

Titan Anchor Piles from

ISCHEBECK<sup>®</sup>

**TITAN**



- The solution for fast and efficient tie back anchors
- Improve productivity on site
- Permanent protection against corrosion



Ischebeck Titan Anchor Piles can be used wherever a traditional ground anchor is being considered and provide a rapid, efficient method of installing tie back anchors in one visit to the drill hole.

The installation technique allows the anchor pile to be drilled, installed and grouted at the same time, offering benefits to ground improvement, type of machinery used for installation and dramatic increases in productivity on site.

All Ischebeck Titan bars use the same installation technique and, with a range of 100kN to 3000kN, only the drilling rigs get bigger.

Ischebeck Titan Anchor Piles conform to the current British Standard (BS 8081:1989) except Chapter 8, where other methods have been approved and accepted.

## The Advantages:

- 2 to 3 times greater productivity than conventional systems.
- Grout injection technique continually scours and flushes the sides of the drill hole, enhancing mechanical connection to the soil.
- No casing is required in collapsing ground conditions.
- Ischebeck Titan bars are made from a high quality, high yield, low carbon steel, which does not suffer from hydrogen embrittlement or stress corrosion cracking.
- The grout body provides simple, permanent corrosion protection.
- Very low creep characteristics of the bar obviate the need for re-stressing.
- Can be extended by couplings on site if ground conditions do not match the S.I. information.

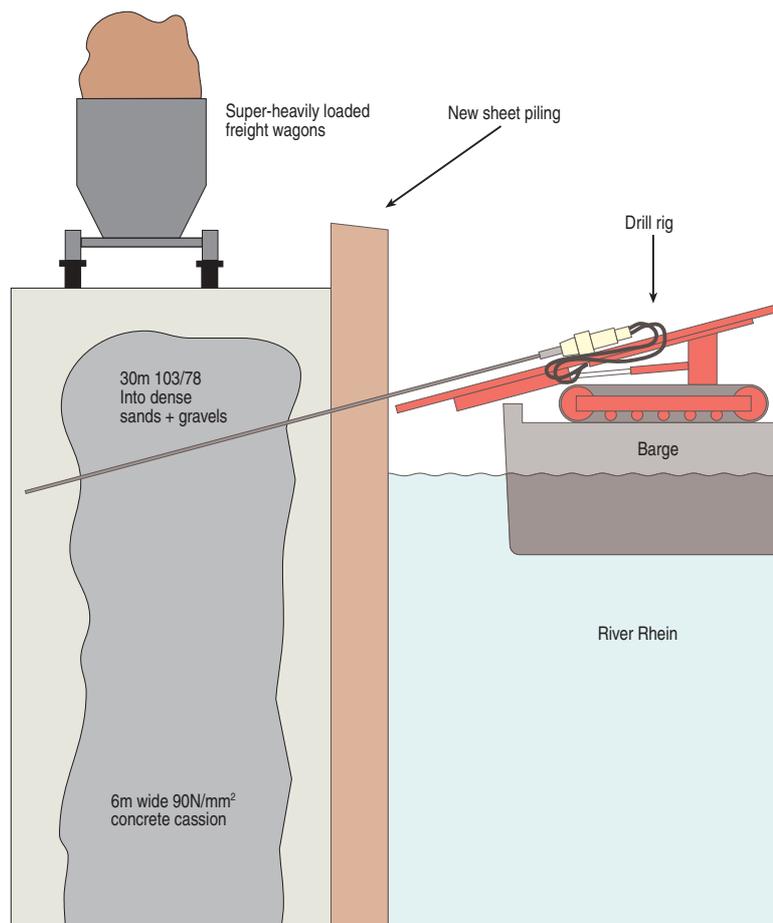


## Port Orsoy

Development of this commercial port on the River Rhein in Germany required the existing quay wall to be strengthened to allow heavily loaded rail wagons to be unloaded into waiting vessels. Ischebeck Titan anchor piles of 30m lengths were installed through the existing sheet pile wall and a concrete filled caisson behind.

Once the installed length had been reached, the contractor continued pumping grout until 80 bar pressure was achieved. This forced the grout into the surrounding soil and continued until a flash set occurred. The bar was prevented from rotating by the set grout, creating an enhanced grout/ground connection similar to post grouting techniques.

- Quay wall strengthening to allow unloading of highly loaded rail wagons.
- 30m long, 103/51 Ischebeck Titan anchor piles, 1500 kN SWL.
- Installed through 6m of 90N/mm<sup>2</sup> concrete filled caisson.



