WORKLOAD ANALYSIS AS A BASIS FOR DETERMINING THE NUMBER OF EMPLOYEES IN THE WAREHOUSE DEPARTMENT OF PT GOLD COIN INDONESIA MEDAN CITY

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Abstract

Workload is an activity carried out by an employee in completing a task or obligation of a job or group of positions carried out within a certain predetermined period of time. This research was conducted at the company PT Gold Coin Indonesia, Medan City, which operates in the animal feed industry, where there is an imbalance in the ratio of overtime hours due to the allocation of employees to each department not being based on workload. In this research, an analysis of workload was carried out on staff with a relatively high ratio of overtime hours, namely in the warehouse department at 184.6 hours/person. The aim of this research is to analyze employee working time using the work sampling method and also balance the workload by analyzing the needs for the number of employees in the warehouse department using the Full Time Equivalent method. The results of this research show that effective working days during a year are 284 days and effective working time is 1689 hours for six working days per week. Through the work sampling method, it was discovered that in the warehouse department, the number of observations of productive activities was 80.29%, namely 5.89% of unproductive activities and 13.82% of personal activities with an allowance of 15%. Based on the results of measuring workload in the warehouse department using the Full Time Equivalent method, there are employees with underload and overload workloads.

1. INTRODUCTION

The process of running an organization or company requires good and focused human resources, so that a good and competitive organization can be achieved. A very crucial thing in a company is arranging optimal human resources, because this is an important part so that the company can run effectively and efficiently. Resources themselves are the main point in business, there are thousands of resources that can be used to facilitate the running of business in a company, including human resources. Human resources (HR) are individuals who are productive in carrying out work and act as drivers of an organization, both in institutions and companies who function as assets so they must be trained and develop their abilities (Susan, 2019). Therefore, managerial tools are needed in planning, managing and controlling human resources, namely human resource management (Priyono, 2010). HR management has undergone changes starting from the era of personnel management then human resource management which continued to resources based on competency until finally the management of human resources as capital or what is called Human Capital. Nasution (2015) states that human capital is defined as all the efforts that workers bring to be invested in the company in creating a company that is reliable and can provide the best service. One way to obtain optimal human resources is to measure workload with the aim of determining how much load employees can bear. Workload is the task or job demands given to employees which they must complete within a predetermined time period at a company. It is necessary to pay attention to the suitability of the workload that has been regulated by the company to the conditions of the workers. Excessive workload can create an uncomfortable working atmosphere for employees. Workloads that are too low can result in labor inefficiencies which have the potential to cause company losses (Wibawa, et al., 2015). An incident that is often faced by several companies is the level of workload on their employees.

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Adhitia Elfian Santoso, Nazaruddin, Anizar Anizar

The phenomenon that is usually encountered is that employees who have been assigned responsibility for work do not match the proportions and as they should. Companies must be able to analyze the workload of their employees in order to create a balance between the load given and the employee's abilities. Workload measurements need to be carried out so that the level of effectiveness and efficiency of the company and employees is maintained stably and does not burden both parties. PT Gold Coin is a pioneer in animal nutrition and manufacturing scientifically balanced animal feed in Asia. PT Gold Coin produces animal feed with the main raw material being yellow corn. PT Gold Coin produces quality animal feed because it uses a research farm which can be used as a means of biological testing. PT Gold Coin Indonesia is part of Pilmico and Gold Coin Group, a food and agribusiness company with a presence in 8 Asia Pacific countries. Based on interviews conducted with HRD, the problem at PT Gold Coin Medan City branch is that overtime often occurs due to overtime taken for the warehouse department not following production working hours, receipt of imported raw materials which must be completed on the same day. and in the warehouse department there is only one shift, unlike the production department which consists of two shifts which can be seen in Table 1.1

Table 1.1
PT. Employee Overtime Ratio. Gold Coin Indonesia Medan City 2022

Department	Overtime Hours (O'clock)	Total Employees (Person)	Overtime Ratio (Hours/Person)
Finance	335	4	83.5
Production	1184	27	43.85
Warehouse	3324	18	184.6
Maintenance	582	8	72.75
Purchasing	10	2	5
LAB	163	3	54.3
QAO	61	2	30.5
DEC	58	2	29
Sales	100	9	11.1
HRGA	364	5	72.8

