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## **Workload analysis using full time equivalent method for production operators at PT Pertamina EP Tambun Field**

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### **ABSTRACT**

Workload is a major challenge in human resource management, especially in modern industrial environments. Workload imbalance between production operators can hurt productivity, operational efficiency, and employee welfare. This study aims to analyze the workload of operators using the Full Time Equivalent (FTE) method as an accurate approach. The results of the analysis show that all operators at the gathering station workstation experience excessive workload conditions, with FTE values ranging from 1.285 to 1.389. In contrast, operators at the gas station well, and pipeline station show FTE values within normal limits, namely between 1.013 and 1.028. This imbalance also affects the work performance of operators, especially at the gathering station, which shows a lower average performance value compared to other stations. As a solution, a recalculation of the workload was carried out after adding one operator to each gathering station unit. The results showed that the FTE value was within the normal range, indicating an improvement in work distribution and the potential for increasing employee performance.

**Keywords:** Full time equivalent; workload; employees; Pertamina

### **1. INTRODUCTION**

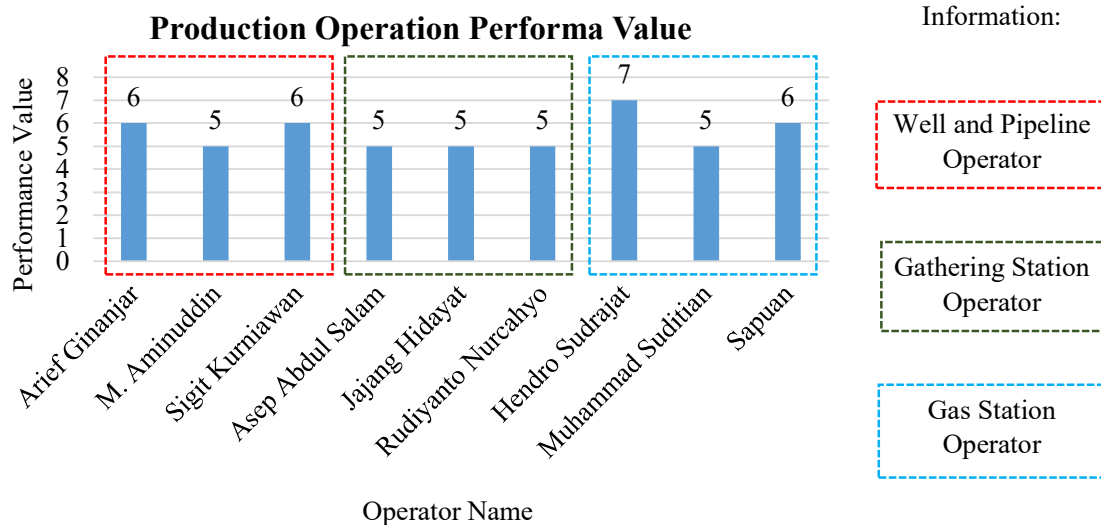
Workload in modern organizations is a fundamental challenge that requires special attention in human resource management. Workload imbalance can result in various operational problems such as decreased productivity, increased employee stress levels, occupational safety risks, and decreased output quality [1]. Workload is one of the main factors that affect the level of success in a company, and workload will affect employee performance in the company [2]. It is important for companies to give more focus to the condition of their workers in completing a job [3]. Each job has a different workload depending on the type of work done, the suitability of the workload set by the company to the condition of the worker needs to be considered and excessive workload can create an uncomfortable working atmosphere for workers because it can trigger faster stress, but on the contrary if the lack of workload can cause losses for the company [4]. Workload analysis is a process to determine the number of hours of work used or needed to complete a job in a certain time [5]. In other words, workload analysis aims to determine how many operators and how much responsibility or workload is appropriate to be delegated to an officer [6]

PT Pertamina EP Zona 7 Tambun Field was established in October 2009, as an oil and gas exploration and production company that plays an important role in meeting national energy needs. In its operations, the company that manages the production area in the Tambun Field, including the



