



CONTROLLING IDLING HOURS ON SCANIA DUMP TRUCKS AS AN EFFORT TO FUEL EFFICIENCY AND IMPROVING OCCUPATIONAL SAFETY AND HEALTH

Agus Amirudin^{1,2}, Faham Burhanudin³, Nurhalimah Vivid Permatasari⁴, Andhika Fitri Ariaputra⁴, Syawal Kamiluddin Saptaputra⁵

¹ SHE Department, PT. Putra Perkasa Abadi Jobsite MLP, Office 8 Building, 8th Floor, SCBD Lot 28 / Senopati Raya 8B, Senayan, Kebayoran Baru, South Jakarta City, Jakarta 12190, Indonesia

² Master's Study Program in Environmental Occupational Safety and Health Management, Postgraduate School, Sahid University Jakarta, Jl. Prof. DR. Soepomo No.847, Menteng Dalam, Tebet, South Jakarta, Jakarta 12870, Indonesia

³ Operation Management, PT. Putra Perkasa Abadi Jobsite MLP, Office 8 Building, 8th Floor, SCBD Lot 28 / Senopati Raya 8B, Senayan, Kebayoran Baru, South Jakarta City, Jakarta 12190, Indonesia

⁴ Group Leader Monitoring Control, PT PPA Jobsite MLP, Jl. DI. Panjaitan, Wundudopi, Baruga, Kendari Southeast Sulawesi 93117, Indonesia

⁵ Public Health Faculty, Halu Oleo University, Kampus Hijau Bumi Tridharma, Anduonohu, Kambu, Kendari, Southeast Sulawesi 93232, Indonesia

*agus.amirudin1984@gmail.com

ABSTRACT

Idling hours refer to the amount of time where a machine or vehicle is operational not active. The purpose of this research is to determine the control of Scania Dump Truck Idling Hours as an effort to fuel efficiency and improve occupational safety and health. This research method is quantitative descriptive. This research was carried out at PT. PPA Job Site MLP. The research subjects in this study were 38 Scania operating in the Engineering and Production sections as well as informants from Overall Grade, Engineering and Production. Data collection methods are document review, interviews and observation. The average use of diesel fuel in idling conditions is 2.57 liters/hour. In the period from January to February, the company experienced losses due to wasted diesel during idling hours amounting to 26,245 liters. The results of improvements that have been made to the idling hours of the DT Scania unit during the period January to April 2023 show significant development, where a decrease of 8% was obtained. Continuous monitoring needs to be carried out in order to maintain positive trends for operators and maintain employee enthusiasm.

Keywords: idling hours; occupational safety and health; productivity

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INTRODUCTION

PT Putra Perkasa Abadi (PPA) Job Site MLP is a company that is concerned with Occupational Health and Safety in the Mineral and Coal Mining Sector which specializes in heavy equipment rental, providing earthmoving & mining services. One of the tools used is a Scania dump truck. The problem that occurs at PT Putra Perkasa Abadi (PPA) Job Site MLP is that there is still a large percentage of idling time. Idling time is a condition where the vehicle is stationary but the engine is running (Eko Handriyono *et al.*, 2020).

Idling hours refers to the amount of time where a machine or vehicle is operating but not active or productive (Zhen, 2022). In an industrial or transportation context, idling hours usually refer to the time during which an engine or vehicle is running without doing useful work, such as when waiting in line, stopped in traffic, or resting without turning off the engine. Idling hours can be a problem because they result in wasted fuel, increased air pollution emissions, and increased operational costs (Abdi et al, 2018). Therefore, reducing idling hours is one strategy to increase operational efficiency and reduce environmental impacts.

Idling hours are related to occupational safety and health, especially with regard to the impact of air pollution and potential dangers associated with machines that are operating but not active. This can be seen when machines that experience idling hours still produce emissions which can include particulates, hydrocarbons and toxic gases such as carbon monoxide (CO) and nitrogen oxides (NOx). Exposure to these pollutants can cause various health problems, including respiratory problems, eye and throat irritation, and increased risk of heart and lung disease (T.R. Kukreja, 2023) (Pinar, 2022). Apart from that, from the aspect of accident risk, machines running idle can also pose a risk of accidents in the workplace. For example, if a vehicle experiences idling hours in a busy area, such as around workers or pedestrians, there is a risk of a collision or other accident if the engine suddenly moves or if the driver is not paying attention to his surroundings.

