



Unique Group

Buoyancy Solutions

RANGE OVERVIEW

Seaflex SeaSerpent™ Overview



Buoyancy & Ballast

www.uniquegroup.com

Seaflex SeaSerpent™ Overview

Continuous Support for Cables

Perfected and Patented

+ SeaSerpent™ is the safest, most effective and most flexible cable installation buoyancy system in the market, and has become the industry's system of choice for installing cables in shallow water. Efficiently replacing outmoded multiple floats to support a submarine cable during installation in shallow water, the patented SeaSerpent™ buoyancy system is a continuous inflatable tube directly attached to the cable at 1 to 1.2 metre spacing intervals to suit the cable weight.

Optimised for your Operation

+ Unlike traditional solid floats, with the SeaSerpent™ it is easy to park the cable on the seabed during adverse tide or weather conditions and to re-float it when required. SeaSerpent™ even allows you to easily lift and reposition a cable to hit a trench, impossible with traditional methods. Sections of cable can also be easily towed to installation sites several kilometres from the launch point.

SeaSerpent™ is generally supplied in 'lay flat' form tightly wound on a braked deployment drum mounted above the cable where it exits the cable engine; the SeaSerpent™ tube is inflated as it unspools and is attached to the cable just before the launch point. This allows rapid and near continuous deployment. A powered drum can then be used to recover the SeaSerpent™. For one-off applications, SeaSerpent™ can also be supplied on a simple timber drum if so required.

The SeaSerpent™ integrated system is not subject to the high attrition rate of traditional individual cable floats and saves a huge amount of deck space and manpower at the launch point. With only 1.5 square metres of deck space required to deck load a remarkable 1 kilometre of buoyancy, SeaSerpent™ reduces transport, storage, handling and replacement costs alongside its operational advantages of speed and control.

Unrivalled Support and Control

+ SeaSerpent™ support and control of the cable cannot be matched. Its key advantage is the operational flexibility it allows the installer; the easy launching procedure is followed by a progressive and controlled sinking sequence which can be started, slowed, or reversed by simple surface control, without subsea intervention.

The form stiffness developed by the SeaSerpent™ inflation pressure greatly decreases cable kinking tendencies, eliminates catenary sagging between floats and thereby removes the requirement to keep constant tension on the cable. This is a particular advantage when the cable contains sensitive fibre-optic elements.

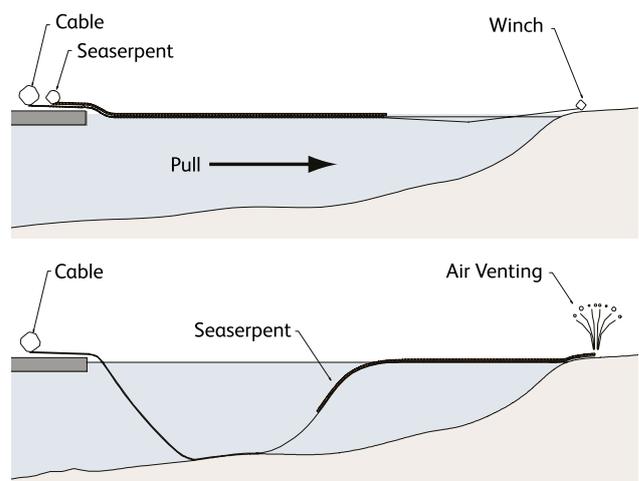
Customised SeaSerpents™ and Handling Systems

+ Most cable types and weights can be immediately addressed from stock using the standard SeaSerpent™ range, catering to up to 170kg of buoyancy per metre. However, in the unlikely event that your cable can't be covered by our standard range we will manufacture a SeaSerpent™ to suit your specific buoyancy requirement. SeaSerpent™ handling systems are available for hire, and customised launch and recovery systems can be built by us to a client's fabrication drawings.

On the Job Support

+ To assist our customers with the smooth operation of the SeaSerpent™, we are able to supply supervisory expertise from our own technicians - who have experience of working with the system on projects right around the world. Many of our SeaSerpent™ customers are now taking advantage of this service, to benefit from the efficiencies and the further cost-savings which result from having Seaflex expertise onboard their vessels.

