Trucks in the Streets: City Reorganization and Improvement in Urban Traffic in Esperanza, Santa Fe

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***Summary*—**
The following work focuses on the problem of inadequate truck parking in Esperanza, Santa Fe. This problem is caused by the lack of strategic planning and industrial development. The central proposal seeks to analyse the creation of a parking lot and loading-unloading area for the trucks. In order to do this, first the context is studied. Next, the problem is stated and the scenes that help understand the problem better are described. After this, the proposal of the relocation of the trucks is detailed. Finally, the strengths and weaknesses of the proposal are stated. Given its potential to create jobs and improve quality of life, its successful implementation will depend on careful planning and management to overcome the associated economic and logistical challenges. It is expected that this work may provide ideas to improve the proper circulation of heavy vehicles so as to improve the city's everyday life.

Keywords: **trucks, parking lot, traffic, development**

***Resumen*—**
El siguiente trabajo se enfoca en el problema del estacionamiento inadecuado de camiones en Esperanza, Santa Fe. Esta problemática es causada por la falta de planificación estratégica y el crecimiento industrial. La propuesta central busca crear un área de estacionamiento y carga-descarga de camiones. Para ello, primero se estudia el contexto. A continuación se plantea el problema y se describen las escenas que ayudan a comprender mejor el problema. Luego de esto, se detalla la propuesta de reubicación de los camiones. Finalmente, se exponen las fortalezas y debilidades de la propuesta. Dado su potencial para generar empleos y mejorar la calidad de vida, su implementación exitosa dependerá de una planificación y gestión cuidadosas para superar los desafíos económicos y logísticos asociados. Se espera que este trabajo aporte ideas para mejorar la circulación adecuada de vehículos pesados con el fin de mejorar la vida cotidiana de la ciudad.

Palabras clave: **camiones, playón, tráfico, desarrollo**

I. INTRODUCTION

Esperanza is a city in the center-east of the province of Santa Fe and it is the first organized agricultural colony in the country. The area of the city is 289 square kilometers, although most of it is farmland. The city has a population of 42,082 inhabitants and is the tenth most populous city in the province.

Esperanza city has a large population and a lot of farms, which generate agricultural work. However, this development brings different problems, such as trucks parked on the streets. This causes breaks in the streets and affects the everyday circulation of citizens.

The objective of this work is to study and analyze the different areas of the city of Esperanza in relation to traffic reorganization. This project focuses on moving the trucks to a new place: a parking area on the outskirts of the city. Therefore, this might bring improvement in urban traffic and development of the city.

In order to achieve this objective, this work is organized this way. First, there will be a description of the city of Esperanza. Next, the problem related to the trucks inappropriately parked in the city will be presented, and its causes and consequences will also be analyzed. After this, there is a description of the proposal: a parking area specifically designed for heavy vehicles. Finally, the strengths and weaknesses of the proposal will be introduced. It is expected that this work may provide ideas to improve the proper circulation of heavy vehicles so as to improve the city's everyday life.

II. PROBLEM DEFINITION AND ANALYSIS

A. *Description of the Context*

The city of Esperanza is a big city that is located between routes 6 and 70 as shown in Fig. 1.

Fig. 1. Esperanza city map

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The city is divided into five different areas: North, West, Center, South and East. Fig. 2 shows the different areas in colors.

Fig. 2. Different areas of the city

The north of Esperanza is the most unsustainable part of the city (Fig. 3). There are many precarious houses (Fig. 4) and there are some parks with little infrastructure. However, the most important landmark in this area is the farm school called "Escuela de Agricultura, Ganadería y Granja" (Fig. 5).

