

BRIDGE ABUTMENT PROTECTION

Stabilisation of earthfill slopes adjacent to bridge abutments must accommodate subgrade consolidation and concentrated storm-water run-off. Terrafix systems offer the ideal solution: They readily conform to changing subgrade profiles while controlling the erosive effects of induced flow and seepage.



SLOPE STABILISATION

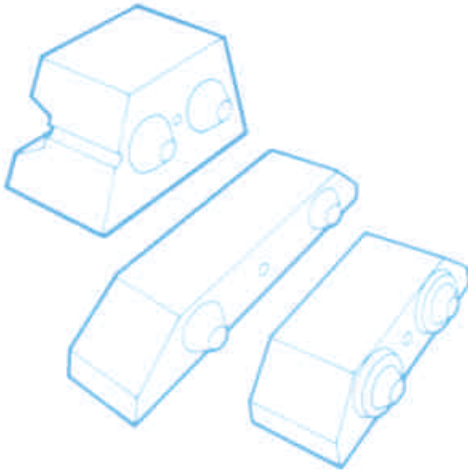
Exposed slopes adjacent to highways and retaining walls often require surface protection to prevent rilling or gulleying as the result of overland flow. Terrafix systems provide permanent, low-maintenance slope stabilisation with great aesthetic appeal.



ACCESS AND PARKING

The Terrafix TL96 system has been specially designed for heavy-duty paving uses. This attractive system is recommended for commercial, residential and industrial installations. Open-joint systems dressed with topsoil and seed are suggested for fire-routes and overflow parking areas.

DESIGN VERSATILITY



PRODUCT RANGE

A wide range of Terrafix block sizes allows the designer to specify the optimum weight and depth of protection for each loading condition. Standard systems are produced with unit weights of 171 kg/m^2 - 586 kg/m^2 (35 lb/ft^2 - 120 lb/ft^2), and thicknesses of 96mm — 254mm (3.8 in. — 10.0 in.). Further design flexibility is provided by the option of "open" or "closed" joint blocks to suit specific requirements for permeability, roughness and open area.

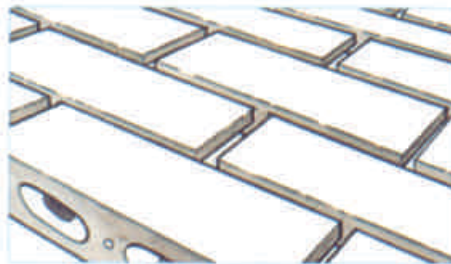


CHAMFER FACING UP

This configuration maximises the open area of the system. The surface cavities formed by the block chamfers help dissipate hydraulic energy at flow-control structures, and limit wave runup on revetments.

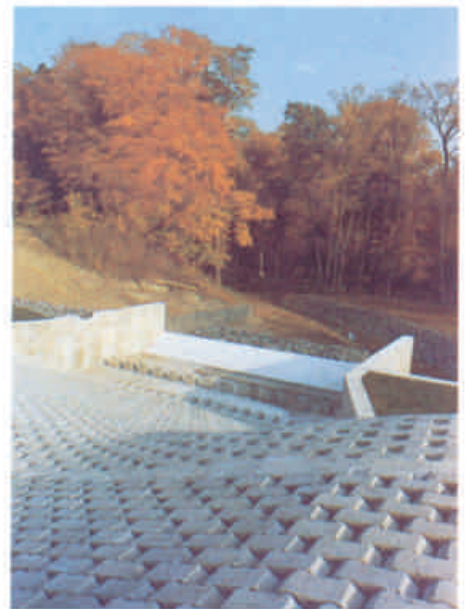
SURFACE TEXTURE

The unique double chamfer profile of the Terrafix block is intrinsic to the system's versatility. The block design specifically provides for two installation arrangements — chamfers facing up, or chamfers facing down — to accommodate differing performance requirements.



CHAMFERS FACING DOWN

The texture and friction coefficients of the "inverted" block systems approach those of monolithic concrete. This configuration provides high flow efficiency, where required, in channel applications; as well, it affords a uniform surface in paving installations.



PROTECTION OF IRREGULAR PROFILES

Erosion protection frequently is applied to channels and revetments with irregular alignments. Such irregularities may have evolved naturally, or may be required for functional or aesthetic reasons. The unique design of the Terrafix block system readily accommodates extreme variations in alignment and profile, without prejudicing system continuity, flexibility or aesthetic appeal. The Terrafix system provides generous three-dimensional flexibility while maintaining shear-connection interlocks between block elements.



