Effect of Motivation, Fatigue, Health and Work Stress when Night Overtime on Performance

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Abstract:- In a project, the acceleration of the project is an achievement that should be achieved by employers and service providers (contractors). To pursue the achievement in terms of accelerating the project a lot of contractors implementing the system work overtime. But the overtime system has a variety of benefits and weaknesses in its application. However, many service providers do not understand the problems that can arise from the system to work overtime. Among the many problems posed one of which is the impact on performance. Many workers in performing overtime work only after the compensation regardless of his physical condition because the compensation is greater than the given time of normal working hours. So in doing the job at the time of overtime work, the performance will be diminished or different work normal working time. In this case there are several variables that accounted for their overtime work is motivation, fatigue, health and job stress. The variables obtained from several previous studies. The method used in this study using multiple linear regression analysis and path analysis with independent variables are variables of motivation, fatigue, health and work stress and the dependent variable is the performance of construction projects workers. motivation, fatigue, health and stress variable overtime work at night influence on the performance of employees amounted to 58.5%. Motivation influence performance about 6.05% and health influence performance about 10.11%.

Keywords:- performance; night overtime; multiple linear regression; path analysis.

I. INTRODUCTION

Human Resources is one of the factors that influence in a job, included in a construction works. A job slightest if not supported by a good human resources in terms of quality and productivity, will deliver maximum results and satisfactory in a project.

With the resources are highly competent and qualified to improve the performance of the organization. In an organization of one of the components that can improve the performance of an employee or employees of an organization, so if want high performance within an organization that can continue to motivation of employees or employees in order to work optimally and effectively. So that the necessary management in improving the performance of labor that affect the success of the construction project for the largest budget allocation in a construction is to labor.

Good performance of workers is indispensable to the success of construction projects. Performance of workers would also affect the amount of the gain or loss of a project. In the implementation on the ground it can sometimes happen because labor is less effective in their work. On the situation in the world of work the contractor, which in the world of work is the work force are often confronted by the problem of a grace period. Time is very influential on the success and failure of a project. Benchmark for the success of a project usually seen short turnaround time at minimal cost without leaving the quality of work.

Overtime will cause any kind of impact on worker performance, the total volume of work produced and also the financial conditions that occur during project implementation. If overtime implemented in a period that is too long, then the resulting allegation that worker's performance will continue to gradually decline. This addition will hurt the contracting parties and the financial terms of execution time, it will also harm the foreman of the work produced in terms of volume and financial condition. In this study, using literature study and field observations related to the case on the impact of the implementation of overtime the night to reduce the impact of night overtime and for the implementation of more effective night overtime.

II. STUDY LITERATURE

A. Motivation

Theories of work motivation is categorized into two broad categories, namely Content Theories and Process Theories. Content Theories try to decipher the relationship between intrinsic factors and certain behaviors, while the process theories describe how personal factors interact and influence each other to produce the behavior. Research work motivation on construction workers who have been made so far using the content was developed using theories and process theories. These studies apply two work motivation theories, namely the theory of Maslow and Herzberg theory. In this study also used the theory of Maslow.

Maslow's Hierarchy of Needs Theory is a theory of hierarchy of needs expressed by Abraham H. Maslow in 1954. This theory is often known as the theory of Maslow's hierarchy of needs (Maslow's Hirarchy of Needs Theory). In this theory, human needs are arranged hierarchically from the lowest to the highest. Indicators used for labor motivation in this study using the categories of needs Maslow described below (see Table 1).

Variables	Work Motivation Indicators	Operational Definitions
Work Motivatio	Physical need	These needs are basic needs of human life, such as food, shelter, clothing, and other basic needs.
	Social needs	This requirement is met through a work atmosphere where members can give and receive.
	The need for appreciation	These needs include the need for power, status, self-esteem, prestige, where people feel the need for recognition from others.
	The need for identity	This requirement is a requirement to demonstrate the potential capabilities of different and better than others in getting things done.

