



Innovative Support Systems Ltd

RAMWALL

RAMWALL

What is Ramwall?

Where can Ramwall be used?

The Ramwall System can be used to support various types of Embankments including Railways, Roads and Rivers/Canals.

Ramwall can either be pre-built and lifted into position as monolithic blocks or built from the ground up as a traditional brick wall would be built (see photo). Pre-building the wall can help where there are access difficulties and restrictions or very short possessions of a specific area.

As you can see from the picture shown, Ramwall is ideal for the stabilisation of embankments that are either slipping or eroding resulting in potentially dangerous situations.

Ramwall can be built much higher by simply stepping it back with every one metre elevation. These 'steps' are then tied together using the vertical steel dowels and tied into the face of the embankment using longer, horizontal steel dowels.

One of Ramwall's big advantages is the speed of construction with a time of approximately 10 minutes for every cubic metre of wall built and filled.



Ramwall (Reinforced Aggregate Matrix) is a unique ground support system manufactured from high quality engineering standard Cares approved steel mesh to BS 4483:2005 and Galvanised to BS EN ISO 1461:2009 to give a life expectancy of approximately 120 years.

Using universally accepted stability and design programmes the Ramwall system can be designed, manufactured and installed to virtually any shape and size.

The basic materials for the Ramwall System are pre-formed Type 1 and Type 2 sheets specifically machine pressed to a unique contour which is what give Ramwall it's high strength capabilities. Common wire sizes used are 6-12mm diameter but we can process various other sizes.

All Ramwall products including accessories can be provided galvanised to BS EN ISO 1461:2009.

How is Ramwall Installed?

The build process of Ramwall consists of several simple parts that makes for a very fast installation time with minimal manpower and equipment required.

1. 3 no Type 1 and 3 no Type 2 sheets are stacked in alternate layers to form a 1 metre high section
2. This is followed by 8 no steel dowels driven into the ground through the middle of each section to provide ground anchorage and slip resistance.
3. Ramwall is constructed with an open base ie the core fill material interlocks/interacts with the ground beneath it. The mass of core material exerts pressure on the ground beneath it keying the two elements together and much reducing the chance of a slip plain forming. The same philosophy applies to rear aspect of an embankment supporting wall/buttruss. The supporting Ramwall is constructed with no facing mesh to the rear aspect of the wall allowing the core fill material to interlock/interact with the embankment/ground requiring support.
4. The layers of mesh are quickly fastened together using various systems one of which is a high quality triple life Hog Ring.
5. The facing mesh panels and the optional top closure panels are then attached as per the design requirements, which gives the wall it's high quality finish.
6. Final stage - fill the Ramwall with the aggregate of your choice for example Track Ballast/Granite or similar with the recommended size being 40-60mm diameter to help eliminate any voids within the wall and this will also help to ensure a fast fill is achieved.
7. Facing Mesh - Various matrix sizes and wire gauges are available in accordance with aggregate infill size and site conditions. Where site conditions vary, a secondary layer of Facing mesh may be applied over the primary Facing mesh reducing the aperture by half or up to a quarter of it's original size. This will ensure zero loss of infill.

NORTH HARROW STORAGE

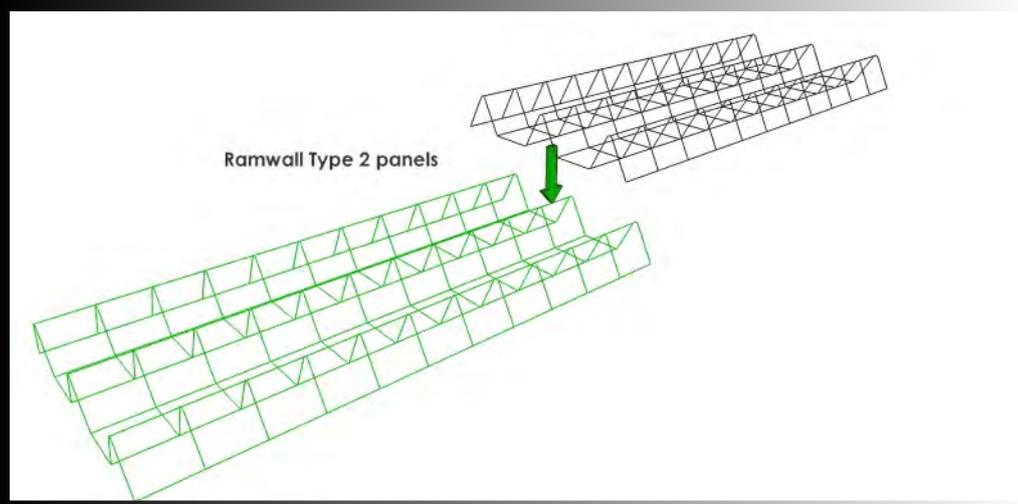


NORTH HARROW RAILWAY STATION

NOTE: Always wear the appropriate PPE when building Ramwall

Ramwall build up procedure

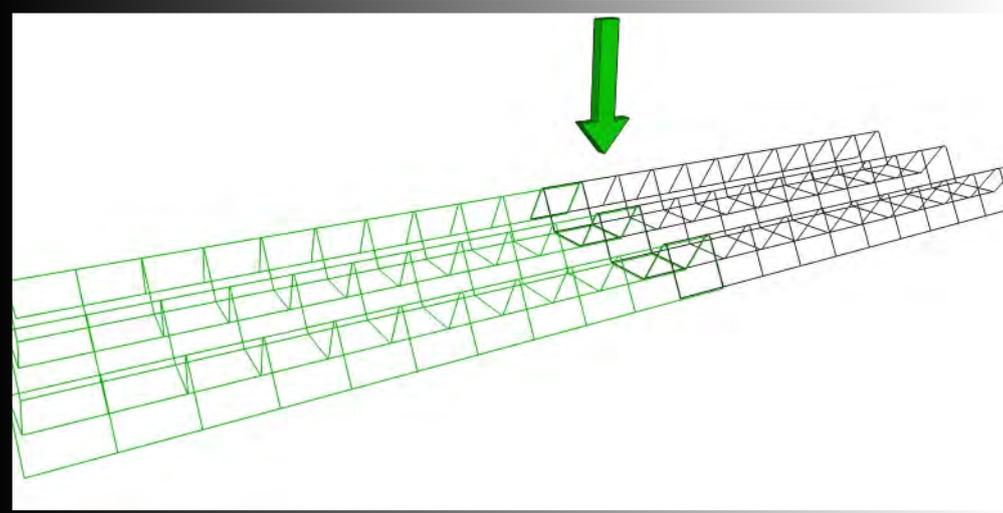
The following images demonstrate the standard Ramwall build method



