



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

**MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING
PRIMARY AND SECONDARY RESOURCES DEVELOPMENT**

**SUSTAINABLE ALTERNATIVES FOR BANNERS REUSE IN THE CITY OF
BOLOGNA**

ABSTRACT: Given the need to find sustainable destination for banners after use, which currently in Bologna, has no other destination than waste, for lack of reuse or even recycle policy in the region, this report is the result of a research to find ways to reuse this material that would benefit the university, academics, and the local community through the needs of the scope. a quick analysis of the possible solutions found for reusing the discarded banner.

Keywords: Banner, Reuse, Recycle.

Bologna, December 2019

1. INTRODUCTION

Concerns about waste management and recycling have become more common, mainly because of mismanagement and improper disposal of materials that could be reused, recycled or recovered. This is the case of banners, a media widely used in presentations, exhibitions, and advertisement industry.

The main component of a banner is synthetic canvas, this is a very resistant noble material that comes from unnatural raw ingredients, ingredients that are synthesized petrochemicals. Technology has helped banner production to improve, and now it is possible to find banners with materials that are highly resistant to heat, moisture, and high definition printing such as Vinyl Canvas. You can find new businesses into this area every day, an example is “Artisan”. “With ArtisanHD’s HP Latex 3000 printer, your photos and fine art prints can be as large as your imagination! Your piece can be printed on everything from fabric to vinyl, with latex-based ink that stays flexible and resists fading” (1) says Artisan on it’s webpage. Surly coming interesting and attractive to the market but not to the earth.

Nowadays, although there are substitutes that are less impactful to the environment like digital and electronic media, access to them is limited and the use of banners, which are cheaper, is unavoidable for a lot of sectors. Their low price accompanies their high quality and is making them non-competitive with respect to other options.

Due to banners polymeric composition, a landfilled banner has a high decomposition time, taking an average of 500 years to decompose, although it is used for a short period of time. For this reason, it reduces the useful life of landfills, in addition to slowing down the processes of degradation of organic matter disposed on site, due to the formation of waterproof layers in the waste column.

Therefore, it is necessary to study its correct destination in order to reduce its negative influence by proposing some alternative paths and increasing its added value by inserting new functionality, with the purpose of the banner to be reused for other applications.

2. DEFINITION OF THE PROBLEM

According to “the Story of Plastic” a documentary produced in 2019 “Public awareness of plastic pollution grows due to increasing media coverage of plastic in the oceans.” (2) Concerns about environmental issues is becoming more intense as society becomes aware of the hidden impacts it is making on his environment. Public judgment starts putting pressure on the businesses and seeks ways to develop societies economic activities more sustainably. Especially massive trades of the world in the petrol industry like ENI, Shell, Total, Exxon mobil etc. are being accused for not taking actions.

In general, banners are made from polyvinyl chloride (PVC) and have a long decomposition time, which is an aggravating factor making banners difficult to recycle. The PVC are made from a mix of resin, plasticizers, fillers and additives. This mix is thermally melted and a laminated material is obtained from this process. This laminate material is coupled with a reinforcement fabric commonly made of polyester, polyamide or other material that guarantees tear and tensile strength, increasing the physical, mechanical strength and durability of the banner.

Nowadays, there are few companies in Europe that are developing techniques to recycling this kind of material, such as Blue Castle, a company from England. In partnership with printable material manufacturer and distributor, Soyang Europe, they have developed a system that enables PVC banner material to be completely recycled, keeping vinyl banners out of landfill at the end of their life and reusing the material responsibly. The developed system consists of four steps: dismantling, sorting, shredding and repurposing.

But even if they were recycled, one problem remains: the grommets. Figure 1. Those little brass eyelets placed all along the hem of each banner to tie off points. they must be removed at a cost that is usually impractical. But even if you do remove the grommets, what do you do with the waste? As a solution, a company in United States has created a large-scale grommet-free production method. “The Banner Ups” products are pressure sensitive adhesive grommets tabs which take the place of grommets. Wind tunnel tests have shown Banner Ups banners can withstand winds up to 90 mph (approximately 144 km/h).



Figure 1- grommets of the banners

I have seen grommets out of plastic in Napoli. Figure 2. But even considering plastic grommets do not solve the problem since the type of polymer used to produce the grommet is not the same as the banner itself and they still need to be separated to become recyclable, so the challenge is still there.



