25/10/2017

RESEARCH PROJECT: "futuristic invention"

Home Topmix

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Summary

List of websites:

http://vwrrc.vt.edu/swc/NonPBMPSpecsMarch11/VASWMBMPSpec7PERMEABLEPAVEMENT.html

https://en.wikipedia.org/wiki/Flood

http://www.tarmac.com/solutions/readymix/topmix-permeable/

http://www.tarmac.com/media/492738/hydromediabrochure28pp_rebranded_lowres1.pdf

http://www.dailymail.co.uk/sciencetech/article-3243247/An-end-puddles-Bizarre-thirsty-concrete-sucks-hundreds-gallons-water-minute.html

http://unesdoc.unesco.org/images/0023/002318/231823E.pdf

The world without our scientific discovery:

Today, there are many natural disasters. In these natural disasters, we can see hurricanes, earthquakes, tsunamis and floods. Because of all these disasters, people have many problems such as injury, the loss of equipment or houses. To be in relation with our subject, we are going to focus only on floods.

According to many surveys, floods could cost around 1000 billions per year in the world. Moreover, this type of disaster is the more frequent because floods represent 1 disaster out of 2 and are the deadliest since they are responsible for more than the 50 000 deaths and around 75 million injured people each year.

The problem of floods is that they also have many consequences on the health. Because of them, diseases or physical injuries could appear.

Natural disasters accentuate the inequality between people because there is more poverty and it is often the poor people who are the most affected. Moreover, they cannot fix their house or their equipment.

But, thanks to our scientific discovery, it is over. People won't have flood problems anymore because there is Topmix. This invention will change the life of all these people.

Moreover, the groundwaters are shortage, and people use water in order to spray their gardens. So, the lack of water is bigger and bigger.

Indeed, the consumption of water represents, on average, 4 billion m3 per year, and 1.3 million liters each second.

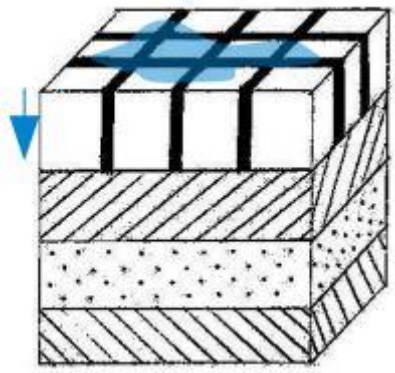
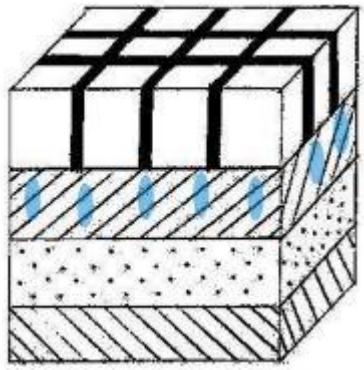
Thanks to Topmix, they could save rain water and protect the environment. As well as natural disasters, in some countries like Bahrain, Kuwait or Qatar, there is a lack of water. According to the projection, in 2030, the world will have to face a water deficit of 40% if it do not change.

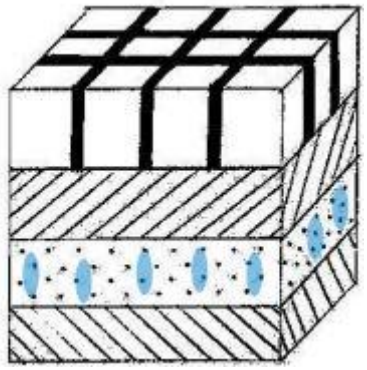
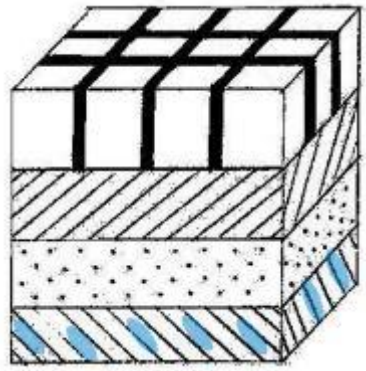
So, our product will be able to save houses and equipment but also, it will be able to save lives thanks to recovery water

Description of House's Topmix:

As you can see on the internet, there is a material called Topmix Permeable which absorbs water on the roads. This material can absorb up to 1000 liters. Their idea is interesting, but the goal will be to make it adaptable to houses.
With TopMix, we can prevent flooding in the streets. Generally, once the water is off the road, it seeps into homes and people lose all their entire house, both personal property and the foundation, everything is out of order. The aim of our project is to find an alternative to Topmix Permeable for application in homes. Thus, when the water goes into the house, it will be directly absorbed.

