

# The Correlation of Individual and External Factors to Work Fatigue in Employee at PT. Hutama Karya Building Division Project, Integrated Building Soekarno Hatta Airport Train Station

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## Abstrak

**Pendahuluan:** Berdasarkan data yang dikeluarkan oleh International Labour Organization (ILO) tahun 2018, menurut Hamalainen 2,78 juta pekerja meninggal setiap tahunnya, 2,4 juta (86,3%) dari kematian tersebut dikarenakan penyakit akibat kerja salah satunya yaitu kelelahan kerja, lebih dari 380.000 (13,7%) kematian karena kecelakaan kerja. Jumlah kecelakaan non-fatal hampir seribu kali lebih banyak dibanding kecelakaan fatal, diperkirakan 374 juta pekerja mengalami kecelakaan ini. **Tujuan penelitian:** untuk mengidentifikasi hubungan usia, status gizi, beban kerja, lama kerja, kualitas tidur dan status merokok dengan kelelahan kerja. **Metode:** Jenis penelitian ini merupakan penelitian analitik menggunakan desain penelitian *cross sectional*, untuk mengetahui hubungan antara variabel dependen dengan variabel independen, data dikumpulkan dengan menggunakan kuesioner. Jumlah sampel sebanyak 61 orang di proyek pembangunan *integrated building*. **Hasil:** hasil penelitian diperoleh jumlah pekerja yang mengalami kelelahan kategori tinggi sebesar 46 pekerja (75,4%), usia kategori beresiko mengalami kelelahan sebanyak 36 pekerja (59%), status gizi kategori normal sebanyak 50 pekerja (82%), beban kerja kategori berat sebanyak 43 pekerja (70,5%), kualitas tidur tidak normal sebanyak 51 pekerja (83,6%), lama kerja tidak normal sebanyak 47 pekerja (77%) dan merokok sebanyak 52 pekerja (85,2%). Hasil uji statistik chi-square didapatkan variabel kualitas tidur ( $p$  value = 0.035), beban kerja ( $p$  value = 0.034), lama kerja ( $p$  value = 0.014) dan merokok ( $p$  value = 0.004) berhubungan dengan kelelahan kerja, sedangkan pada variabel usia ( $p$  value = 0.184) dan status gizi ( $p$  value = 0.287) tidak berhubungan dengan kelelahan kerja. **Kesimpulan:** Peneliti menyarankan agar ditingkatkan lagi pemeriksaan kesehatan para pekerja seperti diadakannya *medical chek-up*.

**Kata kunci --** Kelelahan kerja, beban kerja, pekerja

## Abstract

**Introduction:** Based on data issued by the International Labour Organization (ILO) in 2018, according to Hamalainen 2.78 million workers die annually, 2.4 million (86.3%) from the death of illness due to the work of one of them is work fatigue, more than 380,000 (13.7%) death due to work accidents. The number of non-fatal accidents is almost a thousand times more than a fatal accident, an estimated 374 million workers have suffered this accident. **Aims:** To identify the association of age, nutritional status, workload, length of work, quality of sleep and the habits of smoking with work fatigue. **Method:** analytic research using cross sectional research design, to know the association between dependent variables and independent variables, data collected using questionnaires. Sample number of 61 people in integrated building construction project at Bandara Soekarno

*Hatta. **Results:** The study obtained the number of workers who suffered a high category fatigue of 46 workers (75.4%), age category is at risk of fatigue as many as 36 workers (59%), the nutritional status of normal categories as many as 50 workers (82%), weight category workload as much as 43 workers (70.5%), the quality of sleep is not normal as much as 51 workers And a smoking of 52 workers (85.2%). Chi-square statistical test result obtained sleep quality variabel (p value = 0035), the workload (p value = 0034), the length of work (p value = 0.014) and smoking habit (p value = 0.004) are associated with work fatigue, while in the age variabel (p value = 0184) and the nutritional status (P value = 0287) is not associated to work fatigue. Researchers suggest further improvement of workers health screening such as medical Chek-up.*