Figure 2- plastic grommets

Even if the industry is developing new ways of recycling, it is important to consider other ways of disposing the existing materials that cannot be recycled. Based on this, turning banners into utilities directed to the community in order to, besides generating improvements in the environment, encourage green thinking through the opening of

ideas, and minimizing the amount of this material in landfills, some proposals were designed to bring benefits to the local society.

3. SOLUTIONS

In order to reuse the banner and make it beneficial for the community, this research began on possible products to be developed using this material. The criterion of choice was to evaluate the daily needs of the citizens of the city of Bologna with a special focus on the students of the University of Bologna.

1. During the rainy season, flooding becomes very common in urban areas. To solve the problem, one of the alternatives is the installation of green roofs (Figure 3) on buildings. Green roofs have the ability to absorb rainwater that falls on it, delaying the flow to the drainage system. For the construction of the green roof, it is necessary to apply a waterproof layer, which prevents infiltration in the building. EPDM Rubber is widely used as the waterproof membrane for green roof construction because of its waterproofing properties and resilience. (3) As an alternative of waterproof membrane, the discarded banner is an excellent material that can be used as it is extremely durable and has great waterproofing potential. Because of the weight and thickness of the banners, in some cases layer overlap is required. However, its use requires further care and study of Polymer engineers, especially the determination of other properties, in order to guarantee its performance. In addition, the particularities between banners demand control over each material used, limiting its application on a large scale.

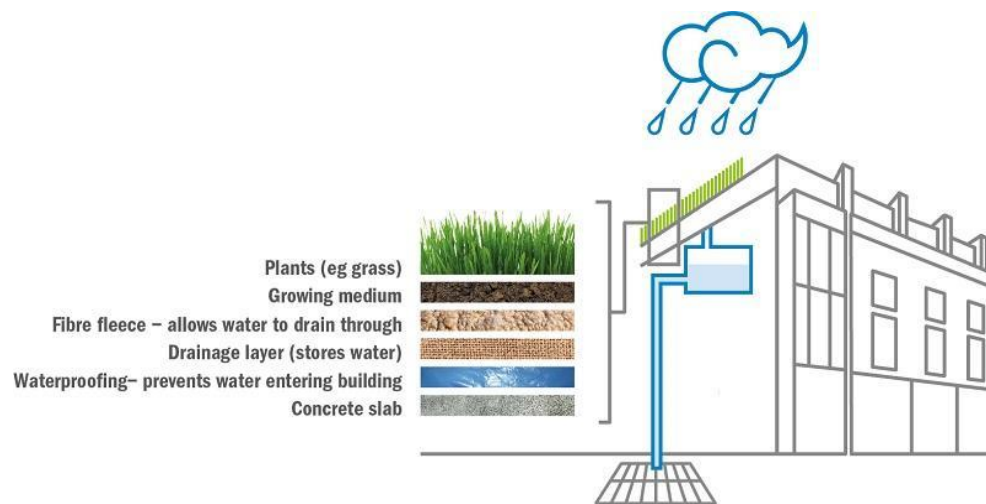


Figure 3- Green roof layers

2. In Bologna and some other student cities in the world like in south west Sweden, there is a lot of wind, rain and cold season is long also like Nordic countries , so the motorcycle drivers need something to cover their hands and feet while driving. To overcome this need, a kind of bilayer banner cloth can be produced, by sticking or sewing a layer of cloth to banner and cutting it in the right shape, we can easily make these wind barriers out of residues (Figure 5). Also motorcycle covers can be made from banners, in this case with no need of swing a fabric layer (Figure 4).



Figure 5- Bilayer Banner Cloth



Figure 4- Motorcycle Cover

3. Another problem related to the rain season is the wet saddle. Nobody wants to seat on a wet saddle after his long day in university. To solve this point, saddle covers could be made (Figure 6) from banners in order to put on your saddle and make sure it remains dry and clean when you come back. Also, it can be a barrier against sun since being under sun can fasten the corrosion of the saddle. And for the students of Unibo who are using their personal bicycles and do not receive bicycles from unibo this can at least be a good supporting strategy by unibo.



Figure 6- Bicycle Saddle Cover

4. Considering that, in Bologna, people can go almost everywhere by bike, the more optimized and detached the bike, the easier the user's life. Thinking about it, another idea is to make some different kinds of pockets, holders, and bags (Figures 7 and 8) for your bike from banner.



