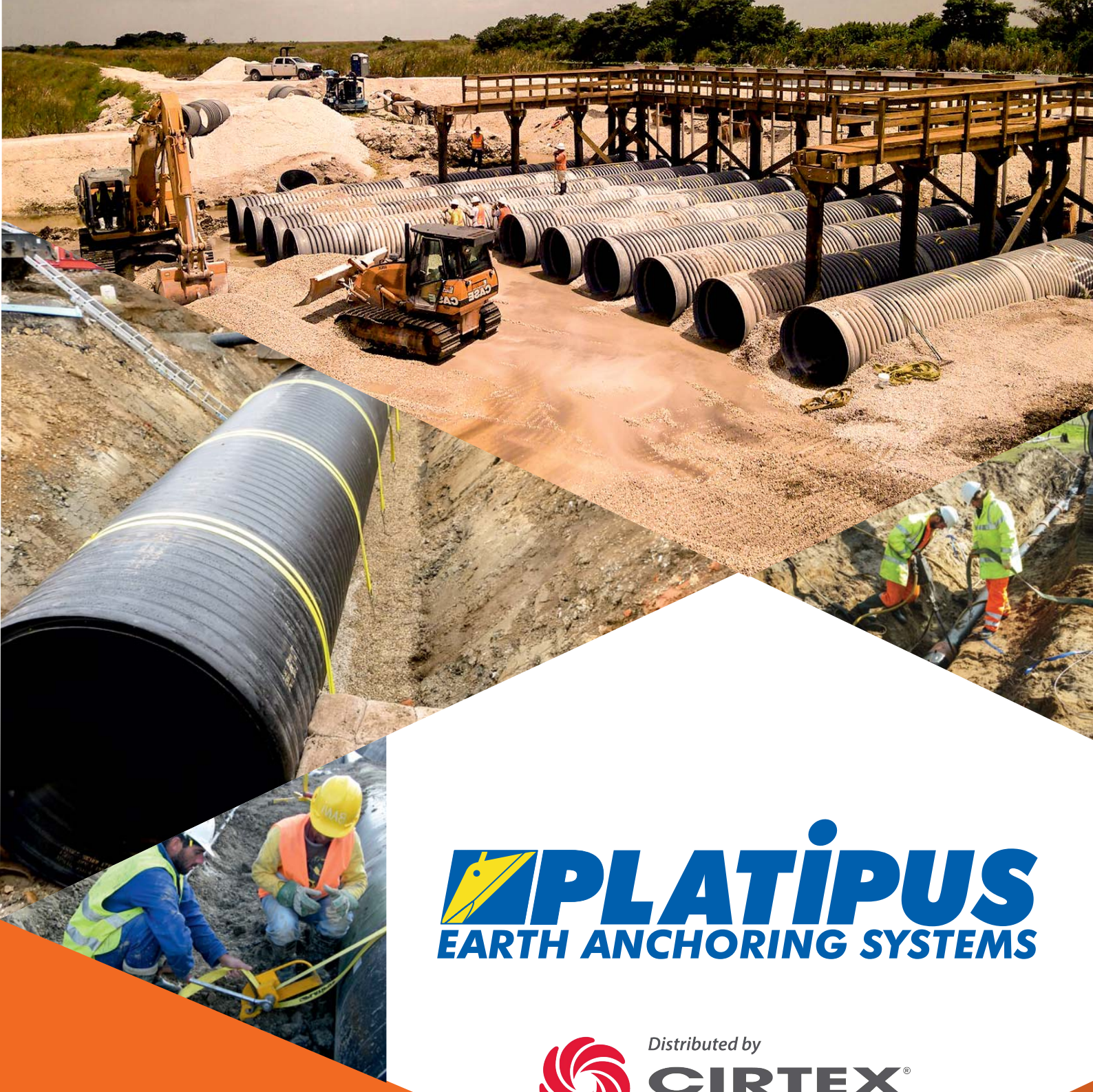


PLATIPUS
EARTH ANCHORING SYSTEMS

Distributed by
CIRTEX®
GAIN MORE GROUND

Pipeline Buoyancy

Brochure

INTRODUCTION

Platipus® Anchors are market leaders in the design, manufacture and supply of mechanical earth anchoring products. The company is renowned for providing some of the most innovative and cost-effective anchoring solutions for the Civil Engineering, Construction and Marine industries.