## Anchor piles for sheet pile walls

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### CTRL 330

Part of the major works undertaken for the Channel Tunnel Rail Link, Contract 330 involved the construction of a cut and cover tunnel to take the main railway line beneath Half Pence Lane. Ischebeck Titan anchor piles of 15m lengths were used to retain sheet piling for the temporary works at the tunnel's entrance.

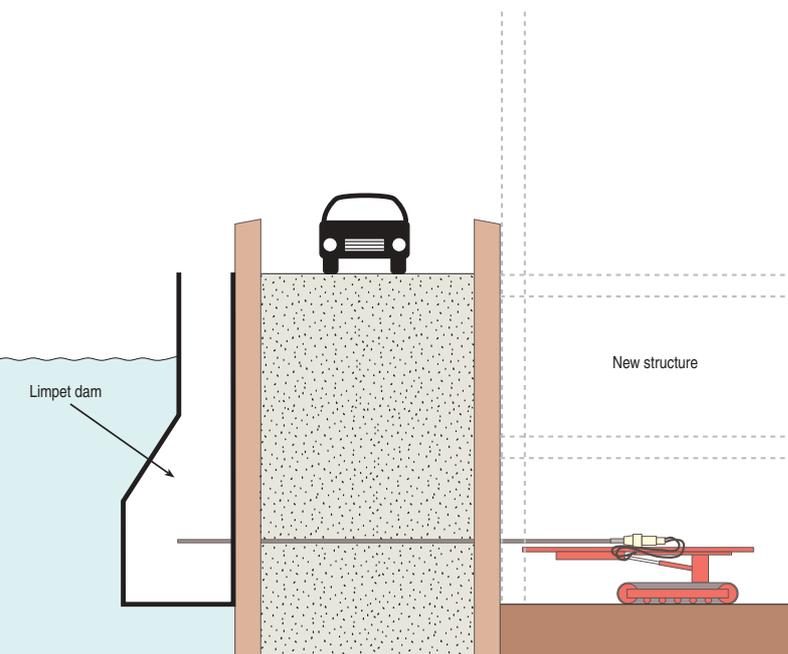
- 15m long 30/11 to 40/16 Ischebeck Titan anchor piles 150kN to 300kN SWL.
- Temporary works for cut and cover tunnel entrance.

### Canary Wharf

Ischebeck Titan's 1,000kN self-drilling marine steel tie bars provided a cost effective and efficient means of retaining sheet pile walling at the prestigious Canary Wharf project in London's Docklands redevelopment.

Using a modified 'nutty crunch' cross-cut bit, the tie bars were drilled through imported special fill material ground and two thicknesses of 25mm steel piling before being stressed using a nut and plate assembly.

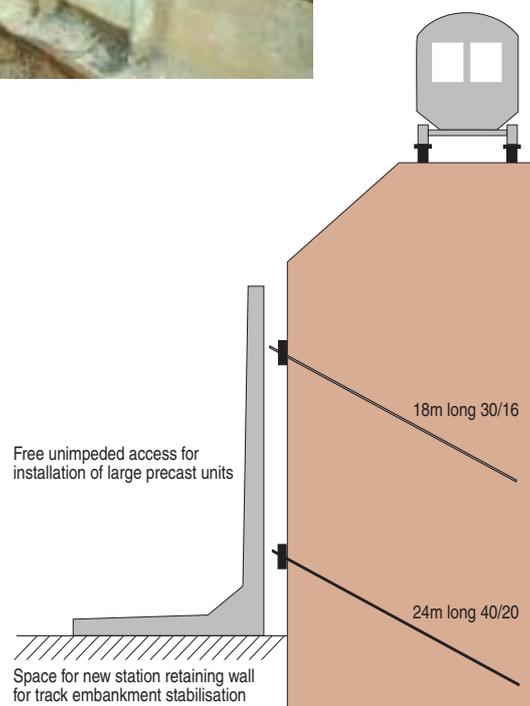
- 12m 1,000kN self-drilling marine steel tie bar
- Modified 'nutty crunch' cross-cut bit



## Old Roan Station, Liverpool

Traditional strutting methods to retain piling during the installation of precast concrete retaining wall units for a new railway station platform near Liverpool impeded access and prevented effective installation. A combination of 18m and 24m long Ischebeck Titan anchor piles were selected to tie back the piling, allowing unimpeded access for installation of the units.

- 18m 30/16 and 24m 40/20 Ischebeck Titan anchor piles of 100kN & 250kN SWL.
- Installed using 150mm diameter hardened clay drill bit.