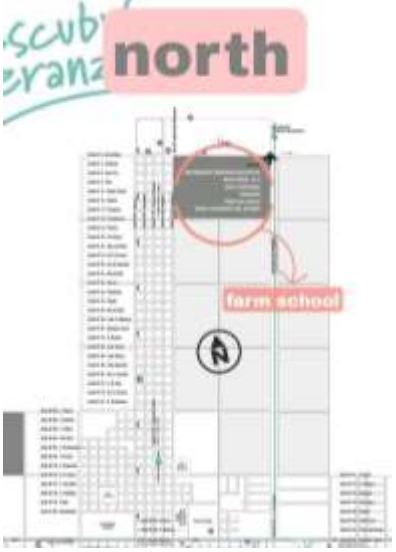

Fig. 3. North zone

Fig. 4. House in the north zone

Fig. 5. Farm school

In the west of the city there are two schools, San José school and a technical school, 455 EETP (Fig. 6).The university of Agricultural Sciences and Veterinary Sciences, from Universidad Nacional del Litoral are in this area. Therefore, this is a student residential area. Also, as shown in Fig. 6. , in this zone there are factories, such as FIMACO (Fig. 7), which is an industrial factory.

Fig. 6. West zone

Fig. 7. FIMACO

In the south of the city there are some primary schools, houses and markets (Fig. 8). There is also an old train station; Fig. 9 shows this.

Fig. 8. South zone

Fig. 9. Abandoned train station

In the center of the city there are some bars, markets, hospitals and museums (Fig.10). In addition, the main Park (Fig. 11) is in this part of the city, which is the most visited and the most beautiful in the city of Esperanza.

Fig. 10. Center zone

Fig. 11. Main park (Plaza San Martín)

In the east of the city is the Agriculture Park (Fig. 12 and Fig. 13). There are also some dance clubs and luxury houses. This is the most affluent part of Esperanza. The city is expanding in this area, so it is under development and under construction.

Fig. 12. East zone

Fig. 13. Park named "Parque de La Agricultura"

As can be seen in the pictures above, Esperanza City is a busy place and this generates more urban traffic. Therefore, the circulation is affected in a negative way, mostly in the East.

B. Problem Statement

The trucks inappropriately parked in the streets is a problem that significantly affects the urban circulation of traffic in cities, mostly in terms of people's mobility and the efficient performance of daily activities. The cities with increased economic and social development have this problem, as is Esperanza city.

Esperanza severely experiences that problem due to its contextual conditions. This is located between busy routes, which makes it an important commercial and industrial development. This means that the city receives plenty of truck traffic from different directions.

The trucks are big and heavy transportation vehicles, so they are more difficult to drive and park. Apart from this, they need wide and safe spaces for carrying out loading and unloading tasks. Also, the drivers need a place to rest and do the maintenance of the units. As the city does not have appropriate spaces for these operations, this generates disarray and social conflicts in the streets.

C. Description of Scenes that Help Picture the Problematic Situation.

Truck parking is a growing problem that affects not only traffic, but also the environment in the city of Esperanza. The pollution generated by these trucks is evident in various areas, bringing with it consequences for the city.

Fig. 14. Trucks parked in the streets

Fig. 15. Truck parked inappropriately

Fig. 14 and fig. 15 show some examples of the ways in which trucks are parked. This type of inappropriate parking of trucks occupies spaces designated for other vehicles or pedestrian areas.

Fig. 16. Truck parked on the bike path

In addition, some trucks load and unload in the city (Fig. 16), parking on the bike path. Therefore, the section of the street specially designed for cyclists to circulate is invaded by trucks, putting the safety of cyclists at risk.

Fig. 17. Inspector writing down the infraction of the truck

Although the Municipality of Esperanza issues fines for improperly parked trucks (Fig. 17), truckers continue to park on the streets because there are no proper parking areas.

D. Identification and analysis of causes or factors that give rise to the problem:

Poor truck parking on city streets is a problem that affects road safety, mobility and the quality of life of people. Among the factors that originate it, there are several that stand out. A first cause is connected with lack of strategic planning. Esperanza does not have a strategic transportation plan that regulates the movement and parking of large vehicles, especially in center and commercial areas.

The increase in uncontrolled development is another major factor. The demographic and economic growth of the city has caused a major demand for goods and services, which requires trucks for distribution. However, this development is not accompanied by an adequate road infrastructure that permits access and exit of trucks without generating congestion or interference with local traffic.

