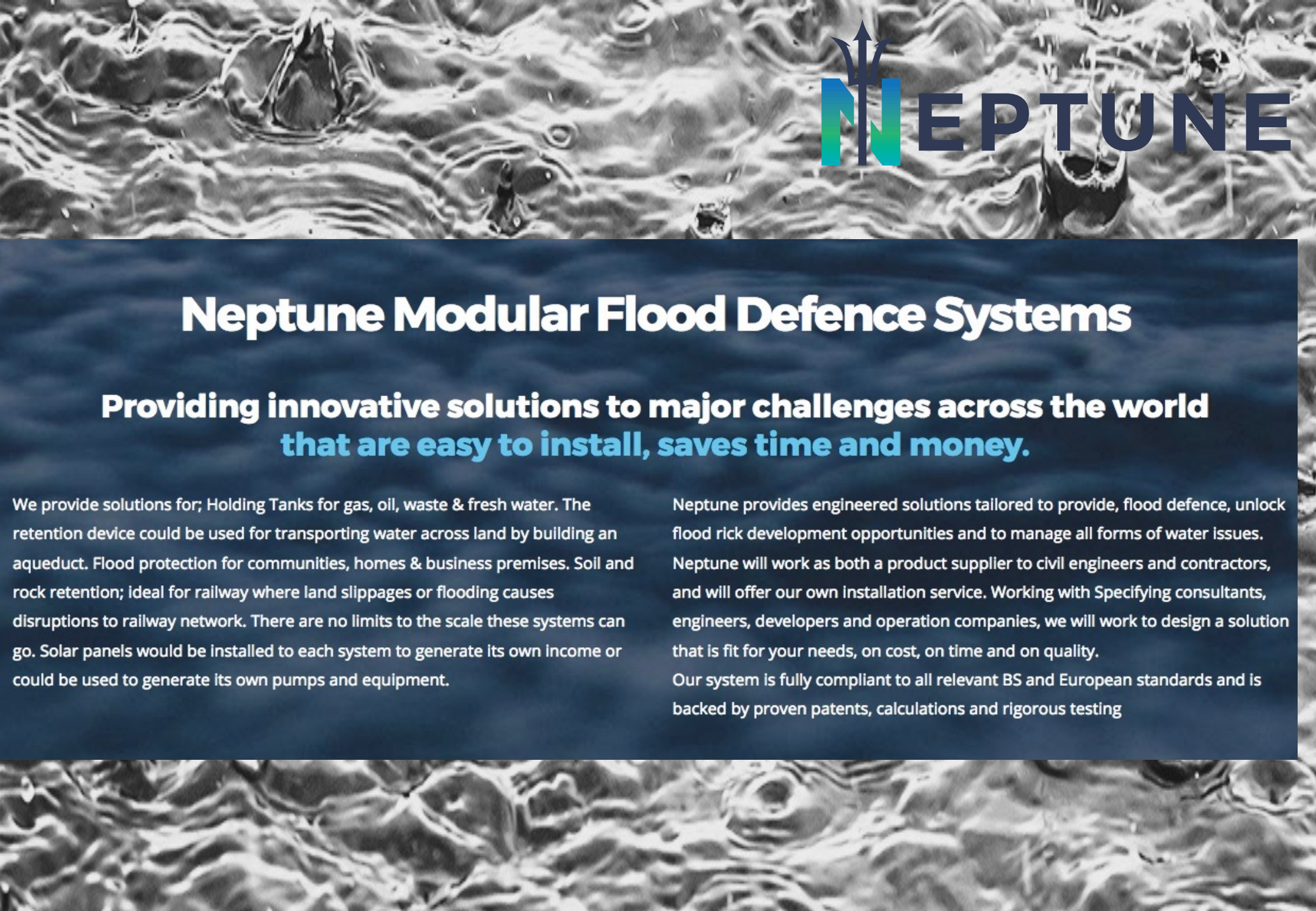

NEPTUNE

Neptune Modular Flood Defence Systems

Providing innovative solutions to major challenges across the world that are easy to install, saves time and money.

We provide solutions for; Holding Tanks for gas, oil, waste & fresh water. The retention device could be used for transporting water across land by building an aqueduct. Flood protection for communities, homes & business premises. Soil and rock retention; ideal for railway where land slippages or flooding causes disruptions to railway network. There are no limits to the scale these systems can go. Solar panels would be installed to each system to generate its own income or could be used to generate its own pumps and equipment.

