

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 on the quality of life of the community in 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 quality of life 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. Public perceptions of environmental safety and comfort indicate concern about the risk of accidents and health impacts due to pollution. 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, Quality of Life, 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 condition 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 the management and service of the community. The economic

potential of Sandpaper 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 Ministry of Home Affairs code 12.07.26.2008, 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:

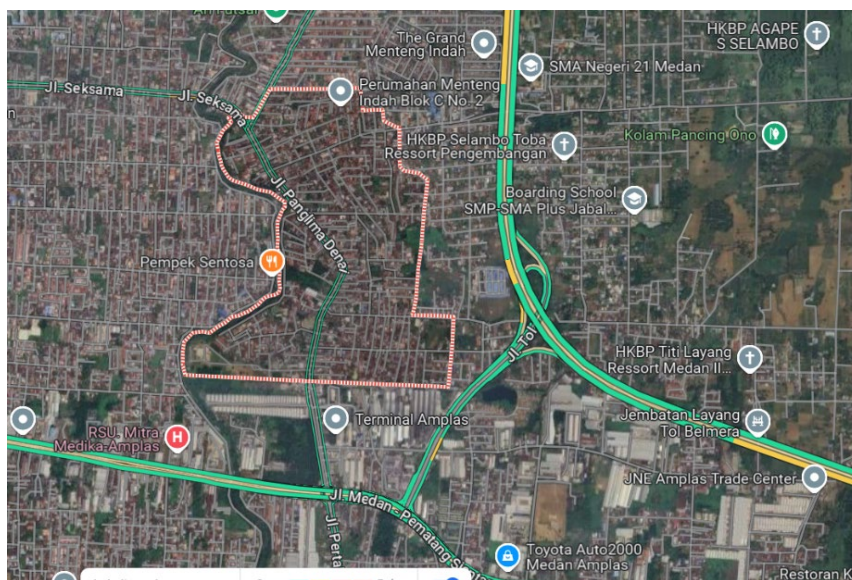


Image: Sandpaper Village, Percut Sei Tuan District
Suber: google maps

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 KIM, 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 interfere with the quality of life 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. In addition to the condition of repairing sidewalks and roads, problems that often arise related to traffic are the disruption of vehicle flow during construction. Sidewalk repairs can lead to narrowing or partial closure of roads, which worsens congestion and increases travel time. Vehicles had to be diverted to other narrower lanes, adding to the volume of congestion. The closure of major roads can also disrupt access to business areas or residential areas, reducing the efficiency and productivity of local communities.

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 disrupts 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 is an important instrument in assessing the impact of traffic changes caused by industrial activities on the lives of local communities. However, the impact of traffic in the Medan industrial area is often not maximized or ignored, so that the negative impact on the community continues. In this context, it is important to conduct a traffic impact analysis to evaluate the influence of industrial activities in the Medan Industrial Estate (KIM) on the quality of life of the community in Amplas Village. This is in line with the opinion (Mena et al. 2019) that quality of life measurement must be used as a tool to identify development achievements in a region. This research aims to understand the impact of traffic caused by the existence of KIM on the quality of life of the people 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 affects the quality of life of the people 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?

Research Objectives

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

THEORETICAL FOUNDATIONS

1. Traffic Impact in Industrial Estates

Traffic Impact Analysis, 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 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, an increase in industrial activity often causes a surge in traffic volume, which can affect the quality of life 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 negatively impacts public health as well as the environment. Therefore, the application of traffic impact analysis in industrial estates is very important to formulate a sustainable traffic management strategy. This is in line with the opinion (Rahardjo. 2018) which emphasizes the need for in-depth analysis to understand the social and economic impacts of industrial activities. By using a traffic impact analysis 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. The Impact of Traffic on the Quality of Life of the Community

The impact of traffic on the quality of life of people around industrial estates is an important concern in urban studies and public health. Quality of life is 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 being experienced by directly exposed communities. Furthermore, the noise generated by transportation activities and industrial operations also contributes to a decrease in quality of life, 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 quality of life 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, because the exhaust gases produced contain harmful substances such as carbon monoxide (CO), nitrogen dioxide (NO₂), and fine particles. According to research (Hardjono, 2019), high concentrations of this pollutant can cause serious respiratory problems, especially for children and the elderly who belong to groups vulnerable 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, 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 disorders. Therefore, it is important to implement mitigation measures through traffic impact analysis 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, as well as potentially 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. The study also shows that the discomfort caused by noise can interfere with an individual's concentration and productivity, reduce the quality of social interaction 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. Mitigation efforts Traffic impact analysis 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

This study uses a qualitative descriptive approach to understand the impact of traffic from the Medan Industrial Estate (KIM) on the quality of life 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 Traffic Impact Analysis reports, data from traffic offices, 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 include sorting data, grouping data into key themes such as impacts on health, safety, congestion and socio-economic aspects, as well as drawing conclusions to describe the impact of traffic on the quality of life of the community in Amplas Village.

4. DISCUSSION RESULTS

The Impact of Traffic in the Medan Industrial Estate on the Social and Economic Community of Sandpaper Village

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 the increase in traffic in industrial estates has the potential to reduce the quality of life of the community due to the increase in gas and noise emissions from vehicles.

In this context, traffic impacts are 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 quality of life of the community, both in terms of economy and social. 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 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. The environment is full of air pollution, noise, and access difficulties have led some residents to consider moving to quieter areas, which has 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 has a significant impact on the quality of life of the people 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 plays a crucial role in identifying traffic management needs to prevent negative environmental impacts and ensure that industrial development does not sacrifice the quality of life of the surrounding community. 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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