The Controlled Way to Install Cables in Shallow Water



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Seaflex SeaSerpent™ Overview

Key Features and Benefits at a Glance

For Your Peace of Mind

- + Tested and proven to greater than 3:1 over maximum working pressure.
- + Supports cable fully and gently, with reduced risk of kinking.
- + No stress point loads.
- + 50% reserve buoyancy factor at maximum working depth.
- + Low capital cost.

For Your Ease of Operation

- + Surface control of the sinking process.
- + Can be towed at up to 5 knots.
- + Lift capacities from 40-170 kg/m.
- + Compact and therefore cost-effective to ship, store and deploy.
- + No need for excessive cable tension.
- + Eliminates loss of individual floats.
- + Systems can be supplied with Seaflex technicians, or we can train your people to use it efficiently themselves.
- + Payout speeds in excess of 10m/minute have been achieved.

Seaflex SeaSerpent Specifications

Type	Lay Flat Width	Inflated OD (mm)	Buoyancy Kg/m	Weight (Kg) 50m Section	100m Drum Diameter & Width
3000-4-13	355	226	40	43	770 x 450
3000-3-10	480	306	74	54	770 x 550
3000-2-7	730	465	170	76	770 x 800



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SeaSerpent™ Punctures

One of the 'frequently asked questions' about SeaSerpent™ is "What happens if we get a leak, do we lose the whole cable?" The answer is 'No' - and here's the reason why.

+ Imagine a 50kg SeaSerpent™, with a 25kg/m cable attached, is floating on the surface with a positive pressure inside the tube of 0.2 bar. In this state it is quite firm to the touch and if any part of it was pushed underwater, it would maintain inflation (and thus its buoyancy) down to a depth of 2m. Lets say the total water depth is 14m.

Now take a sharp knife and slash a big hole in the SeaSerpent™. The pressure immediately drops around the hole as air escapes, the buoyancy disappears and it starts to sink towards the seabed.

As the leak passes the 2m depth, the tube collapses and no more air can escape.

Although no more air is escaping, there is now a length of cable with no support which will sink to the seabed and continue to drag down more and more cable each side of it until the pressure rise inside the SeaSerpent caused by the decreasing volume is sufficient to support the cable down to a certain depth. The actual depth at which this happens is the same %age of the overall depth of water as the reserve factor of buoyancy.

This is because the reserve factor of 50% means one metre of 50kg/m SeaSerpent™ will support 2m of 25kg/m cable. So if the water is 14m deep only half this depth of SeaSerpent will be required to support the cable to the seabed i.e. a depth of 7m.

So if the SeaSerpent™ is ruptured for any reason, all is not lost although a fair length of cable may be on the seabed and the SeaSerpent remaining on the surface will have increased pressure to equal that of its lowest point of inflation, in this case 0.7bar.

To recover the situation, the damaged SeaSerpent™ section must be repaired, sealed or replaced, after which the portion of cable on the seabed can easily be raised by putting more air into the SeaSerpent™.

This will progressively lift the cable off the seabed and back to the surface.

While on the subject of problems - there is another point that should be mentioned - namely, the ties.

It is absolutely essential that these are strong enough and secured so that they cannot come undone. Any decent knot ensures the latter but the strength required can be under estimated if the bursting stress of the tube is not allowed for.

