TENAX
TENWEB GEOCELL

Fig 1. Crest anchorage details

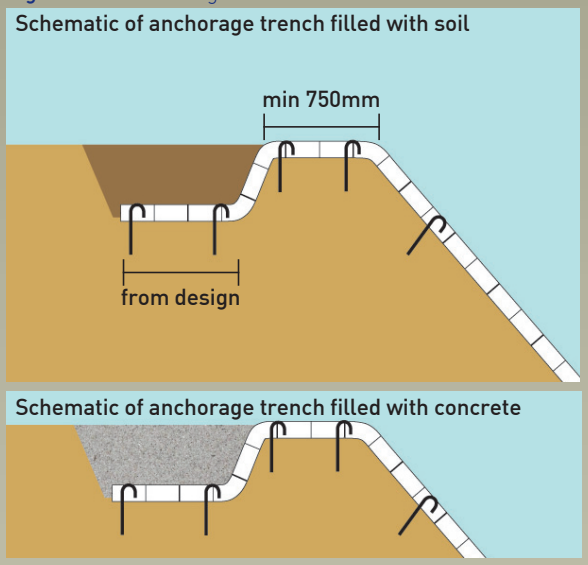


Fig 2. Anchorage types

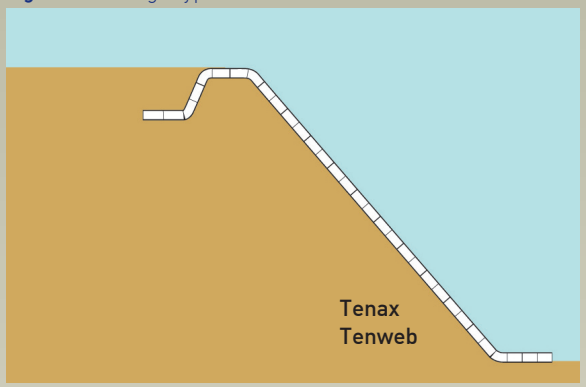
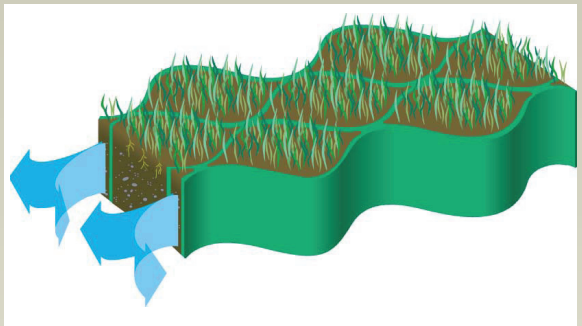


Fig 3. Expanding Tenweb panels



Site Preperation

Prepare the site to the design specifications (grade, geometry, soil compaction, etc.) The area should then be dressed to be free of soil clods, roots, stones or vehicle imprints of any significant size. Any voids should be filled in order to obtain a smooth laying surface allowing Tenweb Geocell to fit flush against the ground surface contours.

Installation

Excavate anchor trench where an anchorage trench is specified, each panel should be anchored at the top of the slope in a trench whose dimensions are determined by design depending on the geometry of the slope (Fig. 1). For shallow slopes, anchor trenches may not be required as pins used to fasten the system to the slope can provide sufficient anchorage strength.

NOTE: Seek advice from the Tenax Geotechnical Office for further guidance on anchorage trench details.

Tenweb panels can be expanded to the full open dimension, parallel to the flow direction (Fig. 3).

Anchor the panel at the top of the slope and fasten at the bottom of the trench with pins (Min. 8mm diameter and typically 300-450mm in lenght depending on consistency of the sub-grade).

The anchorage trench at the top may be filled with any suitable fill material. If possible, backfill with concrete to reduce the trench embedded length. (See Fig. 1).

Tenweb Placement

Along the slope the geocells should be anchored with pins typically 300mm - 450mm in length depending on the consistency of the slope material. The spacing between the pins shall be determined by design with each pin placed on the junctions of the panel as shown in Fig. 4.

