

# The Impact of Traffic in the Medan Industrial Estate on the Social and Economic Community of Amplas Village, Percut Sei Tuan, Deli Serdang Regency, North Sumatra

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## ABSTRACT

This study aims to analyze the impact of traffic in the Medan Industrial Estate (KIM) on the social and economic community of Amplas Village, Percut Sei Tuan, Deli Serdang Regency, North Sumatra. The research method uses a descriptive qualitative approach to understand the traffic impact of the Medan Industrial Estate (KIM), which includes in-depth interviews and questionnaires involving respondents from the local community. The results showed that the presence of industry had a positive impact on the community's economy, with 70.78% of respondents expressing improvements in economic structure and 100% of respondents agreeing that industry has reduced the unemployment rate through job creation. However, negative impacts such as air pollution and noise due to increased traffic are also felt significantly, which has the potential to reduce the social and economic quality of the community. The results showed that 75.60% of respondents reported an increase in income, but they also faced challenges such as congestion that led to an increase in business operating costs and a decrease in property values. This study recommends the need for more comprehensive traffic planning and attention to the environmental impact of industrial activities. It is hoped that with the right mitigation measures, the quality of life of the people in Amplas Village can be improved without sacrificing sustainable economic growth..

**Keyword :** Traffic Impact, Medan Industrial Estate, Social and Economic, Air Pollution, Congestion, Safety

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## 1. INTRODUCTION

Industry is one of the main pillars that drives economic growth in a region. The presence of industrial estates can have a positive and negative impact on social, economic, environmental and public health aspects. Economic growth is often the most visible positive impact, leading to the development of industries in a region. Samsul et al. (2016) revealed that there is a significant influence of the existence of industry on the socio-economic conditions of the community, with a high level of correlation to income, health and living facilities. However, Jacob et al. (2018) added that the more factories are operating, the greater the potential for environmental pollution that can occur, both to air, water, and soil, which will have a negative impact on public health.

Amplas Village is located in Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province, with an area of 310.01 hectares and a population of around 8,475 people. The village consists of five hamlets, each of which contributes to community management and services. The economic potential

of Amplas Village is quite large, especially in the agricultural sector, thanks to its large land and proximity to Medan City which makes it easy to access the market. Amplas Village also faces challenges, such as improving infrastructure and providing better basic services. Although there are already public facilities such as schools and health centers, the quality needs to be improved to meet the needs of residents. With the postal code 20371 and the code of the Ministry of Home Affairs 12.07.26.2008, the Sandpaper Village can be identified administratively. With collaboration between the government, the community and the private sector, there is an opportunity for Amplas Village to develop into a more independent and prosperous Village. Here is a map image :