CRUSHED STONE

Dressing the joints and cavities in the block system with a graded crushed stone serves two functions;

1. Inhibition of unwanted vegetation
2. Enhancement of the rigidity of the installed system ____ such as may be desirable where severe uplift forces are encountered. It is recommended that any treatment with crushed stone should await the initial "settling-in" of the system on filled or highly compressible subgrades.

SURFACE DRESSING

To accord with both functional and aesthetic requirements of the protection, the surface of the installed system may be dressed with either topsoil or crushed stone.

TOPSOIL AND SEEDING

The addition of topsoil and subsequent seeding will produce a fully grassed protective cover which blends with most natural settings. The underlying geotextile allows complete root penetration, which enhances overall stability of the protection. Maintenance of the protection with conventional grass cutting equipment is facilitated by the uniform surface texture.



WIRING AND ANCHORING OPTIONS

The versatility of Terrafix systems has been further expanded with the availability of a variety of wiring, cabling and anchoring materials.

Wires and cables of Type 304 stainless, high tenacity polyester or galvanised steel may be selected to lift and install preassembled block panels. These materials may also be threaded through preformed conduits in the system following manual block installation, to reinforce or anchor the protection. Selection of the type and size of reinforcement is governed by the specific function of the wire or cable.

Earth-anchors may be incorporated into the total system design to enhance

stability under extreme loading conditions. The situations where anchors are normally recommended include:

Suspension of certain revetments on steep slopes.

Grid-anchoring through the system on high energy dissipation installations.

Tie-back anchoring of earth-retaining structures.

These techniques, designed according to specific subgrade and loading conditions, permit the inherent advantages of the Terrafix block system to be fully utilised on a broad range of soil stabilisation installations.



SYSTEM SPECIFICATIONS

STANDARD TERRAFIX BLOCKS

PHYSICAL PROPERTIES

Block Dimensions

	T-38	T-45	T-50
Length (mm)(in)	447/17.6	610/24.0	610/24.0
Width (mm)(in)	175/6.9	152/6.0	152/6.0
Thickness (mm)(in)	96/3.8	114/4.5	114/4.5
Coverage ²			
Block (sq.m)(sq.ft)	0.093/1.00	0.111/1.20	.093/1.00
Bundle (sq.m)(sq.ft)	5.86/63.0	4.00/43.0	3.35/36.0
Weight ³			
Block (kg)(lbs)	15.9/35.0	23.1/51.0	22.7/50.0
Bundle (kg)(lbs)	1000/2205	833/1836	816/1800
System (kg/sq.m)(lb/sq.ft)	171/35.0	205/42.0	244/50.0

STANDARD PREASSEMBLED BLOCK PANELS

Panel Dimensions⁴

Width (m)(ft)	2.34/7.67	2.54/8.33	2.44/8.00
Minimum Length (m)(ft)	3.66/12.0	3.66/12.0	
Maximum Length (m)(ft)	11.00/36.0	11.00/36.0	11.00/36.0

Panel Weight

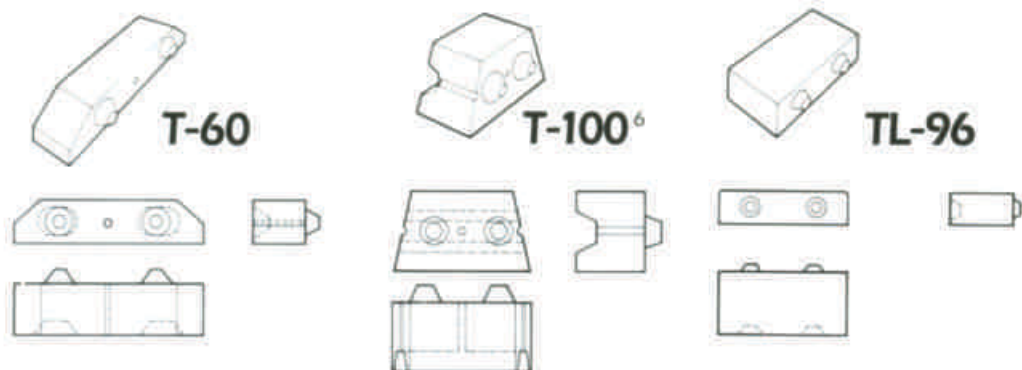
Minimum (tonnes)(tons)	1.48/1.63	1.91/2.10	1.86/2.05
Maximum (tonnes)(tons)	4.44/4.88	5.73/6.30	5.59/6.15

GENERAL APPLICATIONS⁵ GUIDELINES

General purpose block system for light-moderate flow-velocities in channels. Suitable for revetment protection of small lakes, ponds and lagoons. Open surface texture is ideally suited to topsoil dressing and seeding.