Neptune provides engineered solutions tailored to provide, flood defence, unlock flood rick development opportunities and to manage all forms of water issues. Neptune will work as both a product supplier to civil engineers and contractors, and will offer our own installation service. Working with Specifying consultants, engineers, developers and operation companies, we will work to design a solution that is fit for your needs, on cost, on time and on quality.

Our system is fully compliant to all relevant BS and European standards and is backed by proven patents, calculations and rigorous testing

Welcome to Neptune Solutions

The first modular flood barrier systems in the world.

The barrier systems are constructed in form of a continuous wall against flood water that typically has high volume and speed.

Our innovation and engineering department provides expert technical support to you throughout the UK, on a diverse range of projects.

Our engineers are happy to work in close conjunction with you and your teams, on projects that are more intricate than average or perhaps are on a larger scale. These projects can range from relatively small to highly bespoke solutions on unusual projects.

Neptune Solutions

Benefits and Quality Assurance

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The System Benefits

Short assembly times

Far shorter than other methods with only light machinery on site.

Neptune is made from machined or cast steel

Requires less lead time and has little land fill requirements.

Withstand the force of a 9 metre wave

The sea defence system can withstand adownward vertical force of 176.5N =18 tonne

Multi-terrain assembly

Above/below ground or part below, reducing the need for excavation or need for aggregate.

The System Quality Standards

SSIP SAFETY SCHEMES IN PROCUREMENT

constructionline

BSI UKAS QUALITY MANAGEMENT 003

UVDB empowered by Achilles

The System Strength

The patented Neptune System optimises the principles and mechanics of force dispersal and utilises principles emanating from traditional engineering theory.

The diagrams to the right show the positions of stress when vertical and horizontal forces are applied

The outside bend of the fastest flowing river (3m depth) in the UK causes impact force of 23.4kN = 2.5tonne. If this river had a further 1 metre of depth the forces would increase by a further 7.6kN. The 100mm box section barrier can withstand 335kN = 34.2tonne of horizontal force

The force of a 9 metre wave in storm force conditions would exert a force of 27kN = 3tonne (Per square metre).The sea defence system (200mm box section) can withstand 652kN. The downward vertical force the system can withstand is 176.5N =18 tonne
Whilst competitors in the market focus on concrete solutions the Neptune System (made from machined or cast steel) is as effective, requires less lead time and has little land fill requirements.

The design used by Neptune allows multi-terrain assembly above/below ground or part below, reducing the need for excavation or need for aggregate

Assembly times are far shorter than other methods with only light machinery on site

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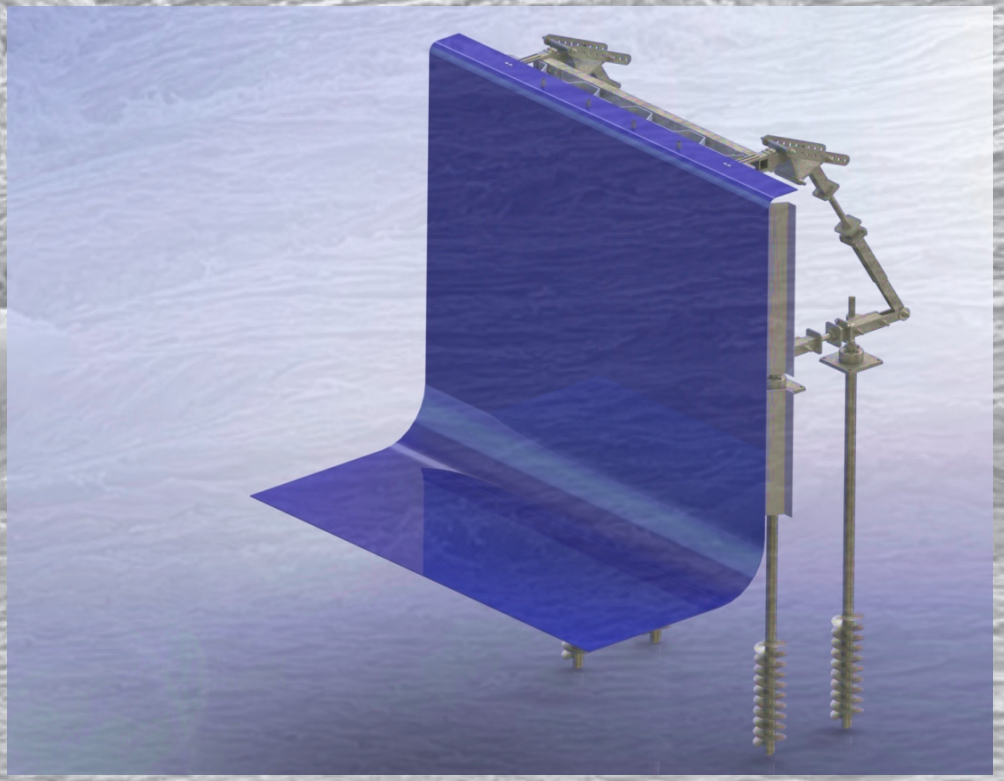