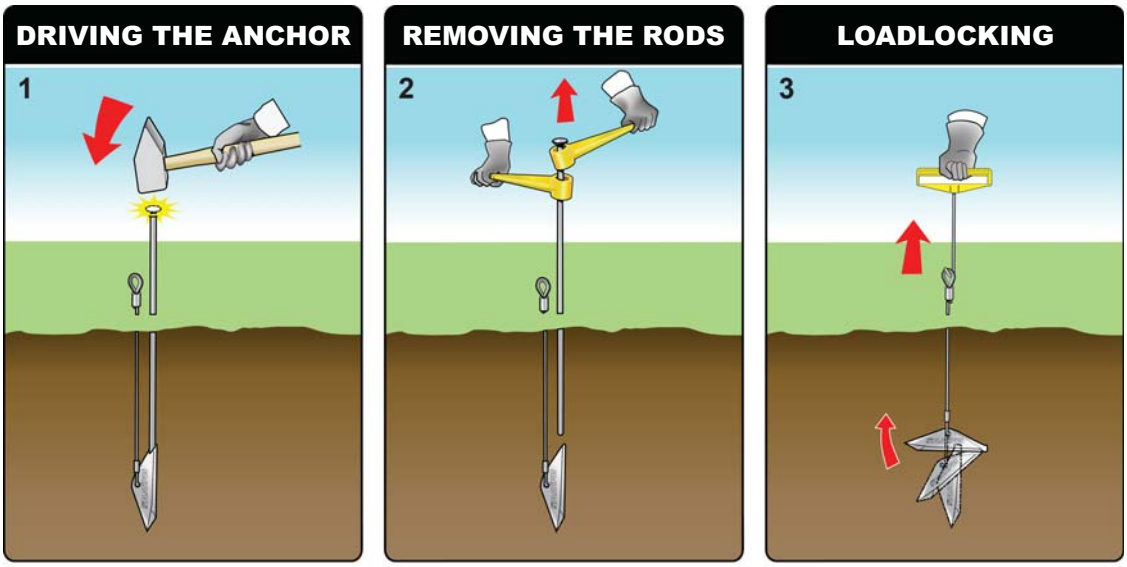
The percussion driven earth anchor (PDEA) is a unique, modern and versatile device that can be quickly installed in most displaceable ground conditions. It offers a lightweight corrosion resistant anchor that can be driven from ground level using conventional portable equipment. It creates minimal disturbance in the soil during installation; can be stressed to an exact holding capacity and made fully operational immediately. As a completely dry system it also has minimal impact on the environment.

KEY BENEFITS OF THE PLATIPUS® EARTH ANCHORING SYSTEM

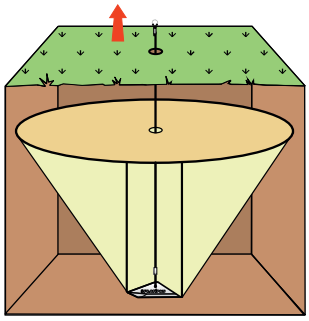
- Proven design solutions for buoyancy control of small & large pipelines
- Significant time & cost savings over concrete coating / set on / bolt on weights / bags
- Minimal environmental damage
- Proof testing of each anchor upon installation
- Application designed webbing for fast installation with no damage to pipes or their coating
- Installation before or after the pipe is laid
- No specialist installation equipment required
- Flexible anchor selection for varying soil conditions
- No Cathodic protection required

'SIMPLY' HOW A MECHANICAL ANCHOR WORKS

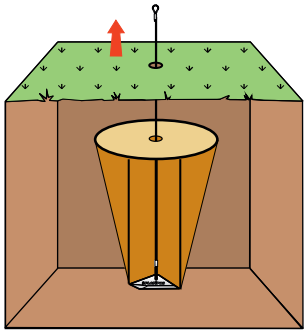
There are three steps to the installation of an anchor system:



STRESS DISTRIBUTION & BEARING CAPACITY



Granular Soil
(Based on Terzaghi's calculation)



Soft Cohesive Soil
(Based on Skempton's calculation)

The stress distribution in front of a loaded anchor can be modelled using foundation theory. The ultimate performance of an anchor within the soil is defined by the load at which the stress concentration immediately in front of the anchor exceeds the bearing capacity of the soil.