**Keywords -- Work Fatigue, Workload, Workers**

## I. INTRODUCTION

Every work activity involving the human factor, machines and materials through stages of the process have a risk of danger with the variety level of risks, which allows the occurrence of occupational accidents and diseases. The number of employees in Indonesia have been increased every year, but it is not offset by the efforts of the company in applying K3 (Health and Safety Work) so the numbers of work accidents in Indonesia is still quite high.<sup>1</sup>

According to the Regulations of the Minister of Manpower of the Republic of Indonesia Number 09 in the Year 2016 about Health and Safety in Work at Height are all activities to ensure and protect the safety and health of workers through the efforts to prevent of work accidents and diseases caused by work.<sup>2</sup>

According to (Hamalainen et al., 2017) estimates the latest of which was issued by *the International Labour Organization (ILO)* of 2.78 million workers die every year because of work accidents and diseases caused by work. About 2,4 million (86,3 percent) of the deaths is because of the disease due to the work of one of them, namely because of the work fatigue, while more than 380.000 (of 13.7 percent) due to work accident. Every year, there are almost a thousand times more numerous accidents work non-fatal compared with the fatal work accident. Non-fatal accident was estimated experienced by 374 million workers every year and a lot of accidents this has serious consequences to the capacity of the employee's income.<sup>3</sup>

According to data taken from the Organization of Health Insurance (BPJS) of the year 2018, in Indonesia, the numbers of accidents work increased from year 2017 to 2018 as many as 123.041 cases in the year

2017 and 173.105 cases in the year 2018, the case of the crash of work increased as much as 50.064 the case of the total cases for the year 2017 to the year 2018. The general cases occur is still dominated by cases of mild level of work accident in the industry such as factories and workers who suffered accidents work is dominated by the most work in the age of earning with low competence. According to Tarwaka et al, the year 2004 in the Sustainable (2016) Fatigue is a mechanism of protection of the body in order to spared from further damage so that there is recovery after rest and fatigue is regulated centrally by the brain.<sup>4</sup> Feelings of tiredness may cause a person to be unable to work anymore so that a person stops working as well as physiological fatigue which causes workers who work physically to stop their activities because they feel tired and even workers can fall asleep due to fatigue.

According to Tarwaka, 2004 Fatigue show a condition that is different from each individual, However, all of them result in a loss of efficiency as well as a reduction in work capacity and endurance.<sup>5</sup> A worker in labor will feel tired if he or she has worked for 7 hours per day or 42 hours per week for six days in a row and 8 hours per day or 40 hours for five days in a row. Based on the data obtained, there is no division of work shifts carried out by the company. Workers work optimally to achieve the target, and workers work more than normal working hours, this is done by the company to complete the project according to the target. Therefore, most of the 163 workers complained about the fatigue they experienced

So, based on these issues, the formulation of this research's problem is "How the Relationship between Individual and External Factors to Work Fatigue in Workers at PT. Hutama Karya, Integrated Building Project Division of Soekarno Hatta Airport

Station for the Period of March - July 2020." This study aims to see if there was a link between age, nutritional status, workload, length of work, sleep quality, and smoking habits and worker fatigue.

## II. METHOD

This is an analytical study that employs a cross-sectional research design, namely a study to investigate the dynamics of the correlation between risk factors and effects through approach, observation, or data collection. This study was carried out at PT. Hutama Karya, Integrated Building Project Division of Soekarno Hatta Airport Train Station, from March to July 2020. The population of this study was 163 workers in the integrated building project, and the sample was calculated using the Lemeshow formula, with 61 workers as the sample results. The data was collected using an accidental random sampling technique, with primary data obtained from questionnaires and secondary data obtained from company data PT. Hutama Karya, Integrated Building Project Building Division, Soekarno Hatta Airport Train Station. The data obtained from field research was then analyzed using statistical tests to determine the results of the Univariate analysis to see the distribution and frequency of the independent and dependent variables, and the results of the Bivariate analysis to see the relationship between the independent variable and the dependent variable using the Chi-square test. The confidence level square = 0.05 if the p-value is 0.05 and there is a significant relationship, otherwise there is no significant relationship if the p-value is > 0.05.

