang Feed Medan is a company engaged in the production of animal feed which involves many employees in its production activities. Increasing the demand for animal feed in the market requires companies to implement a full work system for 24 hours so that market needs are met as well as achieving production targets. Based on observations at the business location, it was found that working employees were faced with noise from production machines, the smell of animal feed arising from raw materials and finished products, and demands to fulfill a production yield of 12 tons per hour. As a result, employees must focus on working by optimizing the full-day use of large-scale machines so that the company implements a division of labor system for employees. These conditions allow employees to experience high levels of stress and workload which can have implications for their level of performance. Based on these theoretical and empirical gaps, this research was conducted to examine the impact of stress and workload on employee performance moderated by work shifts at PT. Cheil Jedang Feed Medan.

Theoretical Review

Work Stress

Naqvi et.al (2013) define stress as a condition of mental, psychological, and

physical disorders that arise due to pressure when human resources are not fulfilled in fulfilling individual requests. Then a person spends his time at work (Ariyanti & Irbayuni, 2022). Stress is also said to be a tension that affects a person's condition, emotions, and thought processes (Siagian, 2012).

Indicators of work stress according to Syahronica (2015) include: (1) psychological, continuous stress will affect someone at work, such as confusion, anxiety, fatigue, irritability, boredom, noise from production machines, and fatigue at work; (2) behavior, stress experiencing unpleasant conditions in doing work, such as absenteeism from work, thoroughness at work, speaking uneasily, leaving work, and using office facilities; (3) physical, the condition of employees who experience fatigue due to facing work situations that are too heavy such as easy physical fatigue, problems resting during sleep hours (too much or too little sleep), shortness of breath, headaches, stiff neck muscles, and inhaling unpleasant odors from the process of making animal feed.

Workload

Koesomowidjojo (2017) and Argiarini (2020), define workload as a collection of work that employees must complete within a certain period. If an employee's abilities exceed job demands, it will cause feelings of boredom. On the other hand, if the worker's ability is lower than the job demands given, this will cause greater fatigue.

According to Hirmawati (2016), workload indicators include: (1) working time is used for the implementation of work related to production; (2) the target to be achieved is the individual's view regarding the size of the work target given by the company to complete the work; (3) the amount of work and excessive workload given by employees from superiors; (4) superiors are measured by the attitude of superiors who are unfair in giving assignments and superiors often supervise employees at work which causes employees to feel pressured or anxious; (5) enthusiasm for work is a individual attitudes in the work process, lack of appreciation from the company for the work

provided, and a work environment that is not conducive.

Shift Work

According to Suma'mur (2013), work shifts are a division of working time for employees to complete work with several options, namely morning, afternoon, or evening work time. The shift work system has different characteristics from the regular work system. In a regular work system, employees work a fixed working time every day, whereas in a shift work system employees carry out work more than one day to fulfill a 24-hour/day schedule (Nurmianto, 2004). During one working day, employees who work on a shift system must work at a specified time, for example, morning shift, night shift, or rotating shift. Work shift indicators according to Ekaningtyas (2016) include: (1) shift regularity is a shift work schedule system work regularly; (2) holidays are the free time between work shift changes; (3) shift rotation speed is the number of days required to swap shifts; (4) break time is time that each employee can use to rest/relax; (5) number of workers or team.

Employee Performance

Performance is an assessment of work results (Wirawan, 2009). The output produced from a job within a certain time is also called performance. According to Mangkunegara (2013), employee performance is the result of the quality and quantity of output achieved by employees in fulfilling work responsibilities. According to Mangkunegara (2013), indicators of employee performance include: (1) attitudes are evaluative statements towards objects, people, or events; (2) work reliability consists of following instructions, initiative, caution, and diligence in carrying out work; (3) the quantity of work is the ability to produce according to the number of standards set by the company; (4) quality of work is the ability to produce according to quality standards set by the company.

Research Hypothesis

Impact of Stress and Workload on Employee Performance

Several studies have observed the relationship between work stress, workload, and performance, namely Niken (2015), and Nurbaity et al. (2019) prove that work stress and burden have a significant effect on employee performance. Increasing stress and workload will reduce employee performance. Excessive stress and workload will have a negative impact, which will lead to fatigue both physically and mentally and various emotional reactions such as headaches, indigestion, and irritability. Meanwhile, too little stress and workload where work occurs due to reduced motion will cause boredom. Based on the findings of these studies, hypothesis 1 is formulated as follows:

H1: Stress and workload have a significant impact on employee performance at PT Cheil Jedang Feed Medan.