Another cause is industrial development growth. Esperanza city has experienced industrial growth in recent years that has increased the flow of trucks transporting raw materials or finished products. The trucks usually circulate on routes or streets that are not prepared to support their weight or dimensions. Also, there are not sufficient places for parking.

A final factor is the lack of adequate infrastructure: The city lacks sufficient truck parking spaces, like parking lots, sheds or industrial zones. This makes drivers leave their vehicles in unauthorized places, like streets, sidewalks, squares or parks.

E. Identification and Description of the Consequences

The trucks inappropriately parked in the streets is a problem that generates a series of negative consequences for both drivers and pedestrians. In the first place, there is an increased probability of crashes. Improperly parked trucks take space that should be available for other vehicles or pedestrians. This reduces the width of the road and makes circulation difficult. As a result, the risk of accidents involving trucks and other vehicles increases, particularly at intersections or during lane changes. It can also cause accidents to pedestrians trying to cross the street or walk on the sidewalk.

A second consequence is related to the deterioration of road infrastructure: trucks have a greater weight and dimensions than other vehicles, resulting in increased stress on pavements and road structures. When parking is done in inappropriate or unauthorized places, trucks cause damage to the asphalt, sidewalks, bridges, traffic lights or traffic signs. This reduces the useful life and quality of the road infrastructure, and generates maintenance and repair costs.

Reduced visibility for pedestrians is another negative situation. Improperly parked trucks obstruct the vision of both drivers and pedestrians, complicating their ability to perceive the environment. This especially affects the most vulnerable pedestrians, such as children, the elderly or people

with disabilities, who may be hidden behind trucks or have difficulty accessing safe areas.

Another important consequence has to do with air pollution in the city. Trucks that are not parked correctly contribute to urban traffic congestion, which implies major fuel consumption and a greater emission of polluting gases into the air. These emissions degrade the air quality within the city, potentially resulting in respiratory problems, allergies or cardiovascular diseases in the population. Additionally, trucks contribute to noise pollution through the sound of their engines or their horns that alters the well-being and tranquility of the people.

Decreased overall city operation capacity is a further major consequence. Incorrect truck parking reduces the operational and functional capacity of the road; these vehicles occupy lanes or spaces that could be used by other vehicles or other transports. This results in reduced average speeds, lower levels of service, and disrupted traffic flow, ultimately leading to longer travel times and increased stress levels for users. Additionally, public transportation is adversely affected, losing efficiency and quality by having to face delays and inconveniences due to poor truck parking.

III. THE WAY FORWARD

A. Problem approach

The main objective of this project, as it was mentioned, is to fix the problem of trucks parking in the wrong places in the city. The way forward is to move them to areas outside the city center. To do this, it is interesting to look at how other busy cities in Argentina, like Goya in Corrientes, Franck and El Trébol in Santa Fe, and Paraná in Entre Ríos, solve similar problems.

These cities have adopted different solutions in their respective urban areas. Among these alternatives, there is one that stands out as the most appropriate and effective: the creation of a sector for the loading and unloading of products, along with parking facilities for trucks, located far from the city. This solution is mostly characterized by its efficiency in reducing the negative impact associated with the circulation of trucks in the city center.

In this designated space, known as parking lot (Fig. 18 and Fig. 19), a series of essential activities are carried out, such as documentation control, assignment of parking spaces, weighing of trucks for compliance with loading regulations, maintenance and repair of transport units, efficient loading and unloading of products, and convenient arrangements of product storage.

Fig. 18. Parking lot example

Fig. 19. parking lot entrance

The solution plan has two key stages. First, it is important to consider the location of the parking lot and, second, to strategically organize the different areas to guarantee the success of the project.

As it is a large construction, it requires adequate space. After a strategic analysis of the different areas of the city of Esperanza, the location proposed is near the Industrial Park (Fig. 20). This choice is based on the fact that most of the factories located in this area require loading and unloading services of trucks, which will allow them to have their inventory nearby to remove their products more efficiently.