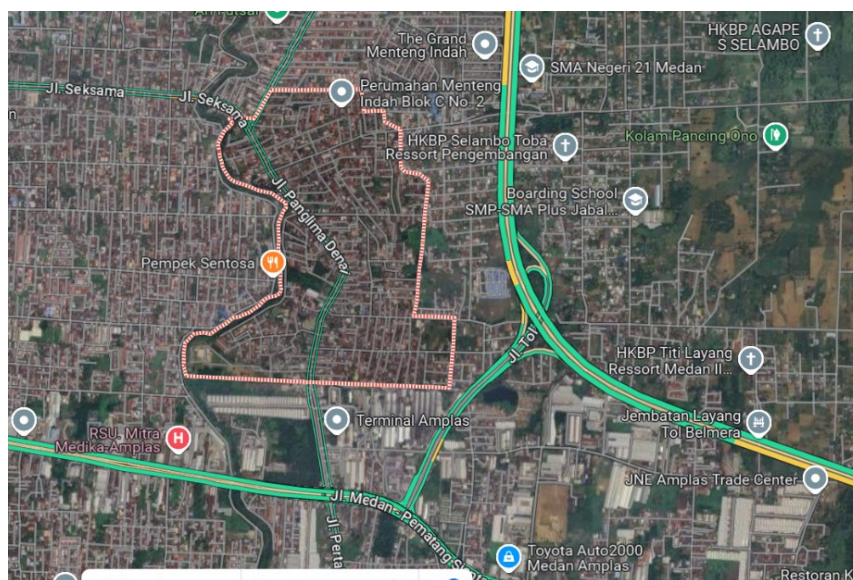


Image: Sandpaper Village, Percut Sei Tuan District  
Suber: google maps

The Medan Industrial Estate (KIM) functions as one of the important economic centers in North Sumatra, which has implications for increasing industrial activities in the vicinity, including in Amplas Village, Percut Sei Tuan, Deli Serdang Regency. Amplas Village, which is located close to the Medan Industrial Estate (KIM), has experienced a significant increase in traffic volume due to industrial activities. The impacts of this increase in traffic include public health affected by air pollution, increased traffic safety and adverse socio-economic impacts. Data from BPS Deli Serdang Regency shows that there is economic growth in this area, but the increase in traffic also has the potential to create congestion that can disrupt the social and economic situation of the community. The Medan Industrial Estate (KIM) is one of the largest industrial centers in North Sumatra and plays an important role in driving regional and national economic growth. Along with the development of industry in this region, there has been an increase in economic activity accompanied by a significant increase in traffic volume. One of the areas directly affected by the increase in traffic is Amplas Village, which is located in Percut Sei Tuan District, Deli Serdang Regency, Yusuf, M. (2021).

The existence of industrial estates and the increasing flow of transportation, especially heavy vehicles such as trucks and containers, have had a considerable impact on the local community. Increased traffic in the region has caused various problems, including congestion, increased air pollution, noise, and an increased risk of traffic accidents. People living around industrial estates feel a decrease in quality of life due to these impacts, which not only affect physical but also mental health. The increase in emissions from motor vehicles in the region has had an impact on air quality, which in turn has led to health problems such as respiratory diseases. In addition, the noise from large vehicles that cross the area throughout the day adds to the stress burden for the local community, interferes with sleep quality, and affects mental well-being. On the other hand, frequent congestion also worsens residents' mobility, prolongs travel time and interferes with daily activities, Putra, I. F. et al. (2024).

In addition to health and safety issues, the increase in traffic in this area also has an impact on the social and economic aspects of the community. Although industry creates economic opportunities, many residents feel that their neighborhoods have become less comfortable and less livable. The deterioration of

environmental quality due to pollution and noise has also caused some residents to consider moving to other quieter and healthier areas. This phenomenon shows that despite the economic benefits, the negative impact of increased traffic on people's quality of life requires serious attention, Usman, A. (2023).

Traffic Impact Analysis (ANDALALIN) is an important instrument in assessing the impact of traffic changes caused by industrial activities on the lives of local communities. However, the implementation of Traffic Impact Analysis (ANDALALIN) in Medan industrial estates is often not optimal or neglected, so that the negative impact on the community continues. In this context, it is important to conduct a Traffic Impact Analysis (ANDALALIN) to evaluate the influence of industrial activities in the Medan Industrial Estate (KIM) on the social and economic of the community in Amplas Village. This is in line with the opinion of Mena et al. (2019) that quality of life measurement must be used as a tool to identify development achievements in a region. This study aims to understand the impact of traffic caused by the existence of the Medan Industrial Estate (KIM) on the social and economic community of Amplas Village. Thus, it is hoped that this research can provide recommendations that are useful for the management of industrial estates and the improvement of community welfare. In addition, this study also aims to analyze in depth how the impact of traffic in the Medan Industrial Estate (KIM) affects the social and economic of the community in Amplas Village and provide the right solution to overcome existing problems.

## 2. PROBLEM FORMULATION

What are the social and economic impacts experienced by the people of Amplas Village due to traffic congestion caused by activities in the Medan Industrial Estate (KIM)?

### RESEARCH OBJECTIVES

To analyze the social and economic impact felt by the people of Amplas Village due to traffic congestion caused by activities in the Medan Industrial Estate (KIM).

