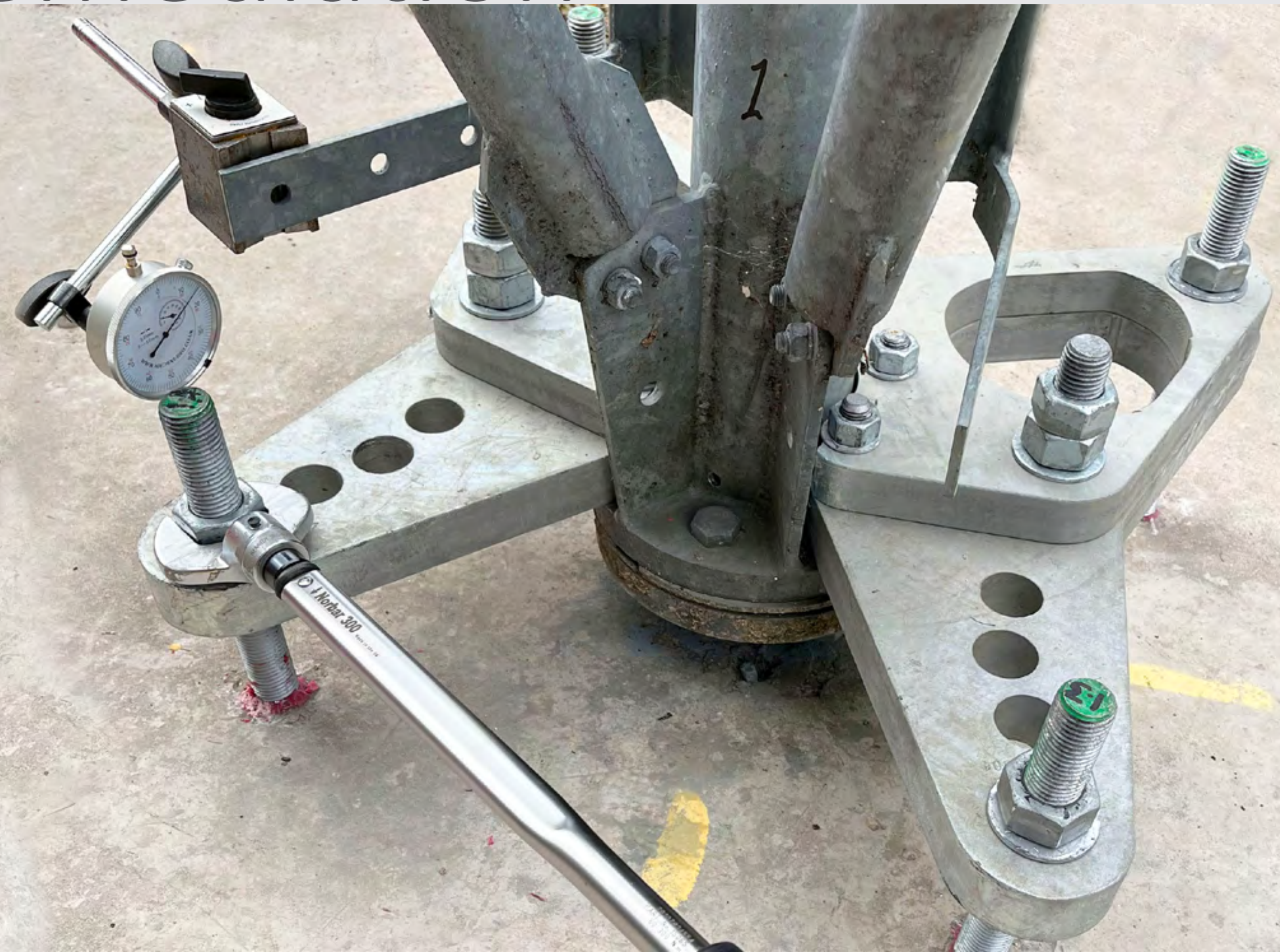


ButterFLI: Tower Remediation

Avoid tower collapse and make structures safe.

Simple, low cost answers to extending the life of your network.

Bypass corroded base stubs, holding down bolts and tower legs.



Tower Failure & Hidden Corrosion



The video still on the far left shows water jetting from a hole drilled in a tower leg, illustrating the risks of hidden corrosion in older towers, particularly at the interface between tower and foundation. Note the complete lack of external signs of corrosion.

The photograph shows a tower that collapsed, following the failure of base stubs at the plunge point. Note again, that the tower itself is corrosion free.

ButterFLI: Bypass Solutions For Base Steel

Avoids tower collapse and makes structures safe.

Extends the life of older towers with base stubs corroded at the top of the concrete (plunge point). ButterFLI plates bridge over the original stubs, enabling the tower to remain in service.

The entire solution can be installed by hand, by a team of two.

No plant is required and no outage.