Source: PT. Employee Overtime Data. Gold Coin Indonesia Medan City 2022

The data obtained shows that PT. Gold Coin Indonesia Medan City employs a total of 80 employees. Details of the number of employees can be seen in Table 1.1. The ratio data obtained from Table 1.1 shows that there are departments where the overtime ratio (hours/person) is relatively high, namely the warehouse department with an overtime ratio above 180 hours/person. It is necessary to evaluate the number of employees in the warehouse department. PT. Gold Coin Indonesia Medan City allocates employees to each department not yet based on workload. The warehouse department has the highest overtime ratio (184.6 hours/person) with a total of 18 employees. Mangkuprawira (2003) states that a person's workload is determined in the form of company work standards based on the type of work. If the workload given is too heavy, work inefficiency will occur. If the workload given is too light, it will cause the company to lose money in human resource (HR) costs, making it inefficient. According to Prihartini (2007), there are several factors that influence the workload of each individual employee, namely physical tasks, job responsibilities, length of work time and overtime. In this research, work sampling will be used. Work Sampling is a technique for calculating workload to make a number of observations of employee work activities. This method can be classified as direct work measurement because the implementation of this measurement activity must be researched or observed directly in the workplace (Auliyufliha, et al., 2019).

Workload

Workload is a situation where employees are faced with tasks that must be completed at a certain time. In addition, excessive quantitative and qualitative workloads can lead to the need to work for very large numbers of hours, which is an additional source of stress (Munandar, 2010). Workload indicators according to Manuaba (2000) include external and internal factors.

1. External factors
    a. The tasks carried out are of a physical nature such as work attitude and work flow. Meanwhile, mental tasks such as the complexity of the work or the level of difficulty of the work affect the emotional level of the worker, responsibility for the work, distance to the workplace, etc.
    b. Work organization such as length of working time, organizational structure model, delegation of tasks and authority.
    c. The work environment is the physical work environment and the psychological work environment. Internal factors
2. Internal factors are factors that originate from within the body itself as a result of reactions to external workloads. The body's reaction is called strain, the severity of the strain can be assessed both objectively and subjectively. Internal factors include:
    a. Somatic (gender, age, health condition).
    b. Psychological conditions (motivation, perception, desires and satisfaction)

Work Sampling

Work Sampling is a technique for calculating workload to make a number of observations of employee work activities. This method can be classified as direct work measurement because the implementation of this measurement activity must be researched or observed directly in the workplace (Auliyufliha, et al., 2019).

Full Time Equivalent

According to Oesman (2012) FTE (Full Time Equivalent) is a way to count the number of people in a population or organization. FTE (Full Time Equivalent) is a way of measuring people who work "full time" (according to established standards) so that it is the actual number of hours worked as a full time employee. Based on the workload analysis guidelines issued by the National Civil Service Agency in 2010, the FTE index value is divided into 3 categories, namely: underload, normal and overload. Each value range in the index is as follows:
    a. Underload (workload is still insufficient) = FTE index value between 0 — 0.99
    b. Normal (workload is appropriate) = FTE index value between 1 — 1.28
    c. Overload (too much workload) = FTE index value greater than 1.28

2. IMPLEMENTATION METHOD
Place and time of research

The time the research was conducted was from August to December 2023. The location of this research was carried out at PT. Gold Coin Indonesia Medan City.

Types of research

This research is a qualitative and quantitative descriptive research. According to (Sinulingga, 2016), descriptive research is a research method aimed at systematically, factually and accurately describing the facts and characteristics of a particular object or population. This research aims to investigate in detail human activities and work to find facts obtained from interviews and observations, but does not carry out hypothesis testing.

Research Population and Sample

Population according to Sugiyono (2016) is a generalization area consisting of objects/subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn. The population in this study was 18 people. Sample size is the number of samples that will be taken from a population. According to (Sugiyono, 2016) if the population is relatively small. So the sample was determined using the census method or what is usually called a saturated sample, that is, 18 people were used as samples for research.

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Adhitia Elfian Santoso, Nazaruddin, Anizar Anizar

Research Steps

The research steps carried out are as follows:

1. Field study

   At this stage, a Japangan study or survey was carried out in the company to find out what problems were actually occurring in PT's warehouse department. Gold Coin Indonesia Medan City to gain a frame of mind in solving the problems to be studied.

