A computerized system to evaluate freight transport performance in West Sumatera, Indonesia

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Abstract. Most of economic regional developments in Indonesia depend on freight transport system, efficient freight transport system would produce low cost of transport, it will affect on the price of good and the market. Freight transport in Indonesia is usually served by trucks, these mode has been identified as the transport mode that operate with high cost and inefficient. This paper shows the result of research on freight transport in West Sumatra that operated in Padang. This result is based from direct interview on 100 truck drivers in Padang. It shows that majority the trucks serve freight transportation between cities in West Sumatera and other Province in Sumatera island, most of goods that transported from Padang are construction materials. During deliver the goods, they require time about 1-2 days and always stop several times for break and eat. This is because the drivers drive the truck alone. The total operational cost spends during delivery to other province in Sumatera Island between Rp 1 millions - Rp 2 millions, there are illegal retributions for about 1-5% of operational cost, these retributions are conducted by person or organization. The Regulations that impede the performance of freight transport are prohibition of trucks enter the city in the morning and afternoon at peak hours.

1. Introduction
Freight transport is one of the most important transport mode that support logistic transport system in West Sumatera, it is because only this mode that serve freight transportation between city in West Sumatera. This mode has superiority than other transport mode, this mode can be operated door to door, loading and unloading cost can be reduced. Therefore, freight transport should be supported as sustainable transport system [1]. Because of the crucial role of this transport mode, this mode should have reliable operation system to support economic activities. From information in the media, there are many problems of freight transport during operation, such as overloading that often causing road pavement deterioration (see figure 1), and there are illegal retribution that conducted by people along the route of travelling. Even though these problems still arise, the logistic transports are still serving logistic transport for people and company. The problems look still can be solved directly by driver in the site, even though this problem could decrease efficiency of transport operations, they cannot avoid it. The drivers usually have limited access to complaint the problems to government and the government neglects the impact of that problem to the cost of transport [2]. Even though, it will affect to the price of the product, but local government usually ignore those cases, because to solve those problems need coordination between government units. The weakness of government control system is coordination between government units is weak. The problems of freight transport not only occur in developing country, these problems also occur in developed countries. Lindholm stated that aspects of freight
transport are not a prioritized, it is not allocated as public transport, cycling or walking routes. The government usually lack of long-term transport planning for freight transport [3].

![Overloading truck](image1.jpg)

**Figure 1.** Overloading truck [4].

Based on those problems, this research was conducted to explore the problems and performance of freight transport operations [5]. This paper shows the result of analysis on the problems and freight transport performance in West Sumatera. Freight transport from and to Padang was explored, because Padang is the center economic activities that distribute the logistic to all cities in West Sumatera.

2. **Research method**

This research was conducted on 10-27 June 2019 in Padang Indonesia. Samples of survey were truck drivers that travel from or to Padang. The numbers of samples that have been interviewed are 100 drivers. Three main locations for survey are Mudik Market Road, Freight Terminal Koto Lalang and Bypass Road, the location of survey is at several red dots as shown in figure 2.

![Survey location](image2.jpg)

**Figure 2.** Survey location.

The survey is conducted using deep interview, the experiences of driver were explored using revealed preference method. The parameters that have been explored are freight transport performance during operations. Then, the data was analyses using descriptive analysis method.
3. Result and discussion

Analysis data of 100 drivers has been conducted, the result is shown in figure 3 to 15.

Figure 3 shows that majority truck deliver building material, expedition package and fertilizer. This freights are deliver to city in West Sumatera or other province, because Padang is center of regional business areas.

![Figure 3. Freight types.](image)

The origin of travel majority from Padang and Jakarta, see figure 4, and the travel destination majority outside West Sumatera, see figure 5.

![Figure 4. Travel origin.](image)

![Figure 5. Travel destination.](image)
The trucks deliver the freight majority in overloading conditions, the load more than 14 tons and 16 tons for two axles of allowable number of load (BJI), the distribution of truck load is shown in figure 6.

During travelling, the drivers spend the money for meal, fuel and others. The amount of expenses are depending the length of destination. The range of spending between Rp 400.000, - - Rp 3.600.000, -. The highest spending, when the drivers travel to Jakarta. The distribution of driver spending data is shown in Figure 7. The drivers expense will increase by increasing the length of destination.

Travel duration to each destination was measured. To reach Jakarta, it needs about 5 days, and other city in Riau Province and North Sumatra need about 2-3 days. Distribution of travel durations to each destination is explained in figure 8.
During travel to destination, the driver would stop for while to take a rest, cooling the tire because the weather too hot and eat. Average duration of take a rest about 1 hour. The distribution of number of take a rest is shown in figure 9. The high number of take a rest occur when driver drive to Jakarta, they take a rest for about 16-23 times. When they drive to Riau dan North Sumatera Province, they take a rest for about 6-14 times.

![Figure 9. Number of take a rest.](image)

Driver usually stop for many times because they need to stop, but sometime they must stop because there is accident, disaster, flat tire, broken machine, bad road condition and sometimes they just stop to avoid travelling at night passing in the area that usually thief grab the freight of truck. This condition will be causing delay. Distribution of travel delay is shown in figure 10.

![Figure 10. Travel delay.](image)

Along travel to the destination, drivers are usually stopped by people to ask the driver enter the terminal and ask to pay the terminal retribution, although they didn’t want to stop in the terminal. The amount of retribution fee that spend by driver to each destinations are shown in figure 11.
Figure 11. Legal retribution fee.

Figure 11 shows that total amount of retribution fee that spending by drivers is relatively not high, except to Jakarta. Other those retributions, there are people asking the illegal retribution for nothing, usually they confess as member of Indonesia Trade Union (SBSI), they ask for about Rp 10,000 - Rp 20,000, -, if the driver refuse it, they will break the glass of truck. Total amount driver spend for illegal retributions is shown in figure 12. Illegal retribution to Jakarta is higher compared with legal retributions. In West Sumatera, only in Pasaman the case is exist.

Figure 12. Illegal retribution fee.

The other drivers expense during to the destination, they also spend for money for eat. Total expenses for meal become high when the destination is far. Distribution of meal expense could be seen in figure 13.
During travel to destination, the driver will spend the money for full fill the truck fuel. The amount of expense for fuel depending the length to destination. The highest spending for fuel is to Jakarta, it will spend about Rp 3,000,000. It is because the truck vehicles need high fuel per km compared passenger vehicle. The distribution fuel expense for each destination is shown in figure 14.

The expenses of driver during travel to destination are shown in figure 15.
Figure 15. Freight transport expenses.

Jakarta is the most destination that spending high cost of transport. Although, there are illegal retribution, but amount of those retributions are relatively low compared with other expenses.

4. Conclusion

Freight transport operations in West Sumatera still have several problems, these problems arise from transport operation system and environment situation, such as overloading truck, illegal retribution, too many vehicle stop for long destination because of using one driver, and thief grab the freight of truck.

Inefficient freight operations are caused by long travel duration because of too many driver stop for several factors, high travel delay because of time operation restriction for heavy vehicle at city center, and driver must stop when at night passing certain area that several thieves would grab the freight of truck, the high fuel consumption and illegal fee retribution. These are the factors that increase travel time operations and high cost of freight transportation.

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