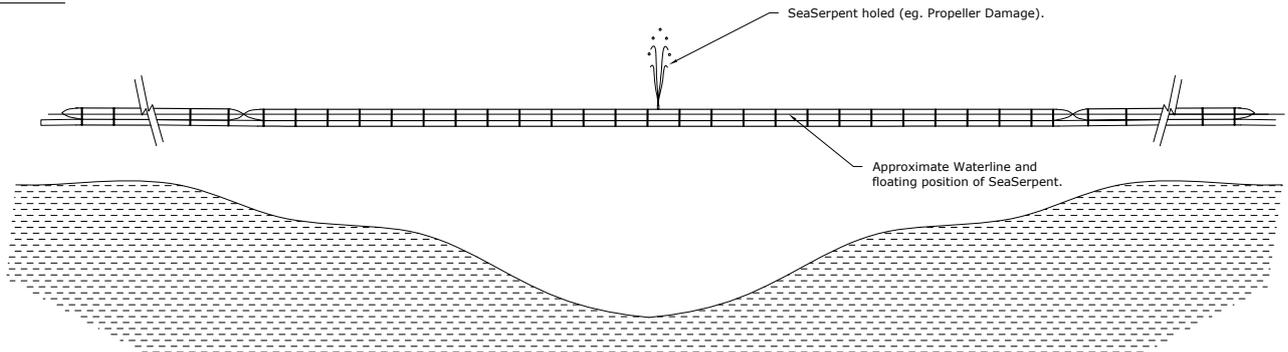
It is not enough to say the cable weighs 20kg/m, so a tie every metre only needs to accept this load. In the sinking situation above, the last two or three ties are supporting 7m of cable which should be allowed for, as well as the load created by the internal pressure in the tube. As a rule of thumb, a safety factor of at least 6:1 should be used. 8mm, 10mm or 12mm polypropylene rope is usually favoured.

Having said all this, to date we have no reports of a SeaSerpent™ that has suffered a rupture failure and only one case where inadequate ties caused a problem. Provided propellers are kept away from the tube, it is a very robust and tolerant piece of equipment and gives very few problems in service.