2. Literature Study

   Sources from the literature study used in this research are books, journals and previous research related to workload issues. The aim at this stage is to identify what methods can be used to solve existing problems in PT's warehouse department. Gold Coin Indonesia Medan City.

3. Identify the Problem

   At this stage, problem identification is carried out based on the data obtained that there is an imbalance in workload with the number of employees in PT's warehouse department. Gold Coin Indonesia Medan City which resulted in overtime. After identifying the problem that has been obtained, it is then used as a reference in determining the problem formulation that will be the focus of this research.

4. Problem Formulation

   After identifying the problem, a problem formulation can be obtained. The formulation of the problem in this research is that there are departments that have high overtime hours and some that are low, so the problem that needs to be resolved is by measuring the workload in departments that have a relatively high ratio of overtime hours and the need for the number of employees can be calculated, namely in the warehouse department.

5. Goal Setting

   Research The research objective is determined based on the problem formulation described in Chapter I. The aim of this research is to balance the workload with the needs of the number of PT employees. Gold Coin Indonesia Medan City in the warehouse department so that the ideal workload can be obtained in that department.

6. Data Collection

   The data collection stage includes observation and interviews. Apart from that, the data collection stage requires the following data:
   a. Data on employee job descriptions in the warehouse department.
   b. Data on the number of employees in the warehouse.
   c. Work sampling observation data on warehouse department employees by observing employee activities which are grouped into three categories, namely: productive, unproductive and personal activities. Observations were carried out for nine hours with an observation interval of every two minutes for each employee. Activities included in the productive category are activities related to employees' main tasks. Meanwhile, unproductive activities include arriving late, chatting or joking, leaving early, reading the newspaper. Meanwhile, personal activities are eating, drinking, going to the bathroom and praying.

7. Data Processing

   After obtaining the required data, data processing methods are carried out that are relevant to the problem being faced. The following are the data processing stages carried out using the work sampling method followed by the FTE method, namely as follows:
   a. Calculation of productive, unproductive and personal activities.
   b. Test data adequacy
   c. Test data uniformity
   d. Workload calculation.
   e. Calculation of the number of employees according to workload.

1. Results and Discussion

   Results and discussion are carried out by comparing the results of data processing with current conditions.

2. Conclusions and Suggestions
   This section contains conclusions regarding the results obtained from the research.

3. RESULTS AND DISCUSSION
Workload Analysis

Workload analysis is a description of the workload in a company to measure and calculate workload. Apart from increasing transparent, proportional, rational and professional organizational capacity, workload calculations also function to increase employee effectiveness and efficiency in carrying out tasks (Rafli, 2020). Effective working time at PT. Gold Coin Indonesia Medan City in the warehouse department is set within 1 week with 6 working days. The working day starts from Monday to Saturday with an effective working hour of 40 hours. The following are the company's effective working days and hours.
a. Monday to Friday
         08.00 – 16.00 (Working time)
         12.00 – 13.00 (Break time)
b. Saturday
         08.00 – 13.00 (Working time)
         12.00 – 13.00 (Break time)

Calculation of effective working time is carried out for 1 year. The activities observed consisted of 3 activities, namely productive, non-productive and personal activities. Observations were carried out during working time, namely for 8 working hours with a time interval observed every 2 minutes. Employee effective working days can be seen in Table 3.1.

Table 3.1
Number of Effective Working Days for Employees in 2022

No	Month	Number of Days (Days)	Sunday Holiday (Day)	National holiday (Day)	Annual leave (Day)
1.	January	31	5	1	
2.	February	28	4	2	
3.	March	31	4	1	
4.	April	30	4	2	
5.	May	31	5	5	
6.	June	30	4	1	12
7.	July	31	5	2	
8.	August	31	4	1	
9.	September	30	4	0	
10.	October	31	5	1	
11.	November	30	4	0	
12.	December	31	4	1	
	TOTAL	**365**	**52**	**17**	**12**
	TOTAL EFFECTIVE WORKING DAYS	**284**			

From the results of calculating working days in table 3.1, it can be seen that the number of days in 1 year is 365 days. From these 365 days, 52 days of Sunday holidays are reduced, 17 days of national holidays and 12 days of annual leave. So the employee's effective working days are 284 days.