## THEORETICAL FOUNDATIONS

### 1. ANDALALIN in Industrial Estate

Traffic Impact Analysis (ANDALALIN) is an important tool in transportation planning and management that aims to evaluate the impact of traffic flows generated by certain activities or projects on the surrounding environment. According to Santoso (2017), Traffic impact analysis (ANDALALIN) functions to identify the need for infrastructure improvements, prevent congestion and ensure community safety and comfort. In the context of industrial estates, such as the Medan Industrial Estate (KIM), increased industrial activity often causes a surge in traffic volume, which can affect the social and economic impact of the surrounding community. A study by Sari (2020) shows that increased traffic in industrial estates can contribute to congestion, air pollution and noise, which have a negative impact on public health and the environment. Therefore, the implementation of Traffic Impact Analysis (ANDALALIN) in industrial estates is very important to formulate a sustainable traffic management strategy. This is in line with the opinion of Rahardjo (2018) who emphasized the need for in-depth analysis to understand the social and economic impacts of industrial activities. By using the Traffic Impact Analysis (ANDALALIN) approach, it is hoped that the government and stakeholders can identify the right solutions to improve infrastructure, reduce congestion, and maintain the safety and comfort of people living around industrial estates.

### 2. Traffic Impact on the Social and Economic Community

The impact of traffic on the social and economic impact of communities around industrial estates is an important concern in urban studies and public health. Social and economic conditions are often affected by a variety of traffic-related factors, including air pollution, noise and travel time. Research by Sari (2018) shows that the increase in traffic in industrial estates contributes directly to the decline in the quality of public health, especially through an increase in vehicle exhaust emissions that cause air pollution. This air pollution has a significant impact on health, especially for those who live close to major roads in industrial areas. According to data from the World Health Organization (WHO) in 2016, air pollution is correlated with an increased risk of respiratory diseases, including asthma and bronchitis, which are more vulnerable to directly exposed communities. Furthermore, the noise generated by transportation activities and industrial operations also contributes to social and economic decline, with research showing that excessive exposure to noise can result in sleep disturbances and psychological stress (Dahlgren, 2019). As such, it is

important to consider the impact of this traffic in the planning and management of industrial estates in order to improve the social and economic of the community and ensure a healthy environment.

### 3. Air Pollution and Public Health

Air pollution produced by motor vehicles in industrial estates is one of the main focuses in the Traffic Impact Analysis (ANDALALIN), because the exhaust gases produced contain harmful substances such as carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and fine particles. According to Hardjono's (2019) research, high concentrations of this pollutant can cause serious respiratory problems, especially for children and the elderly who are included in vulnerable groups to health impacts. The study showed that children have a developing respiratory system and are more sensitive to pollution, while the elderly often have pre-existing health problems, so they are more affected by pollutant exposure. In the context of the Medan Industrial Estate (KIM), an increase in traffic volume in line with intensive industrial activities can worsen the air quality around the area. The results of a study by the Ministry of Environment and Forestry (2020) confirmed that areas with high traffic density showed a significant increase in air pollution levels, which had an impact on public health. This impact is not only limited to respiratory diseases, but can also increase the risk of cardiovascular disease and other health problems. Therefore, it is important to implement mitigation measures through Traffic Impact Analysis (ANDALALIN) to identify and reduce air pollution, as well as protect the health of people living around industrial estates.

### 4. Impact of Noise on Comfort and Mental Health

The noise generated from traffic in industrial estates has a significant impact on people's quality of life, where this factor is often overlooked in environmental planning and management. A study by Nurhadi (2020) shows that high noise levels in industrial estates can reduce the comfort of life, and have the potential to affect the mental health of the surrounding community. Chronic noise has been linked to a variety of health problems, including an increased risk of stress, sleep disturbances and hypertension, as described by Pratama (2018). Long-term exposure to noise can cause adverse physiological reactions, such as increased blood pressure and stress responses, which have a direct impact on the well-being of society as a whole. Research also shows that the discomfort caused by noise can interfere with an individual's concentration and productivity, reduce the quality of social interactions, and increase tension within the community. Therefore, it is important to consider noise factors in environmental impact analysis, especially in industrial estates, to formulate effective mitigation strategies in order to create a more comfortable environment and support people's mental health.