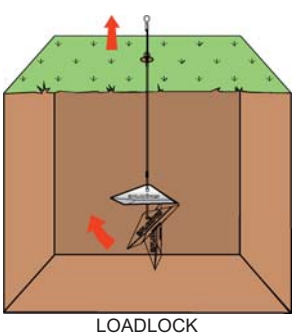
Factors that will affect the ultimate performance of the anchor include:-

- Shear angle of the soil
- Size of the anchor
- Depth of installation
- Submerged conditions

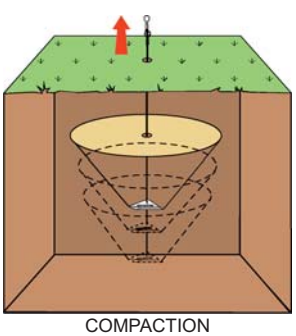
Platipus® anchors perform exceptionally well in a granular soil, displaying short loadlock and extension characteristics, a broad frustum of soil immediately in front of the anchor and extremely high loads.

Stiff cohesive soils, such as boulder clays, can also give outstanding results. However, weaker cohesive soils, like soft alluvial clays, can result in long loadlock and extension distances and a small frustum of soil in front of the anchor. Consequently these conditions require a larger size of anchor and if possible a deeper driven depth to achieve design loads.

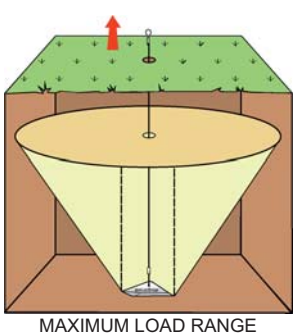
TYPICAL ANCHOR BEHAVIOUR



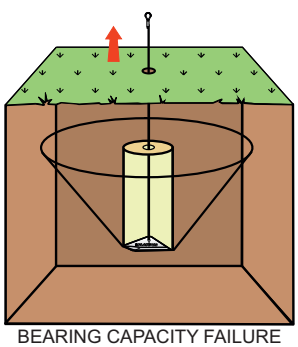
LOADLOCK



COMPACTION AND LOAD



MAXIMUM LOAD RANGE



BEARING CAPACITY FAILURE

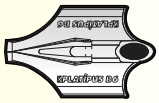
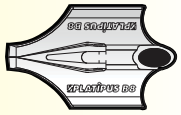
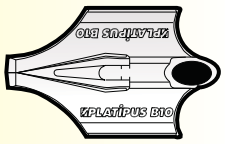
STEALTH & BAT ANCHORS

Stealth system

The Stealth anchor is designed to cover a wide range of lightweight anchoring solutions. Its chisel point and streamline shape make installation easy using simple hand tools.

We have designed two complete solutions with our S6 / S8 anchors combining them with our own tensioners and webbing.

Each set can be installed in a few minutes using hand tools.