Stage 1

Start by laying out the required number of Type 2 Panels making sure each joint is overlapped by 200mm (one square)

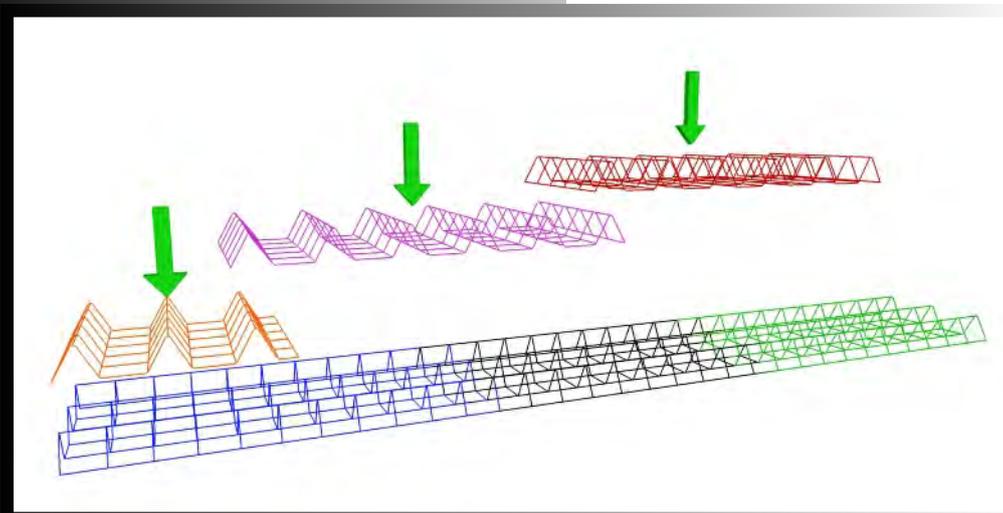
The first layer should always represent the total length of wall i.e the requirement is a 30m wall therefore layer 1 must contain 15 Type 2 panels



Stage 2

When overlapped, the panels require fastening together with several Hog rings. Check the panels are aligned with one another

As with the Type 2 panels, the Type 1 also Require overlapping by 200mm (one square)



Stage 3

The Second layer consists of Type 1 panels. Always start with a Half panel (1.1m) this ensure the joints do not coincide

NOTE: Each layer is built to it's full required length. The above images show short lengths for illustration purposes only