General purpose block system for moderate flow-velocities in channels and at hydraulic structures. Suitable for river-bank protection and revetment work in marinas and reservoirs. Manning "n" — value in 0.020 — 0.023 range.

Performance characteristics and similar to T-45 systems. "Closed" joint feature increases unit weight and reduces "n" — value. Preferred where moderate hydraulic impingement and turbulence are anticipated, as at culvert outlets and drop structures.



642/25.3

178/7.0

150/5.9

0.114/1.23

3.42/37.0

36.3/90.0

1089/2400

317/65.0

2.57/8.42

3.66/12.0

9.14/30.0

3.00/3.30

7.50/8.25

406/16.0

203/8.0

254/10.0

0.084

2.27/24.0

40.8/90.0

1102/2430

488/100.0

2.44/8.00

3.66/12.0

7.32/24.0

4.36/4.80

8.73/9.60

356/14.0

178/7.0

96/3.8

0.063/0.68

4.55/49.0

14.5/32.0

1045/2300

230/47.0

2.49/8.17

2.44/8.0

6.10/20.0

1.41/1.55

3.53/3.88

The "closed" jointed T-60 system is generally suitable for high flow velocities in channels, chutes and spillways. Preferred where severe hydraulic stresses and ice-action occur as in exposed shoreline protection works.

Extreme-duty revetment system offering both "open" and fully "closed" installation options. Designed for situations where very severe hydraulic impact and uplift stresses are anticipated. Well suited for lakeshore and coastal protection.

Heavy-duty interlocking paver system featuring the unique Terrafix mortise and tenon shear connection elements. Sand-filled joints inhibit vegetative growth and provide very high resistance to traffic loads. The paver is available in a range of colours.

1. CONCRETE QUALITY

Minimum compressive strength @ 28 days — 41.4 MPa/6,000 psi
Maximum moisture absorption — 5%

2. COVERAGE

Average values are quoted — Coverage may vary due to block spacing tolerances.

3. WEIGHT

Average wet-densities have been assumed. Values may vary depending on properties of local aggregates used in block manufacturing.

4. PANEL DIMENSIONS

Non-standard panel sizes can be supplied on request.

5. GUIDELINES

Application guidelines are provided for preliminary evaluation purposes only. Rigorous assessment of actual field conditions by a qualified technical authority is essential as part of final design and system selection.

6. T-100

Indicated values are based on "open" joint configuration for T-100 system. "Closed" jointed configuration results in an approximately 20% increase in system unit weight and a corresponding reduction in coverage.

PHYSICAL PROPERTIES

MATERIAL GRADE

		270R	360R	600R	1200R
MASS	gm/m ²	270	375	600	1200
THICKNESS	mm	3.0	3.5	4.7	5.8
GRAB TENSILE	Newtons (N)	556	690	1180	2500
BALL BURST	N	1112	1550	2400	5000
MULLEN BURST	Mpa	1.5	2.2	3.85	9.0
E.O.S.	(μm)	130	150	150	100
PERMEABILITY	K(cm/s)	2.6 x 10 ⁻¹	2.8 x 10 ⁻¹	2.3 x 10 ⁻¹	1.5 x 10 ⁻¹
ELONGATION AT BREAK	%	70-100	70-100	70-100	70-100
STANDARD ROLL SIZES	Metres	4.0 x 50 2.2 x 100	4 x 50	4 x 50	4 x 50

Notes:

1. The above products represent four of the most commonly used grades.
2. Intermediate grades up to 2000 gm/m² manufactured to order.
3. Factory and on site sewing is available as a customer service.

