



 **PLATIPUS**  
*EARTH ANCHORING SYSTEMS*

# Photovoltaic Applications

Brochure

# INTRODUCTION TO PDEA<sup>®</sup>

## Percussion Driven Earth Anchors

Platipus<sup>®</sup> have over 37 years of experience in the design, manufacture and supply of Percussion Driven Earth Anchors (PDEA<sup>®</sup>) for a wide variety of market sectors.

Our PDEA<sup>®</sup> systems outperform conventional methods of stay anchoring and utilise low cost, lightweight, portable installation equipment, most of which is readily available worldwide.

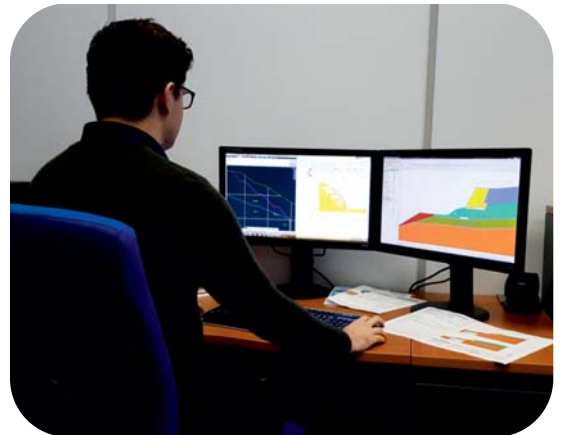
Key Benefits include:

- No excavation, saving time, labour and money.
- No danger of working in deep unshuttered holes.
- The anchor drives directly into undisturbed soil.
- The use of lightweight portable tools means multiple anchor installations can be achieved quickly by a crew of two.
- Every anchor can be proof tested to confirm the actual load.

## TECHNICAL GUIDANCE & SUPPORT

With thousands of successful projects worldwide we offer pre-contract site evaluation and anchor testing together with on-site training and support. In addition, we are able to provide real time technical guidance at all stages of the anchor system design and installation process allowing for greater engineering confidence.

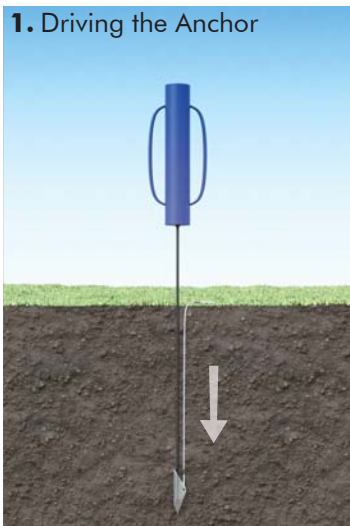
As part of our commitment to offer a complete package, a non-chargeable Conceptual Proposal outlining possible anchoring solutions, suitable for your project, can be provided complying to relevant standards, where applicable.



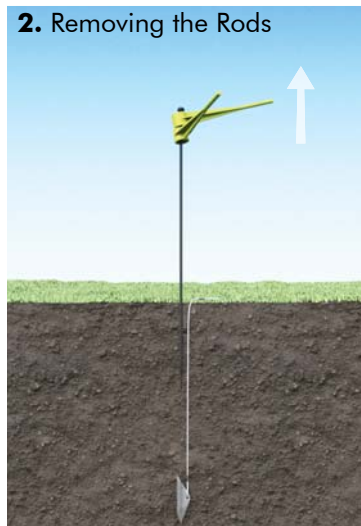
## 'SIMPLY' HOW A MECHANICAL ANCHOR WORKS