**ACTON RAILWAY EMBANKMENT
STABILIZATION**

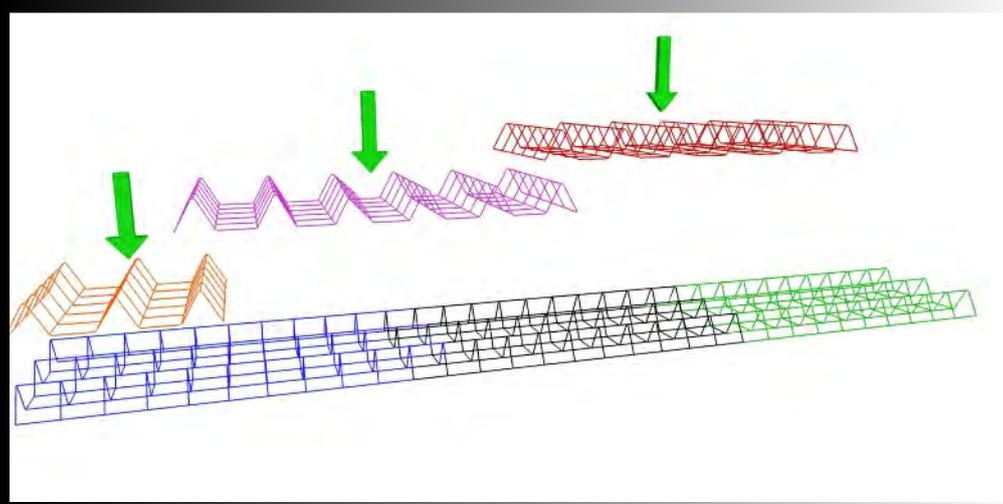


ACTON RAILWAY EMBANKMENT

NOTE: Always wear the appropriate PPE when building Ramwall

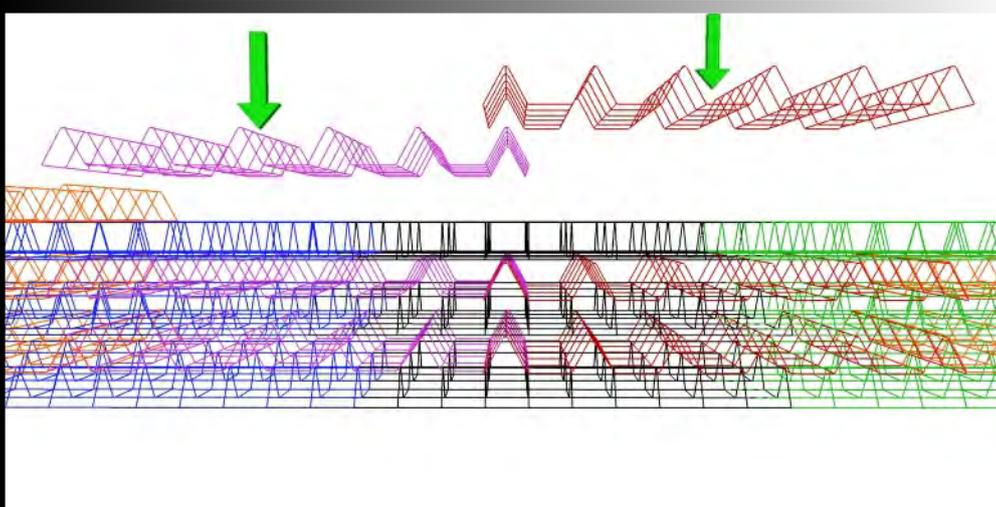
Ramwall build up procedure

The following images demonstrate the standard Ramwall build method



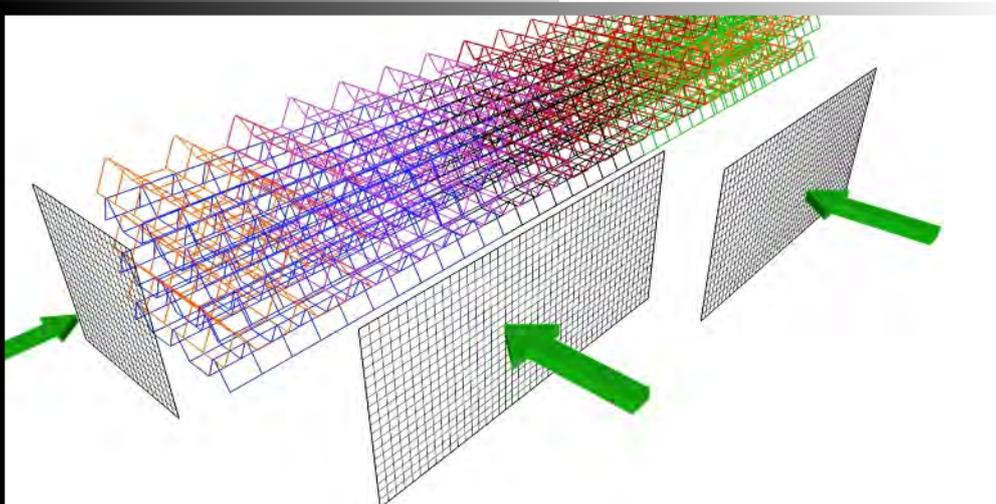
Stage 4

As in Stage 3, the panels overlap one another by 200mm. Always check alignment whilst building up. Hog Ring each panel to the layer below it.



Stage 5

When building Ramwall to 1 metre high the sixth panel will be the top. As in previous stages, Hog Ring the current layer to the last one.



Stage 6

Once the desired wall height has been achieved, position the Facing mesh on the required areas and fasten using an adequate number of Hog Rings.

NOTE: Each layer is built to its full required length. The above images show lengths for illustration purposes only

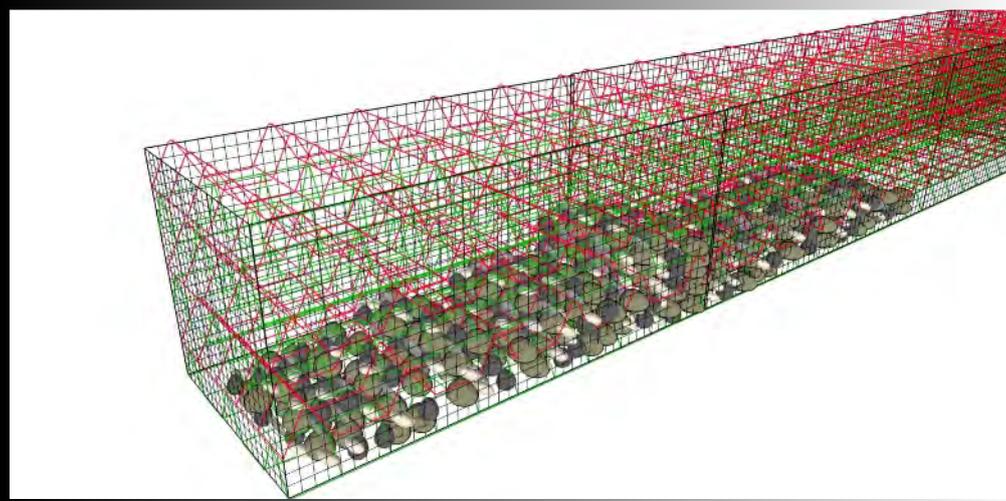


TONFANAU BEACH EROSION PROTECTION

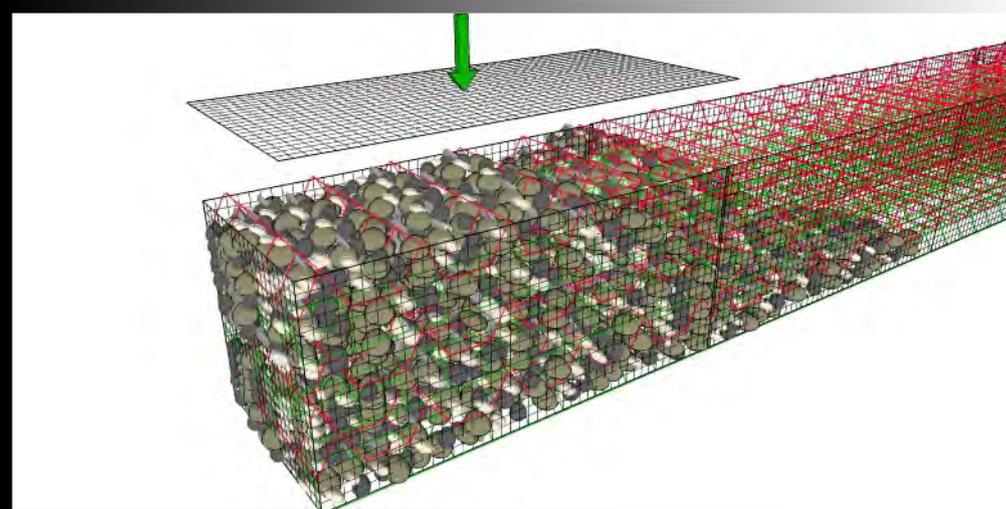
NOTE: Always wear the appropriate PPE when building Ramwall

Ramwall build up procedure

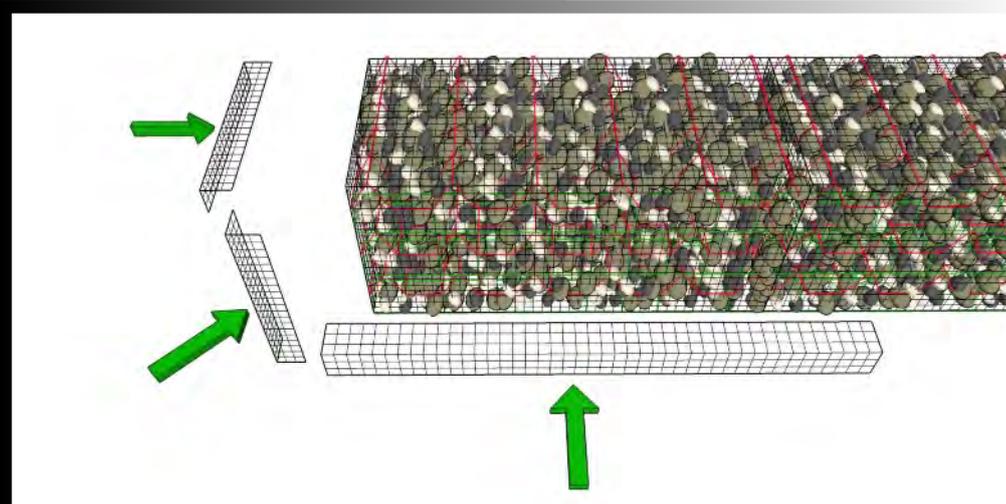
The following images demonstrate the standard Ramwall build method