Fig. 20.Industrial Park

When assembling the parking lot, there will be several work areas, as shown in Fig. 21:

Fig. 21. parking lot work areas

- Entry and exit sector: In this sector, a person will check the truck's documents and allow vehicles and people to enter and exit. In this way a vehicle record will be maintained.

-Loading and unloading sector: In this area, workers will load products or materials from the warehouse to the truck or unload materials, depending on the trucker's requirements. Security and organization will be top priorities in this sector to guarantee that tasks are carried out smoothly.

-Materials storage sector: In this sector of the parking lot, there will be a warehouse. This will save time and help

organize the products, so sellers, retailers or merchants can find what they have ordered.

-Parking sector: In this area of the project, there will be a parking space divided into two areas: one for trucks and another for customers who come to pick up materials from their suppliers. The parking of large vehicles will serve both as a truckers' rest area and as a truck relocation area.

-Unit maintenance sector: In this sector, the weight of the trucks will be controlled to guarantee their safety. Additionally, specialized equipment and trained personnel will be available to identify any problems the trucks may have.

This solution will not only benefit local businesses by reducing transportation costs and delivery time, but it will also minimize truck traffic in the city center, improving mobility and road safety in urban areas. Apart from this, its location near to the Industrial Park will increase collaboration between companies and improve transportation coordination, which can help grow the local economy.

B. Strengths and Weaknesses of the Proposal

The proposal developed in this work will probably improve the current situation. However, it is always important to consider both strengths and weaknesses.

1. Strengths:

-Environmental impact: If the movement of trucks and activities related to them are relocated outside the city, it will help reduce air and noise pollution in the city center.

-Job creation: The presence of different activities to carry out in the parking lot will generate new jobs, which will be beneficial for local people.

-Road safety: The relocation of trucks far from the city center will improve road safety, reducing the number of heavy vehicles on main roads and the probability of crashes.

-Collaboration with local companies: The local companies will be involved in the implementation of the project, promoting collaboration between the public and private sectors.

-Local economic benefit: The Municipality will be able to make agreements with distribution companies, charge a nominal fee for the maintenance of the site and obtain benefits.

-Improvement in road organization: The loading and unloading of materials in the parking lot will help prevent traffic disruptions in the city, allowing the client to later find them or request a delivery service.

-Security: The implementation of a camera and surveillance system in the parking lot will guarantee the security of the trucks against possible theft.

2. Weaknesses:

-Implementation costs: The creation of a new loading and unloading parking lot, along with the necessary infrastructure, will be expensive.

-Temporary Inconvenience: The construction of the parking lot and the relocation of loading and unloading operations will cause temporary inconvenience to nearby residents and businesses that use these installations.

-Possible resistance from carriers: The change can encounter resistance from some carriers and companies, especially if they are used to operating in the city center.

-Logistics challenges: Managing the transportation of materials from the parking lot to final the destinations will be possible but can present additional challenges, such as extended delivery times or coordination problems.

-Community rejection: The local community will oppose the project if the purpose and benefits are not adequately communicated, due to a lack of information or misunderstanding.

-Complexity of the project: The planning and construction of the project, with complex implementations and management, will take a long time, so it is not a quick solution.

IV. CONCLUSION

In conclusion, the central problem presented in this report refers to the inappropriate parking of trucks on the streets of the city of Esperanza. The lack of designated truck areas leads to negative consequences such as traffic congestion, deterioration of road infrastructure, safety risks, air pollution and obstacles to urban mobility.

To address this problem, a strategic solution is presented which consists of creating a designated area for parking and loading/unloading trucks near the Industrial Park in Esperanza. This, in addition to reducing the negative effects mentioned, increases collaboration with local companies and creates jobs. Although this solution involves financial and logistical challenges, it has the potential to significantly improve the quality of life in the city.

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The present project is a skills integration activity in Inglés I at Universidad Tecnológica Nacional, Facultad Regional Paraná, carried out by EFL engineering students. The yearlong project requires students to delve into a problem in the city where they live and to address it by means of a simple project in English. Should the reader have any questions regarding this work, please contact Graciela Yugdar Tófalo, Senior Lecturer, at gyugdar@frp.utn.edu.ar.