Data processing
Warehouse Department Working Time Calculation

The results of observing working time using the work sampling method for the warehouse department can be seen in Table 3.2.

WORKLOAD ANALYSIS AS A BASIS FOR DETERMINING THE NUMBER OF EMPLOYEES IN THE WAREHOUSE DEPARTMENT OF PT GOLD COIN INDONESIA MEDAN CITY

Adhitia Elfian Santoso, Nazaruddin, Anizar Anizar

Table 3.2
Total Use of Warehouse Department Employee Working Time

Warehouse Department	Total Observations (2 minutes)			Amount (Time)	Percentage (%)			Total Percentage (%)
	PRO	TPR	PRI	Total	PRO	TPR	PRI	
DO	404	16	62	482	83.82	3.32	12.86	100
SKRM	392	24	66	482	81.32	4.98	13.7	100
ADW	388	26	68	482	80.5	5.4	14.1	100
F.O	366	40	76	482	75.93	8.3	15.77	100
SHPBO	398	20	64	482	82.57	4.15	13.28	100
WBO	376	36	70	482	78	7.47	14.53	100
SWP	376	38	68	482	78	7.89	14,11	100
CDOs	384	34	64	482	79.66	7.06	13.28	100
WSR	394	22	66	482	81.74	4.56	13.7	100
SKA	392	28	62	482	81.33	5.81	12.86	100
Total	3870	284	666	-	802.87	58.94	138.19	-
Average	**387**	**28.4**	**66.6**	**482**	**80.29**	**5.89**	**13.82**	-

The number of employee observations in Table 3.2 can be seen in the warehouse department for productive activities ranging from 406 times to 432 times. For unproductive activities it ranges from 20 times to 38 times and for personal activities it ranges from 30 times to 40 times. The average number of work observations of warehouse department employees for productive activities was 413 times or 85.72% and for unproductive activities was 33 times or 6.85%. Meanwhile, for personal activities it is 35 times or 7.43%. The use of personal and non-productive activities is still in accordance with the standards of Law no. 13 of 2003 where the use of allowance for activities is 30% and for effective work activities it is 70%.

Data Sufficiency Test

The data adequacy test is carried out to determine the number of observations that must be made in work sampling. The following is the calculation of the data adequacy test from the number of observations made on 18 warehouse department employees:

Confidence level = 95%, then k = 2
Accuracy level (s) = 5%

$$N' = \frac{(\frac{K}{s})^2 \, (1-\bar{p})}{\bar{p}}$$

$$N' = \frac{(\frac{2}{0,05})^2 \, (1-0,8029)}{0,8029}$$

$$N' = \frac{40^2 \, (0,1971)}{0,8029}$$

N' = 392.7 rounded to 393 observations

Based on the results of data adequacy calculations, it can be concluded that the number of observations that have been made is sufficient compared to the number of theoretical observations, namely 482 observations for each employee where N>N' (482 times > 393 times).

Data Uniformity Test

The data uniformity test is carried out to find out whether the data obtained is uniform and does not exceed the determined Upper Control Limit (BKA) and Lower Control Limit (BKB). The data uniformity test was carried out on the percentage of productive activities of 18 employees in the warehouse department. The following is the calculation of the Upper Control Limit (BKA) and Lower Control Limit (BKB):

$$\text{BKA} = \bar{p} + 3\sqrt{\frac{\bar{p}\,(1-\bar{p})}{\bar{n}}}$$

$$BKA = 0,8029 + 3 \sqrt{\frac{0,8029\,(1-0,8029)}{241}}$$

BKA = 0,8029 + 3 (0,0256)

BKA = 0,8796

BKA = 87,96%

$$BKB = \bar{p} - 3 \sqrt{\frac{\bar{p}\,(1-\bar{p})}{\bar{n}}}$$

$$BKB = 0,8029 - 3 \sqrt{\frac{0,8029\,(1-0,8029)}{241}}$$

BKB = 0,8029 − 3 (0,256)

BKB = 0,7260

BKB = 72,60%

Based on the calculation of the Upper Control Limit (BKA) and Lower Control Limit (BKB) obtained, it can be seen that the productive percentage of the 18 warehouse department employees is in the range between the Upper Control Limit (BKA) and the Lower Control Limit (BKB). So the data is uniform.In the data uniformity test control, the productive percentage of employees in the warehouse department can be seen in Figure 3.1.