Ramwall can be filled by machine, by hand or by positioning 1 ton bags of material above the wall and slitting the bag for a rapid fill



The Top mesh panel is fastened with Hog Rings on all available edges and to the peaks of the final layer



Stage 7

Now place the Dowels a minimum of 1 per square metre and fix firmly in the ground. For the fill material the specified size stone is 40-60mm diameter to ensure a fast fill, zero escape and a void free wall

Stage 8

Stage 8 of the build is to place the top mesh in position and fasten using an adequate number of Hog Rings

Stage 9

Fitting the Reinforced Corners: These corners may be fitted to any exposed corners to both reinforce and to give a good aesthetic finish

TONFANAU FILLING WITH 1 TON BAGS

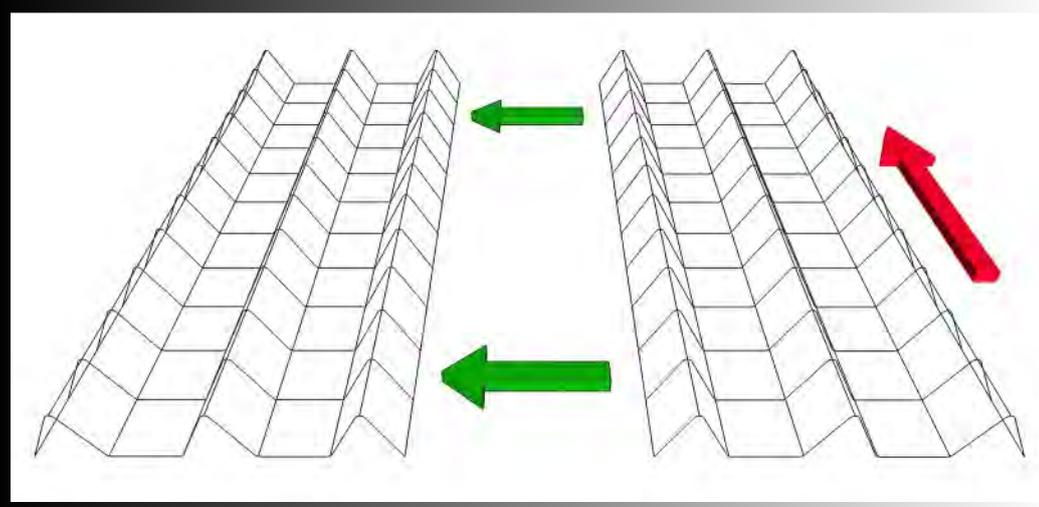


TONFANAU 4 METRE HIGH RAMWALL

NOTE: Always wear the appropriate PPE when building Ramwall

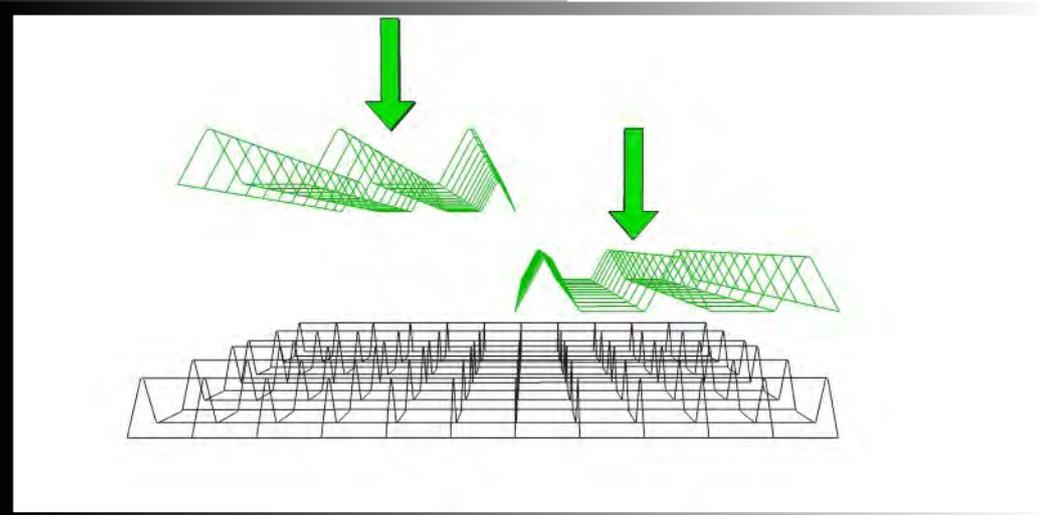
Ramwall build up procedure Type 2 Panels Only