Table 1. Variable Indicators Motivation

B. Work stress

Stress is a dynamic condition in which an individual is confronted with an opportunity, constraints (constraints), or demands (demands) which is associated with what is really wanted and the result dipresepsikan as uncertain and important (Schuller, 1980). The negative impact of stress can occur in the form of a biological response, emotional response, increased accidents in the workplace. Furthermore, stress can cause job dissatisfaction and turnover (Hemmington and Smith, 1999).

In research Ruyter et. al (2001), said that work stress has a negative impact on job satisfaction, organizational commitment, job performance and turnover. This is consistent with research Jaramillo et. al (2006) found that high stress levels will lower job satisfaction, organizational commitment, and increase turnover intention. According to the House (1981), a person has a good social support, she can dampen the stress that occurs in their work. So that if an employee has a high social support will manage work stress faced with looking good and working stress in different ways so as to provide a positive impact on employees. Indicators of job stress, according to Robbins (2006) (see Table 2).

Variables	Work Stress Indicators	Operational Definitions
Work stress	Attitude / behavior	Like forgetting, lack of attention to everything, do not concentrate on carrying out the task, tend to injuries and so forth.
	Emotional	Irritability, anxiety, depression / depressed and so forth.

Table 2. Variable Work Stress Indicators

C. Fatigue

Fatigue at work can be caused by many other factors, such as long work hours (overtime), extended work periods, the Job with low autonomy, low job satisfaction, low control over overtime, noise, Repetitive work tasks, the psychological profile of the work, Heat (Hallowell, 2010).

According to expert ergonomics suggested a link between fatigue stress levels, or rather exhausted with work productivity. This is demonstrated by the reaction of the body against the types of stress that is different, therefore it is necessary to measure the tendency to get a solution for the implications of fatigue suffered by workers and its effect on corporate performance (Ulfa, 2006). Measurement of labor fatigue in this study using a subjective measurement of fatigue feeling. Indicators used to measure labor fatigue in this study using the method of measurement subjective feelings of fatigue are as follows (see Table 3).

Variables	Fatigue Indicator	Operational Definitions
Fatigue	Physical exhaustion	A condition characterized simply a person feels tired, easy to suffer from headaches, feeling nauseated, experiencing changes in eating and sleeping patterns, and feel drained of energy excessively.
	Emotional exhaustion	Dimensions marked the emergence of depression, frustration, felt imprisoned by his job, apathetic, easily sad, and feel helpless.
	Mental fatigue	Negative and cynical form of prejudice against other people and negative view of themselves and their work.

Table 3. Variable Indicator Fatigue

D. Health Workers

The duration of working time affect the health and welfare of workers. Research shows that the addition of overtime and work schedules increase the risk of high blood pressure, heart disease, fatigue, stress, depression and others. Some studies indicate that there is a relationship between the length of working hours to increased risk in injury and illness in the industrial sector and professions such as construction workers, nurses, anesthetics, and other health workers, miners, bus drivers, truck drivers, firefighters and plant workers. This also applies to the manufacturing company (Dembe et al, 2005).

Working with the environment more comfortable and pleasant, so overall the employees will be able to work longer and improve the performance better. According to Dessler (1997), the indicators used for the health of the labor can be seen in Table 4.

Variables	Occupational Health Indicators	Operational definitions
Health	The circumstances and conditions Employees	The circumstances and conditions of employees is a condition experienced by employees at work that support the activities in the work.
	Work environment	The working environment is the wider environment of the workplace that supports employees in the work activity.
	Protection of Employees	Employee protection is a facility provided to support the welfare of employees.

Table 4. Indicators of Health Variable

E. Performance

Performance is the result of quality and quantity of work achieved by a person in performing the tasks assigned to him in accordance with the standards or criteria established. Performance shows the success rate of employees in carrying out their duties and responsibilities. The higher performance of the employee, then the overall organizational productivity will increase (Taurisa et. Al, 2012).