Apart from that, from the aspect of fuel use and operational costs, idling hours also cause fuel waste and increase overall operational costs (Robert, 2023). Machines that continue to run without doing useful work consume fuel without producing productivity, which in turn can affect a company's operational efficiency (Hardik, 2020). Thus, managing idling hours effectively can help improve occupational health and safety in the workplace, reduce exposure to air pollution, reduce the risk of accidents, and optimize the use of resources such as fuel.

According to (Sidinra *et al.*, 2022) the cause of idle time is waiting time because there is often a queue of more than one unit to be loaded in the mining front area, Queuing Time is the time the dump truck waits in the dump area to carry out dumping, Stop Empty Time and Stop Load Time is the time the dump truck stops in a state charged or uncharged. Idle time can affect loading and unloading productivity (Rahayu *et al.*, 2021). Operators who keep running the engine even though the vehicle is stationary can cause fuel wastage (Sidinra *et al.*, 2022). The company will experience losses due to wasted fuel during idle time.

Based on monitoring the performance of the Scania unit via the C300 Fleet Management Portal from January to February 2023, data obtained on the average idling ratio of the DT Scania unit was 48% of total working hours or the equivalent of 20,105 idling hours in a period of 2 months. Average diesel usage in idling condition is 2.57 liters/hour. In the period from January to February, the company experienced losses due to wasted diesel during idling hours amounting to 26,245 liters or the equivalent of 755 million rupiah. There is potential for savings in diesel usage of more than 5000 liters every month. Excessive use of diesel during Idling Hours for Scania Dump Trucks is due to the high idling ratio of the Scania unit, which is the habit of dump truck operators, especially in this case, DT Scania, which was found several times still starting the engine even though the unit was stopped, which was actually very detrimental to the company. Fuel is wasted without any material movement (there is only a cost stream but no revenue stream at the same time). The purpose of this research is to determine the control of Scania Dump Truck Idling Hours as an effort to increase productivity

and occupational safety and health at PT. Putra Perkasa Abadi Job Site MLP Southeast Sulawesi.

METHOD

This research method is quantitative descriptive. This research was carried out at PT. Putra Perkasa Abadi Job Site MLP. The research was conducted in January - February 2023. The research subjects in this study were 38 Scania operating in the Engineering and Production sections as well as informants from Overall Grade, Engineering and Production. Data collection methods are document review, interviews and observation.