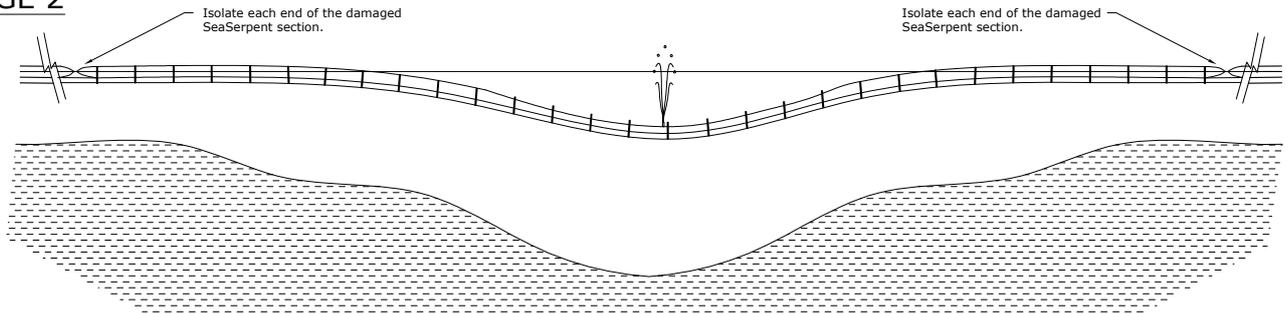


SeaSerpent Self-Sealing Puncture Recovery Process

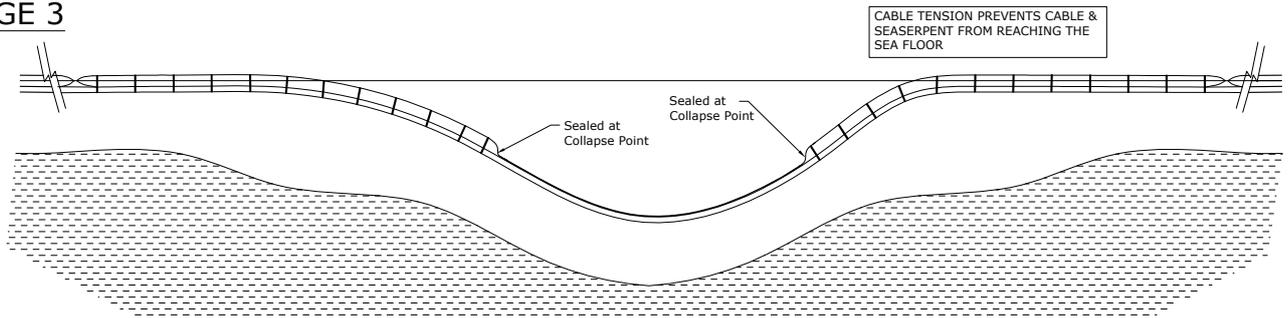
STAGE 1



STAGE 2



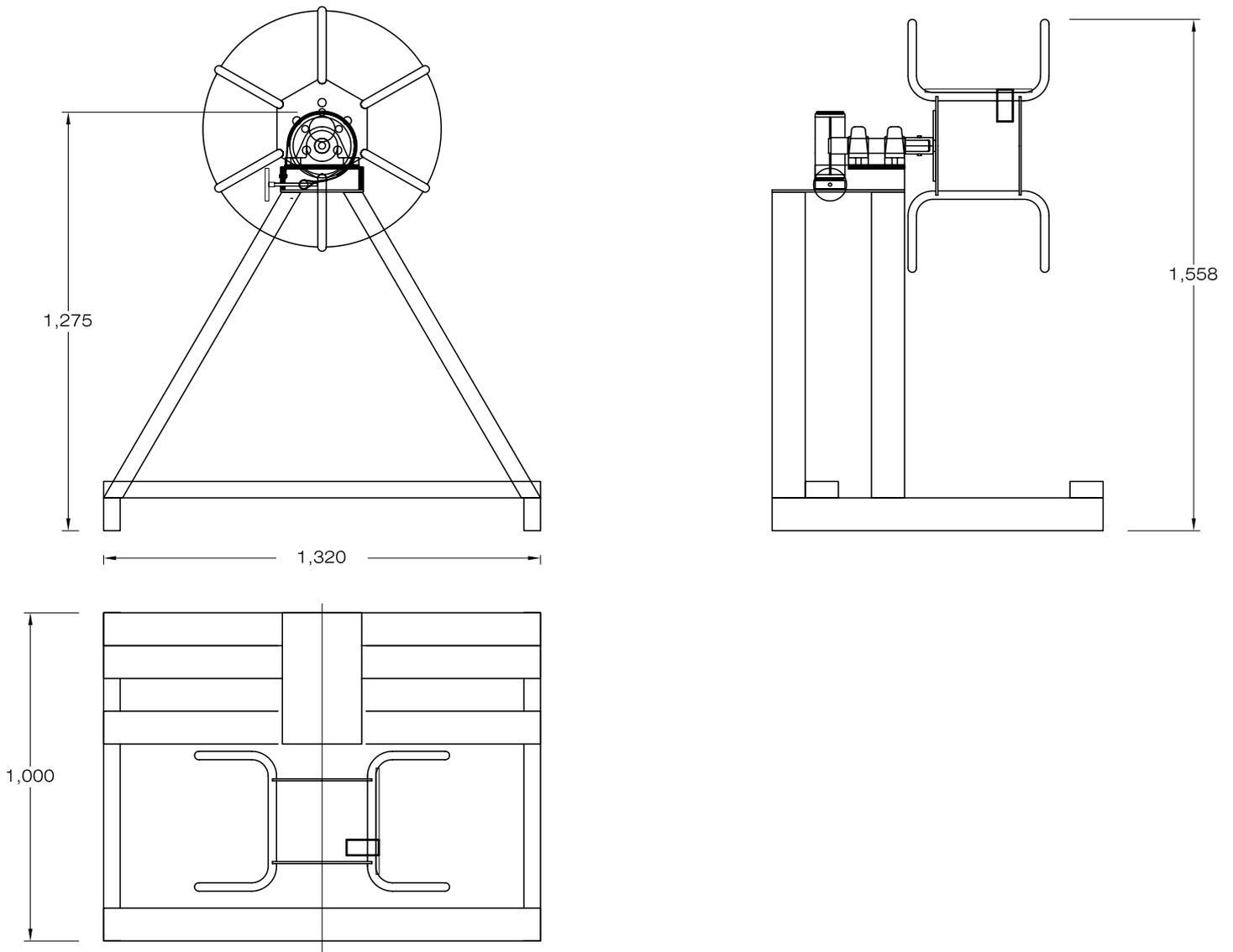
STAGE 3