## III. RESULT

The Univariate analysis results present the distribution of variable characteristics, namely the frequency and percentage of each variable, namely the independent variables, namely individual and external factors, and the dependent variable, namely work fatigue

using the IFRC (Industrial Fatigue Research Committee) questionnaire, which categorizes fatigue into four categories, namely low, moderate, and severe. The results of the univariate and bivariate analyses are shown below.

**TABLE 1. THE DISTRIBUTION OF THE RESPONDENTS' FREQUENCY CHARACTERISTICS IN THE PT. HUTAMA KARYA DIVISION OF BUILDING THE PROJECT OF INTEGRATED BUILDING STATION WAGON AIRPORT**

Variable	Category	%
Age	Not at Risk of ≤ 30 years	41
	at Risk > 30 years	59
Nutritional Status	Skinny ≤ 18,5	3,3
	Normal 18.6 - 24.9	82
	Fat 25.0 - 27.0	14.7
Workload	Light (score 75 – 100)	13,1
	Currently (score 100 – 125)	16.4
	Heavy (score 125 – 150)	70,5
Sleep Quality	Normal (7 – 8 hours)	16.4
	Not Normal (< 7 hours or > 8 hours)	83.6
Length of Work	Normal (8 hours)	23
	is Not Normal (> 8 h)	77
Smoking Habit	No Smoking	14.8
	Smoking	85.2
Fatigue	Low (score 30 – 52)	9.8
	Currently (score 53 – 75)	14,8
	High (a score of 76 – 98)	75.4

Source Of Data : Primary Data 2020

Based on the Univariate results from the table above, it can be seen that the majority of the respondents who were more than 30 years old were 36 respondents (59%), whereas for the nutritional status variable, the majority of the respondents had normal nutritional status, namely 50 respondents (82%), The variable of workload for majority of respondents (43%) had a heavy workload; for variable sleep quality, the majority of respondents (51%) had abnormal sleep quality (7 hours or more than 8 hours) (83.6%), For the length of work variable, the majority of the respondents had an abnormal length of work (> 8 hours), namely as many as 47 respondents (77%), for the smoking variable, the majority of the respondents who

smoked were 52 respondents (85.2%), and for the fatigue variable, the majority of the respondents who smoked were 52 respondents (85.2%). It can be seen that the majority of respondents experienced work fatigue in the high category, with as many as 46 respondents falling into this category (74.4%).

**TABLE 2. TABULATION CROSS BASED ON VARIABLES INDEPENDENT TO A VARIABLE DEPENDENT ON THE PT. HUTAMA KARYA DIVISION OF BUILDING THE PROJECT OF INTEGRATED BUILDING STATION WAGON AIRPORT SOEKARNO HATTA**

Variable	Category	P Value
Age	Not at Risk of $\leq 30$ years at Risk $> 30$ years of	0,184
Nutritional Status	Skinny $\leq 18,5$ Normal Is 18.6 - 24.9 Fat 25.0 - 27.0	0,287
Workload	Light (score 75 – 100) Currently (score 100 – 125) Heavy (score 125 – 150)	0,034
Sleep Quality	Normal (7 – 8 hours) Not Normal ( $< 7$ hours or $> 8$ h)	0,035
Length of Work	Normal (8 hours) Not Normal ( $> 8$ h)	0,014
Smoking Habit	No Smoking Smoking	0,004

Source Of Data : Primary Data 2020

Based on the results of statistical tests using the Chi Square test with a degree of confidence (95%). There is no significant correlation between age, nutritional status, and work fatigue. And there is a significant correlation between workload, sleep quality, length of work and smoking habits with work fatigue.