Work Shifts Moderate the Impact of Work Stress on Employee Performance

The effect of work stress on employee performance significantly affects employee performance (Cokorda & I Made, 2016; Leonardo & Ida, 2018; Lestari et al., 2020; Nabila, 2022). In addition to work stress, work shifts are another factor that influences employee performance improvement. The significance of the influence of work shifts on employee performance has been verified through research conducted by Dony and Asri (2019), Hendrawan et al. (2020), Yulianti (2019), and Erwina et al. (2022). However, other research proves otherwise that implementing shift work in companies does not contribute significantly to improving employee performance (Nurul and Rinandita, 2017; Ratih et al., 2020). Based on the contradiction of these findings, in this study, the work shift variable is placed as a moderating variable in the influence between work stress and employee performance. Based on the previous research, hypothesis 2 is formulated as follows:

H2: Work stress has a significant impact on employee performance moderated by work shifts at PT Cheil Jedang Feed Medan.

Work Shifts Moderate the Impact of Workload on Employee Performance

The effect of workload on employee performance has been examined by several studies (Leonardo & Ida, 2018; Lestari et al., 2020; Alpin et al., 2021; Nabila, 2022; Hermawan, 2022) and proves that there is a significant effect between workload and performance employee. In addition to workload, work shifts are another factor that influences employee performance improvement. The significance of the influence of work shifts on employee performance has been verified through research conducted by Dony and Asri (2019), Hendrawan et al. (2020), Yulianti (2019), and Erwina et al. (2022). However, other research proves otherwise that implementing shift work in companies does not contribute significantly to improving employee performance (Nurul and Rinandita, 2017; Ratih et al., 2020). Based on the contradiction of these findings, in this study, the work shift variable is placed as a moderating variable in the influence between workload variables and employee performance. Based on the previous research, hypothesis 3 is formulated as follows:

H3: Workload has a significant impact on employee performance moderated by work shifts at PT Cheil Jedang Feed Medan.

to experience high levels of stress and workload. The total population as well as the research sample is 101 employees based on the saturated sampling technique as the basis for determining the entire population as a research sample (Sugiyono, 2017). The data collection tool in this study used a questionnaire. Research data analysis techniques use multiple regression tests to test hypothesis 1 and the MRA (Moderated Regression Analysis) test (Ghozali, 2019) to analyze hypotheses 2 and 3.

Results and Discussion

Characteristics Respondents

The respondent's characteristics in this study were described based on gender, age, education level, and work length. The majority of respondents were male, 91 people (90.10%), aged 20-30 years, 70 people (69.31%), 60 people with undergraduate education (59.41%), and had work experience below 5 years namely as many as 54 people (53.47%). Thus, the research respondents are dominated by young employees who show enthusiasm for working at a young age and have a relatively high education level so that they have the potential to become talents for the company in the future.

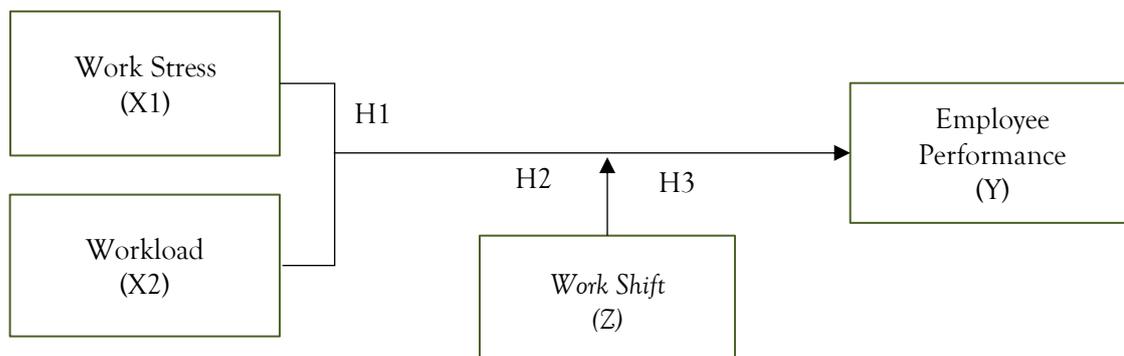


Figure 1. Conceptual Framework

Research Methods

This type of research is explanatory and analyzes the relationship between two or more research variables. The research was conducted at PT Cheil Jedang Feed Medan which implements a full work system, namely 24 hours a day and a work shift system for its employees so that it is possible for employees

Validity and Reliability Test

The research questionnaire was tested for feasibility through validity and reliability tests. The results of the validity test for each questionnaire statement item for the variables of work stress, workload, employee

performance, and work shifts found a calculated r value $> r$ table (0.196), so it was concluded that all question items were declared valid. For the reliability test results, Cronbach's Alpha value for the work stress variable was 0.801, the workload variable was 0.738, the employee performance variable was 0.807 and the work shift variable was 0.726. All of these variables have a Cronbach's Alpha value of > 0.60 , so it can be concluded that all the variables analyzed in this study were declared reliable.