ANCHOR TYPE	EYE / T-LOC VERSION	DIMENSIONS L x W x H (mm) (L x W x H - inches)	PROJECTED SURFACE AREA SQUARE mm (SQUARE inch)	MATERIALS	TYPICAL LOAD RANGE*	MINIMUM DRIVEN DEPTH
S6		171 x 58 x 50 (6.7 x 2.2 x 1.9)	8,200 (12.71)	Aluminium Alloy; SG Cast Iron; Bronze	5 - 25 kN (1100 - 5500 lbs)	0.8 - 1.2 m (2.5' - 3.5')
S8		263 x 90 x 76 (10.3 x 3.5 x 3)	19,555 (30.31)	SG Cast Iron; Bronze	10 - 40 kN (2200 - 8800 lbs)	1.1 - 1.5 m (3.5' - 5')
B4 Bat anchor		310 x 110 x 93 (12.2 x 4.3 x 3.6)	28,600 (44.33)	SG Cast Iron; Bronze	20 - 60+ kN (4400 - 13200 lbs)	1.5 - 2.5 m (5' - 8')
B6 Bat anchor		336 x 206 x 91 (13.2 x 8.1 x 3.6)	45,500 (70.52)	SG Cast Iron; Bronze	30 - 100+ kN (6600 - 22000 lbs)	2 - 3 m (6' - 10')
B8 Bat anchor		423 x 259 x 105 (16.6 x 10.2 x 4.1)	71,500 (110.82)	SG Cast Iron; Bronze	50 - 150+ kN (11000 - 33000 lbs)	3 - 4 m (10' - 13')
B10 Bat anchor		541 x 335 x 110 (21.3 x 13.2 x 4.3)	115,800 (179.49)	SG Cast Iron; Bronze	75 - 200+ kN (16500 - 44000 lbs)	4 - 5 m (13' - 16')

*The typical load range of an anchor is dependant on the engineering properties of the soil, from soft clays to compacted granular material and assumes non submerged conditions.

Bat system

The Bat anchor is designed to achieve higher loads and also enhanced anchoring in soft cohesive soils. Its ability to accept the T-Loc lower termination allows flexibility with regard to on-site anchor assembly and choice.

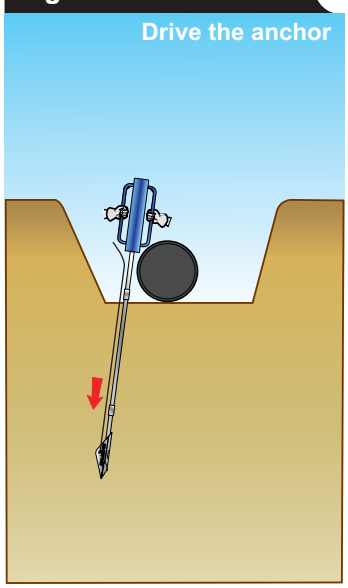
The installation equipment requires more powerful hand-held / machine mounted breakers and hydraulic loadlocking equipment.

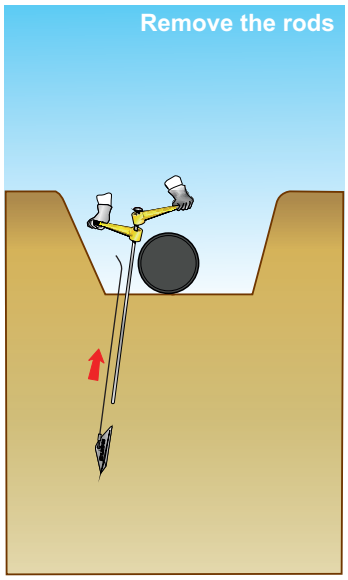
The options in this case cover four anchor head configurations and a different tensioner solution combined with a low impact webbing strap to remove both the need for cathodic protection and damage to the pipe coating.

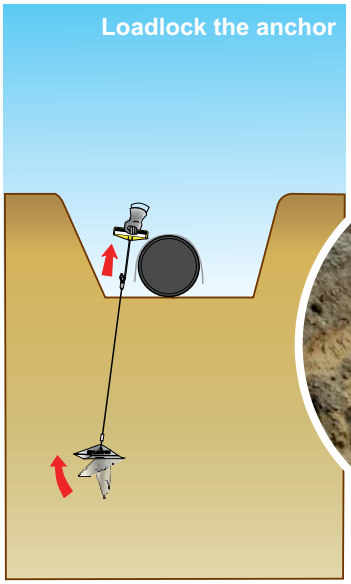
INSTALLATION

Anchor systems can be installed using a range of light, medium or heavy installation equipment. As the requirement for anchor size and placement depth increases it may be necessary to utilise more powerful equipment.