Off-The-Shelf Solutions For All Towers

ButterFLI:	For towers with CHS legs with flanges without stiffening plates.	Swann A2	ButterFLI (low capacity)
FLI Heart:	For sites with low edge space or congested sites.	Swann B2-3	ButterFLI (medium capacity)
FLI Oval:	Like FLI Heart but for different flange dimensions.	30H	ButterFLI (medium capacity)
FLI Star:	For CHS towers with stiffened flanges.	TT30	ButterFLI (medium capacity)
FLI Spade:	Restores capacity to tower legs with corroded foundation connection.	TT40	ButterFLI (medium capacity)
FLI Angle:	For angle towers with corroded stubs.	Swann B3	ButterFLI (high capacity)
FLI Wheel:	For monopoles.	Satturn	FLI Heart
		AD703	FLI Heart (high capacity)
		Eve Type 9	FLI Heart (high capacity)
		Swann Type 4	FLI Star
		Swann Type 4	FLI Spade
		DC415	FLI Oval
		DC410	FLI Oval
		ATT850	FLI Angle

ButterFLI: light, medium & high capacity

ButterFLI plates restore full capacity to the corroded foundation connection of tower legs up to 750kN ULS. They bypass the corroded stub by interfacing with the lowest tower flange and can be modified for any CHS leg and flange without stiffening plates.

The plates are light weight and can be carried and installed by hand, without plant. The force is distributed into the concrete foundation via post fix anchors and high strength grout.

Patent pending.



FLI structures

ButterFLI

Low Capacity.

Restores full capacity to corroded foundation connection of tower legs up to 400kN ULS.

Bypasses corroded stub by interfacing with the lowest tower flange.



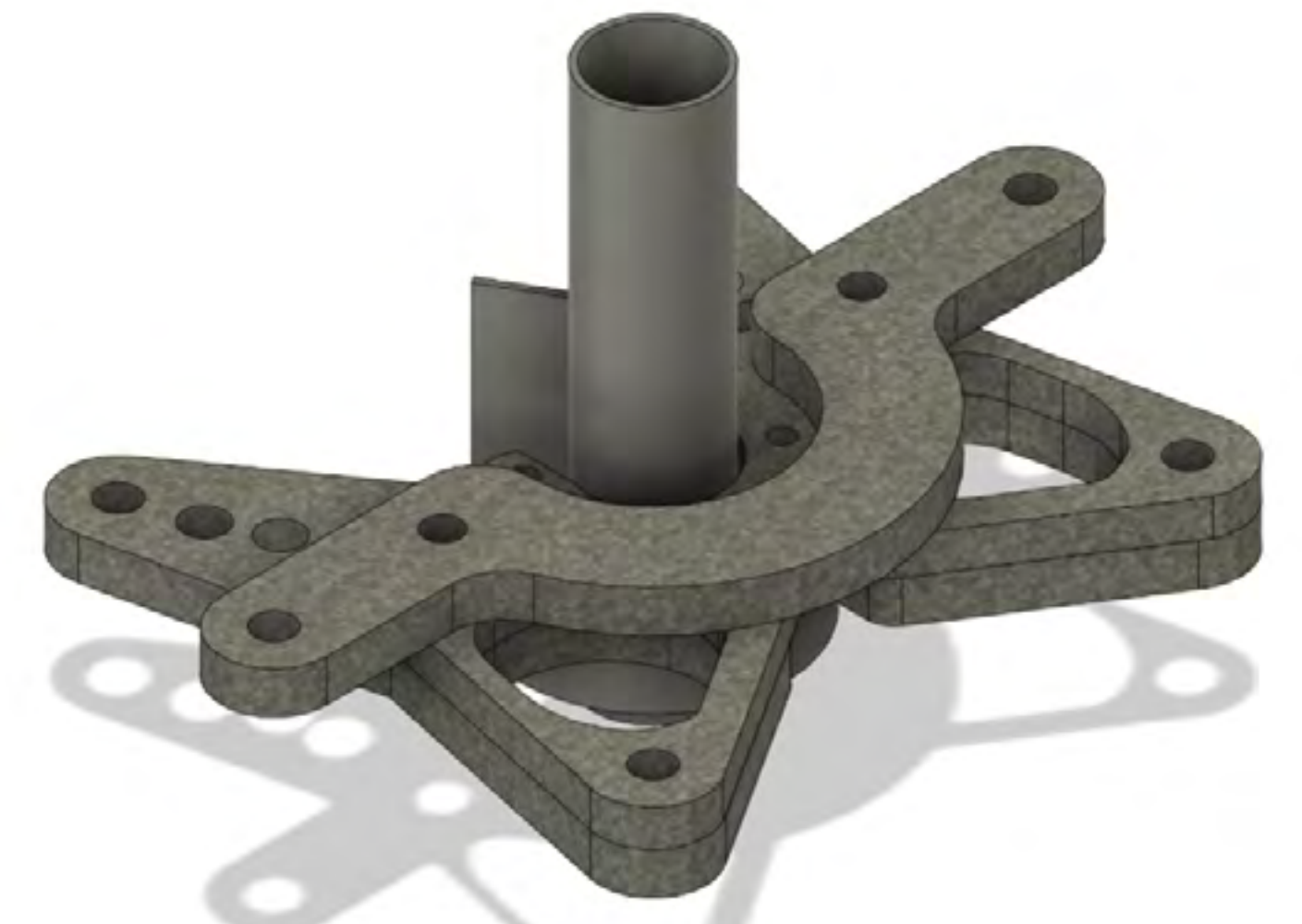
Medium Capacity, to 600kN ULS.