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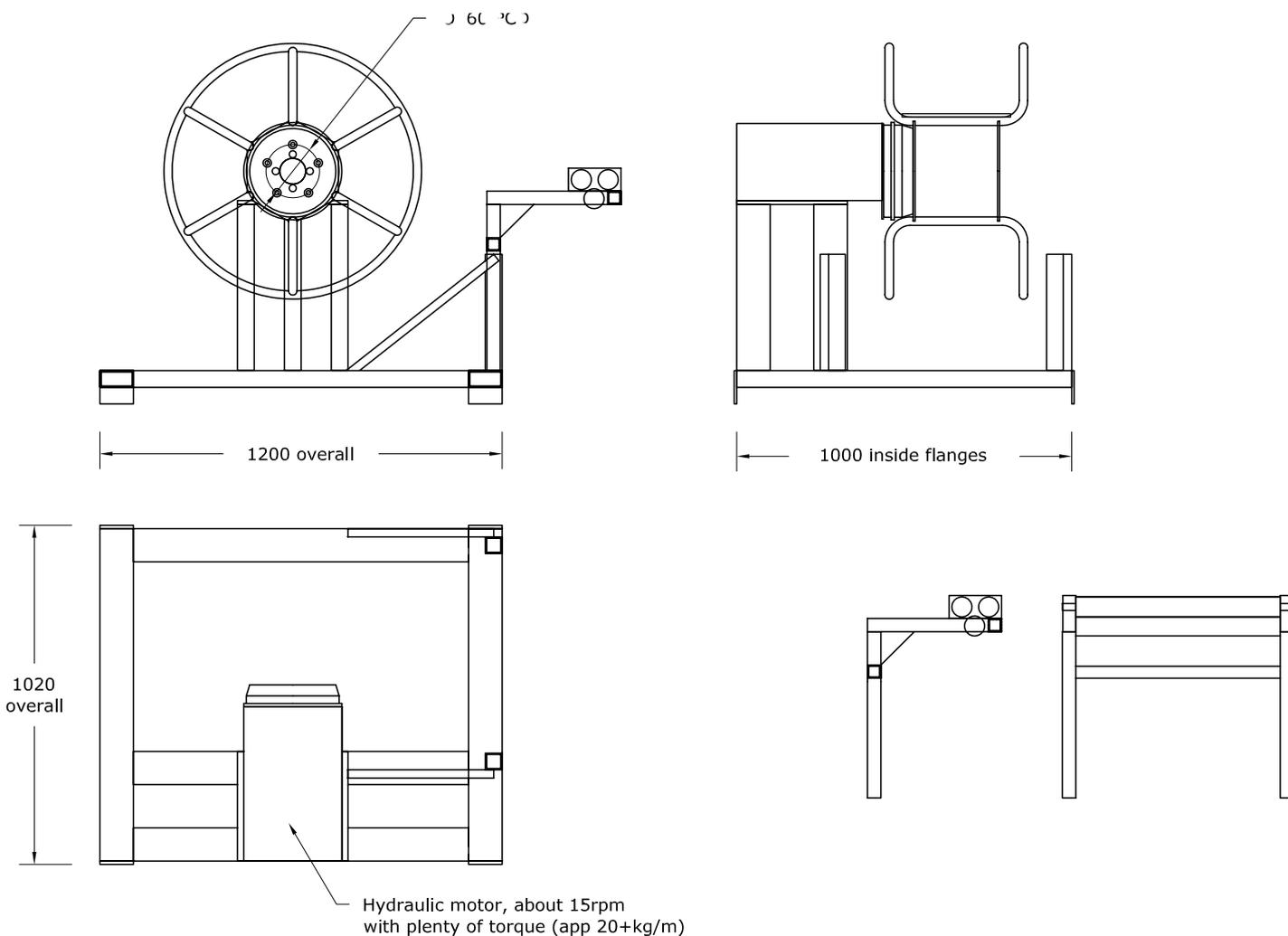
SeaSerpent Launch Pedestal



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SeaSerpent Recovery Pedestal