The following images demonstrate the Type 2 only Ramwall build method



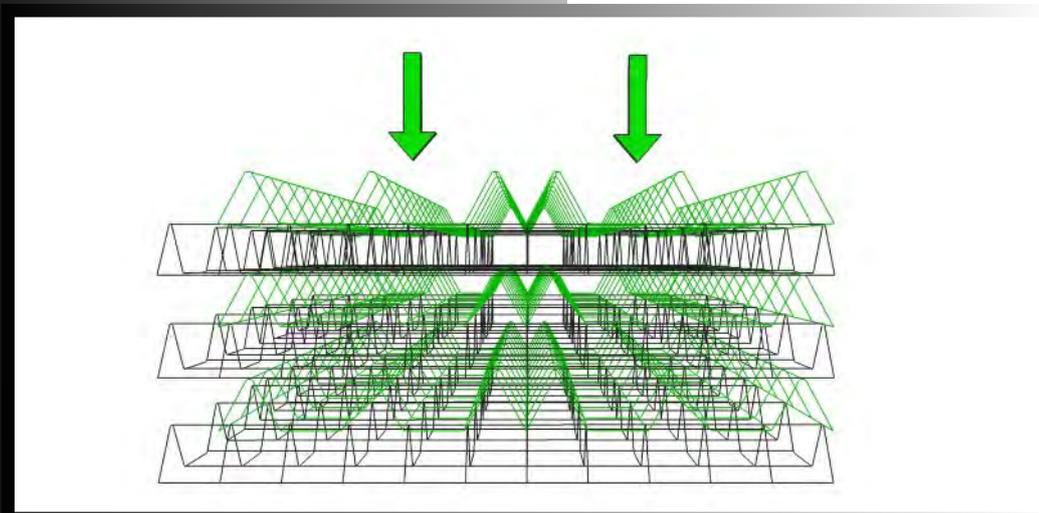
Stage 1

Start by butting together two rows of Type 2 panels ensuring parallel alignment between the pairs. Longitudinally, (red arrow) panels overlap 200mm for each additional length added



Stage 2

At 90 degrees to layer 1, place the second layer on top, these are butted up and hog ringed together at the butt point



Stage 3

Repeat stages 1 & 2 until the desired height and length is achieved, Always check Alignment as each layer is being built

NOTE: Each layer is built to it's full required length. The above images show short lengths for illustration purposes only

TONFANAU WALL DURING FILLING PROCESS

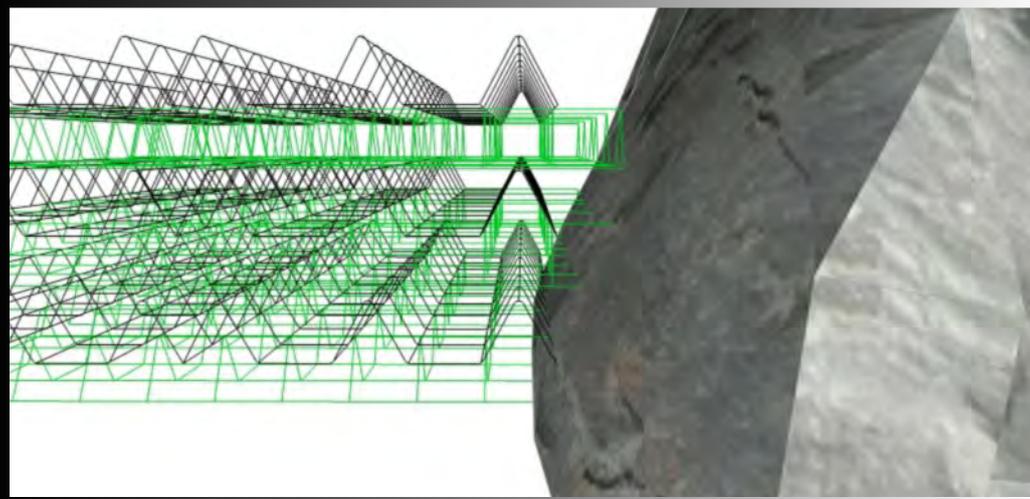


TONFANAU BEACH RAMWALL

NOTE: Always wear the appropriate PPE when building Ramwall

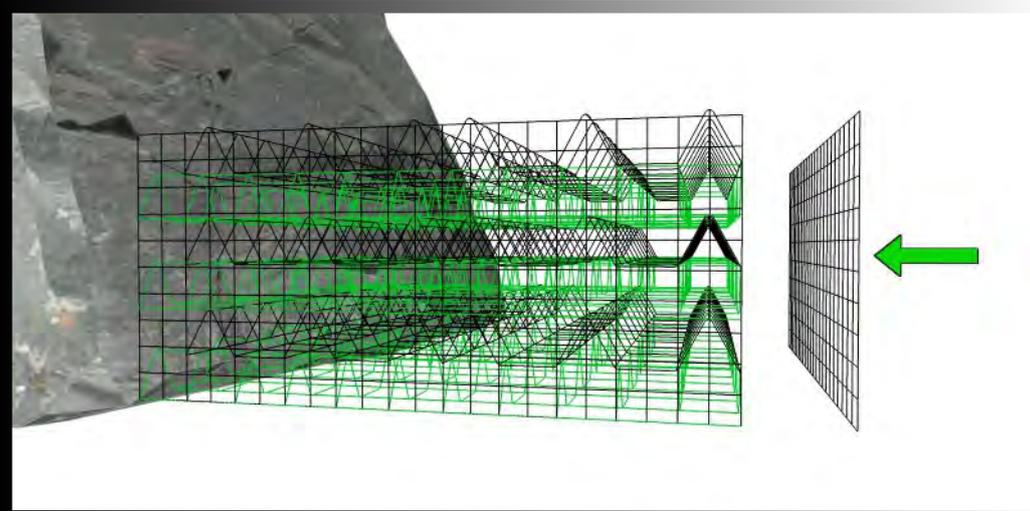
Ramwall build up procedure Type 2 Panels Only

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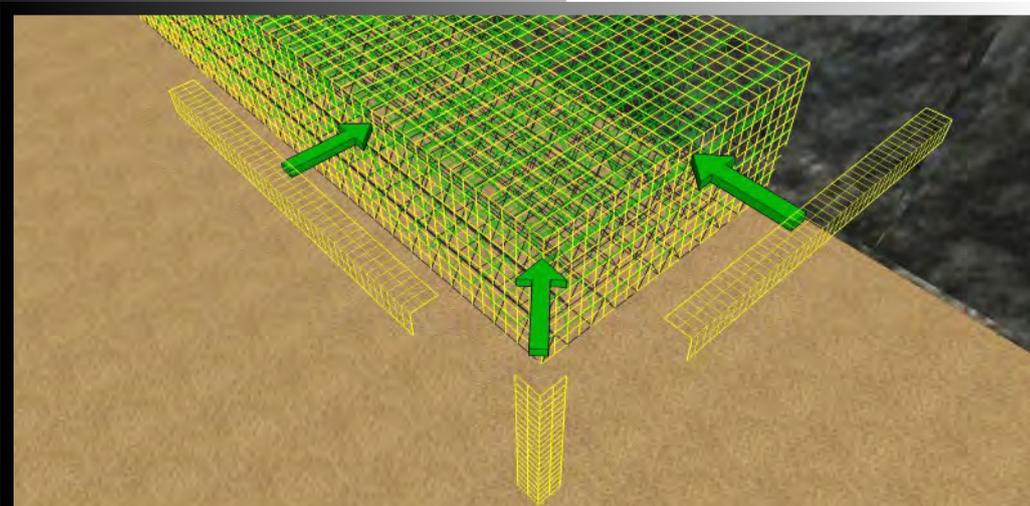
Stage 4