Can be modified for any CHS leg and flange without stiffening plates. A three-plate "Split-Wing" design is used for larger leg diameters and higher forces whilst still enabling hand installation.



High Capacity

Up to 750kN ULS Or alternately used for towers with low strength concrete foundations.



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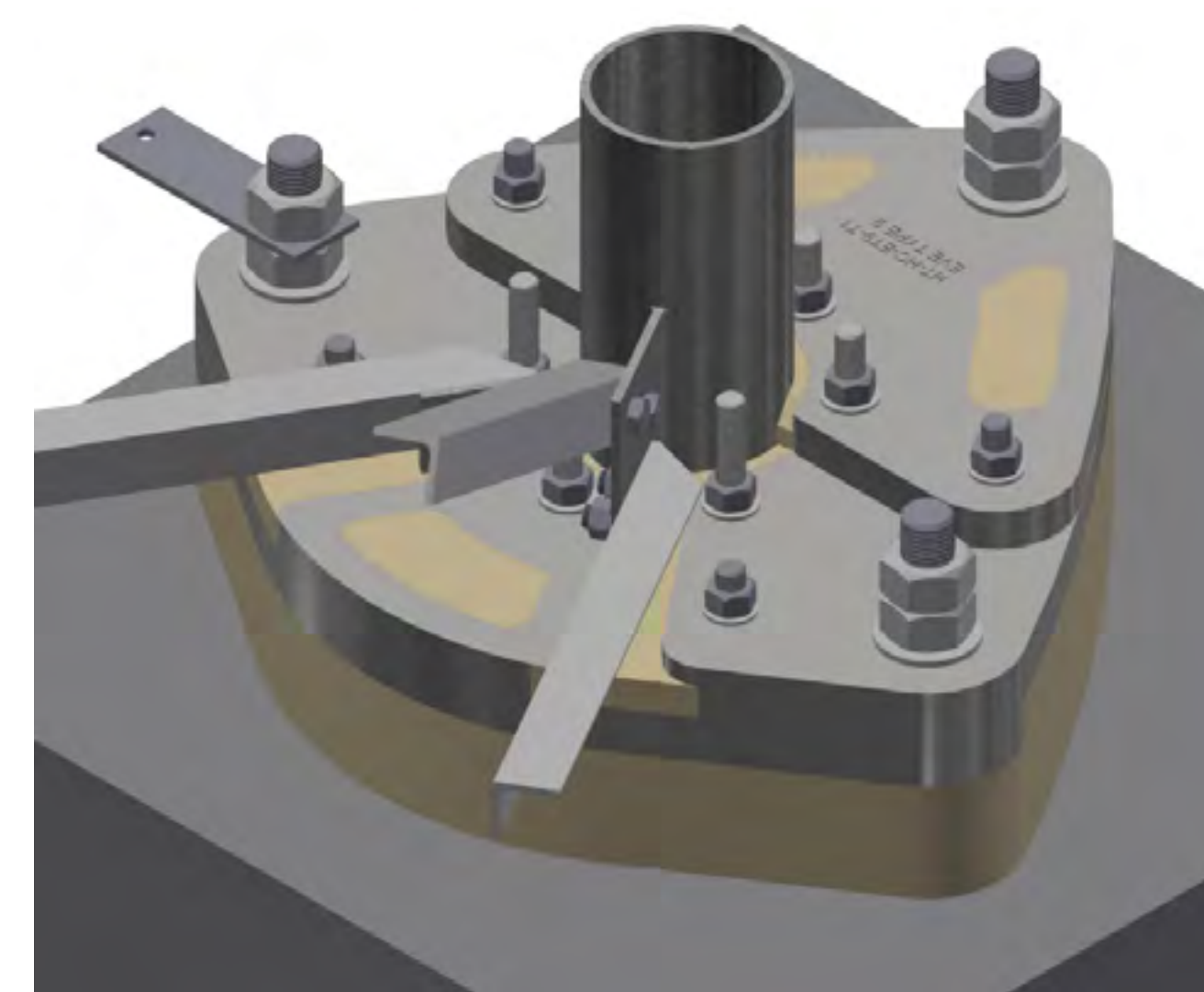
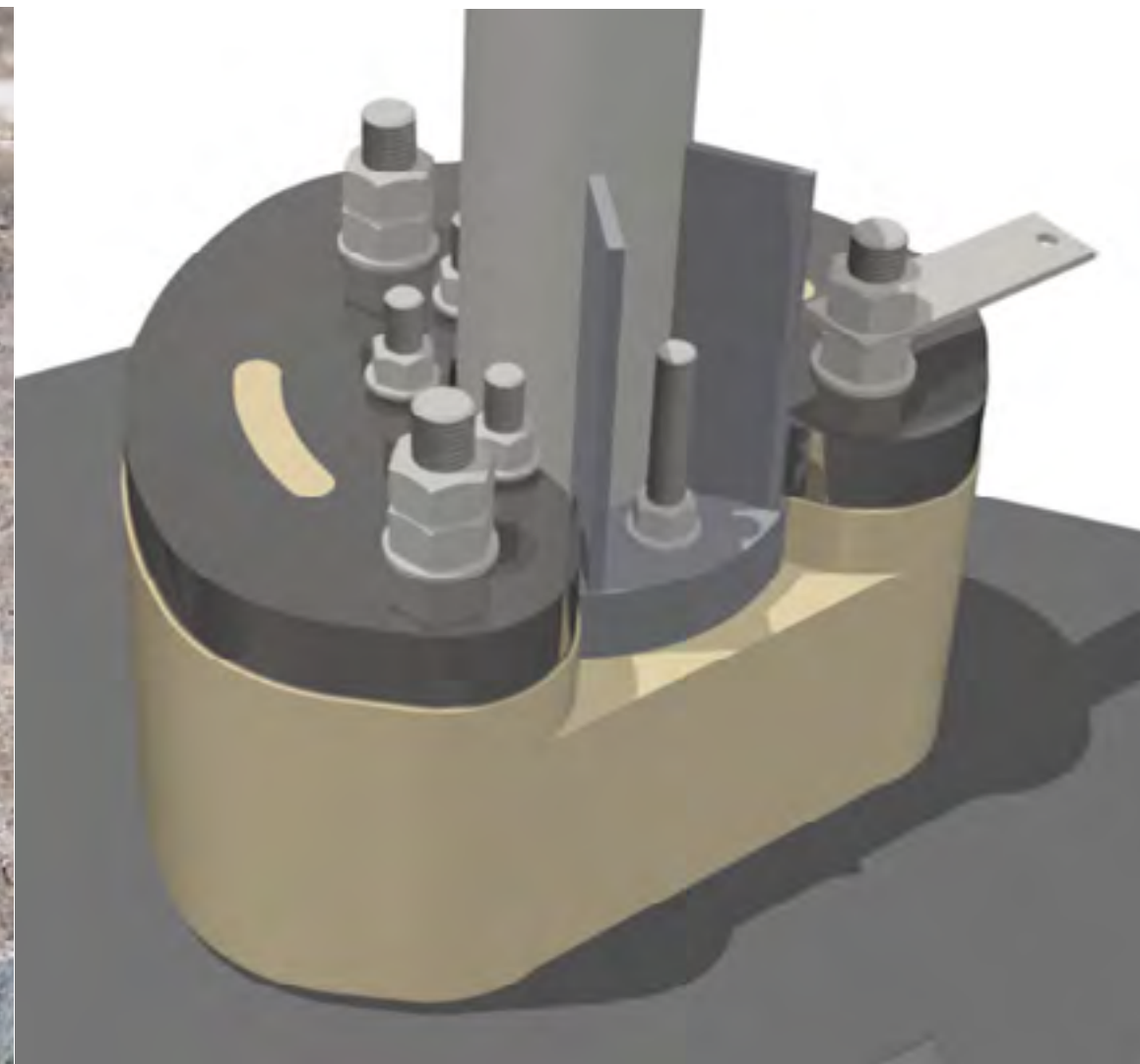
FLI structures