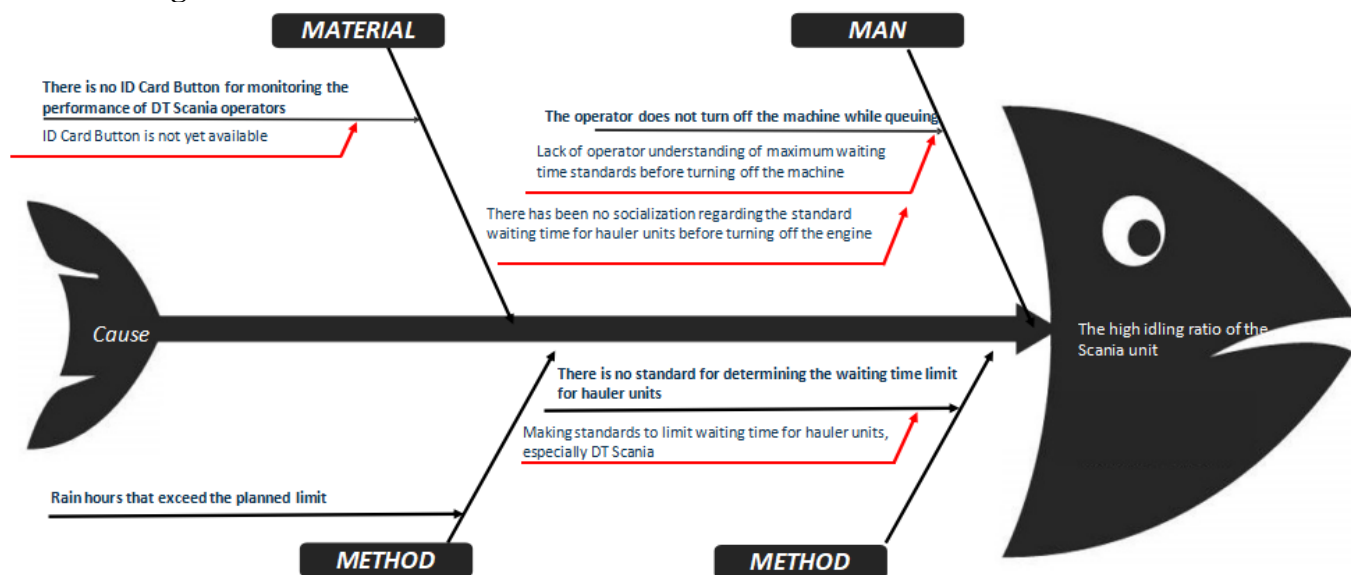
RESULTS

Analysis of Factors and Causes of Problems

The main problem is the high idling ratio of the Scania unit. There are several factors that cause this as follows:

1. Materials: Activities that must be carried out are monitoring the DT Scania unit. The condition that should occur is that all operators have an ID Card Button that is connected to the Scania Fleet Management Portal. However, the current situation is that there is no ID Card Button for monitoring the performance of DT Scania operators. The effect of this monitoring is limited to the unit's performance and cannot monitor the operator's performance.
2. Man: The activity that must be carried out is operating the DT Scania unit. The condition that should occur is that all operators turn off the machine when it is not operating. However, the current situation is that operators do not turn off the machine while queuing. The effect of this is that the unit operates unproductively and wastes fuel.
3. Method: The activity that must be carried out is setting standards. The condition that should occur is that all units have a standard limit idling ratio. However, in the current conditions there is no standard for determining the waiting time limit for DT Scania units. The effect of this is that there is no reference for determining which unit operations are appropriate and which are not appropriate.
4. Environment: Conditions that should occur are rainfall below the planned limit. However, the conditions currently occurring during rainy hours exceed the limit. The effect of this is that the unit cannot work effectively.

Fishbone diagram



Improvement Activities

Table 1.
Improvement Activities

| No. | What | Why | How |
|-----|--|---|---|
| 1 | There is no ID Card Button for monitoring DT Scania operator performance | ID Card Button not yet available | Procurement of ID Card Button to monitor Dt Scania operator performance |
| 2 | There are still units that turn on the engine while queuing | Lack of operator understanding of maximum waiting time standards before turning off the machine | Socialization was carried out regarding the maximum waiting time standards for units in operation |
| 3 | | | Monitoring the performance of DT Scania operators via the Scania Fleet Management Portal |
| 4 | | | Giving rewards to operators with the best performance |
| 5 | There is no standard DT Scania idling ratio parameter | There are no parameters for determining the standard waiting time for DT Scania units | Making Standard Parameters for the Idling Ratio of DT Scania units |

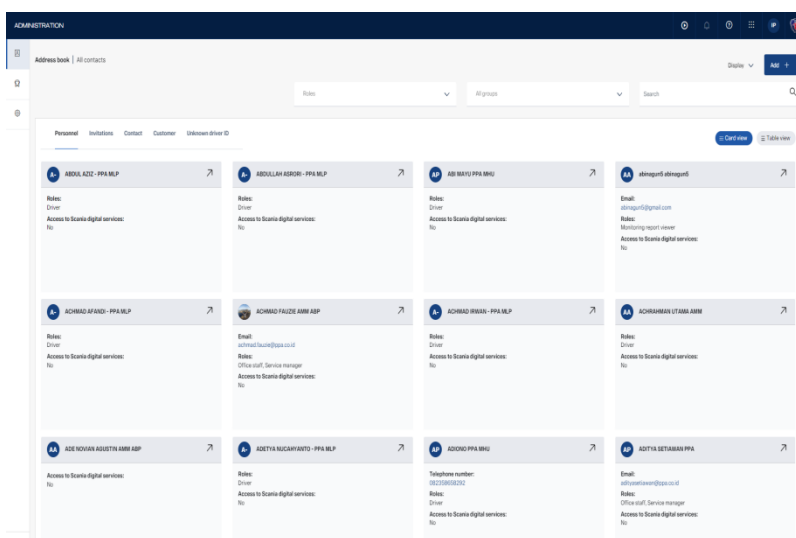
Based on the table above, there are 3 problems and plans for improvement in efforts to reduce diesel usage during idling hours of Scania dump trucks, as follows:

1. There is no ID Card Button for monitoring the performance of DT Scania operators. This occurs because the ID Card Button is not yet available. To overcome this, we must procure an ID Card Button to monitor the performance of DT Scania operators which will be implemented in March at the MLP PPA site by Engineering at a cost of Rp. 232.500.000.
2. There are still units that turn on the machine while queuing. This occurs due to the operator's lack of understanding of the maximum waiting time standards before turning off the machine. To overcome this, there are several ways :
 - a. Socialization was carried out regarding the maximum waiting time standards for units in operation which will be carried out in March at the MLP PPA site by Production.
 - b. Monitoring the performance of DT Scania operators via the Scania Fleet Management Portal which will be carried out in March at the MLP PPA site by Engineering.
 - c. Rewards will be given to operators with the best performance in June at the MLP PPA site by Engineering at a cost of Rp. 3.000.000.
3. There is no standard Idling Ratio parameter for DT Scania. This occurs because there is no parameter to determine the standard waiting time for DT Scania units. To overcome this, standard parameters for the idling ratio of DT Scania units must be created which will be carried out in June at the PPA site MLP by Engineering.

Implementation of Improvement Ideas

1. Procurement of ID Card Button and DT Scania operator registration on the Scania Fleet Management Portal

Before repair efforts were made, the operator did not have an ID Card Button. After carrying out repair efforts, all operators have an ID Card Button that is connected to the Scania fleet management portal.



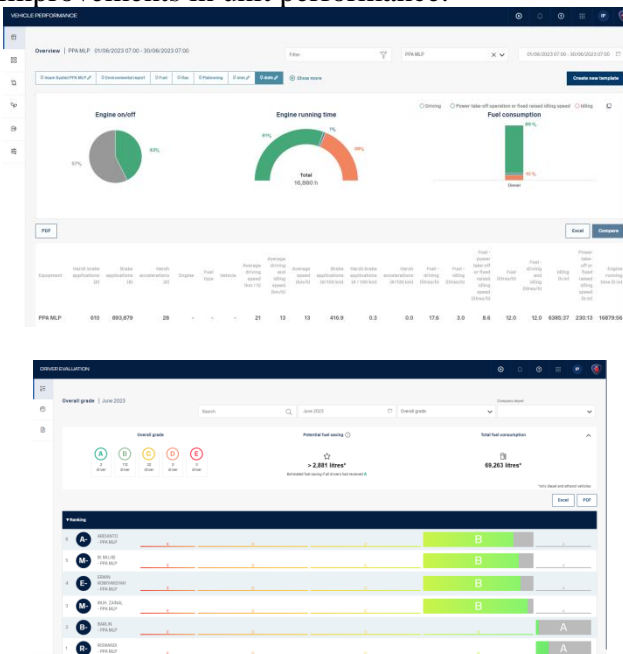
Socialization of Production Supervisors regarding waiting time standards and performance assessment parameters for DT Scania operators

Before repair efforts were carried out, the operator did not know the standard waiting time for DT Scania units. After repair efforts were carried out, the operator understood the standard waiting time for DT Scania units.



Periodic monitoring of DT Scania operator performance via the Scania Fleet Management Portal

Previously, idling ratio monitoring in the Fleet Management Portal was limited to unit performance. After improving the idling ratio monitoring in fleet management, there is potential to experience improvements in unit performance.



Providing rewards and punishment to operators with the best performance

Improvement efforts through providing rewards and punishment have a positive impact on operators where operators are increasingly motivated to improve their performance.