As each layer is built up it may be necessary to cut the layers back to follow the contours of the ground



Stage 5

As with the standard Ramwall once the height has been achieved the Facing mesh can now be attached to the front face and the ends of the wall using Hog Rings



Stage 6

Reinforcing Corners are fitted to each exposed corner adding strength and finish to the Ramwall

NOTE: Each layer is built to its full required length. The above images show short lengths for illustration purposes only

NORTH HARROW STATION



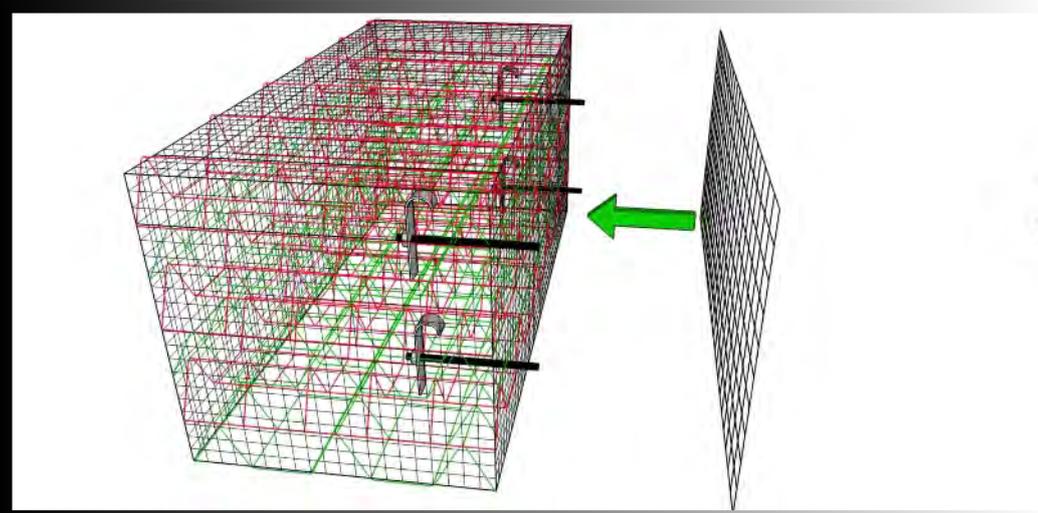
NORTH HARROW STATION

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Ramwall Heavy Duty Armour- Anchors Installation Guide

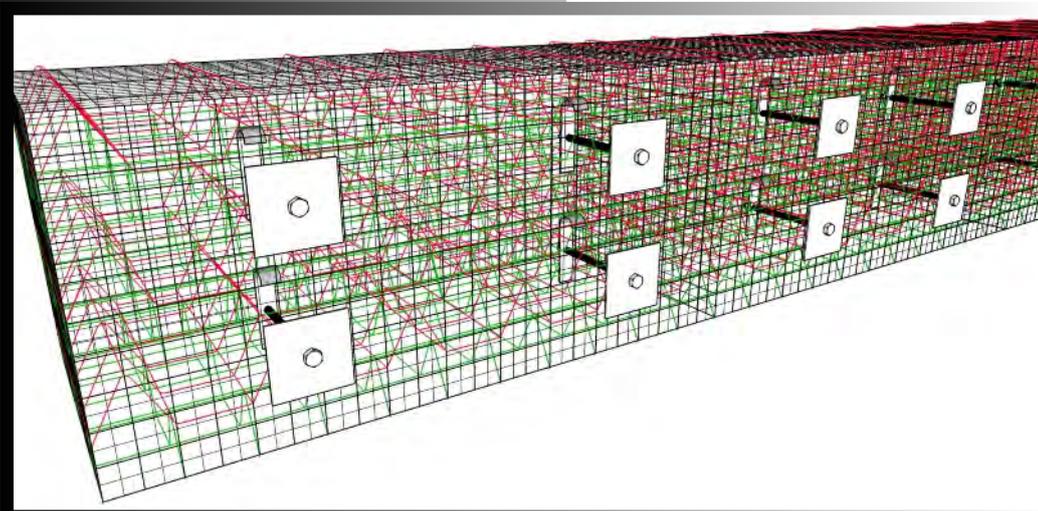
Heavy Duty Anchors

The Anchor bolt is used to fasten back the Heavy Duty Armour which is an optional, secondary heavy Facing panel. The Anchor hooks around the internal wires of the Ramwall basket



Stage 1

This image shows the Anchor Bolt and Heavy Duty Armour before the Anchor Bolts are tightened back. Place the Armour over the Bolts



Stage 2

Now place the washer plates over each bolt followed by the nuts which can be tightened once general alignment is satisfactory

NOTE: Each layer is built to it's full required length. The above images show short lengths for illustration purposes only

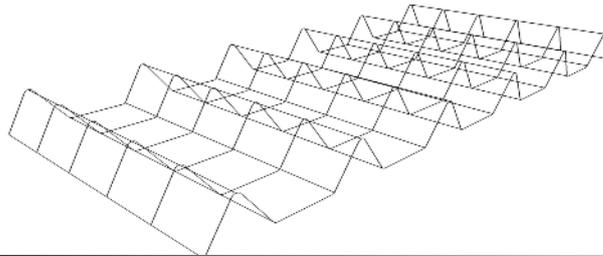


ACTON RAILWAY SHOWING INSTALLATION OF HANDRAIL

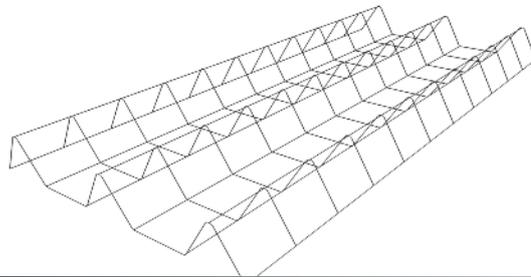
RAMWALL

Ramwall Parts List

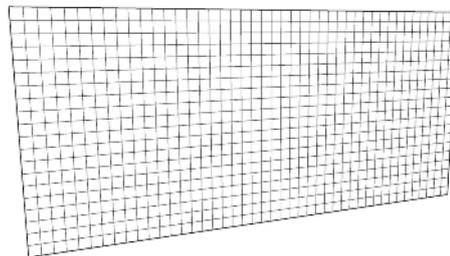
Ramwall Type 1 Panel
– 2.2 x 1.0m Standard
depth – 167mm