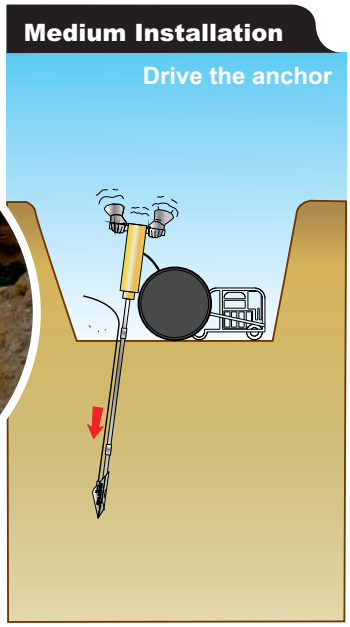
Light Installation

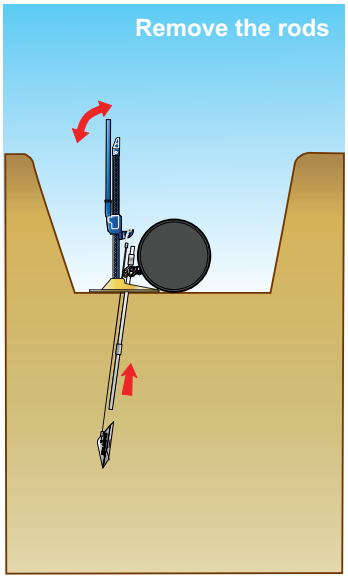


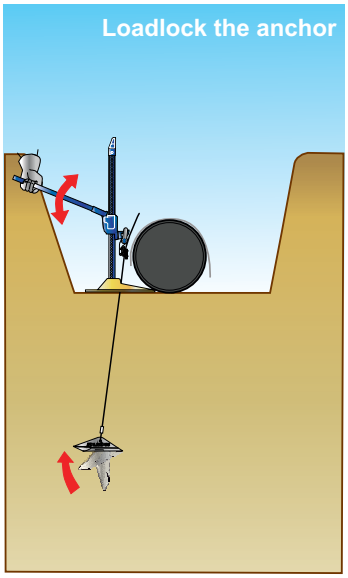




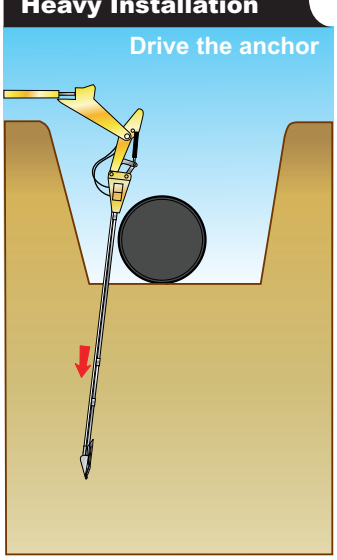
Medium Installation

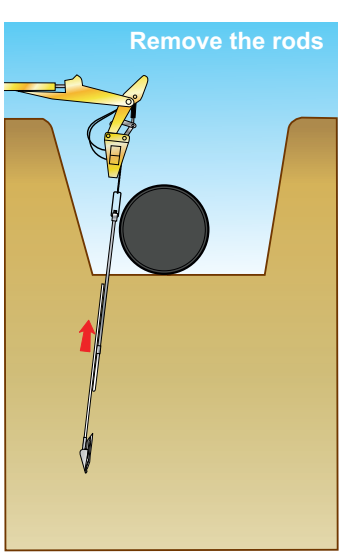


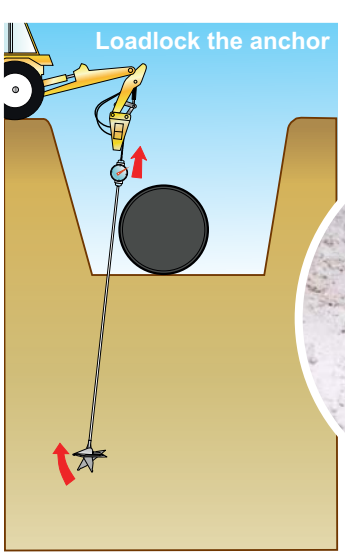




Heavy Installation







Case Study

GAZ DE FRANCE, CALAIS

Client: Gaz de France
Consultant: Typicon
Main Contractor & Anchor Installer: Denys

PROJECT SPECIFICATION

A 14km high pressure gas pipeline needed to be laid through the northern part of Calais. High water levels meant that buoyancy control measures were required to hold the pipeline in position. Conventional methods were considered too expensive so an alternative solution, with minimal environmental impact, was required.