### 5. Impact of Congestion and Productivity

Congestion that often occurs in industrial estates also affects the productivity and efficiency of the surrounding community. According to Santoso (2017), longer travel times can cause people to lose productive time, which ultimately has an impact on their economic well-being. Congestion also increases the risk of traffic accidents, which can endanger motorists and pedestrians in the area. Traffic Impact Analysis Mitigation Efforts (ANDALALIN), a number of studies recommend the implementation of a more integrated traffic system and stricter zoning arrangements in industrial estates to reduce traffic impacts. Nurhadi (2020) suggested optimizing alternative routes, increasing the use of public transportation, and limiting the operating hours of heavy vehicles in industrial areas. The implementation of these mitigation measures is believed to reduce the negative impact on the quality of life of the community.

## 3. RESEARCH METHODS

Qualitative method as a research procedure that produces descriptive data in the form of written or spoken words from people and observable behaviors according to Sugiarto, A. (2024). This study uses a descriptive qualitative approach to understand the impact of traffic from the Medan Industrial Estate (KIM) on the social and economic of the community in Amplas Village, Percut Sei Tuan, Deli Serdang Regency. This approach was chosen because it can delve deeper into people's experiences and perceptions regarding the impact of traffic they experience. The research was conducted in Amplas Village because this area has a high level of traffic due to activities in industrial areas. The data sources in this study consist of primary and secondary data. Primary data was obtained through in-depth interviews with local communities and

related parties, while secondary data was taken from official documents such as the Traffic Impact Analysis (ANDALALIN) report, data from the local Transportation Agency (DISHUB), and relevant literature. Data collection was carried out through three main methods, namely in-depth interviews to understand the impact of traffic on people's lives, direct observation of traffic conditions and road infrastructure, and documentation from reports and other written sources. The data that has been collected is then analyzed using thematic methods. The analysis steps included sorting the data, grouping the data into key themes such as the impact on health, safety, congestion and socio-economic aspects, as well as drawing conclusions to describe the impact of traffic on the socio-economic of the community in Amplas Village.

#### 4. DISCUSSION RESULTS

##### **Traffic Impact Analysis (ANDALALIN) in the Medan Industrial Estate on the Social and Economic Community of Amplas Village**

In the context of cities, inequality in regional development is caused by differences in resources, which can hinder the economic growth of a region. Economic growth is measured through the growth rate of economic sectors, showing the overall economic growth rate according to Nuraini, C. (2023). In collecting data on field results through in-depth interviews and questionnaires with the people of Amplas Village, various perceptions related to the impact of the presence of industry on their environment were found. From the results of the questionnaire, 70.78% of respondents revealed that the economic structure of the community has improved after the existence of industry, while another 29.26% stated that they were not aware of any changes. This perception reflects the economic progress felt by the community, where 87.81% of respondents agree that their economy is improving, while 5.33% do not know about the change.

Further data shows that the presence of the cement industry, such as Tonasa, contributes positively to job creation. All respondents (100%) agreed that the unemployment rate in their area is declining thanks to the job opportunities provided by the industry. In addition, 41 respondents also stated that this industry provides job opportunities for people outside the region, creating a wider economic impact. The increase in people's income is also a positive indicator, where 75.60% of respondents reported an increase in income since the presence of the industry, while 21.95% stated that they did not know about the increase. However, 2.43% of respondents reported no increase in income, indicating that there are still challenges that need to be overcome. The community also considers that the industry's attention to their welfare is quite good. This can be seen from 58.53% of respondents who stated that the industry has provided business capital assistance. In addition, 100% of respondents felt that the industry is very concerned about the surrounding environment, reflecting the industry's awareness of its social responsibility.