Labor performance was the work accomplished person or group of persons in accordance with the powers/ responsibilities of each employee during a certain period. A company needs to assess the performance of the employees. The performance assessment plays a very important role in increasing the motivation in the workplace. Assessment should provide an accurate picture of the job performance (Brahmasari et. Al, 2008).

An organization established course with a specific purpose. While the goal itself is not fully be achieved if employees do not understand the purpose of the work he does. That is, the achievement of the objectives of any work performed by the employee will have an impact on the overall goals of the organization.

Therefore, an employee must understand indicator - indicator of performance as part of an understanding on the outcome of his work. According to Robbins (2006), indicators of performance variables are shown in Table 5 below.

Variables	Performance indicators	Operational definitions
Performance	Quality	Quality should be generated in the work. Quality is quality to be produced (good or not). Reflects the quality of the output form.
	Quantity	The amount that must be completed and achieved in the work, as well as the output of the process or the execution of activities. Related Quantities amount of output produced.

Table 5. Performance Variables Indicators

F. Multiple Linear Regression

Regression analysis is one statistical data analysis technique that is often used to examine the relationship between independent variables and dependent variable (Kutner, Nachtsheim and Neter, 2004).

The general form of multiple linear regression model with n independent variables are as in equation (1) below.

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_n X_{in} + \varepsilon_i \qquad (1)$$

Y_i is the dependent variable
$\beta_0, \beta_1, \beta_2, \beta_n$ is a parameter
X_i, X_{i2}, X_{in} is the independent variable
ε_i is residual (error) for the i-th observation the assumed normal distribution is independent and identically with an average of 0 (zero) and variance.

According to Gujarati (2003) assumptions on multiple linear regression model is a model of regression linear in the parameters, the average value of the error is zero, the variance of the error is constant (homoskedastik), no autocorrelation in error, do not occur multikolinieritas the independent variables, error normal distribution.

III. RESULT AND DISCUSSION

A. Validity Test Variables

Validity test is done by measuring the correlation between variables with a total score of variables and was conducted by examining 10 questionnaires before being disseminated to all respondents. How to measure the validity is to find correlations between each - each question with a total score using the formula product moment correlation technique. If the correlation value is calculated (r) > r table it can be stated that the item had been valid, so that all of the questions in the questionnaire declared invalid. R count value is the value in the column "correlations" in the SPSS output sheet. R table with a significance of 5% and the number of respondents (n) 10 amounted to 0.6319. Validity test results variable motivation, fatigue, health, work stress and performance of workers on night overtime can be seen in Table 6 as follows.

Variables	Item	r-count	r-table	Conclusion
Motivation (X1)	X1.1	0.788	0.6319	*valid*
	X1.2	0.865	0.6319	*valid*
	X1.3	0.786	0.6319	*valid*
	X1.4	0.712	0.6319	*valid*
Fatigue (X2)	X2.1	0.894	0.6319	*valid*
	X2.2	0.910	0.6319	*valid*
	X2.3	0.863	0.6319	*valid*
Health (X3)	X3.1	0.836	0.6319	*valid*
	X3.2	0.891	0.6319	*valid*
	X3.3	0.938	0.6319	*valid*
Work Stress (X4)	X4.1	0.984	0.6319	*valid*
	X4.2	0.982	0.6319	*valid*
Performance (Y)	Y.1	0.709	0.6319	*valid*
	Y.2	0.961	0.6319	*valid*

Table 6. Validity of Test Results Variable Overtime Hours

Based on the results of testing the validity of the variables of motivation, fatigue, health, work stress when night overtime on worker's performance, the value of the entire correlation count (r) > r table is 0.6319 so that the measurement variable is declared valid for future research.