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

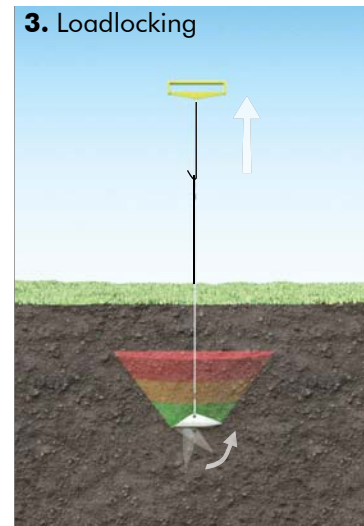
**1. Driving the Anchor**



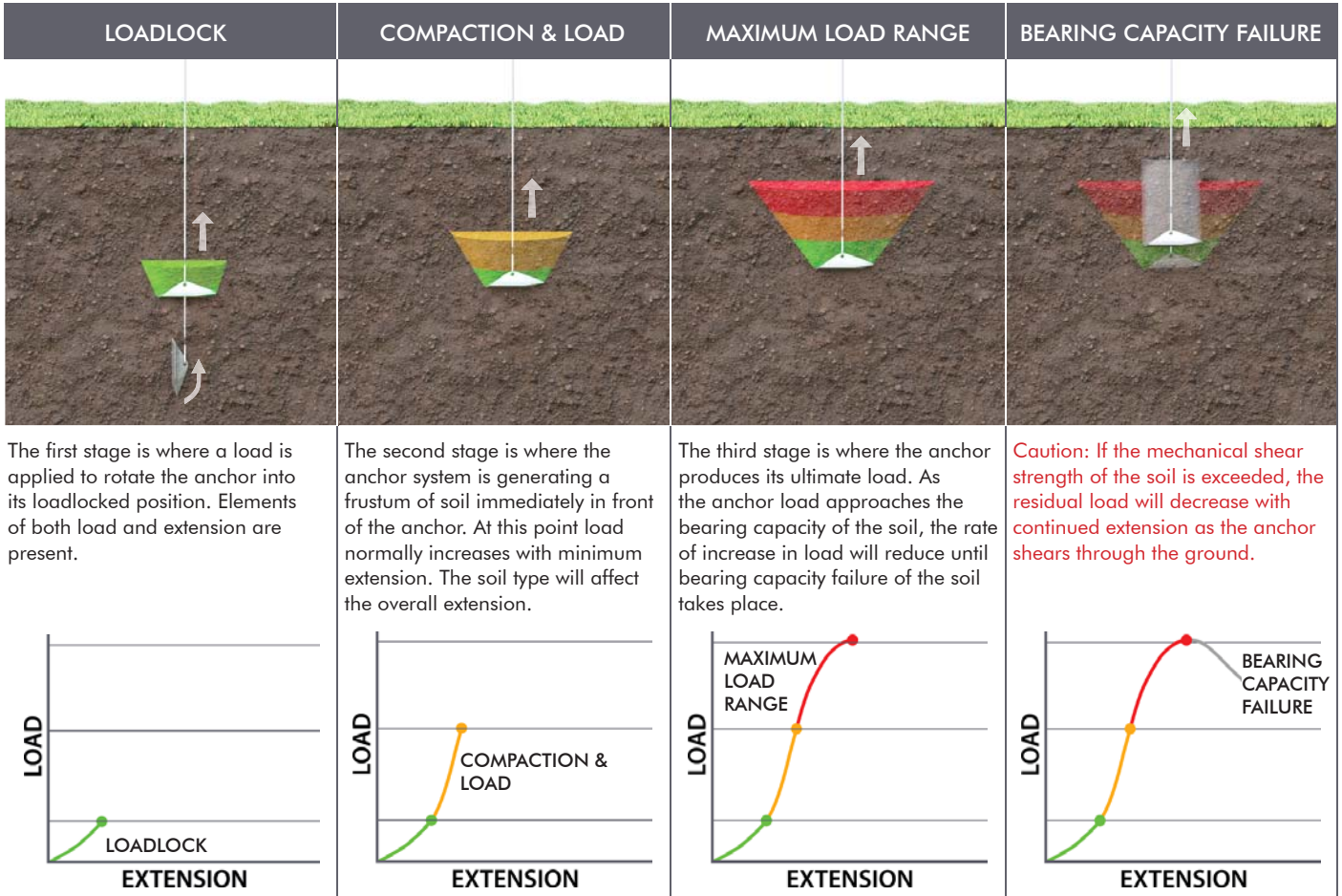
**2. Removing the Rods**



**3. Loadlocking**



# TYPICAL ANCHOR BEHAVIOUR



## SITE ANALYSIS & LOAD TEST REPORT



With the correct soil information we are able to predict holding capacities of our earth anchors. In circumstances where soil information is not readily available we recommend that a site analysis and load test report is completed.

The information recorded on this report will create an accurate picture of the site's condition and the exact capabilities of the anchor system. It will also identify other important considerations such as accessibility and installation times.

# STEALTH ANCHOR



The 'Stealth' anchor is designed to cover a wide range of lightweight anchoring. Its chisel drive point and streamline shape makes installation easy, in most cases, using simple hand or power tools. This also makes it an ideal choice when working in areas with restricted access.



Each anchor can be supplied with either wire tendon or rod.