FLI Heart

For low edge distances or congested sites with limited space. Due to edge distance constraints and concrete reinforcement, the anchors have been reduced to 320 PCD. Patent Pending.

Medium capacity single plate up to 550kN ULS

High capacity three plate to 750kN ULS.



FLI Oval

New product designed to suit the Dynamic Concepts DC415.

2 plate design.

2No. M36 Fisher anchors per leg.

720mm anchor embedment.

Patent pending.



FLI Star

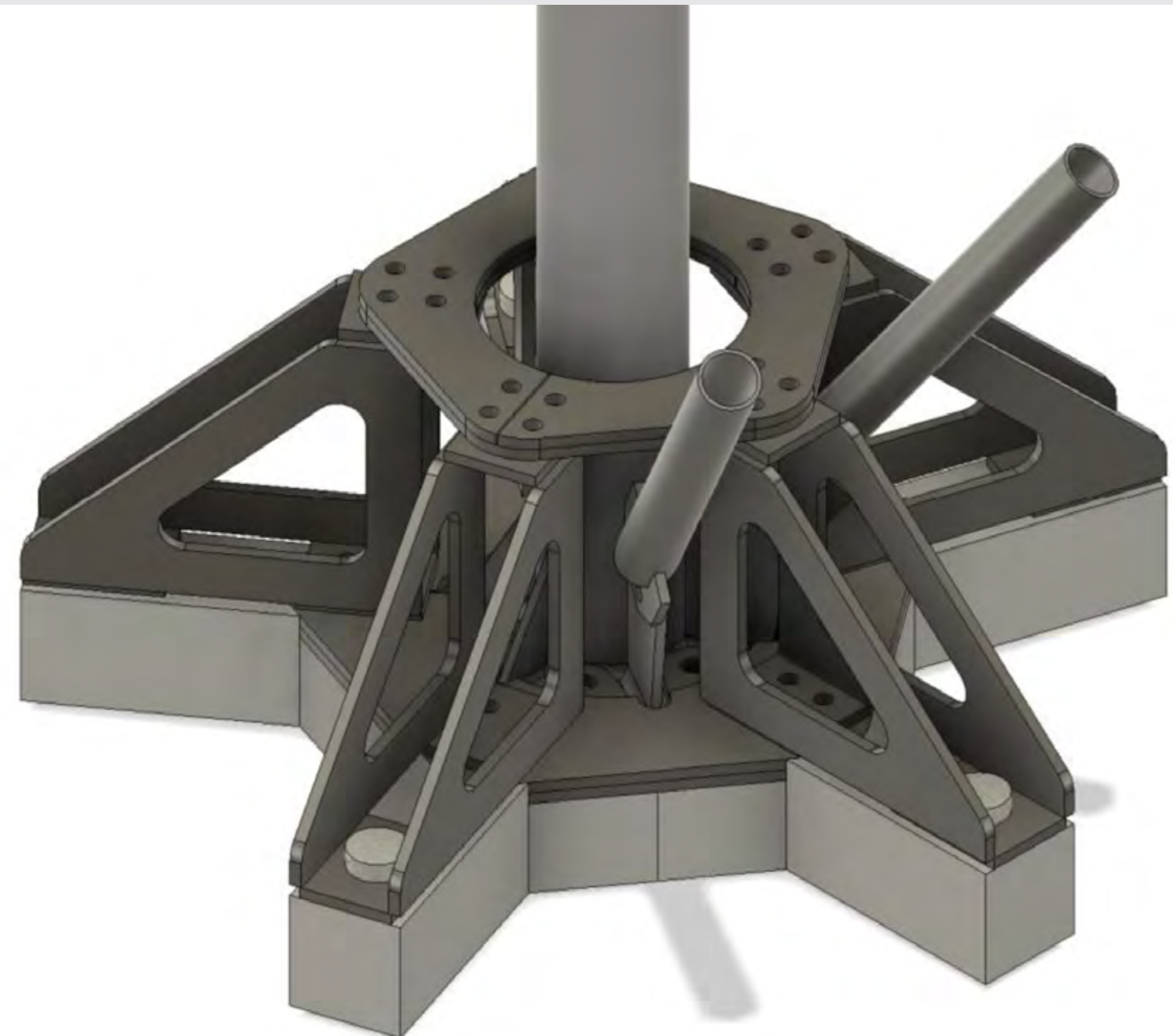
Developed for Type 4 towers but can be modified for any CHS leg and flange with or without stiffening plates.
For towers supported on grout with stiffened flanges/HD Studs.



Medium Capacity
Restores full capacity to corroded foundation connection of tower legs up to 600kN ULS.

High Capacity, to 760kN ULS.

Patent pending.



