



Inglés I – Skills Integration Project

Inglés I UTN FRP

Electromechanical Engineering

Group members: Paolo Maldonado – Martín Paniagua

Sustainable Recycling of Textile waste: Design of Eco-Socks in Monte Caseros, Corrientes

1. Introduction

One of the group members worked in a textile company in his city of origin, which is Monte Caseros, in the province of Corrientes. While working there, he witnessed many positive aspects of the company as well as others that could be improved. The textile company is called TN&PLATEX. It is in Monte Caseros, which is a city in Corrientes. This company produces a lot of dozens of socks per day. They are of different types, models and colours. To produce these socks several rags are produced as a result. Rags are rests of socks and rests of threads. They are not used so they are discarded.

Since this company was founded in Monte Caseros, the job opportunities have increased, but the garbage produced by the city has increased greatly, too.

The purpose of this presentation is to describe the current situation of textile production pollution in Monte Caseros, Corrientes. We are also going to analyze a solution consisting in reintroducing discarded rags into the production process.

First, we are going to show the premises of company that is the focus of this work. Second, we are going to discuss the problem connected with rags production. Next, we are going to introduce the factors that give rise to this problem. After this, we are going to discuss the impact that the big production of rags has in the environment and company. Finally, we are going to describe our action plan to approach this problem.

2. Problem Definition and Analysis

2.1) Description of the context



Inglés I – Skills Integration Project

Satellite picture

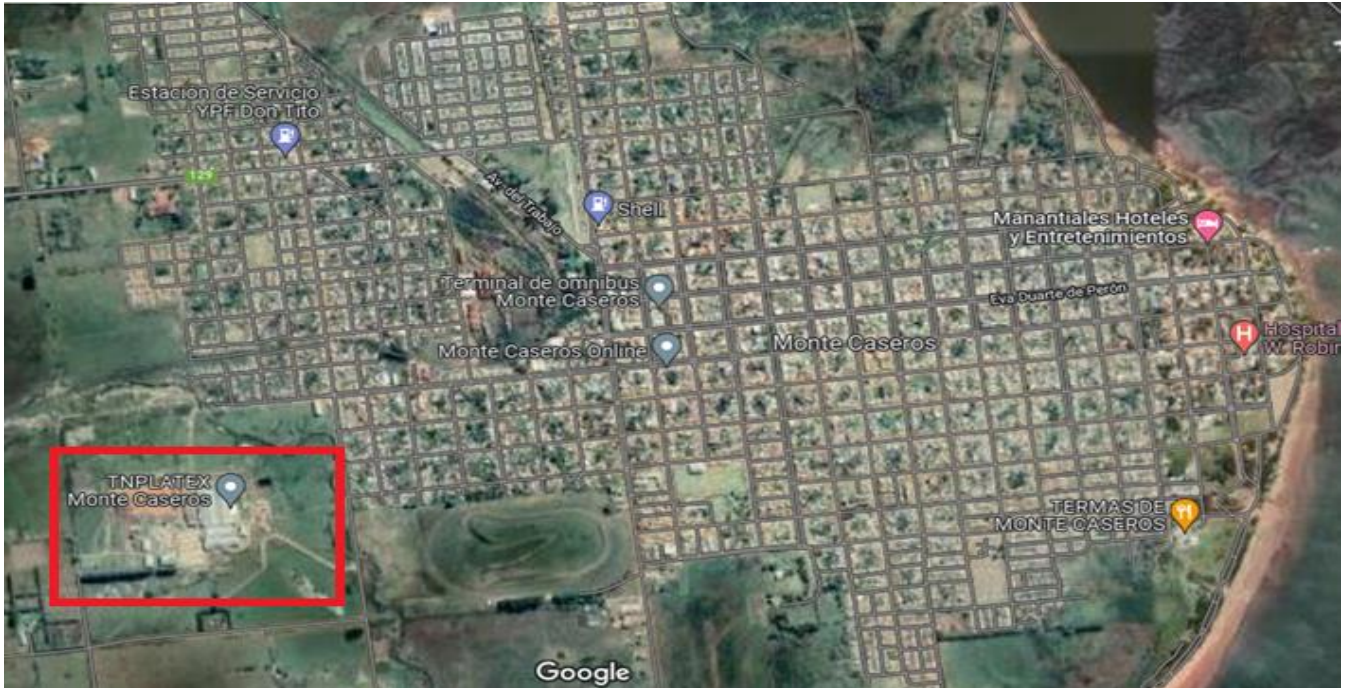


Fig. 1. <https://www.google.com.ar/maps/@-30.2523577,-57.6456467,3074m/data=!3m1!1e3>.

This is a satellite picture of Monte Caseros, Corrientes. This city has 33,000 citizens and 88,000 km² so it's not a big city compared with other cities in Corrientes. In this picture, we can see that the textile company is in the Southwest of the city. The company is very well located because it has easy access to the route and it is far from the urban area of the city.

The company



Fig. 2. Building of company TN & PLATEX.



Inglés I – Skills Integration Project

In this photo we can see the company TN & PLATEX premises of Monte Caseros, Corrientes. It has 32,000 square meters and 1,000 employees. In this company, there are several production areas like threads, socks, seamless, looms.

TN & PLATEX was founded in 1979 in Monte Caseros, but this company was not independent. It was part of another company called Karatex until, in the year 1998, TN & PLATEX became independent. Later, branch offices were opened in La Rioja and Buenos Aires.