B. Test Reliability Variables

Reliability is an index that shows the extent to which a measure is reliable or unreliable. Each gauge should have the ability to provide the measurement results are relatively consistent over time. Reliability can be calculated using Cronbach Alpha formula that scores instead of 0 and 1. If alpha is greater than 0.6 then declared reliable either, more than 0.5 otherwise reliable enough, and when less than 0.5 otherwise unreliable.

Variable reliability test results of motivation, fatigue, health, work stress and performance of workers on overtime night work can be seen on the output processing of the data presented in Table 7 below.

Reliability Statistics	
Cronbach's Alpha	*N of Items*
.876	14

Table 7. Reliability Test Results Variable Overtime Hours

Based on the results of testing reliability, the coefficient values of the variables (α) is above the critical point (0.6) so that the measurement variable is declared reliable (reliable) for further research.

C. Normality test

Normality test aims to determine whether the regression model, both dependent and independent variables have a normal distribution or not. A good regression model is one that has a normal distribution. The statistical test that can be done in a test of normality is the Kolmogorov-Smirnov test. In multivarians, data normality test performed on residual values. Normal distributed data indicated by the significant value above 0.05. Normality test can be done in two ways, "Normal P-Plot" and "Table Kolmogorov-Smirnov". In Normal P-Plot principle (Normal P-Plot of Regression Standardized Residual), if the data spread around the diagonal line and

follow the diagonal lines show the normal distribution pattern.

Variable normality test results motivation, fatigue, health, work stress when night overtime on worker's performance can be seen in Fig. 1.
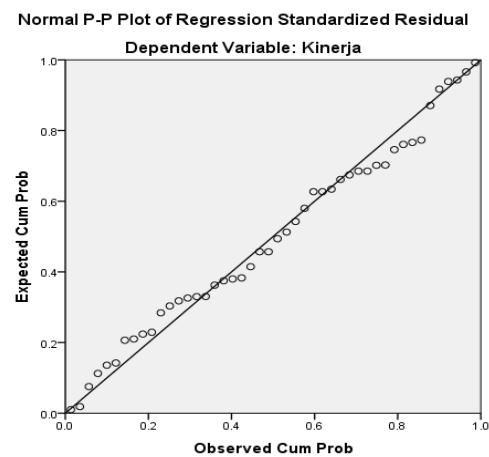

Fig 1:-The Curve Normality Test Night Overtime

From the analysis of the normality test curve can be seen working late evening that the dots are spread around the diagonal line and distribution follow the direction of the diagonal line so it can be concluded that the processed data are normally distributed data that normality test is met. Or you can also see Fig. 2.
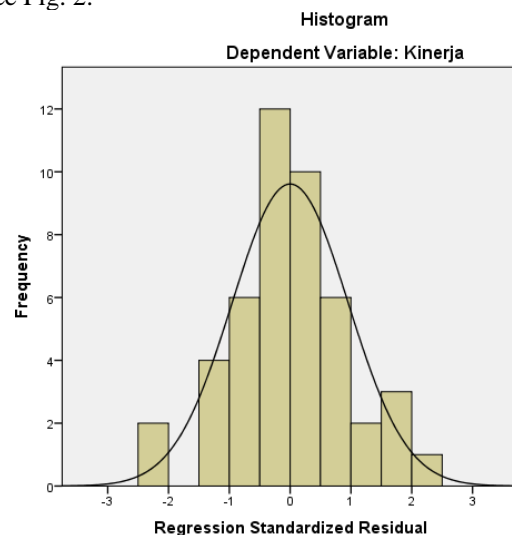

Fig 2:-Histograms Normality Test Overtime hours

It can be seen that the normal distribution of data. To analyze the Kolmogorov-Smirnov, see the line "Asymp. Sig. (2-tailed) "the bottom line. If the value is more than (> 0.05), the normality test can be met. Based on the analysis of the Kolmogorov-Smirnov, known normal distribution of data. This is demonstrated by the significant value above 0.05, which is 0.2.