Classical Assumption Test of Regression

The results of the classical assumption test for research hypotheses 1, 2, and 3 including tests for normality, multicollinearity, and heteroscedasticity were declared to meet the goodness of fit model. The data distribution for the three hypotheses is normally distributed, there is no multicollinearity between independent variables, and there are no symptoms of heteroscedasticity in the research model.

Variable Description Results

The level of performance of respondents at PT Cheil Jedang Feed Medan is dominated by workers with moderate performance (55%) followed by high performance (30%) (Table 1).

Table 1. The Employee Performance Frequency Distribution

Categories	Frequency	%
Low (1 - 2,33)	15	15%
Moderate (2,34 - 3,67)	56	55%
High (3,68 - 5)	30	30%
Total	101	100%

This means that the reliability aspect of work in following instructions from superiors, initiative, craftsmanship, and ability to produce work output in the quantity and quality of work is in the medium category.

Table 3. The Cross-tabulation of Workload and Employee Performance

Workload		Employee Performance Level			Total
		Low	Medium	High	
Workload Level	Low	0 (0,00%)	3 (3%)	6 (5.9%)	9 (8.9%)
	Medium	10 (9.9%)	35 (34.7%)	24 (23.8%)	69 (68.3 %)
	High	5 (5%)	18 (17.8%)	0 (0.00%)	23 (22.8%)
Total		15 (14. 9%)	56 (55.4%)	30 (29.7%)	101 (100%)

Employees with medium and low performance are dominated by relatively young employees, as shown in Table 2. Based on the data in Table 5, it is known that high-performing employees are 21 respondents (21%), moderate performance is 38 respondents (38%), and high-performing employees are low (12%). The relatively young age characteristics of the respondents are prone to having low resistance to work stress, so that when experiencing stress at work it will have an impact on decreasing job performance.

Table 2. The Cross-Tabulation of Age and Employee Performance

Performance Categories	Age Categories			Total
	20-30 Years	31-40 Years	41-50 Years	
Low	12 (12 %)	3 (3 %)	0	15
Medium	38 (38 %)	12 (12 %)	6 (6 %)	56
High	21 (21 %)	7 (7 %)	2 (2 %)	30
Total	71 (71 %)	22 (22 %)	8 (8 %)	101 (100 %)

In terms of workload, the majority of respondents perceive that working at PT. Cheil Jedang Feed Medan has a relatively high workload. This is shown by the research data as shown in Table 3. The data proves that employees who perceive workload in the moderate category also perform moderately (34.7%). This finding is consistent with the results of the statistical hypothesis 1 test. Thus, this supports research findings that prove that workload has a significant effect on employee performance (Leonardo & Ida, 2018; Alpin et al., 2021; Nabila, 2022; Indah et al., 2022; Aulia, 2022).

The relationship between work stress and employee performance is explained by the data in Table 4. The level of employee stress at a medium level has an impact on employee performance at a medium level as well (30.7%).

Table 4. The Cross-tabulation of Stress and Employee Performance

Stress		Employee Performance Level			Total
		Low	Medium	High	
Stress Level	Low	0 (0,00%)	7 (6,9%)	7 (6.9%)	14 (13.9%)
	Medium	5 (5,0%)	31 (30.7%)	23 (22.8%)	59 (58.4 %)
	High	10 (9,9%)	18 (17.8%)	0 (0.00%)	28 (27.7%)
Total		15 (14. 9%)	56 (55.4%)	30 (29.7%)	101 (100%)

A high level of work stress will have an impact on low employee performance outcomes (9.9%), as well as a high-stress level will result in high-performance outcomes (6.9%). Interestingly, a moderate level of employee work stress will have a high impact on employee performance (58.4%). This condition is in line with the theory that explains the relationship between work stress levels and individual performance in organizations (Mc Shane & Von Glinow, 2008). Employees who experience stress at the medium level, then their work behavior is motivated to be more productive, and this is balanced with adequate individual work capacity to deal with the pressure they are facing.

company's efforts to implement a work shift system.