Securely fasten down the panel ensuring the pins are arranged in a staggered pattern like the number 5 on a dice. Adjacent panels should be fixed using the same pins, one pin every 2-4 cells, depending on selected geocells.
(See Fig. 4)

Infilling the Geocells

Infilling can be performed manually or carried out using mechanical plant such as a front-end loader, backhoe, bottom dump bucket or a conveyor system. Tenweb cells can be filled with top-soil, or any other material such as soil/grass, gravel or even concrete etc., depending on the final aesthetics and vegetation requirements. The fill material shall be placed to approximately 20mm above the top of the cells and then lightly tamped and levelled to the height of the cell.

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Fig 4. Tenweb pinning arrangements

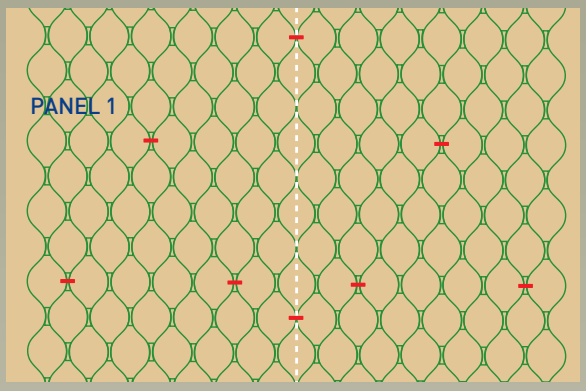

Fig 5. Potential toe anchorage problems

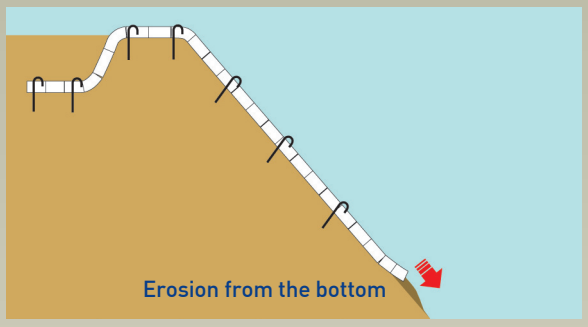

Fig 6. Problems with a lack of pins

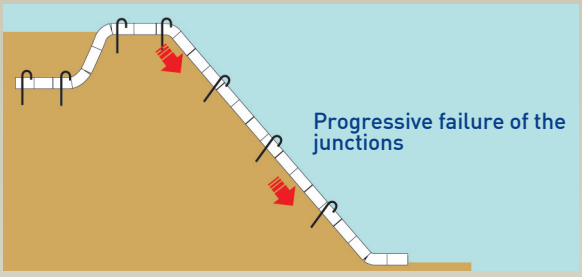

Fig 7. Potential problems due to intense run-off

Seeding and Finishing

If seeding is specified then it is recommended to place the seeds approximately 20mm below the finished level. Application of a further 10-20mm layer of fine top-soil (such as sandy loam) is recommended after seeding and this final layer should be lightly raked (using the back of the rake) to evenly cover the Tenweb cells.
Seeded areas may be protected with light synthetic or natural fibre blankets (jute) especially where steep slopes are constructed.

Key installation advice

Toe anchorage - Figure 5

It is important to ensure the lower cells at the toe of the slope are fixed in a base trench or secured carefully by pins. When this is not properly done, the lower cell row may lift in a 'crocodile mouth shape'. Infiltration water, passing through the cell apertures, will then cause the emptying of infill from the bottom. When the first row of cells is empty, the second row begins to rise, and so on. Erosion continues up to the first pin that is able to resist the cell from rising. Therefore it is essential that the first row of cells is properly fixed, so that this problem is resolved.

Lack of Pins - Figure 6

If the number of pins is less than required or if the pins used are not properly chosen, the localised stress transmitted by pins to the junctions can break them. The failure of a junction transmits an over-stress to the adjacent junction, thus producing a progressive failure. It is therefore important that the pin selection and placing is not compromised and that the pin design is carefully selected to suit the slope parameters.

Intense run-off - Figure 7

If there is a long slope upstream, or there is any possible cause of intense run-off, the top rows can be subject to intensive erosion. The change of slope angle, in fact, causes a local increase in water flow speed. To avoid the consequent erosion, it is necessary to cover the zone with a bio-mat or, better, with a geomat. It is strongly recommended to excavate a draining ditch immediately upstream the surface to be protected, thus reducing the run-off.

Contact the Tenax Geosynthetics Division
if more specific advice is required.

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