STANDARD SYNTHETIC CABLES

PRODUCT	1 TONNE	2 TONNE	3 TONNE
CORE	CONTINUOUS HIGH TENACITY POLYESTER FIBRE		
BRAIDED JACKET	CONTINUOUS HIGH TENACITY POLYESTER FIBRE		
CORE INCLUDING JACKET — diameter:mm	6.0	8.5	10.5
OUTSIDE — diameter:mm	8.5	11.5	13.5
OUTSIDE COATING MATERIAL	POLYOFIN COPOLYMER; HIGH IMPACT; UV STABILISED; WEATHERING GRADE		
COLOUR	BLACK	BLACK	BLACK
METHOD OF TERMINATION	BS5281 ALUMINIUM FERRULE SWAGING		
FERRULE CODE No.	CODE 9	CODE 11	CODE 13

TESTING DATA AND TECHNICAL SUPPORT SERVICES

Copies of materials quality control test results and performance evaluations of complete Terrafix Block Systems by independent authorities are available on request.

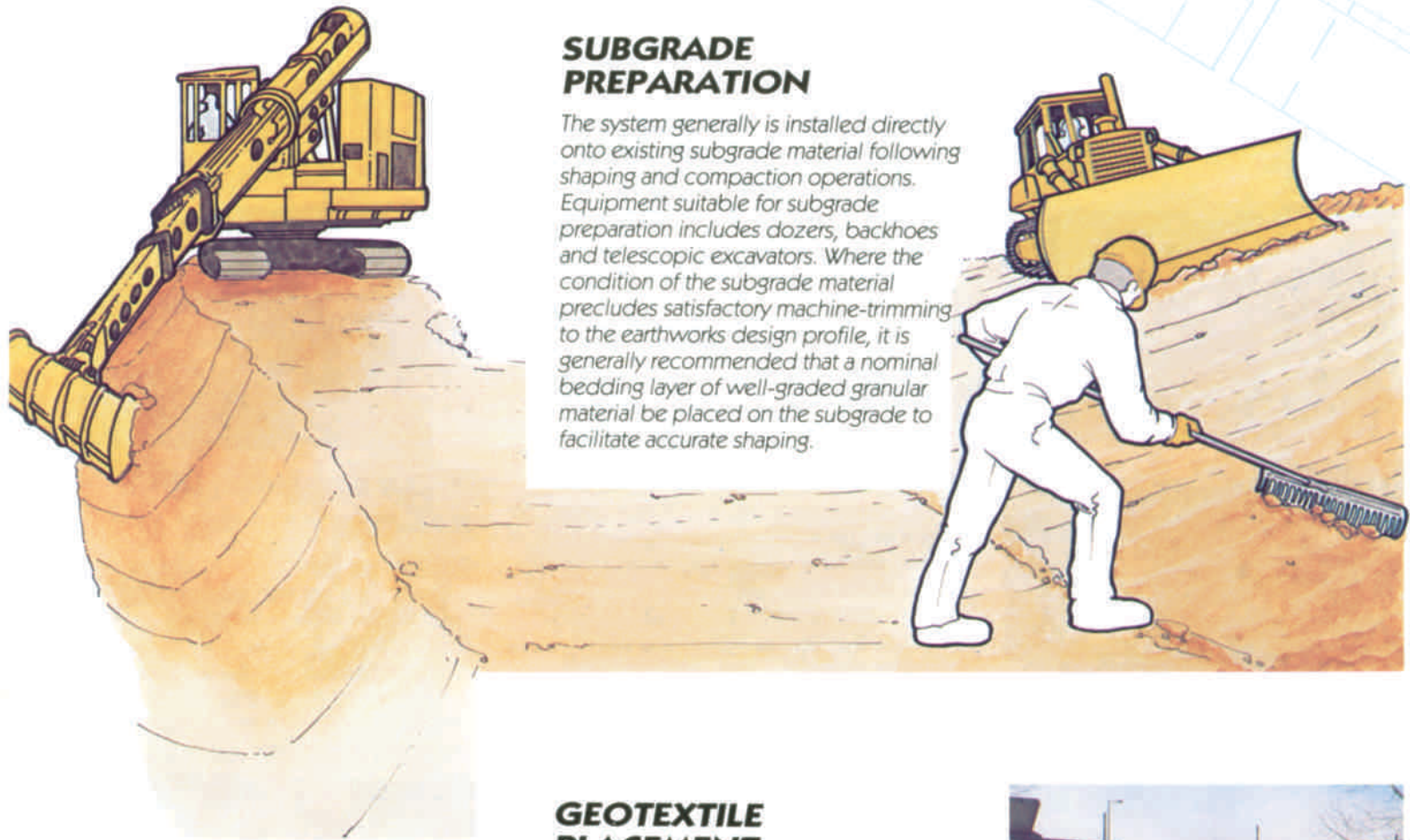
Mobile block plants, which permit temporary on site production of Terrafix blocks, using local aggregates, are also available where project logistics demand.