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gathering station operator, the gas station operator, and also the well and pipe operator, each with three people working in a shift system. However, along with the development of the industry and the need for efficiency, PT Pertamina EP Zone 7 Tambun Field faces challenges in optimizing its operational performance. The main problem (mayor) faced is the imbalance of workload among production operators, which can affect overall productivity and operational efficiency. Initial observations indicate indications of excess workload on some production operators, while others may have free time that has not been optimally utilized. A minor problem that arises is the difficulty in measuring and analyzing workload accurately and objectively. The workload measurement method currently used is not able to provide a comprehensive picture of the distribution tasks and efficiency of the production operators' working time. This causes difficulties in decision-making related to the allocation of human resources and optimal work shift planning [7].



**Figure 1.** Production operator performance value graph

Based on [Figure 1](#), it is known that from the results of the 2024 evaluation, there is a significant variation in operator performance scores in three different positions. The average performance of Well and Pipe Operators is 5.7 with the highest score of 7, namely Hendro Sudrajat, and the lowest 5, namely Muhammad Sudhitan. Gathering Station Operators have a lower average of 5 with uniform scores for the three operators [8]. Meanwhile, Gas Station Operators recorded an average of 6 with one operator achieving the highest score [9]. The performance value obtained is the result of an assessment from the operator's superior at the management level, this value can be interpreted as the performance of each operator within 1 year, with a minimum value of 3 and a maximum value of 8, the better the performance, the higher the value obtained [10]. The assessment obtained by each operator will affect the career level of each employee working at PT. Pertamina EP. Differences in scores between positions and individuals indicate an imbalance in workload that needs to be evaluated to optimize performance [11].

[Figure 1](#) above shows the operator performance at values 5 and 6. The performance value of 5 at all gathering operation stations is felt by 3 operators due to the very heavy workload at the station, thus affecting the performance given by employees, while at other stations the performance is balanced between 5-7. This means that for the 2 stations (gas station operator and well and pipeline operator) in normal conditions the answers between employees are different for their performance. At the gathering operation operator, there needs to be an increase in employees and a reduction in workload to maximize the performance given by the operator at the station [12].

This assessment, given by superiors within a period of one year with a score range of 3–8, has a direct impact on employee career paths at PT. Pertamina EP. To overcome the above problems, the FTE method was chosen as the most appropriate approach for this study. The FTE method allows for a more

accurate and comprehensive measurement of workload, taking into account the total time spent completing specific tasks in a certain period of time. Using the FTE method, this study aims to analyze the workload of production operators at PT Pertamina EP Zone 7 Tambun Field comprehensively and evaluate its impact on employee performance [13]. The results of this study are expected to provide recommendations for optimizing human resource allocation, increasing operational efficiency, and increasing employee job satisfaction in the oil and gas industry.

## 2. METHOD

This study was designed as a descriptive-analytical study with a quantitative approach, which aims to analyze the workload of production operators systematically and measurably using the FTE method. The descriptive analytical approach was chosen because it allows researchers to describe the actual conditions of the workload of production operators and analyze its impact on work performance comprehensively, by considering various factors that affect operator performance [14]. The observation method adopts a combination of cross-sectional and time-motion study approaches, where the cross-sectional approach allows data collection on production operator activities over a certain period of time to obtain a representative picture of the actual workload [15]. Time-motion study is implemented to facilitate the measurement of the time required to complete each work element accurately and in detail, taking into account possible time variations in task execution.

The study was conducted at PT Pertamina EP Zone 7 Tambun Field located in Bekasi Regency, West Java, an oil and gas production facility that has a strategic role in providing national energy. The research location covers three main operational areas: Tambun Gathering Station which functions as an oil and gas gathering facility with various complex processing and instrumentation equipment, Tambun Production Well Area which consists of several active production wells that require continuous monitoring and handling, and Tambun Compressor Facility which is equipped with a modern gas compression system to optimize production. Data collection in this study used observation and interview methods.