SOLUTION

Extensive site tests were carried out, which determined three anchor sizes were needed to achieve the required load of 75kN. At calculated distances, anchors were installed either side of the 1m Ø pipeline, proof loaded and connected together using a specifically engineered tensioning system. Finally, the excavated soil was backfilled concealing all evidence of the pipeline.

Anchor System: B04TB, B06TB & B08TB aluminium bronze anchors c/w 5m & 8m of high strength polyaramid strap & stainless steel tensioning buckle.

Quantity: 3000 **Anchor Design Life:** 60yrs **Soil Type:** Wet sand

Case Study

MESQUITE STREET BY-PASS STORMWATER CIP IMPROVEMENTS

Location: Rockport, TX. **Engineer:** Lippke, Cartwright & Roberts, Inc. **Contractor:** J.J. Fox Construction, Inc.

PROJECT SPECIFICATION

The purpose of the project was to mitigate flooding in the area by improving drainage conveyance toward the Gulf of Mexico. The project required a combination of single and double barrel runs of triple wall 60" HDPE pipe in order to provide additional drainage capacity for the town of Rockport.

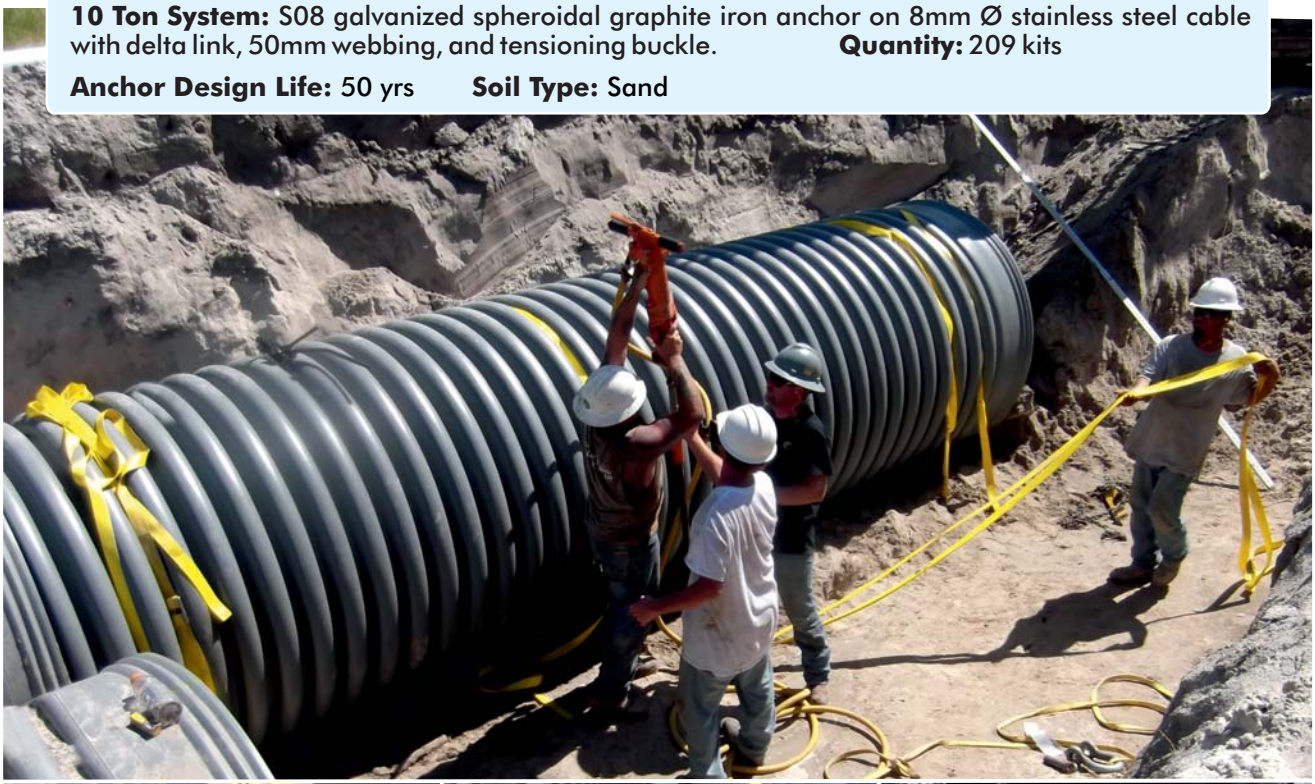
SOLUTION

Based on an engineered required load of up to 11,000 lbs per location, Platipus offered both 2 ton and 10 ton capacity anchor solutions, depending on the required loads in a particular area. The soil was a dense, well-compacted sand which allowed for high loads to be achieved. Approximately 270 pipe anchoring kits, or 540 anchors, were supplied over a 3-mile long drainage line. The anchors were installed with a traditional jack hammer. Each anchor was loadlocked and the load was recorded in order to field verify that the design load was achieved on-site. The ability to field-verify loads, in addition to the small amount of equipment required to install, allowed the Platipus system to be selected in lieu of a combination of poured concrete footings and stainless steel strapping mechanisms.