Ramwall Type 2 Panel
–
2.2 x 1.0m Standard
depth - 167mm



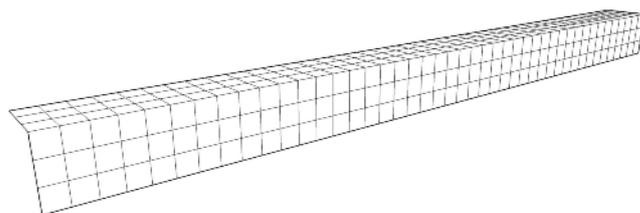
Ramwall Facing Mesh -
standard size 2.2 x
1.0m
50 x 50 x 5mm wire



Steel Dowel - sizes
from 1.5m long up-
wards



Reinforced Corners



ACTON RAILWAY



PITSEA RAILWAY STATION PLATFORM WORKS

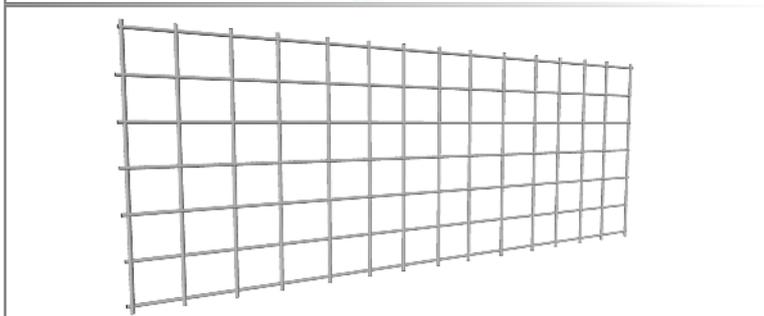
RAMWALL

Ramwall

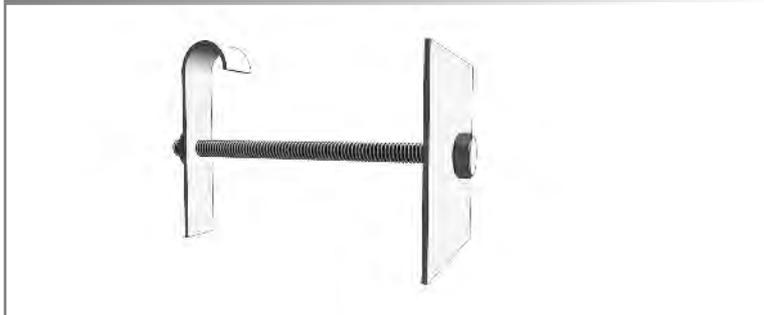
Handrail Pockets



Heavy Duty Protective Armour



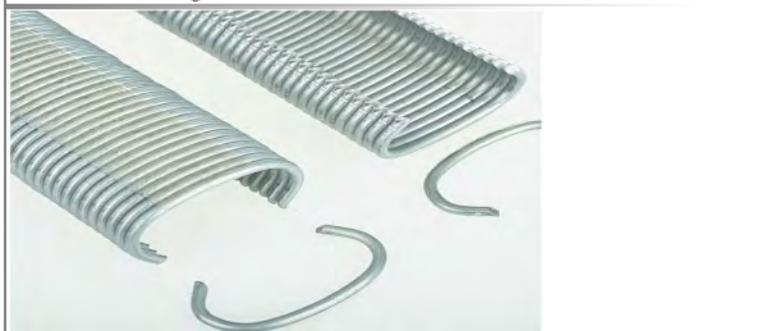
Heavy Duty Protective Armour Anchors



Handrail Sections



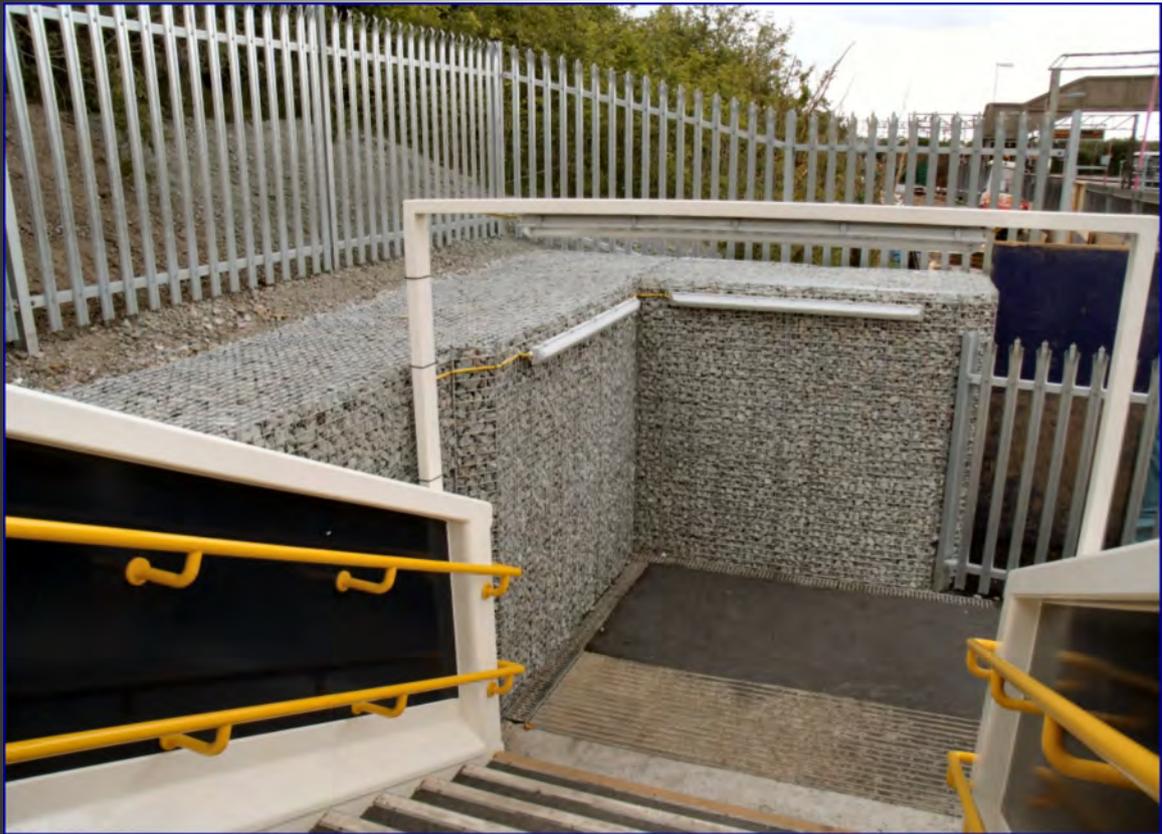
CL50 Triple Life Hog Rings



☎ 01226 381155
