



# Inglés I - Skills Integration Project

## **Members of the Group:**

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## **Title of the Project:**

*Increasing Waste of Water: Breaking of Pipes in the Center of Paraná.*

### 1. Introduction

With the passage of time and the constant growth of population in the city, there is a problem that has not been solved so far. This situation is the increase waste of water in many neighborhoods caused by the constant breaking of pipes.

The purpose of this presentation is to discuss the increasing waste of water in Paraná because of the breaking of pipes. To do this, we are going to describe the problem in detail. We are also going to offer a possible solution.

First, we are going to show the center of Paraná, which is the focus to work. This is one of the areas affected by broken pipes. We are going to show some photos of buildings located in the area. Second, the main problem is going to be presented, describing and analyzing the causes and consequences it generates. Next, we are going to introduce the factors that give rise to this issue. Finally, we are going to describe our action plan to address this issue.

### 2. Problem Definition and Analysis

#### 2.1. Description of the Context

Paraná is the capital of the province of Entre Ríos, located 475 kilometers from Buenos Aires, which is the capital of Argentina. Paraná is located in the center west of the province and on the left bank of the Paraná River. It has a current population of 1,235,994 inhabitants, according to the 2022 census.

In the center of Paraná, the oldest buildings in the city are located, such as the Normal School, the Cathedral, the Theater, the Town Hall among others. It is estimated that they were all built before 1900, which makes this area one of the oldest in the city.

There are also many service and retail stores in the center, where people go to buy what they need, run some errands or just walk around. There are banks, cafeterias, game rooms, squares, cinemas, among others. It is one of the busiest areas of the city, so it must be in good condition.



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### Normal School

This is the Normal School. It is on the corner of Urquiza and Corrientes streets. There is a lot of traffic in the area, especially early in the morning and at midday, when students arrive at and leave school.

### Cathedral

The cathedral is located opposite 1° de Mayo square, on Monte Caseros street. It occupies the place of the original parish of Bajada del Paraná, whose construction dates back to 1730.



### Town Hall

In the image we can see the government house. It is located on Gregorio Fernandez de la Puente street. It is a very crowded area. It is used daily by pedestrians, cars and buses.

### Theater

This is the municipal theater on February 3. It is located on 25 de Junio street in the city of Paraná. Plays and musical shows are held there, making it a very busy area, especially on weekends.



### 2.2. Problem Statement

The problem we are going to discuss is the breaking of pipes in the center of Paraná, which leads to large amounts of water being wasted. Today, a lot of awareness should be raised about the waste of water since



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it is a non-renewable resource, which means that one day we will run out of it. However, even if people in Paraná take care of the water, a lot of water is wasted through broken pipes.

### 2.3. Description of scenes that help picture the problematic situation

In the following photo we can see a broken water pipe. It is a pipeline located in the center of the city of Paraná.

In the foreground of the image, we can see a damaged pipe. This pipe is made of thermosetting fiberglass-reinforced plastic (FRP). We estimate that it has a dimension of 900 mm, since it is a standard dimension for this type.

On the sides, we can see that there is some soil, so the pipe is buried and has not yet been removed to change it. We believe that this rupture could be caused by overpressure of the water. This occurs because the pipes are old and their size is for lower consumption.

We cannot see people in the image, but we believe that professionals such as civil engineers will supervise the work.



In this photo we can see potholes in the street of a city. These potholes are filled with water.

In the center of the image, there are potholes with water that make traffic difficult. We cannot see this, but we believe that these potholes are generated because there are broken drinking water pipes underneath. In addition to damaging the street, there is a waste of drinking water of approximately 50%.

In the upper part of the image, we can see some cars that are parked. It may be that the image was taken in the center of the city because there are some shops. Vehicles circulating along this street should go slowly because potholes can damage the car.



### 2.4. Identification and analysis of causes or factors that give rise to the problem

The waste of water in the city of Paraná occurs for multiple reasons. In this presentation we will talk specifically about the waste of water in the city center due to the conditions of the pipes. One of the main causes is that the pipes are old, so they have already fulfilled their useful life and it is necessary to change them. In addition, these pipes have a smaller dimension than they should, since they were calculated for lower consumption.

Currently, the population of Paraná has grown, so consumption has also increased. Therefore, the causes of the losses of the pipes are aging and inadequate infrastructure for current demand.

### 2.5. Identification and description of the consequences

Broken pipes mainly cause waste of drinking water. This is unfavorable since it is water that has previously been treated at the Paraná water treatment plant. In addition, as the pipes are buried, broken pipes damage the pavement which is above them, when they start to make potholes. This brings about traffic problems, because vehicles must slow down as they can damage the tires or the car itself. Likewise, the municipality must invest in making those repairs that could be avoided by fixing the pipes when they break immediately, which is difficult because the pipes are underground, as we said before.

## 3. The Way Forward

### 3.1. Problem approach

Now, we are going to make reference to our suggested solution to the problem of breaking pipes in the center of Paraná. The solution to the problem addressed is to change the pipes, and moving the installation from the center of the streets to the green part on the sides of the streets. This way, if there is a breaking or a new connection to the pipelines, it will not be necessary to break the asphalt.



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The new pipes will be made of hot-melt PAD (high density polyethylene), using a new technology that does not break streets and sidewalks because it is made with a tunnel that pierces the ground and also avoids encountering sewage and gas pipelines.



This material is better than the currently used material because there is no rust or corrosion and it has a longer lifespan. For it to last longer, it is important to carry out the necessary and adequate maintenance to avoid possible leaks in the pipes.

Likewise, we must raise awareness to reduce the consumption of drinking water, providing society with techniques to collect rainwater to, for example, wash sidewalks and vehicles; thus, teaching citizens about a conscious use of natural resources.

### 3.2 Strengths and Weaknesses of the Proposal

The new pipes have many advantages. One of the benefits of these new pipes is a better use of water, due to the material of the pipes and their joints. Since they are thermofused, they are less likely to be damaged or have leaks. Added to this, its form of repair is more dynamic and faster, in case it occurs, since it avoids breaking the streets, so traffic is not affected.

On the other hand, this solution has some disadvantages. As disadvantages, we can say that, for it to work and be usable, all the pipes would have to be changed, which implies a high cost. Likewise, by changing the pipes, the drinking water service in the area of the work would have to be cut off, which implies that



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institutions cannot function normally. In addition, this will cause complications with the vehicles since they will not be able to circulate on the street, nor will citizens be able to park their cars in their homes, forcing the neighbors to leave the vehicle far from their house. However, if it is well organized, this situation would only last for some days but there will.

### 4. Conclusion

#### 4.1. Final statement

The problem addressed in this project is the breaking of pipes, which causes an increase in drinking water waste in the city of Paraná. Specifically, we are talking about the center of the city of Paraná, where the buildings are from before 1900s, so the pipes in this area are also old, so they are not in good conditions. This is one of the reasons pipes regularly break. The proposed solution is to make changes to the pipes, replacing them with hot-melt PAD pipes, which is an innovative material that has greater durability and protects against oxidation. It is also necessary to provide good maintenance and raise awareness about wasting water.