D. Test Non Multicolinearity

Multicolinearity means a perfect linear relationship or very high among some or all of the independent variables in the regression equation. Multi colinearity problem occurs if between two or more independent variables occur very strong relationship. One way to know is to use their multikolieritas

Tolerance Value or Value Inflation Factor (VIF). When the VIF on each independent variable-value < 10 then it means that there are no issues multicolinierity and vice versa if each independent variable value > 10 then there is multicollinearity.

The test results of non multikolinieritas variables of motivation, fatigue, health and work stress when night overtime can be seen in Table 8.

Variables	Tolerance Value	VIF
(X1)	0.695	1,438
(X2)	0.500	2,000
(X3)	0.353	2,835
(X4)	0.394	2,539

Table 8. Test Results Non Multicolinearity

Based on Table 8 shows all variables in overtime the night does not happen multikolinieritas (Tolerance Value > 0.1 and VIF < 10) so there is no interplay between independent variables at work late tonight.

E. Test Heteroskedastisitas

Heteroscedasticity test aims to test whether the regression model occurred inequality variant of the residual one observation to another observation. If the variance of the residuals some observations to other observations remain, then called homoskedastisitas and if different will be called heretoskedastisitas. A good regression model is a model that does not happen heteroskedastisitas.

Heteroskedastisitas can use the scatterplot graph, the dots that form must be completely dispersed, spread both above and below the number 0 on the Y axis, if these conditions are met then there is no heteroskedasticity and regression models fit for use. The test results heteroskedasticity motivational variables, fatigue, health and work stress when night overtime on worker's performance can be seen in Fig. 3.
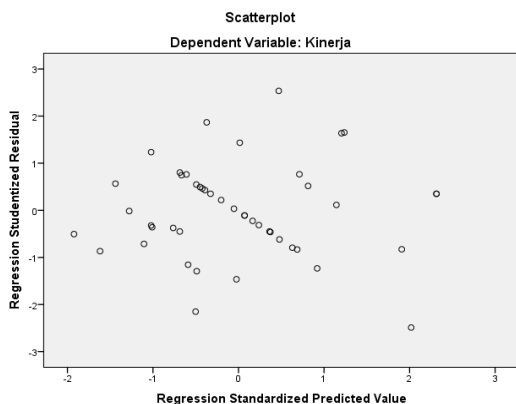

Fig 3:-Test Scaterplot Heteroscedasticity

Scatterplot graph heteroscedasticity test of working late nights dots randomly spread and spread both above and below the number 0 on the Y axis. It can be concluded that there is no heteroskedastisity on this model.

F. Regression analysis

Regression calculations used to predict the magnitude of the dependent variable (worker's performance), using variable data all independent variables. Regression analysis variables of motivation, fatigue, health and work stress when night overtime on worker's performance can be seen in table 9.

Model	Coefficients unstandardized		Standardized Coefficients	t	Sig.
	B	Std. Error	beta		
(Constant)	-0.038	0.809		-0.046	0.963
Motivation	0.123	0.060	0.246	2.038	0.048
Fatigue	0.116	0.096	0.172	1.207	0.234
Health	0.223	0.118	0.318	1.880	0.067
Stress	0.207	0.154	0.215	1.343	0.187

Table 9. Table Coefficient Regression Equations

Based on the regression calculation results in Table 9, it can set up a regression equation that represents the relationship between motivation, fatigue, health and work stress when night overtime on worker's performance as follows:

$$Y = -0.038 + 0{,}123X_1 + 0{,}116X_2 + 0{,}223X_3 + 0{,}207X_4 \qquad (2)$$

Y   = Dependent Variable Performance
X1 - X4   = Independent Variables Factor Night Overtime

G. F test (simultaneous)

The first hypothesis testing using the F test to test variables together (simultaneously) on the dependent variable. Tests were made by comparing the value of F arithmetic with F table with calculations using Anova in SPSS. The results of F-test calculation (simultaneously) the variables of motivation, fatigue, health and work stress when night overtime on worker's performance can be seen in Table 10.