FLI Spade

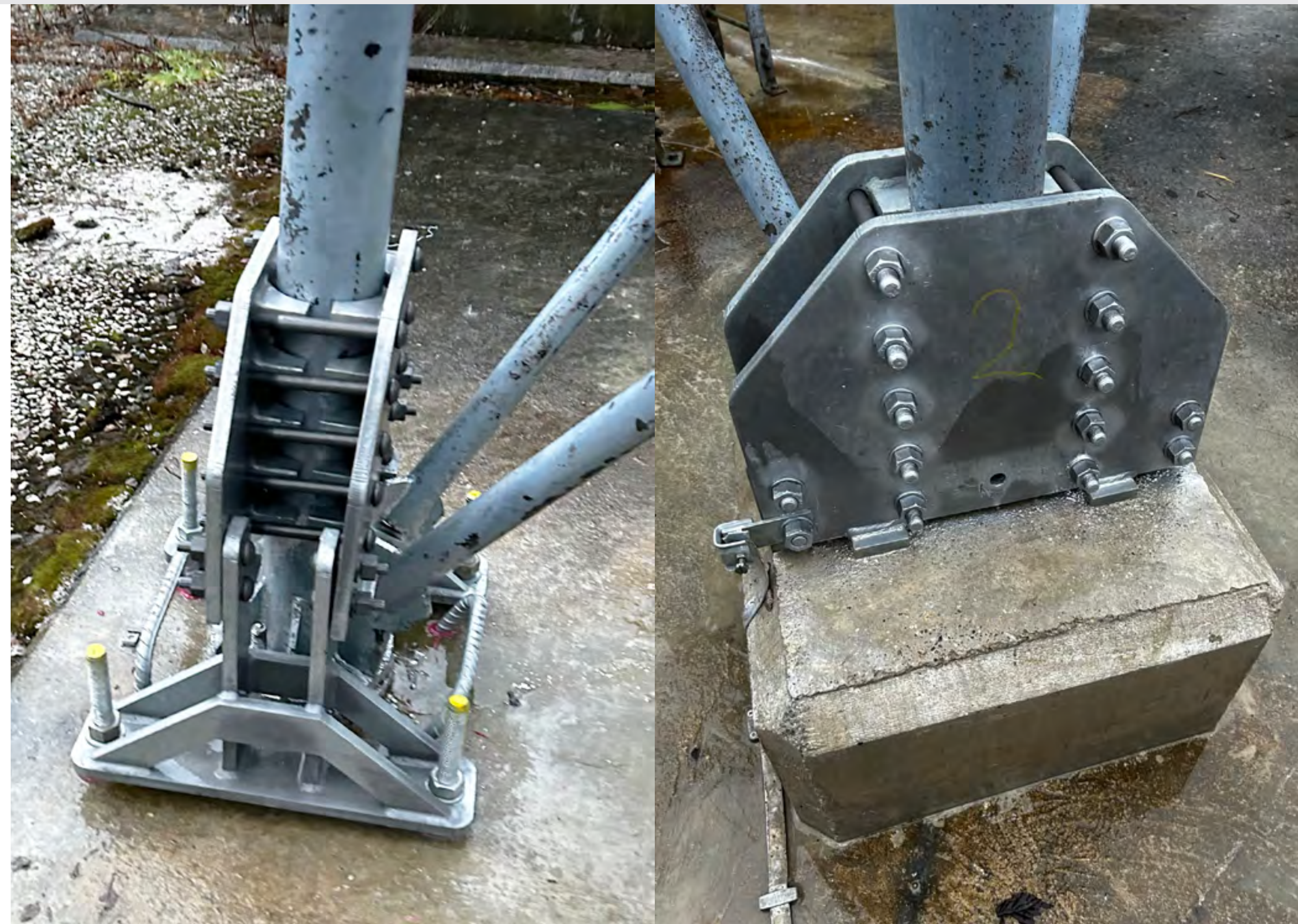
Restores full capacity to corroded foundation connection of tower legs up to 583kN ULS.

Used where there are corroded drainage flanges causing movement at the tower base.

Can be modified for any CHS leg and flange with or without stiffening plates.

Connection is made to the leg bypassing the entire base detail. The solution consists of two clamping plates and two arms. Both can be hand installed. Force distributed into foundation via four Post Fix Anchors and high strength grout.

Patent pending.



FLI structures

FLI Angle

Restores full capacity to corroded foundation connection of tower legs up to 300kN ULS.

Designed for the ATT850 and can be modified for any Angle Tower legs.

Bypass corroded stub by interfacing with the lowest tower splice.

A two-part solution is used which can be hand installed. Force distributed into concrete foundation via three Post Fix Anchors (Hilti or equivalent) and high strength grout.

Patent pending.



FLI Wheel

Monopole Bypass Interface

Corroded holding down bolts bridged with an interface for a new monopole on the existing foundations.

Patent pending.



ButterFLI: Hospital Kit

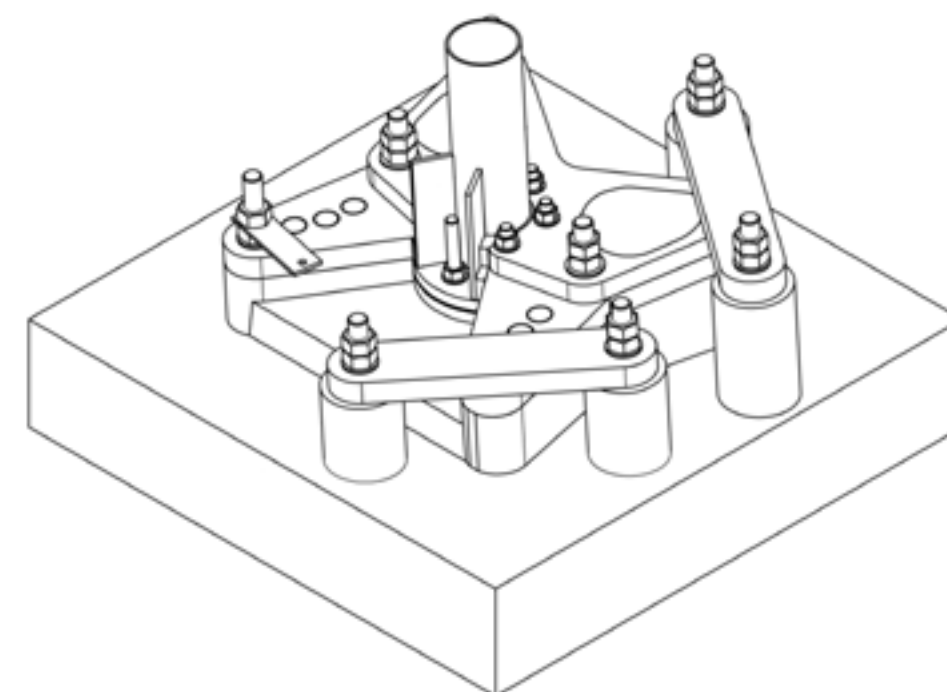
Used to remediate failed Post Fix Anchors (Hilti or equivalent).