However, the negative impact of the industry's presence cannot be ignored. While the majority of respondents felt a positive impact, there was an acknowledgment that the industry could also cause problems, especially in terms of air pollution and noise. This is in line with the results of previous research which showed that increasing traffic in industrial estates has the potential to reduce the community's economy and society due to increased gas and noise emissions from vehicles. In this context, Traffic Impact Analysis (ANDALALIN) is important to identify and mitigate these negative impacts. With in-depth analysis, it is hoped that authorities and industry can formulate better strategies to improve people's infrastructure and quality of life, while still considering sustainable economic growth. The results of this study show that the presence of industry in Amplas Village has a significant impact on the economy and society of the community. However, continuous efforts are needed to address the negative impacts that may arise as the industry grows.

Furthermore, the study also shows that traffic congestion in Amplas Village due to dense activities in the Medan Industrial Estate has a significant impact on the social and economic aspects of the local community. From the social side, traffic jams that take place every day result in disruptions to people's routines, such as delays in daily activities and a decrease in quality of life due to air pollution and high noise. People are feeling a decline in mobility, especially for those who need to travel for work, school or access public services.

From an economic perspective, traffic congestion has resulted in increased operational costs for small businesses around the region, especially for businesses that rely on fast delivery. Longer travel times lead to increased transportation costs, which in turn affects the price of products in the market. In addition, delays in the delivery of raw materials and product distribution from the Medan Industrial Estate (KIM) also affect the stability and productivity of the local economy. This combination of social and economic impacts underscores the need for more comprehensive transportation planning to mitigate the effect of congestion on the people of Amplas Village holistically. Furthermore, the results of the study show a decrease in property values around areas affected by congestion. An environment full of air pollution, noise and difficulty accessing made some residents consider moving to quieter areas, which led to a decline in demand for local properties. This has an impact on the decline in the value of land and property, which in turn affects the economic assets of the local community.

Congestion also affects the psychological well-being of the community. Stress due to long travel times and uncomfortable environmental conditions affects quality of life, with most people reporting increasing discomfort and fatigue every day. This leads to a decrease in productivity, both in work and other daily activities. To address these negative impacts, it is important for local governments and stakeholders to consider long-term solutions, such as improving road infrastructure, setting more efficient logistics transportation schedules, and providing public transportation that can reduce the number of private vehicles in the area. This effort is expected to significantly reduce congestion, thereby improving the quality of life of the community and creating a more stable and supportive economic climate for the residents of Amplas Village.

## 5. CONCLUSION

This study shows that the presence of industry in the Medan Industrial Estate (KIM) has a significant impact on the social and economic community of Amplas Village. From the economic side, industry plays a positive role in improving people's welfare through job creation, income increase and improvement of local economic structure. The majority of people feel the economic progress that has been caused, as seen from the reduction in the unemployment rate and the increase in income. However, this positive impact is also accompanied by serious environmental and social challenges, which are mainly caused by the increase in heavy vehicle traffic around industrial estates. The negative impacts of high industrial traffic include air pollution and noise that adversely affect public health. Air pollution, especially emissions from heavy vehicles, increases the risk of respiratory distress, especially for vulnerable groups such as children and the elderly. High noise also affects people's comfort and mental health, potentially causing stress, sleep disturbances and hypertension. Congestion caused by heavy traffic volumes disrupts daily mobility, increases the operational costs of local businesses and lowers people's productivity. On the other hand, the social aspect is also affected, with a decrease in community mobility and a decrease in property values in the area. The results of this study underscore the need for comprehensive traffic planning and better infrastructure restructuring around industrial estates. Traffic impact analysis (ANDALALIN) plays an important role in identifying traffic management needs to prevent negative environmental impacts and ensure that industrial development does not come at the expense of the social and economic communities around it. The people of Amplas Village hope that there will be concrete steps from the government and the industry, including the construction of safe road facilities for pedestrians, the regulation of operating hours for heavy vehicles and traffic safety socialization. With a planned traffic management strategy, it is hoped that a safer, more comfortable environment can be created and support the welfare and economic sustainability of the community.

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