Shelves



Fig. 3. Shelves of company.

The pictures show thread bobbins that are on the shelves which are in the production area on the premises. We can see a lot of variety of colours, sizes and types of thread. Each bobbin is ordered and identified with a unique code.

Production Area





Inglés I – Skills Integration Project

Fig. 4. Production area of company.

These pictures show the socks production area. This area covers 900 square meters of the company premises. In this area, there are 56 sock machines and 47 employees organized in shifts. The employees work in eight-hour and twenty-hour shifts, namely, the sock machine never stops producing.

Sock production machines



Fig. 5 - 6. Sock machines.

In this picture we can see a sock machine. Each one uses between 10 and 20 bobbins of different threads. They can produce between 100 and 150 dozen of socks per day. Some faulty socks are sold as second quality products and the rest of them called rags. Rags are not used so they are discarded.

Pipelines



Fig. 7. Pipeline.

The picture shows the pipelines that connect each sock machine to the scrap chamber. These pipelines transport thread waste and some rags that are ejected from the machines to the scrap chamber.



Inglés I – Skills Integration Project

The pipes of the pipeline are made of plastic because the metallic pipe affects the temperature of the sock production area.

Scrap chamber



Fig. 8. Scrap chamber.

This photo shows the scrap chamber. This is connected to the pipelines of the previous pictures. We will talk about this chamber later on.

2.2) Problem Statement

Monte Caseros city doesn't have other big companies apart from TN&PLATEX. This is why the only industrial waste of the city is produced by this textile company.

This company produces a lot of dozens of socks per day. A small part of these socks is discarded as textile waste. This has increased day by day so now there is a lot of pollution in the city.

2.3) Pictures that describe the problem

Scrap chamber



Inglés I – Skills Integration Project



Fig. 9 - 10. Scrap chamber.

These photos show the scrap chamber. The scrap chamber has 30 square meters. All the waste of threads and some rags that are expelled from the sock machines are deposited inside this chamber. This chamber is cleaned once a week because all sock machines must be stopped to do this action.

Fabric Scraps



Fig. 9. Textile waste.



Inglés I – Skills Integration Project

In these pictures we can see many bags with scraps of rags and threads in containers out of company. Each bag weighs between 6 and 10 kilograms. We can see that there are several bags so we believe they produce a lot of pollution.

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

The current sock machines have advantages as well as disadvantages. They can produce a lot of sock types, but this has also increased the production of rags. The production of rags is the problem we are discussing and we can conclude that there are some causes of it.

First, there are problems connected with the threads. When a thread is over or breaks, the machine stops and the incomplete sock must be discarded.

Second, there are problems related to the machine. When a machine stops showing an error in the console, the incomplete sock must also be discarded.

Third, there may be an article change. The change from a type of sock to another type of sock is called article change. When an employee makes this change, this action always produces some rags to get to the specific sock.

2.5) Identification and description of the consequences

The causes mentioned above results in the production of many rags. This problem generates a negative impact on the company and on the environment. Because of this, we can conclude that these are the main consequences of this problem.

First, there is some wasted space. The company loses space on its premises it must have an area to save the rag pallets to later be taken by the municipal trash truck.

Second, the company should comply with environmental requirements or else it is fined. The company must pay a fine for generating a lot of waste that covers more space than what it is allowed.

Third, this waste leads to soil pollution. Textile waste produces a lot of pollution of the soil layers and slows down the degradation of the garbage. It modifies the natural cycle of the waste degradation.

3. The Way Forward

3.1) Problem approach

Analyzing the origin factors of the problem, we propose a solution that implies the recycling of threads. This project focuses on the implementation of a machine which takes discarded thread to obtain recycled threads that are turned into material for production of new socks.

The sequence to include this new machine is the following. First, it will be necessary to evaluate an optimal sector in which the new machine is going to be installed. For this, different factors will be tested,



Inglés I – Skills Integration Project

like the distance between the scrap chamber and the location of the new machine, the space available and the fact that this space selected does not obstruct other works of the company.

Second, it is necessary to modify the space selected and install the new machine. The necessary modifications in the selected space should be made to later install the new machine. Finally, a pipeline should be connected from the scrap chamber to the new machine.

Third, it is important to train the employees. The company should choose activities that each employ will take over. After that, the employees selected to work in this sector will take some training sessions, for example, courses to learn how to use the new machine.

3.2) Strengths and weaknesses of the proposal.

Cons:

This project has a few negative aspects. First, the company must make a great investment of time and money on the installation of the new machine and the training of its employees. Second, the recovery process doesn't recover 100% of rags and, finally, the recycle thread can only use it for a few models of socks compared to the normal thread because recycled thread is more difficult to work with.

Pros:

This project has positive aspects that will improve the economy of company and the relation between the company and the environment. The main positive aspects of this project are the fact that the company investment will be recovered in two years' time, the environmental impact will be reduced and the company will have circular economy, that is, it will generate gains from waste.

4. Conclusion

The large production of socks by this company results in the unwanted generation of textile waste. It produces losses for the company as well as pollution, so the production of rags is a big problem for this company and the environment.

In conclusion, this project proposal is sustainable because it relates an environmental problem to a company problem and transforms it into a benefit for both the company and the environment. The project consists in collecting the rags of the production machines and transforming them into recycled thread. This will be used in the production of socks, that is to say, the company will be able to benefit from this textile waste and will reduce soil contamination in Monte Caseros.