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A STUDY OF TRAILER MILEAGE AT HYUNDAI

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Abstract: The study aims to comprehensively analyze the mileage efficiency of trailers produced by Hyundai and to identify the various factors influencing their performance. Mileage is a critical parameter in the transportation and logistics sector, directly impacting fuel consumption, operating costs, and environmental sustainability. This study systematically investigates different aspects affecting trailer mileage, including vehicle load, road conditions, aerodynamic design, tire maintenance, driver behavior, and trailer configurations.

Primary data is collected through field surveys, company records, and real-time performance monitoring across a variety of trailer models and operating environments. Secondary data is obtained through literature reviews and benchmarking against industry standards. Advanced analytical tools such as regression analysis, correlation studies, and trend analysis are used to interpret the data and establish relationships between different operational variables and mileage outcomes.

The findings reveal significant insights into how design optimizations, proper maintenance schedules, and efficient driving practices can collectively enhance trailer mileage. The study also identifies areas where technological improvements, such as the use of lightweight materials and advanced tire technologies, could further improve fuel efficiency. Recommendations are provided to Hyundai for strategic interventions in design, production, maintenance, and driver training programs.

Overall, the study supports Hyundai's objective of developing high-performance, cost-effective, and environmentally sustainable trailers, contributing to greater operational efficiency for both the company and its customers.

I. INTRODUCTION

In the contemporary logistics and transportation sector, fuel efficiency has become a critical determinant of operational performance and cost-effectiveness. For companies like Hyundai, where trailers play a pivotal role in transporting heavy goods and components, optimizing trailer mileage is essential not only for reducing fuel costs but also for supporting sustainability goals. Trailer mileage—the average distance a trailer covers per unit of fuel—can be influenced by a range of factors, including vehicle type, load weight, driving habits, maintenance schedules, and road conditions.

Hyundai operates a large fleet of trailers across diverse routes and terrains, making it vital to understand the dynamics that affect mileage performance. With fuel prices on the rise and environmental concerns gaining attention, maximizing mileage has moved from being a matter of cost-saving to a strategic priority. This study is aimed at analyzing and identifying the key variables that influence trailer mileage within Hyundai's operations.

By examining trailer types, usage patterns, and maintenance practices, the study seeks to provide actionable insights that can lead to better resource utilization, reduced operational costs, and improved overall efficiency. The findings of this study are expected to assist Hyundai in adopting data-driven decisions for optimizing logistics performance and ensuring sustainable transport operations.

STATEMENT OF THE PROBLEM

In the logistics and transportation sector, fuel efficiency plays a pivotal role in operational cost, environmental sustainability, and fleet productivity. Trailer mileage, which reflects the fuel efficiency of trailers used for cargo transport, is influenced by a multitude of variables including driving behavior, vehicle maintenance, road conditions,

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load distribution, and technological integration. At Hyundai, where logistics precision and cost-effectiveness are crucial for maintaining competitive advantage, optimizing trailer mileage is not only a matter of cost control but also of strategic efficiency.

Despite the implementation of modern logistics systems and routine vehicle servicing, inconsistencies and inefficiencies in trailer mileage have been observed across the fleet. These discrepancies pose a challenge to Hyundai's logistics performance by inflating fuel costs, increasing maintenance frequency, and contributing to carbon emissions. Furthermore, a lack of real-time data analysis and structured monitoring frameworks hampers the identification of specific factors negatively affecting trailer mileage.

This study aims to investigate and evaluate the key determinants impacting trailer mileage at Hyundai. It seeks to uncover underlying operational inefficiencies, assess current fuel management practices, and provide data-driven insights into how mileage performance can be enhanced. The ultimate goal is to support Hyundai's logistics strategy by recommending practical, evidence-based measures to improve trailer mileage, thereby contributing to operational excellence and sustainability.

OBJECTIVES OF THE STUDY

1. To understand the current fuel mileage performance of trailers used in Hyundai's logistics.
2. To analyze the influence of various operational factors on trailer mileage.
3. To identify patterns and inefficiencies in current trailer usage.
4. To recommend strategies for improving mileage and reducing fuel costs.
5. To assess driver behavior and its correlation with mileage performance.