ANCHOR TYPE	EYE 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		
							Wire	Rod
<b>S4</b>		121 x 41 x 34 (4.76 x 1.61 x 1.33)	4,127 (6.39)	Aluminium Alloy	1 - 10 kN (220 - 2200lbs)	0.6 - 0.75m (2' - 2.5')	✓	✗
<b>S6</b>		171 x 58 x 50 (6.73 x 2.28 x 1.96)	8,200 (12.71)	Aluminium Alloy	5 - 25 kN (1100 - 5500lbs)	0.8 - 1.2m (2.5' - 3.5')	✓	✓
				SG Cast Iron	5 - 50 kN (1100 - 11000lbs)	1.2 - 1.5m (3.5' - 5')	✓	✓
<b>S8</b>		263 x 90 x 76 (10.35 x 3.54 x 2.99)	19,555 (30.31)	SG Cast Iron	10 - 70 kN (2200 - 15700lbs)	1.5 - 2.0m (5' - 6'6")	✓	✓

# BAT ANCHOR



The 'Bat' anchor is designed to achieve higher loads and also enhance anchoring in soft cohesive soils. Its ability to accept the T-Loc lower termination allows flexibility with regard to on-site anchor system assembly. It also means it can accept a wide range of solid rods.



Installation requires more powerful hand-held hydraulic breakers or, in some cases, a wheeled or tracked excavator with a percussive breaker attachment.

ANCHOR TYPE	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		
							Wire	Rod
<b>B4</b>		310 x 110 x 93 (12.2 x 4.3 x 3.6)	28,600 (44.33)	SG Cast Iron	20 - 100+ kN (4400 - 22400 lbs)	1.5 - 2.5m (5' - 8')	✓	✓
<b>B6</b>		336 x 206 x 91 (13.22 x 8.11 x 3.58)	45,500 (70.52)	SG Cast Iron	30 - 120+ kN (6600 - 26900 lbs)	2 - 3m (6' - 10')	✓	✓
<b>B8</b>		423 x 259 x 105 (16.65 x 10.19 x 4.13)	71,500 (110.82)	SG Cast Iron	50 - 150+ kN (11000 - 33000 lbs)	3 - 4m (10' - 13')	✓	✓
<b>B10</b>		541 x 335 x 110 (21.29 x 13.18 x 4.33)	115,800 (179.49)	SG Cast Iron	75 - 200+ kN (16500 - 44000 lbs)	4 - 5m (13' - 16')	✓	✓

4 \*The typical load range of an anchor is dependant on the engineering properties of the soil.