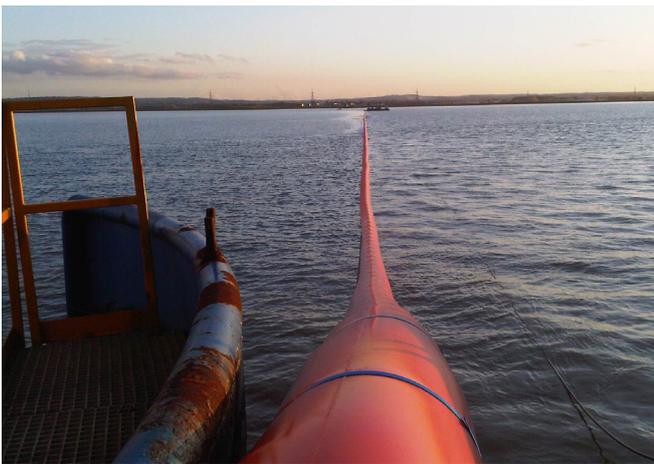


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Case Study

Channel Island Electricity Grid Project Submarine Cable Shore

Client : **VDS CABLE BV**

Operator : **CHANNEL ISLAND ELECTRICITY GRID**

Location : **GUERNSEY - JERSEY - FRANCE**

Water Depth : **0 - 35 MSW**

Project Overview

+ VDS Cable bv, a Dutch Submarine Cable Installation Contractor, was awarded the contract for the installation of 2 HVAC power cables and 2 (bundled) fibre optic cables by the Channel Island Electricity Grid. The submarine cables were installed between the Channel Islands Guernsey and Jersey, then on to mainland France.

The power cables were manufactured by ABB High Voltage Cables of Norway; the fibre optic cables were manufactured by Ericsson of Sweden. The VDS Cable Installation Vessel 'SEA SPIDER' was used for the installation and burial of the cables.

Due to large currents and tidal ranges, combined with restricted vessel access for the shore approaches, Seaflex was contracted by VDS Cable to supply their patented cable flotation system - SeaSerpent.

Seaflex Involvement

+ Seaflex Ltd. supplied 2000m of SeaSerpent cable flotation system Type 2350/2/10 giving a linear buoyancy of 106kg/m.

The SeaSerpent was supplied in 100m (16 off) and 50m (8 off) sections delivered on steel transport, deployment, recovery (TDR) drums. To complement the flotation system two pedestal deployment and recovery systems (DRS) were also supplied.

One manual brake DRS was stationed on the CLV SEA SPIDER for controlled deployment and one hydraulic DRS was stationed with the beach party.

For the start up of the project at Havelet Bay, Guernsey, Seaflex personnel were present to set up and initiate the first shore approach. During this first approach the cable was deployed at 260m per hour, 600m of SeaSerpent in total, cable towed to shore and laid in position within one tide. During the project the SeaSerpent spread was successfully used for a total of four HVAC and four F/O landings.



1. Early morning SeaSerpent equipment load-out on to CLV SEA SPIDER off Cowes, Isle of Wight.



2. SeaSerpent being attached to the HVAC cable showing Seaflex manual brake DRS.



3. The HVAC cable and SeaSerpent being deployed at Havelet Bay.



4. Small work boats are used to tow and position the cable.



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Case Study

Al Khalij Cable Shore Approach Project

Client : **HAMSTO SUBMARINE CABLE CONTRACTORS**

Operator : **ELF PETROLEUM QATAR**

Location : **HALUL ISLAND, GULF OF ARABIA**

Water Depth : **0-60 MSW**

Project Overview

- + As part of the Al Khalij oilfield offshore Qatar, Elf Petroleum Qatar (EPQ) required the installation of a submarine power cable between Halul Island and the DP1 platform, as well as DP1 platform to the wellhead platform.

Through EPQ's main contractor, NPCC, HAMSTO was awarded the contract for the loading, transport and installation of the submarine cables. All cable operations were undertaken from the DP cable lay vessel 'HAM602'. The cables were manufactured by ABB Norsk Kabel AS, Tongsberg, Norway.

Seaflex Involvement

- + Seaflex Ltd. supplied the patented cable flotation system, SeaSerpent, for the vessel to beach cable pull-in operation. The SeaSerpent flexible buoyancy, complete with deployment/recovery system, was delivered to the vessel ready for immediate use.

The complete system was seafastened in position before the vessel loaded the cable in Norway.

Once on location the SeaSerpent was successfully used to float the cable from the HAM602 in to the shallow water with the assistance of the lay vessel's MOB boat. Once at the landfall site the pulling wire was attached to the cable and pull-in operations commenced.