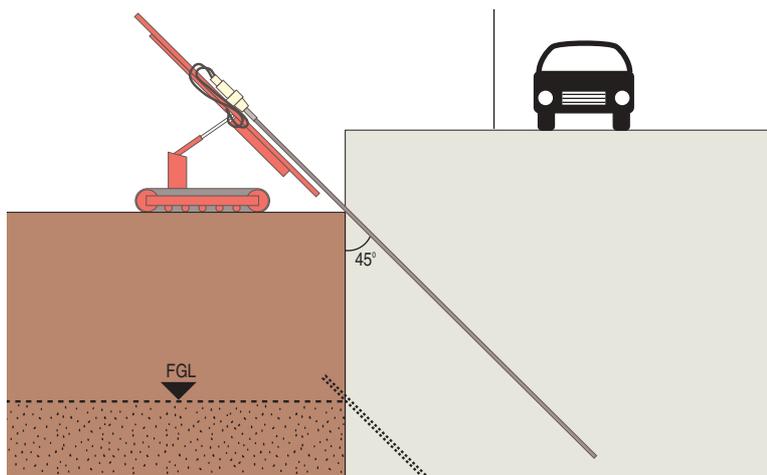


## Residential development, Staines

In order to maximise available working space in a confined site for the construction of new luxury river front apartments, anchor piles were used instead of traditional strutting, obviating the need for waling beams.

Over 100No. anchors were installed beneath Staines High Street and Staines Bridge at a 45° angle to avoid existing services and obstructions.

- Anchor load ranges from 170kN to 510kN
- Increased working space



## Anchor piled ground beam for embankment re-profiling

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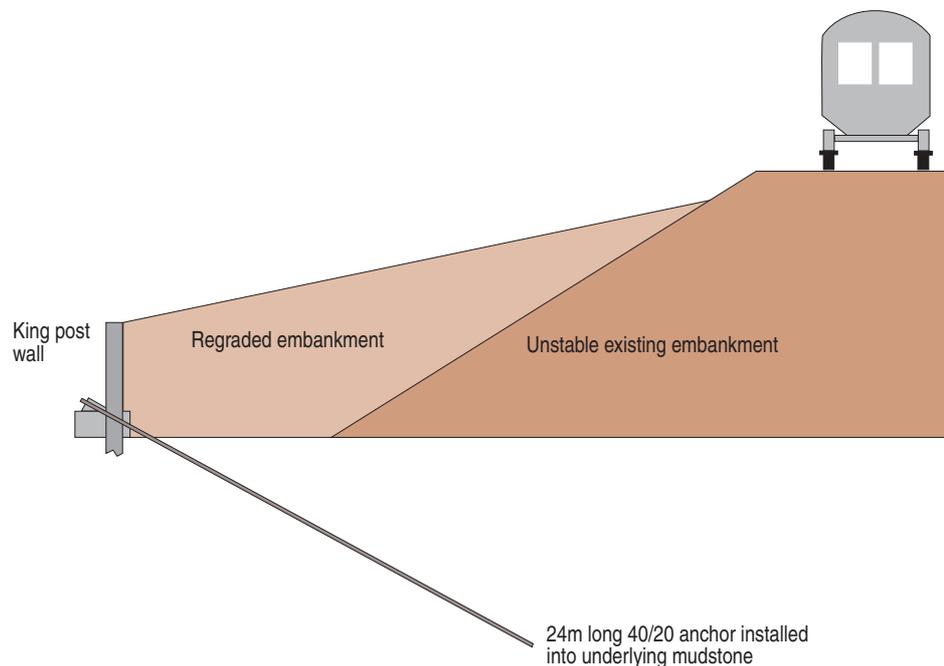
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### Blatch Bridge Embankment

Erosion and general wear required the casting of a ground beam to accommodate re-profiling of this embankment on the Great Western Mainline and prevent ultimate collapse. Using Ischebeck Titan anchor piles removed the need to use temporary casing for the ground beam, allowing installation through mixed ground conditions in one visit to the drill hole and doubling productivity.

- 24m long 40/20 Ischebeck Titan anchor piles of 250kN SWL.
- Installed through clays, sands and gravel into underlying mudstone using 110mm diameter hardened clay drill bit.