Hypothesis Testing

The results of hypothesis 1 testing regarding the effect of stress and workload variables on performance prove that the hypothesis 1 model is considered feasible and able to represent phenomena that occur in the real world, as evidenced by the significance value of the F test of 0.001. The variables of stress and workload simultaneously have an impact on employee performance by only 16.5% (adjusted R-square value). Thus, many other variables can be the antecedents of employee performance that can be studied further. The contribution of each independent

Table 5. The Work Shift Frequency Distribution

Work Shift		Employee Performance Level			Total
		Low	Medium	High	
Work Shift Level	Low	4 (4,0%)	6 (5,9%)	2 (2,0%)	12 (11,9%)
	Medium	8 (7.9%)	34 (33.7%)	9 (8.8%)	51 (50,4 %)
	High	3 (3,0%)	16 (15.8%)	19 (18.9%)	38 (37.7%)
Total		15 (14. 9%)	56 (55.4%)	30 (29.7%)	101 (100%)

Regarding the work shift variable, the majority of respondents perceive the work shift system implemented at PT. Cheil Jedang Feed Medan is relatively moderate (50.4%) and high (37.7%) (Table 5). However, for respondents who have a high perception of work shifts, their performance levels are also moderate (8.8%) and high (18.9%). It seems that respondents have a good perception of the

variable (stress and workload) to the dependent variable (employee performance) can be seen from the significance value of work stress of $0.241 > 0.05$ and the significance value of workload of $0.002 < 0.05$ (Table 6). It can be concluded that the variable of work stress has no significant impact on performance, while workload has a significant impact. Thus, the statement of hypothesis 1 is rejected

Table 6. Hypothesis 1 Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	F test	Adjusted R Square
	B	Std. Error	Beta				
1 (Constant)	43,796	1,972		22,211	0,000		
Work Stress	-0,118	0,100	-0,150	-1,179	0,241	0,001	0,165
Workload	-0,242	0,100	-0,308	-2,421	0,002		

statistically. This means that the variables of stress and workload do not have a significant impact simultaneously on employee performance.

The results of hypothesis 3 testing regarding the effect of workload on performance moderated by work shifts prove that the hypothesis 3 model is considered

Table 7. Hypothesis 2 Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	F test	Adjusted R Square
	B	Std. Error	Beta				
1 (Constant)	14,741	20,287		0,727	0,469		
Work Stress	0,113	1,082	0,143	0,104	0,917	,000	0,257
Work Shift	0,872	0,680	0,574	1,282	0,203		
Work Stress*Work Shift	-0,015	0,036	-0,645	-0,425	0,672		

The results of hypothesis 1 testing related to the effect of work stress on performance moderated by work shift prove that the hypothesis 2 model is considered feasible and able to represent phenomena that occur in the real world, as evidenced by the significance value of the *F test* of 0.000. The impact of work stress on employee performance is moderated by work shifts contributing only 25.7% (*adjusted R-square* value). Thus, many other variables can be the antecedents of employee performance that can be studied further. The contribution of the work stress variable to employee performance can be seen from the significance value of work stress of 0.917 > 0.05. The contribution of the work shift variable to employee performance can be seen from the significance value of 0.203 > 0.05. The contribution of the interaction of stress and work shifts to employee performance obtained a significance value of 0.672 > 0.05 (Table 7). It can be concluded that the variable of work stress has no significant impact on performance moderated by shift work. Thus, the statement of hypothesis 2 is rejected statistically.

feasible and able to represent phenomena that occur in the real world, as evidenced by the significance value of the *F test* of 0.000. The impact of workload on employee performance is moderated by work shifts contributing only 19.3% (*adjusted R-square* value). Thus, many other variables can be antecedents of employee performance that can be studied further. The contribution of the workload variable to employee performance can be seen from the workload significance value of 0.760 > 0.05. The contribution of the work shift variable to employee performance can be seen from the significance value of 0.673 > 0.05. The contribution of the interaction of stress and work shifts to employee performance obtained a significance value of 0.415 > 0.05 (Table 8). It can be concluded that the workload variable has no significant impact on performance moderated by shift work. Thus, the statement of hypothesis 3 is rejected statistically.

Discussion

Based on the results of the regression test for hypothesis 1, the study concluded that work

Table 8. Hypothesis 3 Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	F test	Adjusted R Square
	B	Std. Error	Beta				
1 (Constant)	31,277	20,284		0,352	0,726		
Workload	-0,314	1,026	-0,400	0,306	0,760	,000	0,193
Work Shift	1,753	0,978	0,588	0,424	0,673		
Workload*Work Shift	0,021	0,022	0,359	0,655	0,415		

stress had no significant effect on employee performance, while the workload variable had a significant effect. Variations in employee performance levels can be seen in Table 1. It can be seen that PT. Cheil Jedang Feed Medan's employee performance levels varied, dominated by employees with moderate performance (50%), then high (30%), and there were 15% with low performance. Respondents who perceived workload in the medium and high categories displayed performance in the medium and high categories as well (Table 3). This is in line with previous empirical studies which prove that jobs with moderate workloads encourage employees to work harder. Workload is seen as a positive challenge at work. On the other hand, a low workload can give rise to boredom in employees (Koesomowidjojo, 2017; Argiarini, 2020) if the employee's work capacity is large. This is relevant to the situation of employees who are relatively highly educated (59.41%) and have long work experience (46.53%).