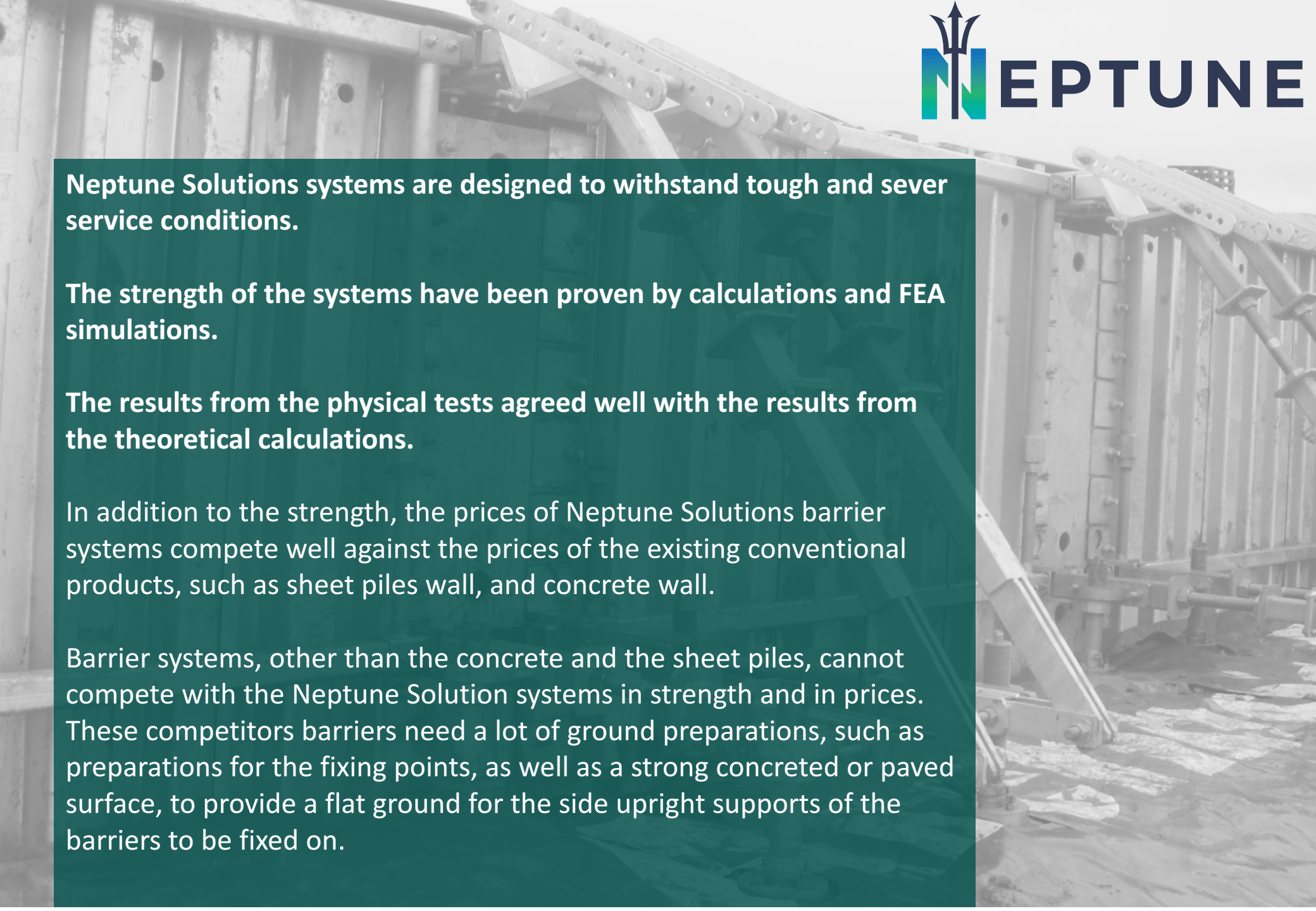

Neptune Solutions systems are designed to withstand tough and sever service conditions.

The strength of the systems have been proven by calculations and FEA simulations.