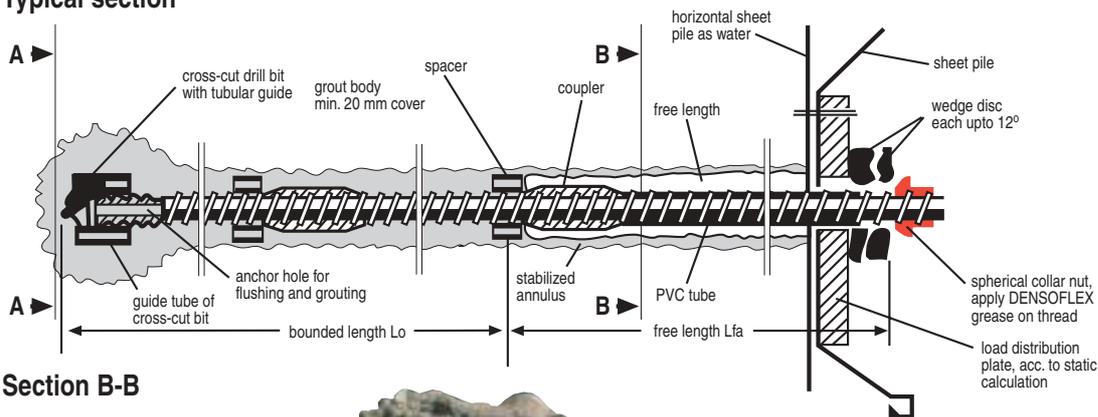


## Steel tendon

The Titan injection anchor is a hollow stem, steel tube which is continuously threaded. The external thread conforms to BS 4461 for reinforcement. It is capable of inducing and controlling grout body cracking during stressing. The pitch of the thread obviates the need for lock nuts at couplings and load plates. The bar is of low carbon, fine grain, micro-alloy constructional steel (< 600 MPa). This steel can be welded and is not effected by

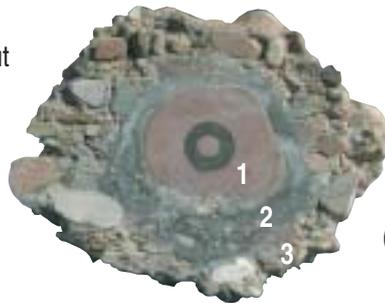
stress crack corrosion or hydrogen embrittlement. At rupture point the steel elongates 15%, providing an extra safety factor. A selection of threaded drill bits allows installation in all ground conditions. The Titan bar is superior in bending, horizontal loading and surface friction when compared to a solid steel bar of the same cross sectional area.

### Typical section

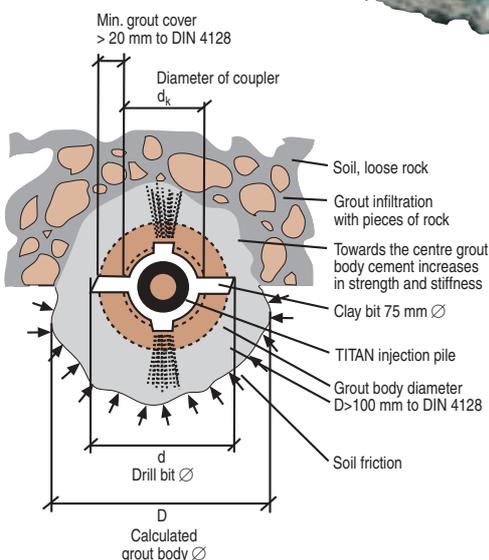


### Section B-B

- 1 Inner full strength grout
- 2 Flushing grout
- 3 Increase mechanical interlock with the soil



### Section A-A



## Grout body

The mainly cementitious grout body ensures a radial tie-in of the anchor tendon in the soil and also provides simple corrosion protection. The rebar-like thread improves the shear connection between the Titan anchor and the grout body. Spacers placed before each coupler guarantee a minimum of 20mm grout cover around the anchor. Unlike grout bodies being produced in cased bore holes, the pressure grouted bodies achieved with Titan injection anchors interlock with the grain structure of the soil. This interlocking effect can easily be seen in sandy and gravelly soils. For cohesive soils, like silty clay, the enhanced grout body is achieved by controlled reaming.

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## Ischebeck Titan Group

Founded in Germany over 120 years ago Ischebeck is renowned internationally for its aluminium formwork and false work systems, trench support systems and ground engineering products.

## Ischebeck Titan Ltd

The company operates from headquarters centrally located in the heart of the UK.



## Product Availability

Substantial stocks of equipment are available ex-stock from the company's strategically located 4-acre distribution site, with most items available nationwide on a 48-hour delivery. Products are available for both hire and outright purchase.

## Technical Support

We will participate in concept stage development. Providing input on applications, production rates, budget design and costings. Active for on site support, particularly for new users. We can provide guidance on industry special european and national standards.



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