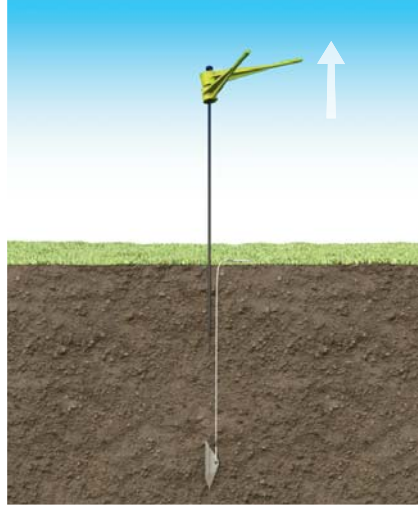
# INSTALLATION, EQUIPMENT & TOOLS

## LIGHT INSTALLATION

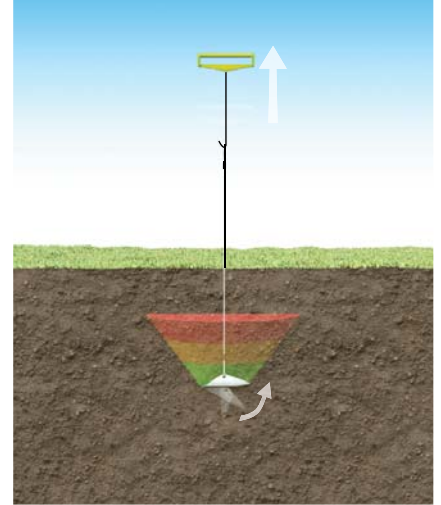
Drive the Anchor



Remove the Rods

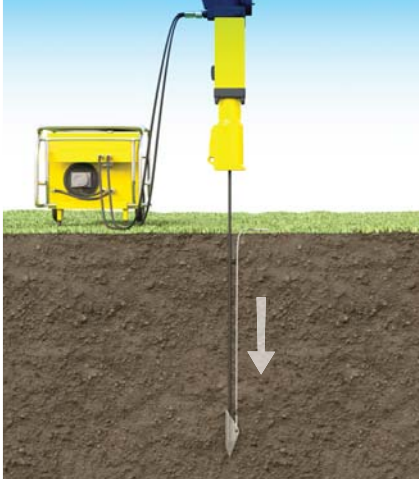


Loadlock the Anchor

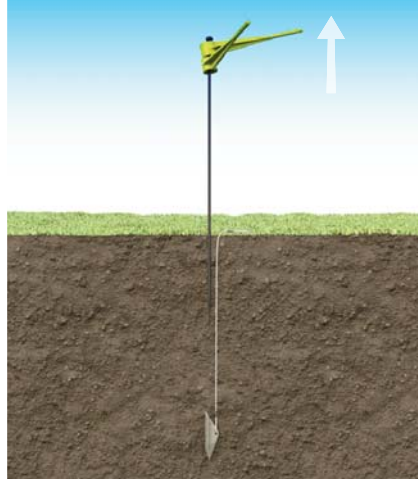


## MEDIUM INSTALLATION

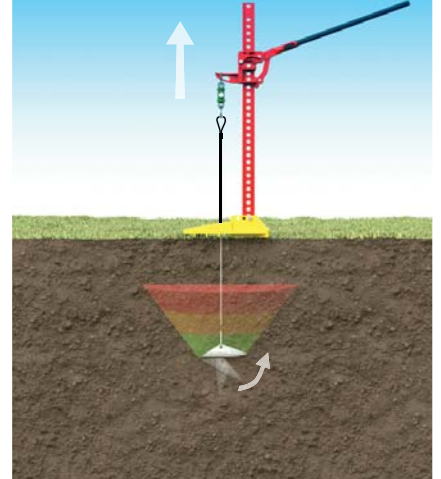
Drive the Anchor



Remove the Rods

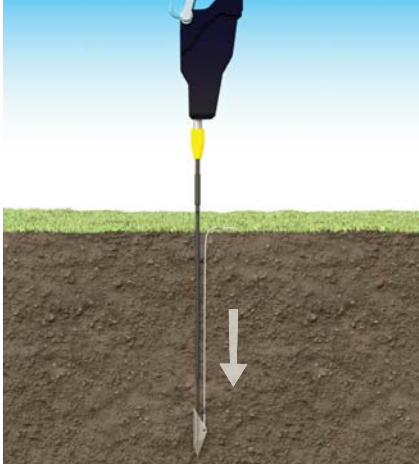


Loadlock the Anchor

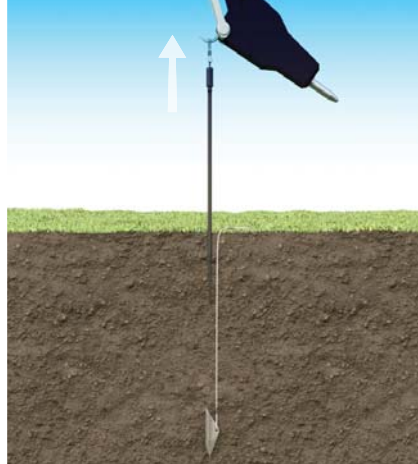


## HEAVY INSTALLATION

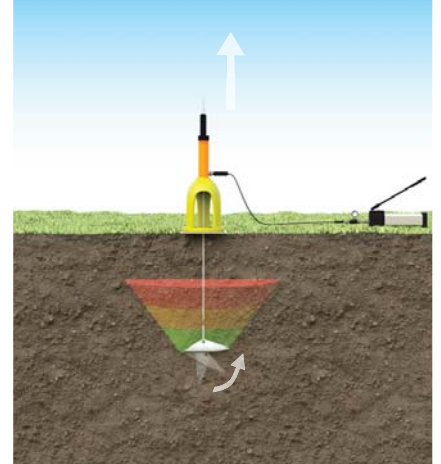
Drive the Anchor



Remove the Rods



Loadlock the Anchor



## GROUND MOUNTED

While rooftop solar arrays are the most common, there are many reasons to consider a ground mounted solar panel system. They are easy to place on open land; can be set at the perfect angle to optimize energy production and are extremely easy to access for cleaning and maintenance. To ensure ground mounted systems are secure and protected from uplift Platipus has developed a range of standard anchoring solutions for most frame designs and are suitable for small (kW) arrays and large (MW) solar parks.



## RETRO-FIT

In situations where traditional foundation solutions have failed or are failing, due to incorrect installation or unsuitable ground conditions, a selection of bespoke wire stay solutions are available to help stabilize the array and provide additional support to uplift. These standard retro-fit systems can quickly connect the array to a Platipus anchor. This typically consists of a stainless steel wire tendon and a simple tensioner which can be tailored to suit most frames, soil conditions and design life.