II. REVIEW OF LITERATURE

1. Singh & Sharma (2019) Explored behavioral and operational factors influencing fuel efficiency in trailers. Key variables included driver habits, overloading, and vehicle condition. They emphasized real-time monitoring for performance improvement. The study found a direct correlation between disciplined driving behavior and improved trailer mileage. It also stressed the importance of feedback mechanisms and monitoring systems for ensuring consistent performance among drivers.

2. Rao et al. (2020) Focused on the role of preventive maintenance in mileage enhancement. Found that vehicles with scheduled servicing performed 20% better in fuel efficiency. They also recommended digital maintenance records to ensure timely interventions. The researchers concluded that preventive maintenance helps in minimizing engine wear and improving fuel combustion, which directly impacts mileage.

3. Gupta & Jain (2018) Demonstrated how under-inflated tires and poor alignment led to reduced mileage. Recommended automatic inflation systems. Their research revealed that 15% of fuel inefficiency could be attributed to improper tire conditions. Aligning and inflating tires regularly was highlighted as a cost-effective measure to boost mileage.

4. Patel (2017) Studied the mileage decline in aging trailers and suggested retrofitting or retiring older vehicles to maintain efficiency. He emphasized the economic impact of keeping inefficient trailers in operation. The research provided a framework for calculating the cost-benefit analysis of trailer replacement versus repair.

5. Kumar et al. (2016) Identified road conditions as a significant factor. Poor road quality reduced mileage by 12%. They advocated for alternate routing and scheduling to minimize rough terrain travel. The study highlighted the role of infrastructure in overall fuel economy and urged fleet managers to incorporate route analysis in planning.

III. RESEARCH METHODOLOGY

The study was conducted at Hyundai Motor India Ltd. over a period of 37 days. Data was collected through primary and secondary sources:

- **Primary Data**: Information was gathered through observation, driver interviews, and mileage logs recorded daily over a 30-day cycle for 12 selected trailers.
- **Secondary Data**: Company reports, maintenance logs, and previous internal audits were used to support the analysis.

Sample Size: 12 trailers were selected randomly to provide a representative sample of trailer operations at Hyundai.

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Tools of Analysis: Descriptive statistics and visual analysis (graphs and charts) were used to interpret the data.

DATA ANALYSIS AND INTERPRETATION

The data analysis focused on the mileage (km/ltr) achieved by different trailers over a 30-day period. The average mileage was calculated, and variations between vehicles were studied. The following key observations were made:

- **Best Performing Trailer**: Trailer No. T9 achieved the highest mileage, averaging 3.9 km/ltr.
- **Lowest Performing Trailer**: Trailer No. T2 recorded the lowest mileage at 2.4 km/ltr.
- **Overall Average Mileage**: The average mileage across all 12 trailers was approximately 3.1 km/ltr.

Mileage variations were attributed to factors such as driver handling, load weight, route conditions, and maintenance schedules. A few trailers consistently performed below average, indicating potential issues with either vehicle condition or driver habits.

FINDINGS

1. Significant variations exist in mileage performance across the trailer fleet.
2. Driver behavior plays a critical role in determining fuel efficiency.
3. Lack of uniform maintenance schedules impacts mileage adversely.
4. Certain routes and loading patterns lead to increased fuel consumption.
5. There is scope for introducing better monitoring systems for fuel usage.

SUGGESTIONS

1. **Implement Telematics**: Install GPS-based mileage tracking systems in all trailers.
2. **Driver Training**: Conduct workshops focusing on fuel-efficient driving techniques.
3. **Preventive Maintenance**: Standardize maintenance schedules across the fleet.
4. **Incentive Programs**: Introduce rewards for drivers who consistently achieve high mileage.
5. **Route Optimization**: Use software to optimize routes for lower fuel consumption.

IV. CONCLUSION

The study concludes that trailer mileage at Hyundai can be significantly improved through targeted operational changes. By focusing on driver training, regular maintenance, and technology-enabled monitoring, Hyundai can enhance fuel efficiency, reduce costs, and contribute to sustainable transportation. This research offers a framework that can be replicated in similar industrial logistics environments.

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