INSTALLATION

The versatility of Terrafix systems reaches beyond their unique design and performance features. It extends to the wide range of installation techniques evolved over many years of field experience. Our technical support staff are available to advise designers and contractors on the most efficient installation methods for their specific projects.

SUBGRADE PREPARATION

The system generally is installed directly onto existing subgrade material following shaping and compaction operations. Equipment suitable for subgrade preparation includes dozers, backhoes and telescopic excavators. Where the condition of the subgrade material precludes satisfactory machine-trimming to the earthworks design profile, it is generally recommended that a nominal bedding layer of well-graded granular material be placed on the subgrade to facilitate accurate shaping.



GEOTEXTILE PLACEMENT

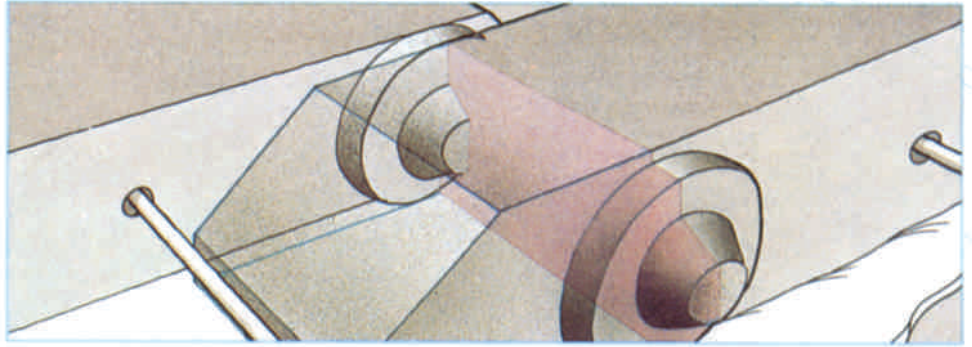
Sections of geotextile, dimensioned according to field requirements, are unrolled onto the prepared subgrade and temporarily secured in position with stakes, with adjacent sections of geotextile overlapped a minimum of 300mm (12"). Complete coverage of the protected area is essential. Outer edges of the protection, particularly those subject to hydraulic flow and seepage, should be dug into the subgrade a minimum of 150mm (6").



THE INTERLOCK

The Terrafix interlock is key to the systems' outstanding stability and mechanical flexibility. Each block has two interlocks positioned for easy running-bond installation. Essentially the interlocks are integral, tapered mortise and tenon joints which act as flexible shear-connectors

throughout the armour. This unique method achieves a positive interlock normal to the protected surface, without exclusive reliance on edge friction or cabling system. It provides very specific benefits:

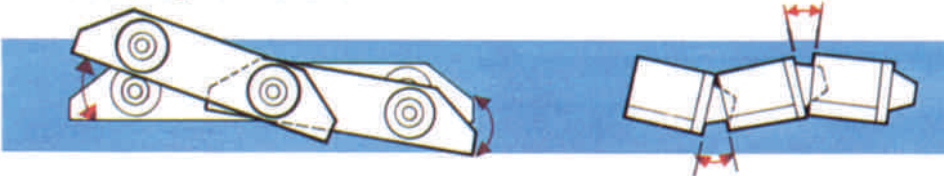
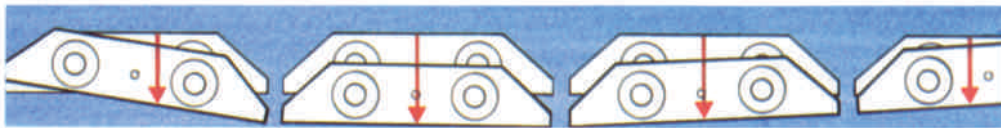


FLEXIBILITY

Protective linings and revetments are frequently installed on subgrades which are subject to short and long-term consolidation and settlement, and to seasonal deformations due to frost-heave. The effectiveness of an erosion control system depends largely on the maintenance of intimate contact between the protective armouring and the erodible subgrade. The Terrafix

interlock system of mortise-and-tenon joints uniquely integrates the entire armour with no sacrifice of conformity to local subgrade movement.