Hypothesis	Value	Status
H0 = Variable motivation (X1), fatigue (X2), health (X3) and work stress (X4) when the night overtime simultaneously no significant effect on worker's performance (Y) H1 = Variable motivation (X1), fatigue (X2), health (X3) and work stress (X4) when the night overtime simultaneously significant effect on worker's performance (Y)	F table = 2.59 F count 27.08 Sig. F = 0.00	H1 accepted

Table 10. Anova Test Results (Test F) Night Overtime

Simultaneous testing at night overtime calculated F value of 14.461. This value is greater than F table (14.461 > 2.59) and the Sig. F is smaller than α (0.05) H0 is accepted. This suggests that the motivation variable (X1), fatigue (X2), health (X3) and work stress (X4) while simultaneously night overtime effect on employee performance significantly (Y).

H. Test T (Partial)

The second hypothesis testing using t test is to determine the significance of the independent variables partially working late nights on the dependent variable. The test is performed by

comparing the value of t arithmetic with t table. If T value > t table then independent variables affect the dependent variable.

Test Results T (partial) motivation variable when night overtime on worker's performance (see table 11).

Hypothesis	Value	Status
H1 = Motivation (X1) when night overtime positive effect on worker's performance (Y)	t table = 1.68 t = 2.038	H1 is accepted

Table 11. Results of Test T (Partial) Motivation Variables

Test Results T (partial) variable overtime fatigue when night overtime on worker's performance (see table 12).

Hypothesis	Value	Status
H2 = Fatigue (X2) when night overtime negative effect on worker's performance (Y)	t table = 1.68 t = 1.207	H2 is rejected

Table 12. Results of Test T (Partial) Variable Fatigue

Test Results T (partial) health variables when night overtime on worker's performance (see table 13).

Hypothesis	Value	Status
H3 = Health (X3) when night overtime positive effect on worker's performance (Y)	t table = 1.68 t = 1.880	H3 is accepted

Table 13. Results of Test T (Partial) Variable Health

Test Results T (partial) work stress variable when night overtime on worker's performance (see table 14).

Hypothesis	Value	Status
H4 = Work stress (X4) when night overtime negatively effect on worker's performance (Y)	t table = 1.68 t = 1.343	H4 is rejected

Table 14. Results of Test T (Partial) Variable Work Stress

I. The coefficient of determination (R2)

The coefficient of determination (R^2) was used to determine the amount of donations or contributions of all independent variables in the regression equation. The coefficient of determination (R^2) variables of motivation, fatigue, health and work stress when night overtime on worker's performance can be seen in Table 15.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.765a	0.585	0.545	0.99189
a. Predictors: (Constant), Stress, Motivation, Fatigue, Health				
b. Dependent Variable: Performance				

Table 15. Coefficient of Determination Night Overtime

Contributions variable motivation (X1), fatigue (X2), health (X3) and job stress (X4) when night overtime on worker's performance (Y) while the rest influenced by other variables that are not incorporated into the model with the value of R Square = 0.585. This figure shows a model has been represented by the independent variable in the model amounted to 58.5%, the remaining 41.5% is explained by other variables outside the model.

J. Path analysis

Correlation coefficient between independent variables, the path coefficient and the influence of other variables that have been obtained can be seen in Figure 4.
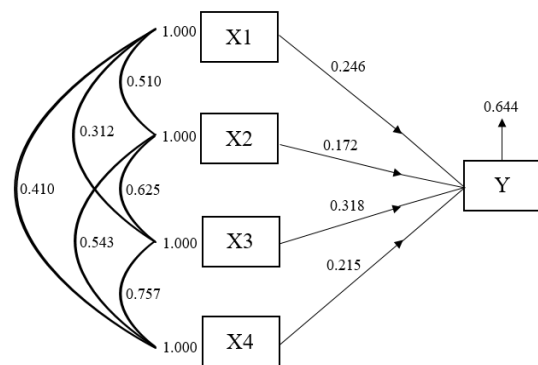