#### IV. DISCUSSION

Based on the research results of bivariate analysis performed on variables of age showed that of the 61 respondents showed that there is no significant correlation between age with the fatigue of work ( $p$  - value = 0.184), workers aged  $\leq 30$  years is

the age of the productive and the ability of a physical person to be mature until the age of 30 years while for the age  $> 30$  years the strength of the physical person will be weakened so that it will decrease the productivity of the working person. In addition to that aged  $> 30$  years were able to adapt to new environment and new experience that is long compared to the aged  $\leq 30$  years, the fatigue of work also can be experienced by anyone, both the aged  $\leq 30$  years or  $> 30$  years. The results of the research is in line with the results of the research which is done by Puti Andam Dewi, et al (2019) which of the Factors associated with fatigue in workers porters in the market Balai Tengah Kecamatan Lintau Buo Utara, West sumatra in her research shows that not there is a relationship between age with the fatigue of working with value  $p$ -value  $0,419 < 0,05$ .<sup>6</sup> The age of a person will have an impact on the condition of the body of each person, the increasing age of a person then will the increased fatigue which will be perceived as influenced by the capacity or the ability of the body of a person. The results of the research that stated that not only workers age old course that can experience the fatigue of work but the worker with the young age may have the fatigue of work. Capacity of work among them is the capacity of mental, functional and social will experience a decrease in the age of the approaching 45 years and the quality of the performance will experience a decrease in the current age of the tread 40 years and will be the high decrease in the performance of such at the time of downloadbefore the age of 50 years. Efforts that can be done to overcome the fatigue of the work is to choose the age of the most work that has opportunities both in increasing the productivity of labor, age should be used as a material consideration to provide the type of work that is adjusted with the power of physical or psychic.

Based on the results of the analysis in this study which is done on the variable status of

nutrition shows that of the 61 respondents showed that there is no relationship that is significant between status nutrition with the fatigue of work ( $p - value = 0.287$ ), it is caused because of the workers with normal nutrition is different with workers who have the status of skinny nutrition or fat, the difference that can be seen as a person who has the status of nutrition normal not to be easy to experience the fatigue is different with a person who has the status of nutritional skinny or fat, on a person who has the status of nutritional skinny will easily experience fatigue because it does not have the strength of the muscles that quite a while a person with the status of nutrition fat will be more work for the maximum time to do a job compared with someone who has status gizi normal not too requires energy which is great for issued when do the activity work.

Epidemiological studies on the impact of the work shows a chronic sleep disorder associated increase the risk of various long-term effects that are detrimental to health, including effects on mental health, gastrointestinal, and metabolic functions. This research is in line with research Boya Nugraha (2020) No difference in age and body weight are significant both in men and women against the incidence of job burnout. As is produced with photo printing applied, almost all the parameters between men and women showed significant differences, to cuali BMI (Body mass Index).<sup>7</sup>

The results of the Research is in line with the results of the research which is done by Dwi Wahyuni et al (2019) which of the Factors are Associated with Fatigue Work on the Workers Part Production in PT. Antam Tbk. Logam mulia Metal Noble, in his research shows that not there is a relationship between the status of nutrition with the fatigue of working with value  $p - value 0.224 < 0.05$ .<sup>8</sup>

This study is not in line with Safira (2020) which states that there is a relationship between nutritional status with fatigue on

workers occupational status of nutrition is not normal at risk 5 times more likely to experience fatigue work, while according to the research Anwar, et al (2018) and research Suryaningtyas (2017) concluded that there is no relationship between nutritional status with work fatigue in workers.<sup>9</sup> Nutritional Status has a positive influence on the increase of working capacity if calories workers are not in accordance with the needs of his body then perceived by the workers is the fatigue which causes the movement of the body becomes slow.