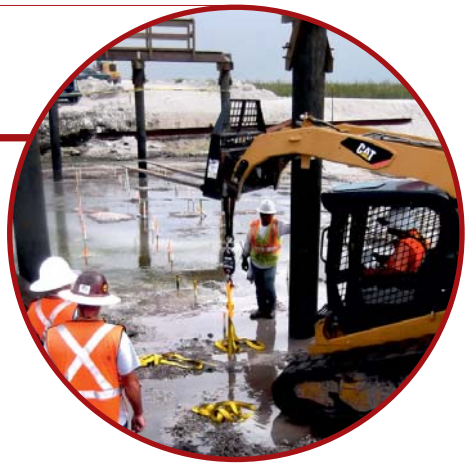
Pipeline Anchor System: 2 Ton System: S06 aluminum alloy anchor on 6mm Ø stainless steel cable with delta link, 35mm webbing, and strap tensioner. **Quantity:** 63 kits

10 Ton System: S08 galvanized spheroidal graphite iron anchor on 8mm Ø stainless steel cable with delta link, 50mm webbing, and tensioning buckle. **Quantity:** 209 kits

Anchor Design Life: 50 yrs **Soil Type:** Sand



Case Study



DECOMPARTMENTALIZATION & SHEETFLOW ENHANCEMENT OF WATER CONSERVATION AREA 3, MIAMI-DADE COUNTY, FLORIDA.

Client: U.S. Army Corps of Engineers
Contractor: Interlaken, Inc.

PROJECT SPECIFICATION

The Water Conservation Area 3 (WCA-3) Decompartmentalization and Sheetflow Enhancement Project (Decomp Project) is designed to restore the natural ecology and hydrology of the WCA-3 portion on the Everglades. The project required 10 parallel runs of triple wall 60" Ø HDPE pipe in order to provide flow equalization between the two sides of a levee that runs north and south through the Everglades. The pipes had to be strapped down in order to prevent floatation during large storm events.

SOLUTION

Based on an engineered required load of 12,000 lbs per location, Platipus offered a 10 ton ultimate capacity anchor system that was composed of S8 galvanized spheroidal graphite iron anchors and a combination of 8mm stainless steel wire cable and 50mm nylon webbing. The predominate soil types present on site were solid limerock at the surface and a dense sand layer beneath. Pilot holes had to be drilled through the limerock in order to drive the anchors to the required depth. Sixty pipe anchoring kits, or 120 anchors, were installed in 3 days. The anchors were driven and loadlocked, the pipe was placed, and then the webbing and buckles were installed. This process was much faster than other competitive systems that involve forming and pouring concrete or filling and placing multiple sand bags over the pipes.