Fig 4:-Diagram Path Analysis

From the path diagram in Figure 4. lanes equation can be obtained as follows.

$$Y=0.246X1+0.172X2+0.318X3+0.215X4+0.644\varepsilon1 \qquad (3)$$

Based on the results of path analysis, it can be seen that the variable that has the most direct influence on the performance (Y) is a health variable (X3) that is equal to 10.11%, whereas if the calculated overall (direct and indirect influence), work stress variables (X4) have the greatest effect on performance (Y) is 48.12%.

	Direct Influence (%)	Indirect Influence				Total (%)
		X1 (%)	X2 (%)	X3 (%)	X4 (%)	
X1	6.05	-	8.77	9.92	8.82	33.56
X2	2.96	12.55	-	19.88	11.67	47.05
X3	10.11	7.68	10.75	-	16:28	44.81
X4	4.62	10.09	9:34	7.24	-	48.12

Table 16. Direct And Indirect Influence

IV. CONCLUSION

The results of the test F variable mention the influence of motivation, fatigue, health and job stress when night overtime on worker's performance. T test results are variable motivation and health are positive influence on the performance workers on night overtime, motivation influence performance about 6.05% and health influence performance about 10.11%. So we can say the performance of workers on night overtime can be improved by increasing the motivation and health of workers. Of the coefficient of determination, motivation, fatigue, health

and stress variable overtime work at night influence on the performance of employees amounted to 58.5% and the remaining 41.5% is influenced by other variables outside the model.

REFERENCES

[1] AE Dembe et. al., (2005). The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States, occup Environ Med 2005; 62: 588-597. doi: 10.1136 / oem.2004.016667.

[2] Ayala Pines and Christina Maslach, (1978). Characteristics of Staff Burnout in Mental Health Settings, hospital and community psychiatry, DOI: 10.1176 / ps.29.4.233.

[3] Awad S. Hanna, Craig S. Taylor and Kenneth T. Sullivan., (2005). Impact of Extended Overtime on Construction Labor Productivity, Journal of Construction Engineering and Management, 131 (6): 734-739.

[4] Balaji Akula and James Cusick, (2008). Impact of Overtime and Stress on Software Quality, Conference Paper, DOI: 10.13140 / RG.2.2.12815.59041.

[5] Claire C. Caruso, (2006). Broad Possible Impacts of Long Work Hours, Industrial Health, 44, 531-536.

[6] Debby GJ Beckers, Dimitri van der Linden, Peter GW Smulders, Michiel AJ Kompier, JPM Marc van Veldhoven and Nico W. van Yperen, (2004). Working Overtime Hours: Relations with Fatigue, Work Motivation, and the Quality of Work, the American College of Occupational and Environmental Medicine, DOI: 10.1097 / 01.jom.0000147210.95602.5.

[7] JM Harrington (2001). Health Effects of Shift Work and Extended Hours of Work, Occupational Environmental Medicine, Med 2001; 58; 68-72.

[8] Kanae Karita, Mutsuhiro Nakao, Mariko Nishikitani, Toyoto Iwata, Katsuyuki Murata and Eiji Yano, (2006). Effect of Overtime Work and Insufficient Sleep on Postural Sway in Information - Technology Workers, Occupational Health Journal, 48: 65-68.

[9] Kiran Singh (2005). Impact of Stress on Work Performance of Employees, Renewable Research Journal, Volume 3 Issue 2 Page 1.

[10] Peter F. Kaming, Paul O. Olomolaiye, Gary D. Holt, Frank C. Harris, (1997). What Motivates Construction Craftsmen in Developing Countries? A Case Study of Indonesia, Building and Environment. Vol. 33, Nos 2-3, pp. 131-141, 1998.