Figure 8- Bicycle Pockets



Figure 7- Bicycle Bags

5. Unfortunately, University of Bologna, the oldest university of Europe is located in one of the most polluted cities of the region. We all know that the first wash of each rain in the rainy season is an acidic very high erupting one. It is not possible to cover all the university buildings in a rain event but, at least, the iconic statues could be protected by making a shelter out of banner (Figures 9 and 10) for them. This will reduce the annual cost of maintenance and also make these states of art last for the next generation of Unibo students.



Figure 10- Historical Shelter



Figure 9- Shelter

6. In order to create a relaxed, integration and leisure environment for students of University of Bologna, it is suggested to make puffs and chairs (Figure 11) made by banner. The space can be intended for reading, encouraging students to read more, or even an environment to rest and relax.



Figure 11- Puffs and Chairs out of banners

7. Thinking of creating a space that benefits the local community, a space inside the university could be destined for the implementation of community gardens or green space. Using banner planters (Figure 12), it is possible to recycle and encourage the habit of gardening in people's daily lives.



Figure 12- Planters

8. Many containers and bins are made of plastic and poorly reusable materials. Using other materials, such as advertising banners, would reduce the use of plastics. a small indoor bin made of banner could be created (Figures 13). Depending on the characteristics of the banner, it is possible to obtain more or less resistance on the bin. It would be an interesting idea to replace the bins in the classes of the university with the bins of banner coming from an idea by students.



Figure 13- banner bins

9. Most of supermarkets and gyms provide cards to improve their services. They usually work as a personal barcode for each user. For this reason, replacing the plastic of the cards for a folded banner is beneficial for the environment. Just print the barcode and paste it on the card (Figure 14).



Figure 14- Barcode banner Card

10. Every year, many school accessories made of plastics, such as pencil cases and folders, are bought by pupils. To encourage banner reuse, we can manufacture purses cases, backpacks and other objects with this material (Figures 14, 15 and 16, 17). Selling products made of reused materials gives a good global vision to the University of Bologna.



Figure 14: Pencil Case



Figure 15: Folder



Figure 16: Wallet



Figure 17: Belt

4. IDENTIFYING STAKEHOLDERS

In order to use sustainable solutions for the reuse of discarded materials in the manufacturing of products that bring improvements at the university and community level, eleven product strategies were thought from the reuse of banners: Green Roof Layer, Bilayer Banner Cloth, Motorcycle Cover, Bicycle Saddle Cover, Bicycle Accessories, Historical Shelter, Puffs, Planters, Bins, Barcode Card and School Supplies.

The reuse of the banner to make these products has as its main objective to meet the needs of residents and students of the city of Bologna. However, it is a great opportunity for companies that manufacture this type of material to benefit and think of new ways to give the banner a smart destination, as well as gaining the trust and environmental prestige of customers, who give preference to politically correct institutions.

An example of a company that benefits from discarded materials in the Emilia-Romagna region is ReMida, which collects materials from waste or remainders of industrial and handmade production. In this way the company gives new life to waste production or mistakes, through new uses and functions, including: collection and distribution of waste material manufacturing company, research projects with architecture studios (for re-qualification of disused spaces), hosting of study groups and international / national delegations, educational paths for teachers and other social-educational workers, workshops in cooperation with artists, stylists, eco-designers, educational activities, for schools of every grade and level, exhibits and events directed to all, and more .

5. IMPACTS GENERATED BY THE PROJECT

Considering that it is an affordable, inexpensive and durable material, banner manufacturing does not yet have an expected end. From this, the proposed project is a small awareness campaign to encourage the reuse of materials that do not yet have a proper destination due to lack of political incentive and initiative of the companies that produce them. Therefore, with the collaboration of the University of Bologna, we encourage students and the community to work on some of the ideas proposed on this project.

In addition to reusing the discarded material, we also propose the use of recyclable materials, such as paper, cardboard and derivatives, to replace the banner. These materials have similar characteristics and can be introduced into the circular economy. In general, we want to show that reuse of materials with a short life cycle is also a valid option.

In the Emilia-Romagna region, around 7500 kilograms of company waste is collected each year, 1200 public and private institutions benefit from discarded materials and thousands of children participate in proposed educational activities by reusing discarded materials.

Therefore, the reuse of materials can also bring, in addition to reducing environmental impacts, economic and social benefits.

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