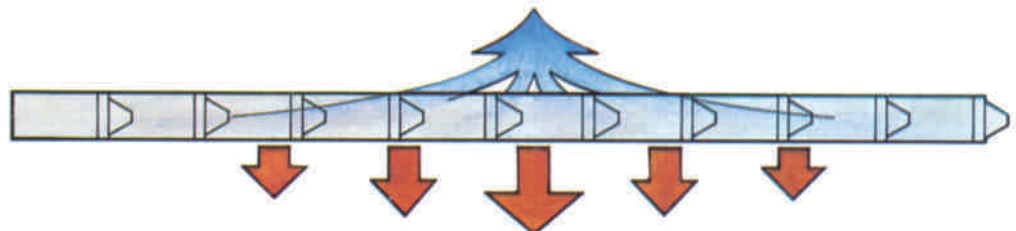
The tolerance of the joints allows blocks to "spread" and thus maintain their positive contact with the geotextile and subgrade, without prejudicing the mechanical integrity of the system as a whole.



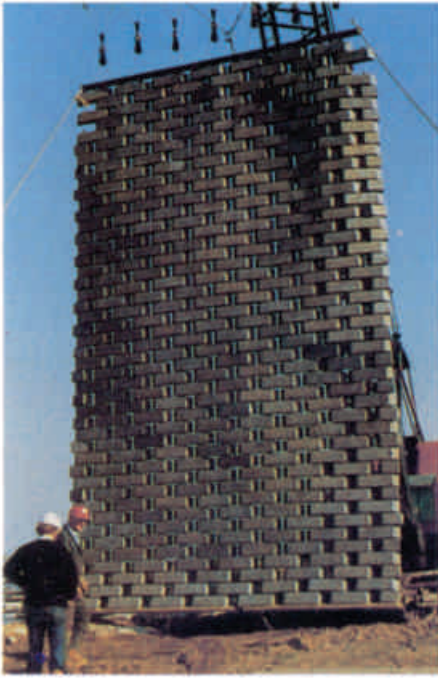
STABILITY

Hydraulic uplift forces — resulting from wave attack, turbulence and high flow velocities — are effectively resisted by Terrafix block systems. The stability of any armour is a function of both the mass of the individual elements, and the effectiveness of the interlock between

those elements. In the Terrafix system, the integral shear-connectors maximise the degree of interlock. Hence the total mass of the armour can be substantially reduced, as compared with traditional protective materials such as rip-rap.



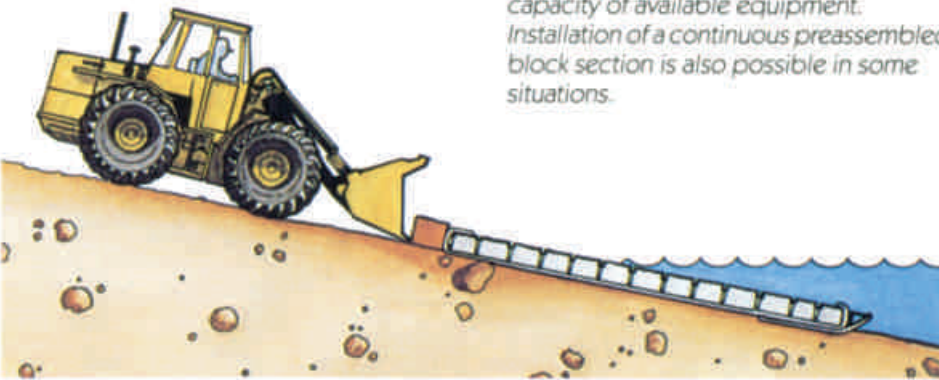
BLOCK PANEL INSTALLATION



Placement of large prewired, preassembled block panels is recommended for underwater installations and on projects where uniform alignment and cross-section afford the opportunity to use modular panel sections. On many projects both panel and manual placement techniques are combined to maximise overall efficiency without sacrificing the aesthetic appeal of the protection.

ON-SITE PREASSEMBLY

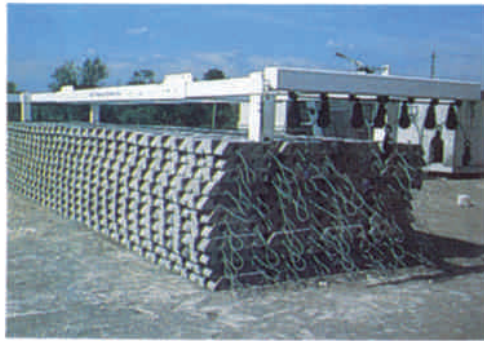
Extremely large block panels tailored to project design requirements can be assembled at the site, then lifted, pushed or floated into position. In this way the Terrafix system placement method can be matched both to site conditions and the capacity of available equipment. Installation of a continuous preassembled block section is also possible in some situations.