## OFF-GRID

Platipus ground anchors are perfectly suited for most off-grid and standalone systems. The anchors can be easily installed by hand with simple tools and unskilled labour, removing the need for specialised equipment. The anchors are available in a range of system configurations to suit temporary and permanent applications. As the anchor system and installation equipment are lightweight and compact, transportation costs are also greatly reduced.



## FLOATING SOLAR

Floating solar arrays are a direct response to the lack of space. They preserve valuable land and represent a serious alternative to ground mounted PV systems. As directional change of solar panels can reduce electricity production it is critical that a floating solar array has some form of directional control mooring system to remain in a parked position. Platipus can provide bespoke anchoring systems that secure any size of floating array to the shoreline or bed and are adaptable to many potential floating solar applications like hydroelectric dams, water-treatment plants, irrigation ponds and quarry lakes.



# CASE STUDY

Redbridge Road Solar Park (7.2MW) - Dorset



## Project Specification

This large 7.2MW solar park was to be constructed on an old landfill site in Dorset as an extension to an existing 5MW park. The single pile mounting system used during the construction of the first 5MW site proved ineffective and initial pile investigations on the new site revealed similarly poor performance. The challenge was then to find an alternative foundation solution to make the project viable in these challenging ground conditions.

## Solution

Anchor tests were carried out across the site which proved the small S6 anchor was ideally suited to provide a load of 10kN making it the Contractors preferred choice. Using tracked drilling rigs, the 2 Drillcorp installation teams were able to rapidly install, loadlock and proof test each of the 3727 stainless steel anchor systems within the required 15 working days. The unique H-Frame mounting system produced by Corbin Industries halved the overall anchor quantities required making it the perfect choice to complete this expansive array.



Anchor System: S6PV1S2M

Quantity: 3727

Design Life: 25 yrs

Soil Type: Landfill rubble

# CASE STUDY

Crossways Solar Park (5MW) Retro-Fit - Dorset



## Project Specification

This large 5MW array was completed using a single pile mounting system. Due to the varied ground conditions on this landfill site, the pile system originally specified was unable to provide the required pull-out loads. The Consultant determined that additional support was needed to prevent the uplift effects of high wind on this exposed rural site.

## Solution

Tests were carried out at 10 locations across the site to determine the anchors performance in these challenging ground conditions. The Consultant calculated a required load of 7.5kN which was comfortably achieved using the small S6 anchor, making it the specified choice for the project. The anchors were rapidly installed, loadlocked and proof tested to 9kN using a combination of piling-rigs, already on site, and handheld hydraulic breakers. A variety of bespoke stainless steel single, double and triple post solutions, including a unique Revolution tensioner, were used to secure the frame to each anchor point.



Anchor System: S6 & end post solutions

Quantity: 2629

Design Life: 25 yrs

Soil Type: Landfill rubble

# CASE STUDY

## Off Grid - Tanzania



### Project Specification

These unique off-grid arrays were to be installed in multiple rural locations, mainly within Africa. One of the key criteria was for locally sourced labour to be employed meaning the whole project, including the foundation, needed to be easy to deploy.

### Solution

Being low to the ground, the required loads to safely secure the array were relatively low. Platipus were able to provide a lightweight S6 ARGS® System which was easily installed and loadlocked using simple handheld tools. The entire foundation kit was supplied in a bespoke wooden pallet allowing for no plastic waste on-site and easy packing with the mounting system, providing the end user with an "all in one" solution that was quick and easy to deploy in the rural locations.



Anchor System: S6ARGS1.5M

Quantity: 224

Design Life: 20 yrs

Soil Type: Varied

# CASE STUDY

## Ootsuda Ike Floating Solar Park (1MW) - Kansai, Japan



### Project Specification

Ciel et Terre specified Platipus Percussion Driven Earth Anchors (PDEA®) to secure this large Floating Solar System, and to help prevent any damage to the panels. This example features a 1MW floating solar park installed on an irrigation pond. The 3,744 panels cover approximately 57% of the 1.84ha (18,400m<sup>2</sup>) water surface, to minimise evaporation and to generate / supply electricity back to the grid.

### Solution

The versatility of Percussion Driven Earth Anchors (PDEA®) allows for anchoring to be carried out both underwater or on dry land with relative ease. In this case, the anchors were installed into the reservoir floor and proof tested to the specified design load, with all work being carried out from a floating pontoon. The materials used in the anchor system were designed to exceed the design life of the floating solar system to ensure a stable and secure solution for many years to come.



Anchor System: B6 & threaded rod

Quantity: 53

Design Life: 25 yrs

Soil Type: Sand



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