Based on the results of the analysis in this study conducted at variable load work shows that of the 61 respondents showed that there is a relationship that is significant between the load of work with the fatigue of work ( $p - value = 0.034$ ), because of the load of work that more errors by workers can only exceed of the limit of the ability of the worker 's own coupled with workers who do the job with the position is not safe, in addition to that the work of a given target work also can cause the load of work that the excess so that workers are required able to work in accordance with the target that has been specified by the company, things that can cause fatigue in workers.

The results of the research is in line with the results of the research which is done by Dwi Wahyuni and Indriyani (2019) which of the Factors associated with job burnout in workers of the production in the PT. Antam Tbk. Logam mulia Precious Metals in his research shows that there is a relationship between workload with the fatigue of working with value  $p - value 0.008 < 0.05$ .<sup>(8)</sup> Each load of work that that can be accepted by the workers should be in accordance with the ability of a physical, cognitive or limitations on the worker 's own that receive the burden of such. If a worker receives a load of work that is too heavy then it will have an impact on the occurrence of fatigue due to work. Load of work preferably adjusted with the adjust ability and capacity

of workers such, efforts that can be done supposed to do the rotation of the work, give you the break that enough to avoid the fatigue of work.

Based on the results of the analysis in this study which is done on the variable quality of sleep shows that of the 61 respondents showed that there is a relationship that is significant between the quality of sleep with the fatigue of work ( $p$  value = 0.035), this can happen because the workers who sleep more than 8 hours to experience fatigue that is quite heavy so it is more fast asleep besides, if you sleep for too long can lead to lack of focus at work, because sleeping too long can cause a headache on the next day and can affect the work of the brain. On the workers who sleep less than 7 hours can easily be sleepy the next day and lead to less focus on work due to lack of sleep, other factors that cause sleep less than 7 hours because when night workers to work overtime or experience insomnia.

Other studies have identified the duration of sleep, time of day, the number of flights and the duration of the task to influence the fatigue of the pilot. The results of the research, Martin (2014) on the pilot short distance shows that the time spent awake not only during but also before the FDP is a strong predictor of fatigue at the end of the task, which seems to exceed the effect of the variation observed in the duration of sleep the previous.<sup>10</sup> When the term fatigue is used, many consider it the same as drowsiness, but this is actually two different (although related). Sleepiness is a tendency to fall asleep; fatigue is the body's response to lack of sleep or physical activity or prolonged mental. Fatigue can be reduced by the activity of the menatap or rest without sleep.

According to the results of research Steven E Lerman, et.all (2012) Fatigue and fullrunan vigilance resulted in the quality of sleep is insufficient or bad can have some

consequences related to safety, including reaction time slowed, alertness is reduced, the ability of decision making is reduced, poor judgment, impaired during complex tasks, and loss of consciousness in a critical situation. Lack of sleep has long been recognized as a public health challenge that has not been met. Many people believe that they adapt to chronic sleep deprivation or that the recovery requires only one episode of sleep which is extended, but research has shown that this is not the case.<sup>11</sup>

Most workers get sleep outside of the workplace, usually in their homes. Make sure adequate sleep could therefore be considered primarily an employee responsibility. However, in recent years employers and regulators have introduced guidance materials focused on lifestyle training to promote of strategies to maximize recovery value of sleep opportunities. Sleep hygiene training and education (T/E) can be measured as an example of a control measure to obtain quality sleep.<sup>12</sup>

Sleep is a physiological function that is vital, and because of it lack of sleep, kte sleep, sleep restriction, and / or sleep disturbance has been associated with many mental and physical health outcomes adverse. In the absence of enough sleep, a significant reduction in the overall activation of the brain occurs, with the deactivation of the largest in the region responsible for processing high-level cognitive, emotional/ affective. The limit of sleeping less than 7 hours per night have wide-ranging effects on the cardiovascular system, endocrine, immune, and nervous, and is associated with adverse consequences including obesity in adults and children, impaired glucose tolerance, and cardiovascular disease. including hypertension.