ANCHORING THE SYSTEM

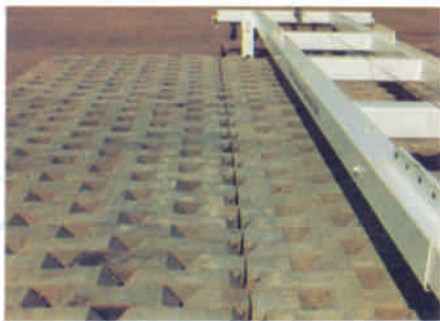
Hanging block revetments and steep slope protection require crest anchors to which the system's wires are attached. A range of anchor types can be used depending on loading and subgrade conditions. Anchors may also be installed in a grid pattern throughout the system to increase the effective weight of the protection in energy-dissipation and earth-retaining structures.





PLANT PREASSEMBLY

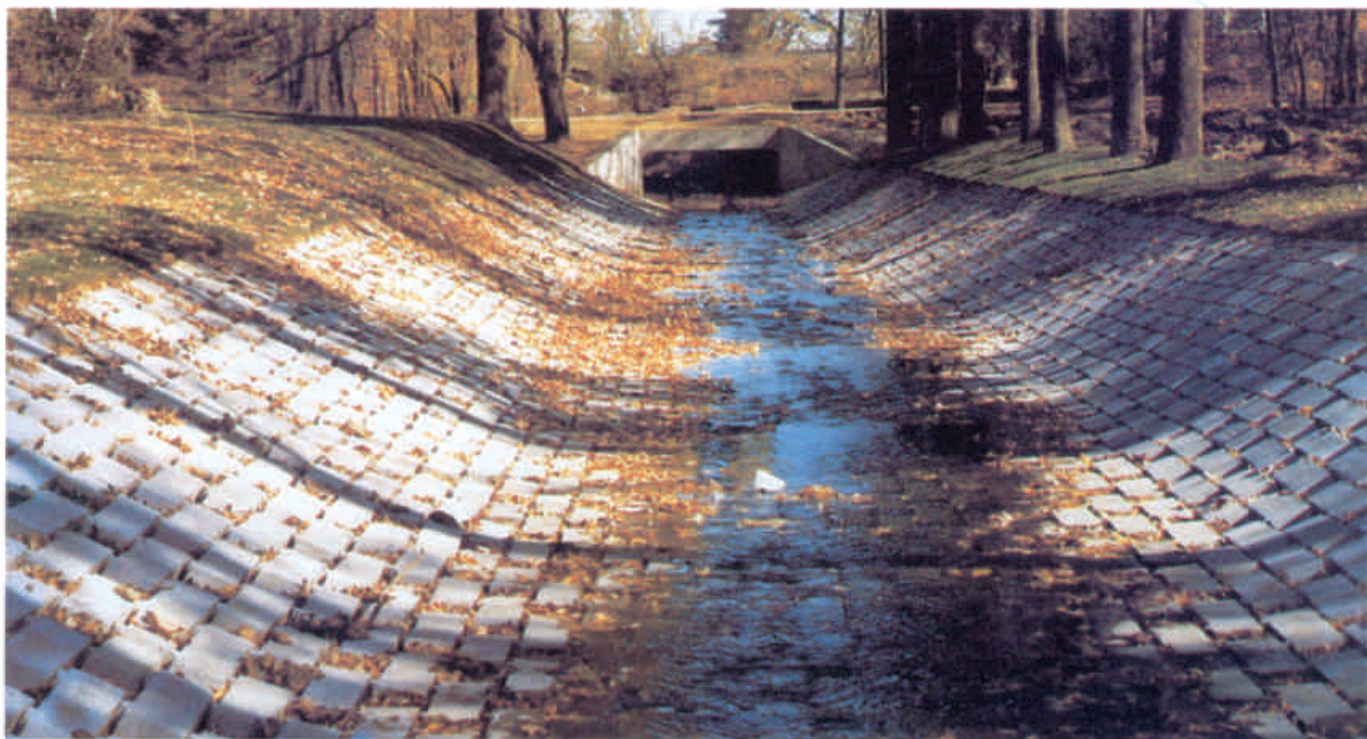
Truck delivery of block panels, preassembled at our plant, offers an extremely fast installation option. Individual panels are approximately 2.44m (8 ft.) wide and can be shipped in lengths of up to 11.00m (36 ft.). Panels are unloaded and positioned by crane, using a quick-release installation traverse.