Specialists raise questions about the quality of the foundation after having absorbed so many liters of water, but we thought of everything because when installing Topmix we will install large water containers under the foundations. Thus, this material prevents flooding, but it also helps to save water by using water recycling bins for the garden or for sanitary (after treatment). So, it will have positive consequences on the environment.

	**The floor:** The ground is customizable according to the desire of the user. Only the seals (it is the material which is between tiles) are not customizable. The dimensions of the seals are a few millimeters (2-3 mm). The thickness of the first structure is 5 cm. This thickness allows for a good thermal insulation and can quickly absorb a large amount of water during water damage. The absorbent structure is the seal.
	**The absorbent layer :** If too much water is spilled on the ground, the seals will take a certain amount of time (a few seconds) to absorb liquid. However, this operation does not create any problem thanks to the absorbent layer. The entire amount of water can be "stored" in this layer. This layer can be called a storage area. The thickness of this layer is 5 cm too.

	**The filter layer :** In this space there are several superimposed filters in order to remove impurities from the liquid. This part is very important because it allows the water to be used and to become potable. The first filter kills all the microorganisms with an iodized filter. The second is a filter to remove impurities (around 3-4 microns). The latter concerns taste; an activated charcoal filter is present in order to render the water neutral and without particular taste like bottle water.
	**Derivation of water :** This step consists in directing the filtered water to a place where it can be stored. These are nanoparticles that are arranged to direct liquids to a defined area.

This is an example of application of this product. In a house, when there is water damage, the water is absorbed by the ground and is then directed to a recovery tank. A washing product of the filter layer is necessary in order not to foul the filter layer. It must be poured on the ground, then once the product has arrived at the level of the filters, it dissolves all impurities stopped by the filters. Then this product is directed to another tank. There is a sensor placed at the entrance of the tank to store used washing products. The sensor detects if the water is safe. If it is, then the water is directed to the next tank (clean water), otherwise, it is directed to the tank for the cleaning product.

This kind of product can be used in different places such as in front of a garage, in an alley, in washing stations, …

Concretely, our futuristic invention named **House TopMix** is a bitumen which is able to absorb a huge amount of water. We will use this bitumen in houses which are at risk of flooding so that populations run away from their homes. Thus, we will cover all the area from the houses with the TopMix Permeable. We can also use this material in front of garage door or in front of the house. TopMix Permeable is composed of 4 different layers which allow bitumen to absorb and filter the water quickly. The first layer is the permeable jointure, composed of big stones which enable the brief runoff of the water. The second layer is made up of an absorbent layer which absorbs the water like a sponge. Then, the excess of the liquid is drippen drop by drop to go to the third layer named filter layer which enables a recovery of drinkable water. At the end, the water flow in a layer allow this drinkable water to divert in a big cistern. During the runoff of the water through each layer, the water follows a vertical way thanks to physical principle. In fact, gravity allows the water to keep a vertical trajectory throughout the flow.

We will be able to put titles on the TopMix where the water will filter through the seal of titles.

Moreover, the cistern will recover the water of the shower or the washing up. The water stored in the cistern will be used to water plants on the garden. That’s why, we have thought of an automatic spraying system when the cistern reaches an optimal level. Furthermore, the spraying can also be used manually when users will have to water their plants. This spraying will be done using drainage.

People’s everyday life change thanks to Topmix:

As you can see previously, natural disasters are very abundant. Because of these disasters, lots of people are affected by floods. Therefore, they will have to leave their houses to survive and thus to desert material property behind

However, this time is over! Thanks to our invention, these people will never be worried anymore. In fact, houses will no longer be flooded because TopMix absorbs completely all the water. The inhabitant affected by flooding will no longer lose their properties.

In our invention, there is a big cistern to recovery the water. They do not lose their properties, but they could recover the filtered water thanks to TopMix in order to use it as they want. For example, they could use the water to water the gardens or to wash their cars.

Moreover, we have mentioned people could install this material in the garage entrance or in the way to their homes because that permits the inhabitants to save money without suffering from flooding. Indeed, the rainwater will be recovery in the cistern too.

Besides, the water stocked in the cistern could be used for other cases. In fact, as the water is filtered, it could donate as a gift to people who need it. In different countries in Africa, there is a lack of drinkable water thus several associations try to help them. Finally, the water in the cistern could be sent to these associations which could supply the countries which are in need.