The results from the physical tests agreed well with the results from the theoretical calculations.

In addition to the strength, the prices of Neptune Solutions barrier systems compete well against the prices of the existing conventional products, such as sheet piles wall, and concrete wall.

Barrier systems, other than the concrete and the sheet piles, cannot compete with the Neptune Solution systems in strength and in prices. These competitors barriers need a lot of ground preparations, such as preparations for the fixing points, as well as a strong concreted or paved surface, to provide a flat ground for the side upright supports of the barriers to be fixed on.

Holding Tanks

Neptune Holding Tanks

Neptune Solutions retention device can be used to create a holding tank for liquid, oil & gas storage.

Other purposes may be used for:

- Aqueducts
- Silt traps
- Precipitation tanks
- Storm tanks
- Intervention tanks for temporary works.
- Wastewater treatment plant
- Fisheries
- Agricultural tanks

Aqueducts

Neptune Solutions Retention System can be used to create an aqueduct to move water across land.

The aqueducts can be built to any size to allow movement of water. The idea of the aqueduct is to be able to transfer water between villages where water is scarce.

Solar panels and water turbines can be installed to the system to allow free electricity to be generated and power the pumps required to keep the water flowing. The system can be used on any terrain and can be designed to go over hills.

Using the aqueduct and holding tank you can create a water treatment facility and store the fresh water for the towns and villages. All of this can be done without the use of concrete so it is ideal for areas where concrete is not an option.

Land Retention

Neptune Solutions retention device can be used for land slippages/slide prevention.

For example the front face of the medium barrier can withstand 220 tones' of pressure. The bigger the barrier the more pressure it can withstand.

Ideal uses for

- Railway network to prevent disruptions to service due to land slides
- Snow barriers
- Prevent rock falls on roads

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Land Retention

Power and Sub Stations

Neptune Protect Sub-Stations

Floods have significant impact on infrastructure such as electricity power sub-stations. The damage occurred to the sub-station in Walham in Gloucestershire is an example. The station provides power to local houses and businesses. Power failure in the sub-station cascades failures to dependent services, such as; water supply, health care, transportation, communication as well as emergency services.

At Neptune Solutions Global we have found an effective solution in protecting sub-stations. It is simply by using the Neptune Solutions barrier systems. The systems with their different sizes and strength can be installed and adapted to suit sites conditions.

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Power

Power Case Study

Case Study:

A sub-station gets flooded frequently in a year. The length of the protection line is 1000m perimeter. The height of the flood water can reach to 1.9m. The seepage water stops at a depth of 2m from the surface of the ground.

Two options are considered:

1 Sheet piles wall (0.6m width x 0.5m depth) 3m length is needed to be built along the perimeter. 2m of the 3m are to be pushed into the ground to stop the seepage water. Beside the sheet piles wall, a concrete wall is to be constructed with 2m height on the sheet piles and along the perimeter line. Therefore the length of the sheet piles in the ground need to have a minimum depth of 6m to support the concrete wall.

2 Is to build 3.0mx5.0m Neptune Solution barrier system wall along the perimeter. Unlike the conventional sheet piles, Neptune Solutions fill ups do not need to be pushed into the ground to a depth more than 2m.

ACTIVITY	TYPE OF WALL, 100M LENGTH	
	Sheet Piles + Concrete Wall, £	Neptune Solution Wall, £
Installing the 1000m length along the perimeter (£200/m depth sheet piles on the assumption to use small sizes, £2,450 per m for 1-2m height concrete wall, £2,500/m Neptune Solutions barrier)	1,999,920 (sheet piles) 2,450,000 (concrete wall)	2,500,000
Cladding	N/A	500,000
TOTAL	4,449,920	3,000,000

As we can see in the above table the cost saving in using the Neptune Solutions systems is substantial.

Although we are quite confident with our basic costs, there are a lot of associated costs in building the conventional sheet piles and the concrete wall, they have not considered in the total costs in above table.

This should increase their costs of the concrete wall further in comparison to using the Neptune Solutions systems.

Neptune Project Assistance

Neptune will work with specifiers, contractors and end-users to develop a solution to fit the project demands.
Our pre-contract services include:
- Pre-contract deign and specification
- Site surveys and soil analysis
- Fully compliant specification and engineering details
- Provision of approved subcontractors and installers

Our post contact services
- Warranty back to backed with specialist installers
- Periodic inspection, service and maintenance visits
- Periodic or on request staff training session (for rapid response installations)
- Defects liability and retention as per contract

All Neptune products have a design life of 50 years and are fully warranted to segue with your defects liability periods and anticipated development life span.