When installing a ButterFLI Plate, every Hilti anchor is tested to check its strength.

In the cases where the anchors do not meet the minimum strength requirement, the anchor must be bypassed to maintain the capacity of the ButterFLI plate.

Maximum Hospital kit capacity: 150kN ultimate limit state

Patent pending



ButterFLI: Concrete Break-Out Kit

Deals with bases previously strengthened by overpour.

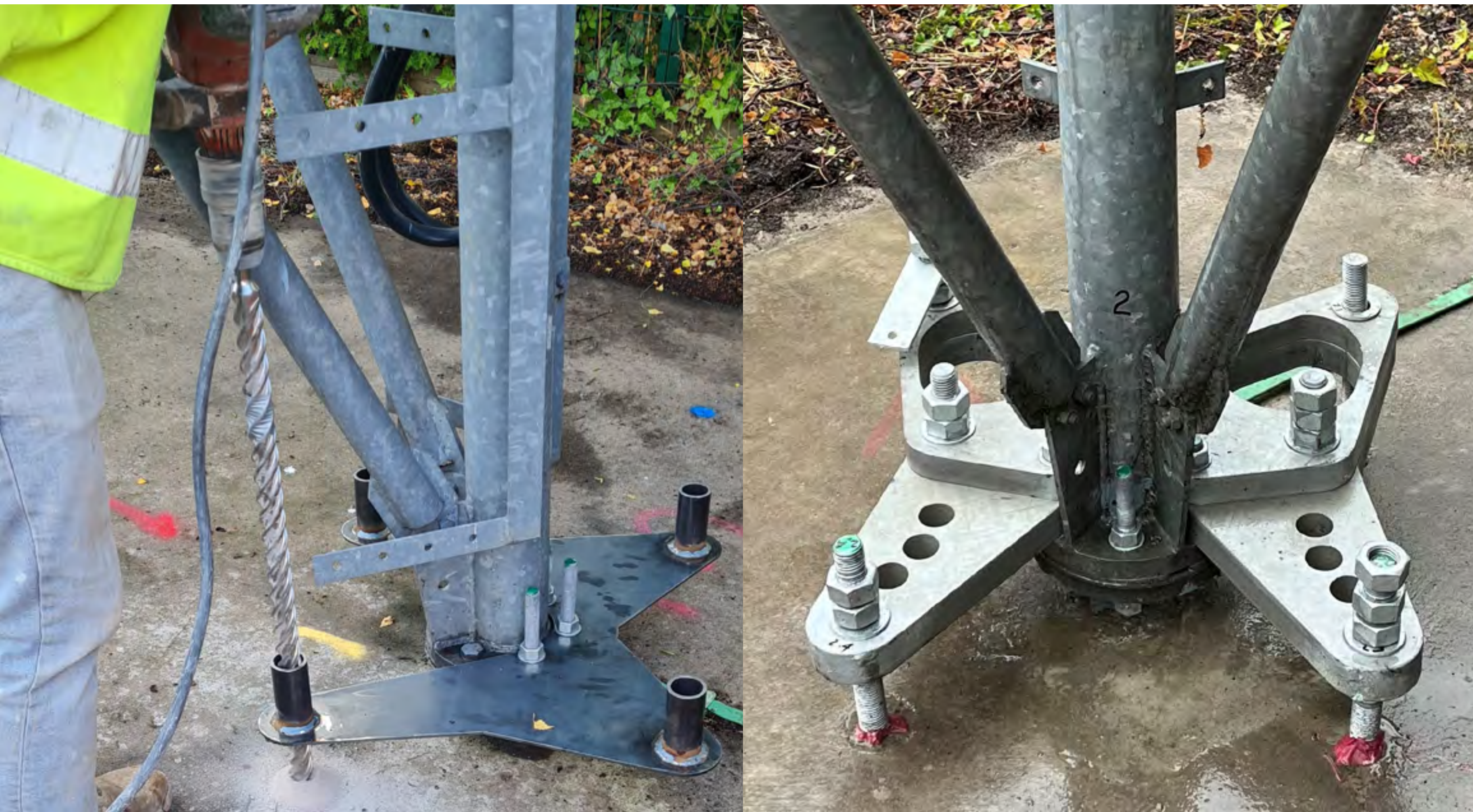
Provides a template for cutting the concrete to accommodate the ButterFLI.