## 3. RESULTS AND DISCUSSION

The results of the study show that in the production process at PT Pertamina EP Tambun Field, 9 operators with 3 workstations must go through. The workstations are Gathering Station Operator, Gas Station Operator, and Well and Pipeline Operator where each operator has 3 workers in it. The company provides an overall target for daily production which is different for each workstation. From the calculation results, the 2 operators in 1 station experienced overload while the others were normal [16]. After that, the data adequacy test was obtained with all activities per workstation having sufficient data. Then, the data will be used to process the data using the FTE method. The Full Time Equivalent (FTE) method is one method used in calculating effective working time to complete a job. This method can determine the amount of effective time to complete a job in a certain period. This method provides benefits because, with this method, the company can determine the optimal number of operators. The results of the FTE method calculation are divided into 3 types, namely below normal (underload), normal, and more than normal (overload) [17].

**Table 1.** Recap of FTE calculation and work performance

Number	Workstation	FTE	Description	Performance
1	Gathering Station Operator 1	1,288	Overload	5
2	Gathering Station Operator 2	1,389	Overload	5
3	Gathering Station Operator 3	1,285	Overload	5
4	Gas Station Operator 1	1,025	Normal	7
5	Gas Station Operator 2	1,020	Normal	5
6	Gas Station Operator 3	1,014	Normal	6
7	Well and Pipeline Operator 1	1,013	Normal	6
8	Well and Pipeline Operator 2	1,013	Normal	5
9	Well and Pipeline Operator 3	1,028	Normal	6

Based on Table 1, the workload is said to be underloaded if the FTE value is <1.00. Workers who have a workload with these criteria should have their work increased or the number of employees reduced. A normal workload is with a value of >1.00 and not more than 1.28. If the FTE value is >1.28

then it is said to be overloaded. Based on the FTE calculation that has been done, the workload results for gathering station operator 1 are 1.288 (overload), gathering station operator 2 is 1.389 (overload), gathering station operator 3 is 1.285 (overload), gas station operator 1 is 1.025 (normal), gas station operator 2 is 1.020 (normal), gas station operator 3 is 1.014 (normal), well and pipeline operator 1 is 1.013 (normal), well and pipeline operator 2 is 1.013 (normal), and well and pipeline operator 3 is 1.028 (normal). The lowest FTE value is in well and pipeline operators 1 and 2 the FTE value is only 1.013. While the highest FTE value is in gathering station operator 2 which is 1.389. Where for 3 operators in the gathering station operator the value is overload.

The FTE calculation then compared with the performance value obtained by each operator shows that in all workstation operators, the gathering station operator is included in the overload category and also the performance value obtained by each operator is 5, in the gas station operator for the initial FTE in normal conditions at a value of 1.00-1.28 where the performance of each operator is on average 5.6 and 7. The last station, namely the well and pipeline operator also has an FTE value above normal between 1.00-1.28 by showing operator performance at a value of 5 and 6. The comparison of the FTE value with work performance is the closer the FTE value is in normal conditions (1.00 - 1.28), the better and better the work performance will be. In this study, the operator performance at the gathering station operator has a value of 5, where all operators experience excessive workload compared to the other 2 stations.

Based on the results of the study, the normal workload can be seen from the FTE value of each workstation compared to the normal FTE value. The percentage of normal workload can be calculated by comparing the total FTE with the number of normal FTEs as many as the number of employees. The workload equalization proposal above shows the proposed FTE value for the gathering station operator workstation which previously had an overloaded workload after the proposed workload merger was carried out, then the proposed operator workload improvement was obtained which had a normal final result [18]. This can be calculated by comparing the total FTE with the normal FTE of as many employees and focusing on operators and workstations that experienced overload, namely the gathering station operator. The calculation results obtained 100% of operators have produced a normal FTE value, namely in the range of 1.00-1.28. After calculating this proposed FTE, the FTE results were obtained which were already in a normal state, namely in the range of 1.00 - 1.28.