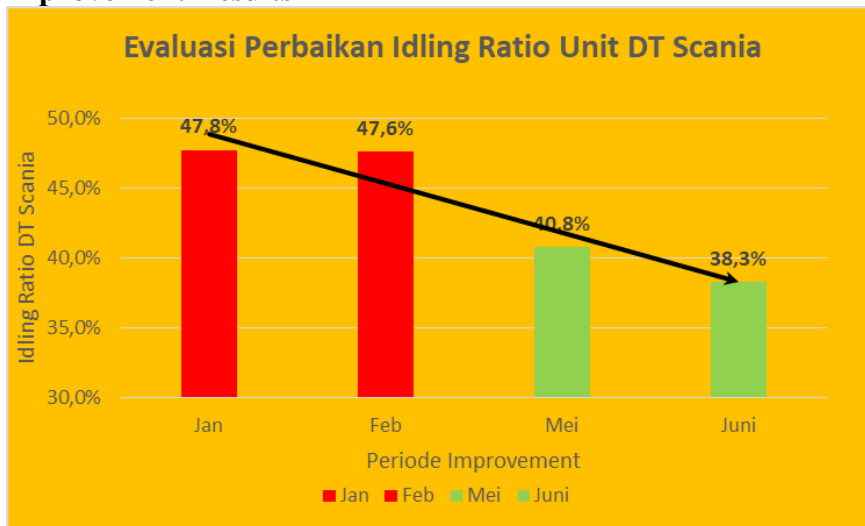


Brainstorming and creating standard idling ratio parameters for DT Scania units

Before repair efforts were carried out, there was no standard Idling Ratio limit parameter for Scania units. After improvements have been made, the standard parameters for determining the Limit Idling Ratio can be known.



Evaluation of Improvement Results



Before Repair

| Month | HM Total | Driving | | Idling | | Fuel Rate | FBR (liter/hr) | Total Fuel Price | Fuel Idling (liter/jam) | |
|---------|----------|---------|-----|--------|----------|-----------|----------------|------------------|-------------------------|------|
| | | HM | % | HM | Unit/Day | | | | | % |
| Jan | 22.895 | 11.959 | 52% | 10.935 | 6,39 | 48% | Rp 14.838,52 | 16 | Rp 5.435.622.904,77 | 2,40 |
| Feb | 19.247 | 10.077 | 52% | 9.169 | 5,36 | 48% | Rp 14.838,52 | 16 | Rp 4.481.256.517,92 | 2,74 |
| Average | 21.071 | 11.018 | 52% | 10.052 | 6 | 48% | Rp 14.695,35 | 16 | Rp 4.958.439.711,34 | 2,57 |
| Total | 42.141 | 22.037 | 52% | 20.105 | | 48% | | | Rp 9.916.879.422,69 | |

After Repair

| Month | HM Total | Driving | | Idling | | Fuel Rate | FBR (liter/hr) | Total Fuel Price | Fuel Idling (liter/jam) | |
|---------|----------|---------|-----|--------|----------|-----------|----------------|------------------|-------------------------|------|
| | | HM | % | HM | Unit/Day | | | | | % |
| Mei | 17.788 | 10.538 | 59% | 7.251 | 4,24 | 41% | Rp11.588,78 | 16 | Rp3.298.281.130,63 | 2,88 |
| Juni | 17.089 | 10.549 | 62% | 6.539 | 3,82 | 38% | Rp11.503,88 | 16 | Rp3.145.383.200,35 | 3,01 |
| Average | 17.438 | 10.543 | 60% | 6.895 | 4,03 | 40% | Rp11.546,33 | 16 | Rp3.221.832.165,49 | 2,95 |
| Total | 34.877 | 21.087 | 60% | 13.790 | | 40% | | | Rp6.443.664.330,98 | |

Based on the results of the evaluation of corrective actions that have been carried out, it was found that the percentage of idling hours in May and June decreased by an average of 6,895 hours and the idling ratio decreased by an average of 39.5%. By reducing idling hours in May and June, fuel savings of 468 million were achieved.

DISCUSSION

Idling Time Control, or controlling the time a machine is not operating, has several benefits for companies. By controlling Idling Time, companies can reduce inefficient fuel use. An engine that is left running without doing productive work will consume fuel without providing significant benefits, so controlling Idling Time can help reduce fuel-related operational costs (Benjamin, 2022). Controlling Idling Time also means keeping the machine from operating unproductively can also help extend the machine's service life. Excessive idling time can cause increased wear on engine components and accelerate the need for maintenance or replacement, so by controlling Idling Time, companies can reduce engine maintenance and replacement costs (Pei-Chun, 2022).