Comes with cover plates for the remaining slot for safety.

Patent pending



ButterFLI: Day 1 Installation



Drill tower legs to remove any trapped water.

Drill stub ready for grouting.

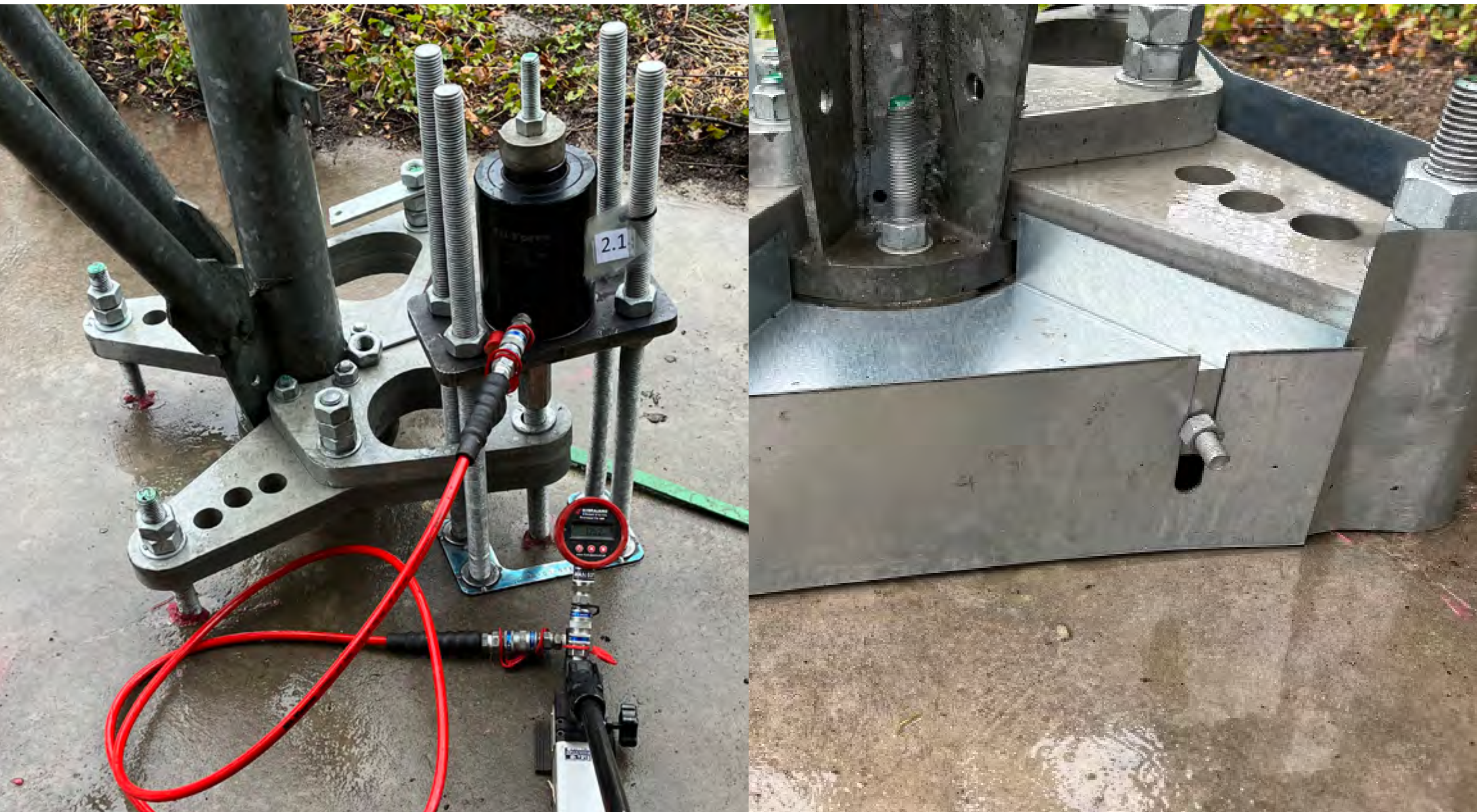
Grout inside stub to drive out trapped water and stabilise rust.

Wire brush and paint stub.

Using a template, drill anchor holes and scabble and clean holes.

Epoxy resin anchor bolts with ButterFLI plates in place.

ButterFLI: Day 2 Installation



Test anchor bolts to verify capacity.

Apply torque to anchor bolts.

Grout under ButterFLIs using re-usable, curved steel grout boxes that enable fast grouting and a neat finish.

Bypass Solutions For Base Steel

The simple and low cost answer to extending the life of your network.