Figure 3.1

Data Uniformity Test for Productive Percentage of Warehouse Department Employees
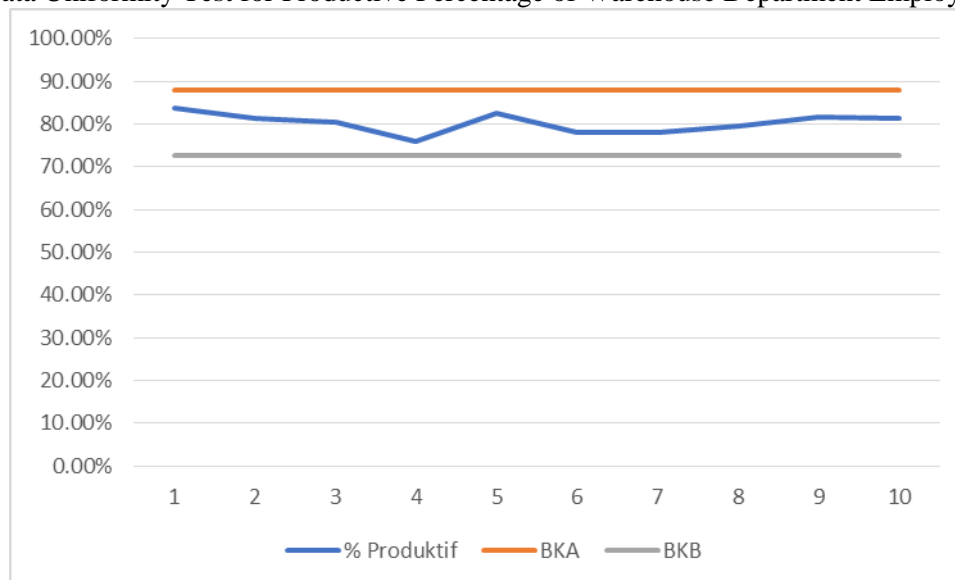
Employee Needs Analysis
Setting Working Times

Determine effective working time by calculating the number of days in a year, the number of Sundays in a year, the number of national holidays and the number of employee leaves in a year. Then the number of Sundays is added to the number of national holidays and the number of employee leave, resulting in a total of non-working days or holidays. Next, the number of days in a year is reduced by the total number of non-working days. The formula for calculating effective working days is as follows:

The number of days according to the calendar in one year	365	day
Number of Sundays	52	day
Number of national holidays	17	day
Number of employee leave days	12	day -
Number of effective working days in one year	284	day

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Adhitia Elfian Santoso, Nazaruddin, Anizar Anizar

According to Law No. 13 of 2003, effective working hours are formal working hours minus working time lost due to not working (allowances) such as urinating, unwinding, eating breaks and so on. The average allowance is around 15% of the number of formal working hours.

One working day	= 8 hourswork – 1 hour (rest time)
	= 7O'clock
Effective time in one day	= 85% x 7 hours = 5.95O'clock
Productive time in one year	= 284days x 5.95 hours 1,689.8
	= 1,689 hours or 101,340 minutes

Arranging Task Completion Time

For each main task, the time used must be measured, how much of the task is carried out in units of results and a certain time period. For the complete calculation of task completion time, see table 3.3.

Table 3.3
Calculation of Warehouse Department Employee Needs

No	Employee	Total Workload
1.	*Delivery Operators*	6248
2.	*Stock Keeper Raw Material*	6674
3.	*Warehouse Admin*	2652
4.	*Forklift Operator*	5848
5.	*Second Hand PP Bags Operator*	2376
6.	*Weight Bridge Operators*	2982
7.	*Sweepers*	962
8.	*Corn Drier Operator*	3438
9.	*Warehouse Supervisor*	1603
10.	*Stock Keeper Additive*	807
Total Task Completion Time		**33590**
Number of employees		**19.88**