There are different things about the relationship between work stress and employee performance. The data in Table 4 shows the fact that the majority of respondents with moderate work stress levels display high performance (22.8%). Employees who feel high levels of stress produce moderate performance (17.8%). Employee performance remains relatively good even though the employee's work stress level is moderate or high. This condition is different from theoretical and empirical studies which state that stress levels are inversely proportional to performance achievements. Employees who feel high levels of stress usually tend to show low performance. It seems that employees at PT Cheil Jedang Feed have good responsibility

for the tasks given and have good stress resistance. This condition is in line with Junita's (2011) research results which prove that the stress experienced by employees can have a positive effect, namely, it becomes a force for employees to achieve high achievements. The results of this research justify the findings of this research which prove that work stress does not always hurt employee performance. Empirically it has been proven that employees who are stressed at a medium level contribute to achieving high performance.

Research findings prove that work shifts do not play a role as a moderating variable in the relationship between workload and stress on employee performance. This means that the work shift variable does not play a role in strengthening or weakening the relationship between stress and workload on performance. Theoretically, the higher the level of stress and workload of employees, the lower their performance will be, and this relationship pattern is further strengthened by a poor work shift system. However, it has been empirically proven that the high-stress level and workload of employees at PT. Cheil Jedang Feed Medan encourages high-performing permanent employees to ignore the role of work shifts as a moderating variable. Thus, the findings of this study are in line with the results of Fitriani (2018) and Ratih et al. (2020) which state that work shifts do not have a significant effect on employee performance.

It seems that respondents have a good perception of the company's efforts to implement a work shift system. The company pays attention to aspects of shift regularity (24,75%), and holiday shifts (19,80%) for employees. As shown in Table 9, relatively good conditions in the implementation of the work shift system, especially in these two

Table 9. The Cross-Tabulation of Work Shift and Employee Performance Indicators

Employee Performance Level	Work Shift Indicators				Total
	Shift Regularity	Holiday Shift	Rotation Speed	Rest Time	
High	7 (6,93%)	8 (7,92%)	0 (0,00%)	0 (0,00%)	15 (14,9%)
Medium	25 (24,75%)	20 (19,80%)	6 (5,94%)	5 (4,95%)	56 (55,4%)
Low	0 (0,00%)	0 (0,00%)	14 (13,86%)	16 (15,84%)	30 (29,7%)
Total	32 (31,68%)	28 (27,72%)	20 (19,80%)	21 (20,79%)	101 (100%)

aspects, will encourage employees to be more productive at work because they are given a balance towards fulfilling their rights as workers. However, the aspect of work shift, especially in the aspect of rotation speed and rest time still has weaknesses. The aspect of the rotational speed raises low performance by 13,68 %, while rest time is 15,84%. Respondents assessed that the speed of work shift rotation among employees and the provision of rest time was not ideal. This aspect needs to be improved by the company in the future. The aspect of work shift rotation speed needs to be extended so that employees have more time to complete better tasks, increase skill development in carrying out tasks during different shifts, and increase productivity. The addition of adequate rest time for employees both at work and outside working hours needs to be considered by the company so that employees have the appropriate time to manage energy at work and time for life-work balance which allows for high job satisfaction and productivity for employees.

Conclusion

The research findings are the answer to the formulation of the research problem in terms of (1) Work stress does not have a significant impact on employee performance, while workload has a significant impact. Respondents who perceive workload in the moderate category also have a moderate performance; (2) Shift work does not moderate the effect of work stress on employee performance at PT Cheil Jedang Feed Medan; (3) Shift work does not moderate the effect of workload on employee performance at Cheil Jedang Feed Medan. The aspects of rotation speed and giving a rest time are not perceived as ideal by respondents so they contribute to low performance.

Suggestion

Based on the research findings, theoretical suggestions are proposed to explore other antecedent variables besides stress and workload, and work shifts that have an impact on employee performance. Based on the results of this research, it turns out that these variables contribute minimally to employee performance. Practical suggestions that need to

be perfected by PT Cheil Jedang Feed Medan are improvements in the aspect of the speed of rotation of working hours between employees and the provision of rest periods according to the relatively high level of stress and workload felt by employees.

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