Based on calculations using the FTE method at PT. Pertamina EP Tambun Field, the workload calculated using the FTE method was obtained. For operators, the workload results for gathering station operator 1 were 1.288 (overload), gathering station operator 2 was 1.389 (overload), gathering station operator 3 was 1.285 (overload), gas station operator 1 was 1.025 (normal), gas station operator 2 was 1.020 (normal), gas station operator 3 was 1.014 (normal), well and pipeline operator 1 was 1.013 (normal), well and pipeline operator 2 was 1.013 (normal), and well and pipeline operator 3 was 1.028 (normal). The lowest FTE value was for well and pipeline operators 1 and 2 because the FTE value was only 1.013. While the highest FTE value was for gathering station operator 2, which was 1.389. Where for 3 operators in the gathering station operator the value is overload [19].

Based on the calculation of the FTE value, for the gathering station operator, the initial FTE value is above the normal FTE, where there is an excessive load on the station so that the performance of employees at the operator is all at a value of 5. At the gas station operator, the initial FTE in normal conditions is at a value of 1.00 - 1.28 where the performance of each operator is averaged between 5.6 and 7. At the last station, the well and pipeline operator also has an FTE value above normal between 1.00 - 1.28 by showing operator performance at a value of 5 and 6. The performance value of 5 at all gathering operation stations was felt by 3 operators due to the very heavy workload at the station, thus affecting the performance given by employees, while at other stations the performance was balanced between 5-7. This means that for the 2 stations (gas station operator and well and pipeline operator) in normal conditions, the answers between employees are different for their performance. At the gathering operation operator, there needs to be an increase in employees and a reduction in workload to maximize the performance given by operators at the station. Based on the results of the FTE calculation, the impact of the workload is felt by all operators at the gathering station operator status is overload, which means that the frequency of work is higher, so a new calculation is carried out which obtains the workload results for gathering station operator 1 of 1.093 (normal), gathering station operator 2 of 1.189 (normal), gathering station operator 3 of 1.087 (normal) [20].

Where the calculation is only carried out on workstations that are overloaded. So that the improvement efforts that can be given to the company are to add workers to all operators who have an

overloaded workload. The details of the additional workers are at the gathering station operator 1 station as much as 1 person, gathering station operator 2 as much as 1 person, gathering station operator 3 as much as 1 person. At stations that are already normal, there is no need for additional workers there. After the additional efforts were made, the normal FTE results were obtained for all operators at all operators at the gathering operation station.

#### 4. CONCLUSION.

The conclusion that can be drawn from the calculation of the FTE method that has been carried out, the results of the overload workload for gathering station operators 1-3 are obtained because they are above 1.00-1.28. The performance value of 5 all at the gathering operation station is felt by 3 operators due to the very heavy workload at the station, thus affecting the performance given by employees, while at other stations the performance is balanced between 5-7. At the gathering operation operator, there needs to be an increase in employees and a reduction in workload to maximize the performance given by operators at the station. Based on the results of the FTE calculation, the impact of the workload is felt by all operators at the gathering station operator status is overload, which means that the frequency of work is higher, so a new calculation is carried out which obtains the results of the workload of gathering station operator 1 of 1.093 (normal), gathering station operator 2 of 1.189 (normal), gathering station operator 3 of 1.087 (normal). Where the calculation is only carried out on workstations that are overloaded. So that the improvement efforts that can be given to the company are to add workers to all operators who have an overloaded workload. Details of the additional workers are at the gathering station operator 1 as many as 1 person, gathering station operator 2 as many as 1 person, gathering station operator 3 as many as 1 person. At stations that are already normal, there is no need for additional workers there. After the additional efforts were made, the normal FTE results were obtained for all operators at all operators at the gathering operation station. The research suggestion that can be given is that PT Pertamina EP Tambun Field should add new employees according to the calculations at the gathering station operator to reduce the workload of its operators and for employees who experience too high a workload, they should report to the highest leader of the production function so that a solution can be found for optimal production activities at each workstation.

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