From the calculation results in Table 3.3, the employee requirement is 19.88 employees, so round up to 19 or 20 employees. If there are 19 employees, then the total employee overtime hours are as follows:

Overtime hours/year	= 0.88 x 1689 hourseffective work/year
	= 1486.32 hours/year

Calculation of the Number of Employee Needs

The number of employees needed can be calculated based on data obtained from the previous stages. After data on effective available working time (WKE) and data on task completion time (WPT) are obtained, the calculation of the number of employees needed in the warehouse department uses the HR requirement formula as follows:

$$KP = \frac{\sum WPT}{\sum WKE} \ x \ 1 \ orang$$

Table 3.4 is the result of calculating employee needs in the warehouse department.

Table 3.4
Number of Employee Needs

No	Department	Employee needs (people)	rounding
1	*Warehouse*	19.88	20
Total			**20**

Workload Based on Full Time Equivalent

Calculations based on FTE show that the employee workload in the warehouse department can be seen in Table 3.5.

Table 3.5
Calculation Results using the FTE Method

Department	Part	Workload	Effective Working Time	FTEs	Information
Warehouse	DO	6,248	1,689	3.70	*Overload*
Warehouse	SKRW	6,674	1,689	3.95	*Overload*
Warehouse	AW	2,652	1,689	1.57	*Overload*
Warehouse	F.O	5,848	1,689	3.46	*Overload*
Warehouse	SHPBO	2,376	1,689	1.40	*Overload*
Warehouse	WBO	2,982	1,689	1.76	*Overload*
Warehouse	SWP	962	1,689	0.57	*Underload*
Warehouse	CDOs	3,438	1,689	2.04	*Overload*
Warehouse	WS	1,603	1,689	0.95	*Underload*
Warehouse	SKA	807	1,689	0.48	*Underload*
Amount		**33590**	**-**	**19.88**	***Overload***

Calculating employee workload using FTE in Table 3.5, it can be seen that there are 7 sections with overload workload and 3 sections for undeload workload.

Comparison of Employee Needs Against Actual Conditions

Based on the results of the discussion, a conclusion can be drawn regarding the number of employees needed based on workload on the actual number of employees. The following data is presented in Table 3.6.

Table 3.6
Number of Employee Requirements and Actual Number of Employees

No	Department	Employee needs (people)	Actual Number of Employees (people)	Gaps	Information
1	*Warehouse*	20	18	-2	Not enough
	Total	**20**	**18**	**-2**	**Not enough**

It is known that the number of employees needed in the warehouse department is short of 2 employees. Companies can add employees to the warehouse department.

Managerial Implications

Based on workload calculations using the FTE method, in detail can be seen in tables 3.3 and 3.5. In the warehouse department, the total Task Completion Time (WPT) per year is 33,590 hours, so that the required number of employees can be obtained with a score of 19.88 people, where there is a calculation taking into account the number of employees in the warehouse department. So it is found that the warehouse department requires 20 employees and the remaining 1486.32 hours/year can be handled by increasing the working time of employees. On the other hand, the company can also provide additional tasks in the underload section.

4. CONCLUSION

Conclusion Based on the research results, it can be concluded as follows:

1. Calculating employee working time begins with calculating the employee's effective working days and hours. The results of the calculations show that effective working days for a year are 284 days and effective working time is 1689 hours. Effective working days are Monday to Friday and working hours are Monday - Friday from 08.00 - 16.00 WIB, while on Saturdays from 08.00 - 13.00.
2. In summary, time usage calculated using the work sampling method shows that the percentage of productive activities for employees in the warehouse department is 85.72%, unproductive activities are 6.85% and personal activities are 7.43%.

WORKLOAD ANALYSIS AS A BASIS FOR DETERMINING THE NUMBER OF EMPLOYEES IN THE WAREHOUSE DEPARTMENT OF PT GOLD COIN INDONESIA MEDAN CITY

Adhitia Elfian Santoso, Nazaruddin, Anizar Anizar

3. Based on the results of calculating the number of employees required by the FTE method, it can be seen that in the warehouse department the required number of employees is 19.88 people, where in terms of calculating expenditure which is more optimal and economical for the company, in the warehouse department only 2 employees are added and the remaining Task load can be done by adding employee working hours (overtime).

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