Frequently Asked Questions 1

Have the barrier systems been prototypes and built?
Yes, the systems have been built and prototyped.

How easy the assemble.
High skilled staff are not required to build the barriers. After short period of training the staff can build the barriers quickly. 4.5m x 5.0m barrier takes 4-6 hours to build. 1.0m x 1.5m barrier takes 20-30minutes to build.

Is it easy to transport?
Yes, each barrier can be transported as a complete unit or four main sub-assemblies which can be transported on a small lorry.

What is the relative costs in comparison to the conventional sheet piles or concrete?
There is substantial costs saving in using the Neptune Solutions systems in comparison to using conventional products like sheet piles and concrete. The cost saving is more than 30- 25% in comparison to using sheet piles, and more than 30% in comparison of using concrete walls. These percentages might vary little bit depending on the complexity of the project.

How does the system work as an interlock structure?
There are fill up plates between each two units. The fill ups are held by clamp plates which hold the plate to the barrier next to it. The barriers with the plates can form a continuous straight, curved or even angled walls.

Can you hid the structure of the barrier?
Yes, cladding is available to cover the barrier. It provides cosmetic look as well as security.

Can the barrier be fitted in tight spaces?
Yes, the back horizontal span in the structure of the barrier can be shortened to suit the available space.

Is the system completely sealed?
Yes, the system is water tight against leaks.

Is there a system/method for inspecting seals/joints construction?
Yes, visual and hand check can be done easily on the seal and the barrier.

Frequently Asked Questions 2

Can you build a tank from using the barriers?
Yes, you can build tanks of different sizes and shapes.

Can you build aqueducts from using the barriers?
Yes, you can build aqueducts with different sizes and shapes.

How do you seal the base of the tank?
Neptune Solutions has come up with a novel approach, it uses large and continuous rubber seal in a shape of the required tank. The base and sides of the tanks are supported with solid insulated layer.

Would the extreme temperatures cause problems to the modular approach of the barriers?
No, the expansion and contractions of the wall of barriers are accommodated for by leaving sufficient spaces between the barriers and fill ups.

Is there a typical assembly demonstration (time lapse video) available to demonstrate construction sequence?
Yes, Neptune Solution provides full training to main and sub-contractors to erect the system to the most efficient and effective ways.

What temporary supports are required?
Neptune Solution barrier systems do not require any temporary support systems, unlike the concrete option.

Are sizes of the sections used repeatable? Or they be spoke?
The section sizes which are used in building the barrier systems are conventional sections available in the market.

What is the factory and site QC?
Neptune Solutions subject all its suppliers to stringent roles and guide lines to meet the BS standards recommendations. All the suppliers have ISO 9005. Strick inspection regime is implemented to ensure high product quality and control. Certificates of Conformity are provided as part of the assurance package.

Is it true; Neptune Solutions systems will compete with the concrete option?
Depending on the complexity of the site, for sure Neptune Solutions systems do not require 29 days to become a solid structure. The largest barrier can take between 406hr to be erected.

Frequently Asked Questions 3

Do the system require lifting machineries?
Depending on the size of the system, availability of lifting machines will shorten the assembly time and make the process easy. However, the fact remains that all the systems can be erected by hands of few personal, especially in difficult and aquod locations.
What is the life span of the systems?
Depending on the requirements of the project, but typical life time is 75-100 years.

Will the systems require regular inspection and maintenance to retain the rigidity?
No, applying cladding on the system will provide sufficient security. Neptune Solutions has come up with a locking cladding system for this purpose. Planed routine checks are useful. There is no way the system will lose it strength or rigidity.

What corrosion protection is available (both internal and external)?
All components and parts are coated with special galvanising layer to protect the parts internal and external surfaces.

What is the costs of the tank using Neptune Solutions option comparing to the concrete option?
The costs of erecting Neptune Solutions tanks is £200/m^3, while the concrete is £500/m^3.

What are the typical lead times from paper to complete solution?
Depending on the complexity of the project, but Neptune Solution is committed to deliver solutions and plans within the required milestones and time scales.

Does UV light cause any degradation to the seal?
Neptune Solutions has range of products which are used to meet the specifications and demand of individual projects.

Do different systems vary in lead, assemble, and deconstruction?
Yes, and the time scales are mentioned in the points above.

How would you incorporate ancillaries in the tank?
All ancillaries can be accommodated for by providing special holes and windows in the walls of the tank (in the barriers) without compromising the structure of the tank.