Pipeline 10 Ton Anchor System: S08EC galvanized spheroidal graphite iron anchor on 8mm Ø stainless steel cable with delta link, 50mm webbing, and tensioning buckle.

Quantity: 60 kits **Design Life:** 50 yrs **Soil Type:** Sand/Limestone

Case Study

OUTFALL PIPELINE - ISLE OF LEWIS

Client: Scottish Water
Consultant: Allen Gordon, Inverness
Contractor & Anchor Installer: Bardon Hebrides Ltd - Aggregate Industries UK Ltd

PROJECT SPECIFICATION

Due to localised shallow slip failures and ground movement along this stretch of the coastline the existing outfall pipeline had in places fractured and broken causing leakage of the pipe contents. This leakage into the surrounding ground promoted further erosion and movement and increased the damage to the pipe and the surrounding area.

SOLUTION

Complete replacement of this 700m long section of pipeline using a 280mm diameter HPPE product was deemed the most cost effective long term solution. To prevent the same fate affecting this new pipeline it was securely anchored into the bottom of a new trench at a depth below any future expected slope failure. Working with limited access the anchors provided a quick and easy way of securing the pipeline. The solution removed the requirement for concrete anchor blocks and minimised the need for machine traffic on site, reducing the damage to the surrounding machair grassland. Once the trench was backfilled S2Geo System anchors were used to secure a MacMatR geosynthetic to minimise any surface erosion and to quickly aid vegetation regeneration.

Anchor System: Pipeline - S06EB aluminium bronze anchor c/w 2m of 6mm Ø stainless steel wire tendon, 25mm wide polypropylene webbing strap and stainless steel ratchet fixing. Erosion Control - S2 Geo System c/w 0.6m of 3mm Ø stainless steel wire tendon, 90mm Ø polyethylene plate & copper swage.

Quantity: Pipeline: 90 sets, Erosion Control: 100 **Design Life:** 120 yrs **Soil Type:** Sandy/Clay

INSTALLATION INSTRUCTIONS FOR LARGE PIPELINE SOLUTIONS

1 Using the Platipus Power Drive Rod (PDR) drive the anchors to the required / engineered depth using suitable installation equipment.

2 Remove the Drive Rod by hand or by using the Rod Removers (RR1) which are useful if the rod is jammed in the hole.

3 Using the Strap Setting Tool wrap the strap as depicted in the photograph and then loadlock and proof test the anchor using a suitable lifting device.

4 Thread the strap into both buckles as shown below. Place the Tensioning Tool under the strap on the pipe on one side and secure by engaging the lever / knurled cylinder against the strap. Thread the loose end into the Tensioning Bar as shown.

5 Tighten by hand until the strap is tight around the drum.

6 Place the Socket and Torque Wrench on the nut and continue to tension until tight or to the engineered torque / load setting. Remove the tool by releasing both straps, cut off strap as required. Repeat on the other buckle if required.

INSTALLATION INSTRUCTIONS FOR SMALL PIPELINE SOLUTIONS

1 Using the suitable Platipus® Hand Drive Rod (HDR) or Power Drive Rod (PDR) drive the Anchors into the ground to the required installation depth or so that the D-Ring is just above the surface.

2 You can invert the postrammer to complete the hand driving, then remove the rod by hand or by using the Rod Removers (RR1) which are useful if the Drive Rods become stuck.

3 Using the Platipus® Plati-Hook (PH1) loadlock the Anchor into its full working position by applying a load to the wire tendon. You can also apply an additional load by passing the drive rod through the handle with an extra person.

4 Thread the strap over the pipe and through each D-Ring and bring both ends to the top of the pipe. Place the tensioner on the top of the pipe and thread each strap through the frame body locators and then pass through the centre of the wheel body. Cut the excess strap off ensuring all the play is removed in the system first.

5 Leave about 5cm / 2 inches each side, then rotate the wheel by hand until the straps tighten together.

6 Place the Tension Lever (TL1S / TL2S) on the tensioner and tighten until satisfied, ensuring that the locking pin is fully located after the final adjustment, cut any surplus material away.

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PLATIPUS
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