According to results of the analysis in this study which is done on the variable old work shows that of the 61 respondents showed that there is a relationship that is significant

between the old work with the fatigue of work ( $p$  value = 0.014), this is due to the weakening of workers who experience work overtime to night and back to work the next day which resulted in fatigue on workers and the break time is reduced, in addition, the productivity and quality of work will be decreased in accordance with the length of working time, the longer a person works then the large is also something that is not desirable, for example, the fatigue that possibility can lead to accidents work.

This result is in accordance with the research conducted by Rahme, et al., 2020 showed that work fatigue significantly increased with lengthy working hours. This conclusion was reported in previous studies highlighting its massive consequences on professional practice. Actually, long working hours and consequent fatigue trigger an alarm for safety.<sup>13</sup> And this result is in accordance with the research conducted by Prastuti (2017) which states that there is a relationship between long work with the fatigue of work.<sup>14</sup>

Long work is the unit of activity of the workers, which is measured in the unit of time specified. Activity that is done for constantly constantly can result in disorders there is a body plus if the occurrence of time overtime so that workers work exceeds the time 8 hours. Duration of work is determined by the level of fatigue and complaints of muscle that is felt by the workers. The work that continues to be continuous is made can effect on the muscle, the system of the circulation of the blood, digestive, nervous, muscular and respiratory.

Based on the results of the analysis in this study conducted on the variables of smoking showed that of the 61 respondents showed that there is a relationship that is significant between smoking with the fatigue of work ( $p$  value = 0.004), based on the research obtained that the respondents with the status of smoking is much achieved, someone that

smoking can easily tired because of the oxygen that enters into the lungs and in the blood is reduced so that the decomposition of the carbohydrates that are in the body also will be slow and cause fatigue.

The results of the research is in line with the results of the research which is done by Apriliani et al (2019) which of the Factors associated with fatigue work on officer firefighter fire in the tribe of the department firefighter fire and rescue South Jakarta in her research shows that there is a relationship between sleep quality with the fatigue of working with value  $p$ -value  $0.015 < 0.05$ .<sup>15</sup> In dalam a piece of property there are 4000 type compounds chemical. There are three components of the main in the property, namely nicotine, tar and carbon monoxide (CO). Tar is a substance that is dangerous which can cause cancer. Carbon Monoxide is a gas toxic which can lower the content of O<sub>2</sub> in the blood. Habit of smoking in addition to causing fatigue can result in complaints other such complaints on the muscle is evidenced by the research of Kania (2020) which states that there is a relationship that is significant between the habit of smoking with the occurrence of a complaint on the muscular workers.<sup>16</sup>

Internal factors work fatigue such as age, gender, nutrition, phsycal workers, health. External factors of work fatigue is work environment, ergonomic, work load, regulations, social relations and working status.<sup>17</sup> Stress and fatigue can be triggered by a decreased immune response. While time during the employee can not rest is caused by rhythm of the body itself.

## V. CONCLUSSION

Fatigue is the construction of a multi-faceted complex is produced from various sources of the work and non-work. Thus, detect and manage them in relation to health and safety at work can be a challenge. However, although it can not be eliminated, it can be



mitigated effectively at the system level through the cooperation and input from various stakeholders.

From the results of the research can be concluded that fatigue in workers of PT Hutama Karya building project *Integrated Building* train station Airport Soekarno Hatta occur by many related factors including, age, duration of work, the nutritional status of workers, the burden of the crimes, the sleep quality of workers and the smoking habits of the workers. For workers is expected to improve the quality of sleep and nutritional status in an effort to minimize the occurrence of fatigue of work resulting from the factor of the individual's own. While for pompany expected to be able to carry out a long working time and rest periods in accordance with the provisions of legislation employment that is applicable Labor Law No. 13 Year 2003 about the working time and rest time as well as Kepmenakertrans R. I Kep. 102/MEN/VI/2004.

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