



**Did you know?**

**Did You Know?... geosynthetics prevent floods and protect lives, livelihoods, and property.**

Changes in weather patterns are one of the principal effects of climate change. We now see more extreme weather conditions. This has a huge impact on communities in low-lying areas, who suffer change to land use on a massive scale when exposed to environmental risks such as flooding.

In these cases, water needs to be kept within certain bounds. Sea defense dykes, flood alleviation emergency dykes, canal dykes, and all manner of streams and channels are an important element of land protection to allow for irrigation or navigation. Indeed, longitudinal dykes are one of the most often used structures designed and constructed to keep river water contained in the event of a flood.

In recent decades, several major flood events have shown the vulnerability of flood protection structures around the world. Frequently, the overtopping of flood protection dykes has led to the total failure of the structure. Plus, river dykes affected by previous incidents were often too low, or in too poor of a condition to resist water height and erosion during a flood. The aftermath of disastrous flood events has shown that dykes are an important part of a society’s infrastructure. They must be designed with maximum safety in mind.



Geosynthetics, when designed into dykes, strengthen flood defenses.



## Did you know?

Dykes are often constructed from a variety of locally available materials; local soils are the most cost-effective construction source. However, this material is often varied, and its permeability can be equally mixed. Surface erosion is often prevented using quarried rock armour which must be placed with other soils in graded layers to prevent loss of finer soil particles. The correct stone grades are often difficult to source and place.

Geosynthetics can be used to improve dykes with state-of-the-art design. Geosynthetic solutions, used in combination with natural materials, have proven to provide:

- Strength and flexibility
- Imperviousness and drainage
- Durability and robustness
- Degradation control

These technologies bring not just structural defense but buy more time for evaluating risk and providing emergency response to at-risk communities. They can be designed to control the interaction of water and soil according to individual and local requirements, including to allow for the optimum construction of waterways and flood protection structures.

There is not always enough space to make the required stable dyke profile solely of soil, for example when buildings, watercourses or other obstacles are expensive or impossible to move. In this case, geosynthetics can be used to increase the stability of the dyke, or increase its slope angle and thus reduce its footprint.

Geosynthetic drainage systems can reduce groundwater pressure in the structure and allow the soil to retain more strength. Geosynthetic barriers can replace thick natural low permeability soil (like clays) with significantly thinner layers, thus reducing the footprint of the structure and increasing its impermeability.

Adding resilience to flood protection structures is critical to future risk mitigation. However, building higher and stronger structures to prevent overtopping waves, storm surge, and flood waters can be costly. The optimization of dyke construction with geosynthetics to increase their resilience not only results in performance advantages, but also in large cost savings.

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**Geosynthetic solutions should be fully investigated on every infrastructure project to ensure they meet the needs of the present without compromising the ability of future generations to meet their own needs.**

Find out more about how geosynthetics are making a difference by downloading the IGS Sustainability eBook [here](#) or visiting our Sustainability [page](#).