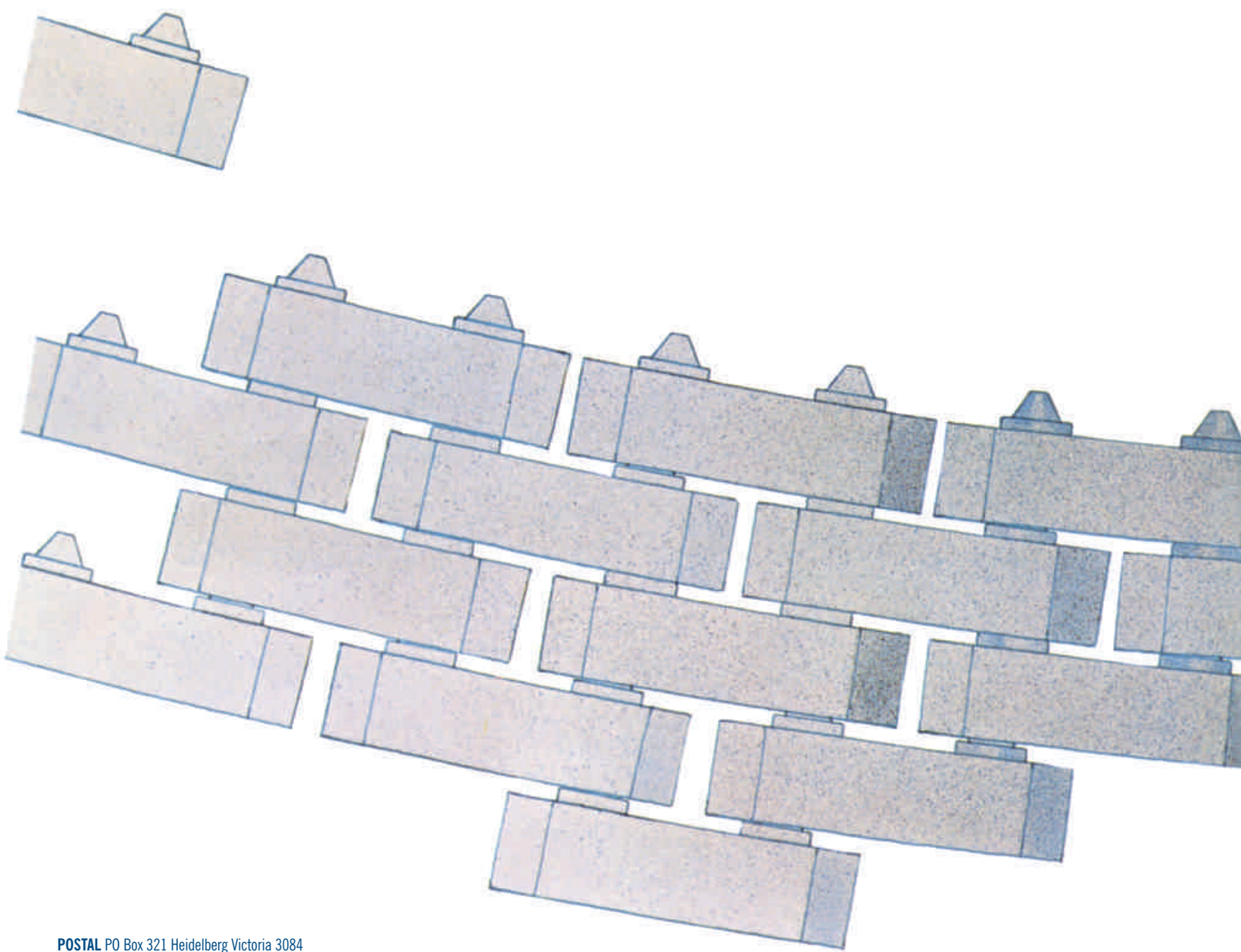
Special panel edge-blocks provide system continuity between adjacent panels, and, if conditions demand, cross wiring of panels can be added.



**TERRAFIX
INTERLOCKING BLOCK
SYSTEMS**



**“ENGINEERED
PROTECTION
FOR SOIL”**



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