We all know that in winter the rain is more important than in summer. Therefore, thanks to our innovation installed in driveways for example, in the winter, Home Topmix absorbs more water than in summer. In consequence, when we want to take care of the garden at the beginning of the summer, we can use the water stocked in the cistern during the winter.

Many people use collecting tanks to salvage water in their property, but this system is cumbersome. Furthermore, our system is located on the floor, so water can't be freezing cold during the winter.

We can see all the advantages for people but now, we will see the advantages for the country and its economy. Indeed, some countries like Haiti or New Caledonia are very exposed to floods and because of this their economy is in danger. Thanks to the Home Topmix we can revive the economy. The residents’ houses will be stronger, and they will have to resist to the floods. So, people won’t be afraid anymore to live in these countries or in these cities which are at risk.

As you previously could understand, our material is very interesting, but it is very technical. So, if people want this material in their houses, they will have to call a specialist. Our product will develop new jobs and thus, it will reduce unemployment.

Arguments to convince the teacher to present our research project to the University Board

This is the list of our arguments:

- Natural disasters cause irreversible personal and material damage all over the world.
- After water damage, many people are deprived of electricity, access to drinkable water and are in need.
- With the incessant rise of sea level, many buildings will have to be rebuilt.
- In many cases, house insurances only partially reimburse the damage.
- The feeling of cold and the difficulty to heat lead to allergies. Wet houses offer very favorable living conditions for dust mites. They are housed in bedding, carpets, textiles, …
- This system allows people to recycle water in order to reuse it for spraying his garden for example.
- This system doesn't take up much space, it's a real advantage to optimize his garden.
- The user can choose different colors for our material.

Criticism we expect to hear from the other students

This is the list of criticisms:

- Would the system implementation be too expensive?
- Will the solidity of the house's foundations be affected?
- The system can only be set up during the construction of a house, if the house exists we cannot insert the system.
- If the ground has several layers, when the water is filtered, it passes in the system. Do layers risk being blocked up in the long term?
- Given that there are 2 containers, one for the water retrieve and the other one for the toxic products, how to empty the container of toxic products?
- This material is very specific, he must be an expert to insert it.
- After one big flood, the floor is damaged. Should we change it?
- If there are no floods, are the cisterns always empty?

Keywords and definitions:

global warming : */ˌgləʊ.bəl ˈwɔː.mɪŋ/* a gradual increase in world temperatures caused by gases such as carbon dioxide that are collecting in the air around the earth and stopping heat escaping into space

natural disaster : */ˌnætʃ.ər.əl dɪˈzɑː.stər/* a natural event such as a flood, earthquake, or tsunami that kills or injures a lot of people

Flood : */flʌd/* to cause to fill or become covered with water, especially in a way that causes problems

Groundwater : */ˈgraʊndˌwɔt̬ːər/* water that collects below the surface of the earth

seep : */siːp/* to move or spread slowly out of a hole or through something

seal : */siːl/* something fixed around the edge of an opening to prevent liquid or gas from flowing through it

layer : */ˈleɪ.ər /* a level of material, such as a type of rock or gas, that is different from the material above or below it, or a thin sheet of a substance:

store : */stɔːr/* an amount of something that is being kept for future use

thickness : */ˈθɪk.nəs/* dimension between two surfaces of an object

charcoal : */ˈtʃɑː.kəʊl/* a hard, black substance similar to coal that can be used as fuel or, in the form of sticks.

salvage : */ˈsæl.vɪdʒ/* to save goods from damage or destruction, especially from a ship that has sunk or been damaged or a building that has been damaged by fire or a flood

divert : */daɪˈvɜːt/* to cause something or someone to change direction

drainage : */ˈdreɪ.nɪdʒ/* the system of water or waste liquids flowing away from somewhere into the ground or down pipes

recover : */rɪˈkʌv.ər/* to get back something lost or spent

dust mite : */ˈdʌst ˌmaɪt/* a very small insect that lives in beds, carpets, curtains, etc. and can make people sneeze or have a runny nose or sore skin if they have an allergy to them

shortage : /ˈʃɔː.tɪdʒ/ a situation in which there is not enough of something

absorbent /əbˈzɔː.bənt/ able to take liquid in through the surface and to hold it

superimposed /suː.pə.rɪmˈpəʊz/ to put, place, or set over or on something else

potable /ˈpəʊ.tə.bəl/ clean and safe to drink

sponge /spʌndʒ/ a soft substance which can absorbs a lot of liquid used for washing and cleaning

cistern /ˈsɪs.tən/ a container in which water is stored

cumbersome /ˈkʌm.bə.səm/ awkward