📄 01226 381177
✉ info@iss-eng.com



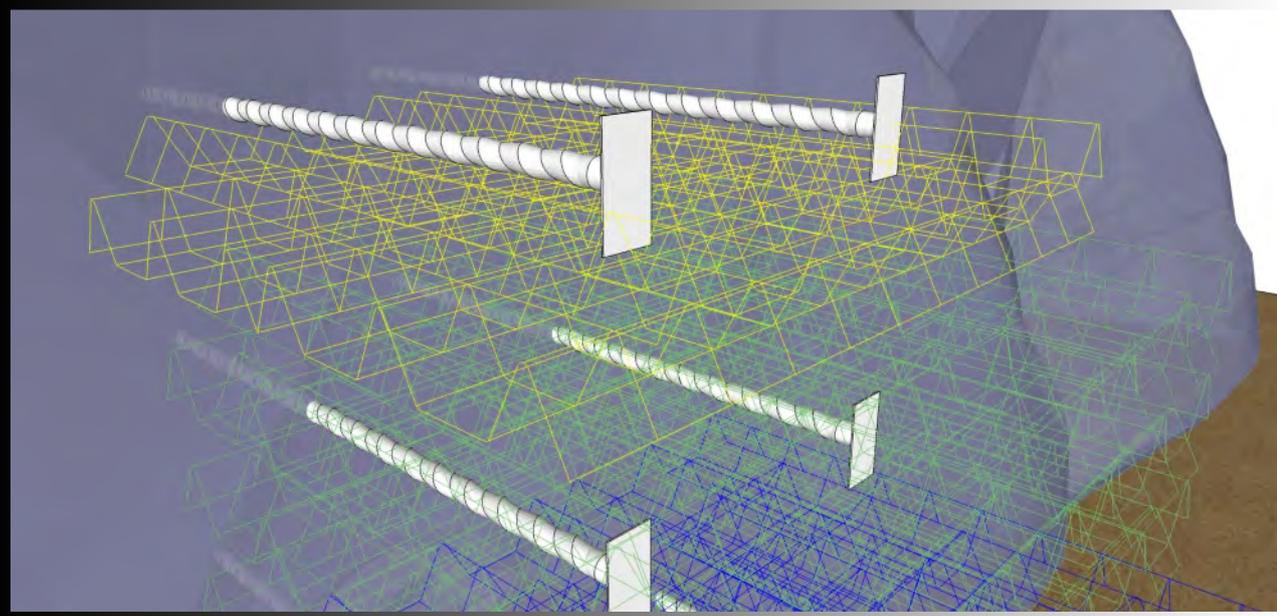
PITSEA RAILWAY STATION WORKS



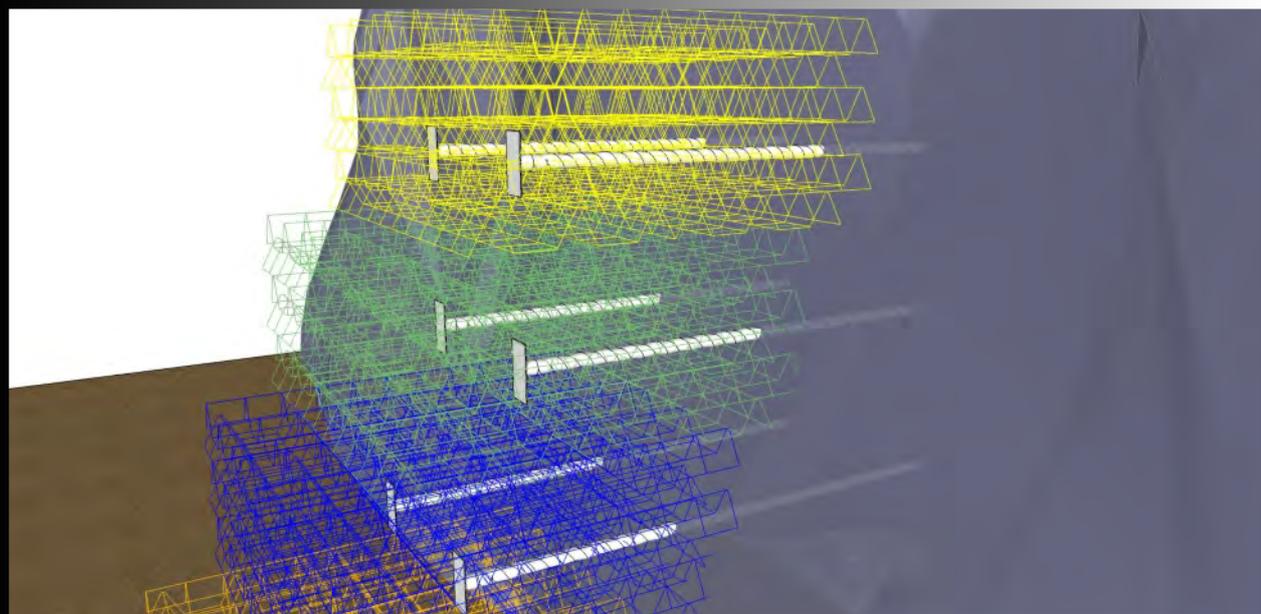
CAPHOUSE NATIONAL COAL MINING MUSEUM EMBANKMENT STABILIZATION

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Ramwall Hidden Tendons



The Hidden Tendons are installed between the layers of Ramwall panels, extending into the earth/rock behind it. There are various Installation methods depending on site/geological requirements



The second image shows the Hidden Tendons fully installed. With the help of the infill the Tendons are firmly secured within the Ramwall