On completion of the pull-in, positioning and controlled lay-down was executed using SeaSerpent. The cable was positioned above the trench, running parallel to the pipeline, and by venting of the buoyancy from the shore end a controlled S-lay was performed.

Seaflex Equipment

- + **Type 2650/6/15 SeaSerpent**

Length: 500m (2 section of 250m)

Linear Buoyancy: 11kg per metre (cable @ 6.5kg/m)

Total Buoyancy: 5,500kg

- + **DRS System**

Seaflex Ltd. designed and fabricated the DRS (Deployment, Recovery and Storage) System in-house to the project requirements of the client. Steel drums with manual brake solution was provided to take a minimum deck footprint.



SeaSerpent in action.



SeaSerpent DRS system positioned on deck at aft overboarding station.



Halul Island, Qatar, Gulf of Arabia.



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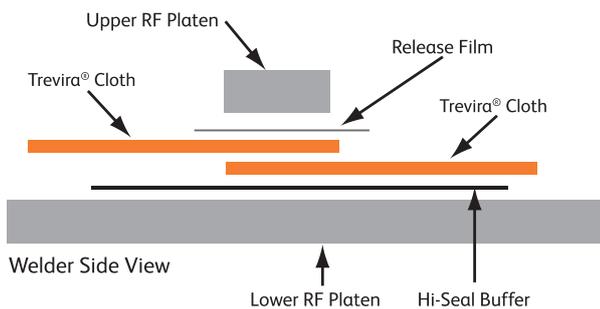
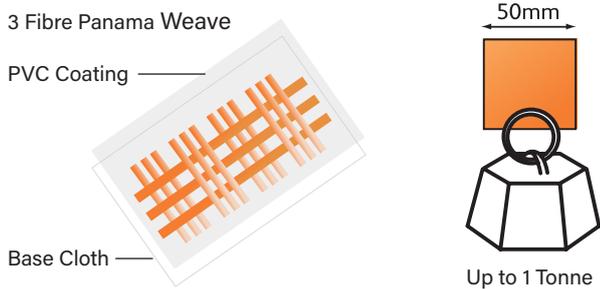
Technology, Service and Support

Manufacturing Technology

+ All Seaflex products are designed and manufactured in the UK. Our bag canopies are constructed from High Tensile Trevira® Polyester base cloth (either 2 /2 or 3 /3 fibre panama pattern weave) coated with heavy duty UV stabilised PVC coating or, for special applications, polyurethane. Trevira is incredibly strong; a 50 mm wide 3/3 strip has a break load of approximately 1 tonne. The panels for our bags are precision cut on our 15 metre long, 3 metre wide advanced automated table for perfect repeatability. Once inspected and approved panels are assembled by skilled personnel to using Radio Frequency welding to strict quality control standards.

Certification

+ All our work is carried out within a system which complies with the ISO 9001-2009 Quality Management Standard as audited by Lloyds Register Quality Assurance for full traceability – and we have now gained ISO 14001 and ISO 18001 accreditation.



Service

+ Whether for hire or sale, all Seaflex products are sent out fully tested and inspected against their build criteria. And we do also offer on-site support to our clients in the use of our products – this most often happens within the more complex buoyancy applications for our products.

In the event that your Seaflex product should suffer minor damage in service, we can supply an approved, boxed field service kit comprising of patches, a professional quality heat gun and instruction manual to make good minor leaks prior to product refurbishment.

We can also advise on the viability of carrying out more extensive repairs, which would typically be undertaken either at our factory or at one of our approved service centres.

Support

+ Our support philosophy is "Wherever, Whenever". This underlines the Seaflex commitment to not just sending out tested, proven products in proper shipping crates and with the most comprehensive documentation package in the business – but to assisting our customers in every way possible throughout their time using our products, whether the job is a hire project or an equipment sale.

We offer worldwide support to our customers via either email or phone from head office in the UK and via our ever-growing network of offices and partners around the world.

You can put your trust in Seaflex – we won't let you down.





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Unique Group's Buoyancy & Ballast products are available for hire or purchase from more than 20 other worldwide locations via our network of independent partners. Please contact us for more details.