By controlling Idling Time, companies can improve overall operational efficiency. Time previously wasted because machines were not operating productively can be allocated to more productive activities, such as production or customer service, thereby helping to increase the company's productivity and profitability. Excessive idling time can also cause increased exhaust emissions which are harmful to the environment. By controlling Idling Time, companies can help reduce their carbon footprint and its negative impact on air quality and the overall environment. Thus, controlling Idling Time is an important step for companies in an effort to optimize operational efficiency, reduce costs, extend machine life, and support environmental sustainability as well as efforts to maintain employee safety and health (Weng, 2019).

Procurement of ID Card Button and DT Scania operator registration on the Scania Fleet Management Portal

Providing an ID card button and registering a DT Scania operator on the Scania fleet management portal has several significant benefits, including operator identification: The ID Card Button allows easy and accurate identification of DT Scania operators in the field (Francisco, 2020). In this way, companies can ensure that only trained and qualified operators operate vehicles, increasing operational safety and reducing the risk of accidents. Apart from that, the procurement of ID Card Buttons plays a role in Monitoring and Monitoring. Through operator registration on the Fleet Management Portal, companies can track operator activities and performance in real-time (Emad, 2018). This allows management to monitor vehicle usage, operational patterns, and fuel efficiency, as well as identify areas where training or improvement may be needed.

Socialization of Production Supervisors regarding waiting time standards and performance assessment parameters for DT Scania operators

Socialization provides production supervisors with a clear understanding of waiting time standards and operator performance assessment parameters. This helps ensure that all parties involved understand the expected performance expectations. Waiting time standards and performance assessment parameters can also help in quality control and operational safety as an effort to improve occupational safety and health (Indasah, 2023). By ensuring that operators comply with established work procedures, companies can minimize the risk of defects and accidents (Saiful et al, 2022).

Periodic monitoring of DT Scania operator performance via the Scania Fleet Management Portal

The Fleet Management Portal enables real-time idling ratio monitoring, allowing managers and operators to track unit idling in real time as it occurs. This enables a quick response to unnecessary idling and allows immediate corrective action to be taken. By continuously monitoring the idling ratio, managers can identify units or areas where the idling ratio tends to be high. This allows identification of specific improvement opportunities, such as additional training for certain operators or technical improvements to certain units. By reducing the idling ratio, companies can reduce unnecessary fuel consumption and save operational costs (Xi Wen et al, 2023). Monitoring the idling ratio allows identifying opportunities to optimize fuel use and improve overall operational efficiency. By reducing idling, companies can reduce exhaust emissions and air pollution, resulting in direct benefits for the environment and public health (Zhenpo et al, 2023). Additionally, reducing idling can also help reduce the risk of accidents and injuries associated with vehicle operation.

Providing rewards and punishment to operators with the best performance

The important thing to do is ensure that the reward and punishment system is applied fairly and consistently and that performance evaluation criteria are clearly explained to all operators. With a good approach, providing rewards and punishment can be an effective tool in managing employee performance and motivation (Risma, 2023).

Brainstorming and creating standard idling ratio parameters for DT Scania units

Brainstorming allows the team to collaboratively generate various ideas and solutions related to reducing the idling ratio. By involving various perspectives and experiences, this process can produce creative and innovative ideas to find solutions to problems (Art, 2023).

Evaluation of Improvement Results

Evaluation of improvement results in broader terms allows companies to evaluate how effective the company's improvement measures are in terms of environmental protection and mining (Rondonuwu et al, 2021). By analyzing the results of improvements, managers can provide direct feedback to the teams or individuals involved in efforts to reduce idling. This can help in identifying what has worked and what needs to be improved in the future. By checking the results of improvements, companies can encourage innovation in an effort to reduce the idling ratio or idling hours. This analysis can give rise to new ideas or more effective approaches to dealing with idling problems. Evaluation of improvement results helps companies to track their progress towards the goal of reducing idling ratio or idling hours. This is important to know if the company is on track to achieve the set targets or if a change in strategy is needed. The company shows a commitment to transparency and accountability in efforts to reduce idling through checking the results of improvements. This helps maintain a culture of accountability across the organization and encourages individual responsibility for overall fleet performance .

CONCLUSION

The results of improvements that have been made to the idling hours of the DT Scania PT Putra Perkasa Abadi Jobsite MLP unit during the period January to April 2023 show significant development, where a decrease of 8% was obtained. Continuous monitoring needs to be carried out in order to maintain positive trends from operators and maintain employee enthusiasm. Standardization has been set as a target reference that the company hopes to achieve.

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