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INTRODUCTION

This guideline provides the methods and procedures necessary for the correct installation of the **Multi-Cell®**.

The installation of **Multi-Cell®** shall be in accordance with these methods and procedures, and the project drawings provided by the Engineer. Where conflicting information arises between this document and the Engineer's specifications or instructions, the Engineer's specifications or instructions shall govern.

1. MATERIALS

1.1 Multi-Cell®

Multi-Cell® is a honeycombed structure that is manufactured from strips of laminated woven polypropylene slit-film tape geotextile that are stitched together alternatively to form three-dimensional square cells. **Multi-Cell®** is used as an in-situ shuttering to cast continuous interlocking concrete paving for road or canal construction and as an erosion control formwork for soil vegetated embankments. **Multi-Cell®** has been extensively used in the construction industry since the early 1980s as a fast and effective solution to canal / channel protection, load support and erosion control.

Mass / panel	Height	75 mm	kg	4.5	SANS 10221
		100 mm			
		150 mm			
Parent product	Laminated polypropylene slit-film woven tape				
	Thickness	mm	0.65	SANS 10221	
Tensile Strength	Parent	Strength	kN/m	26	SANS 10221
		Elongation	%	21	
	Seam	Strength	kN/m	4	
		Elongation	%	12	
Cell size	Side	mm	200 x 200		
	Diagonal		280 x 280		
Panel size	Packaged	mm	450 x 750		
	Expanded		10 000 x 5 000		

1.2 Fill

Fill material shall comply with the engineer's specification as indicated on the project drawings or bill of quantities. **Multi-Cell®** can be filled with concrete, soil or gravel, stabilised or unstabilised and can be vegetated.

2. HEALTH AND SAFETY

As far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees shall be provided and maintained by the contractor, taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment

2.1 Personal Protective Equipment

In the event that personal protective equipment (PPE) is required to mitigate and reduce the risk of injury whilst at work, the following minimum PPE is required:

- Safety shoes with steel caps for handling operations
- Hard hats
- Gloves



2.2 Excavations

All retaining wall excavations are to be suitably shored during construction such that the excavated area is safe and secure for personnel and machinery, and that adjacent structures are not undermined.

All excavations exceeding 1.5 m in depth are to be shored such that all embankments are safe and secure.

Shoring and battering-back remains the responsibility of the contractor.

2.3 Machinery

The contractor shall ensure that work performed and plant or machinery used is under the general supervision of a person trained to understand the hazards associated with it, and who has the authority to ensure that precautionary measures taken by the employer are implemented.

3. Multi-Cell® APPLICATIONS and BENEFITS

3.1 Slope Protection

- Allows steepening of erosion face
- Increases the soil friction angle
- Minimal effect from surface fires as it is a buried system

- Prevents rills and gullies by forming mini-cascades, which slow down surface run-off
- Supports topsoil cover
- Traps moisture in root zone

Applications

- Sand dune protection
- Embankment slopes
- Landfill cover / closure protection
- Dam faces, shore protection and spillways
- Road cut slopes
- Mine dump slope protection
- Bridge abutments

3.2 Channel / Canal Lining

- Provides a continuous, flexible, interlocking block system
- Eliminates joints in conventional continuous concrete costs
- Ideal for construction over active clays
- Shaped, soft finishes can be achieved
- Ideal for a combination of hard and soft finishes
- Can be easily shaped to existing contours of required channel / canal profile
- Eliminates the need for intermediate formwork to contain and prevent slippage of fresh concrete during construction

Applications

- Concrete road side drains
- Down chutes – road embankments
- Down chutes – mine dumps / landfill
- Irrigation canals
- Spillways
- Cofferdams

3.3 Load Support

- Prevents the lateral displacement of loose / soft material by distributing point loads to lateral cells
- Can provide up to 40 % reduction in structural thickness
- Excellent alternative in low CBR areas in the absence of good local road building material

- Prevents rutting in road base repairs
- Excellent performance at low deformation
- Permits the use of concrete in-fills of above-average strengths normally achieved by conventional interlocking paving

Applications

- Access roads
- Strengthening weak subbases and bases
- High-load parking / loading / storage areas (i.e. reach-stackers)
- Boat ramps
- Delivery accesses
- Domestic driveway accesses
- Retaining wall spread footings
- Foundation mattresses
- Pipe trenches
- Low level crossings

4. CONSTRUCTION SEQUENCE

4.1 Slope Protection/Channel Lining

(a) Site Preparation

- Remove all existing vegetation and rock/boulders from the slope.
- Shape and prepare slope. Compact areas where necessary.
- Dig out 300 x300 mm anchor trenches at the top and bottom of slope.

(b) Geotextile Separation Layer (*only for channel linings*)

- Install bidim® over culvert invert level and place down the slopes.
- Overlap bidim® lengths in the direction of the flow, creating a shingle effect.
- Overlap bidim® or sow edges together to prevent movement

(c) Setting out of Multi-Cell®

- Set out area to be covered by Multi-Cell®. Lay the first panel expand and peg the tension frame, 1 to 1, 5 m across the long side (Figure 1). Y10 or Y12 pegs can be used.

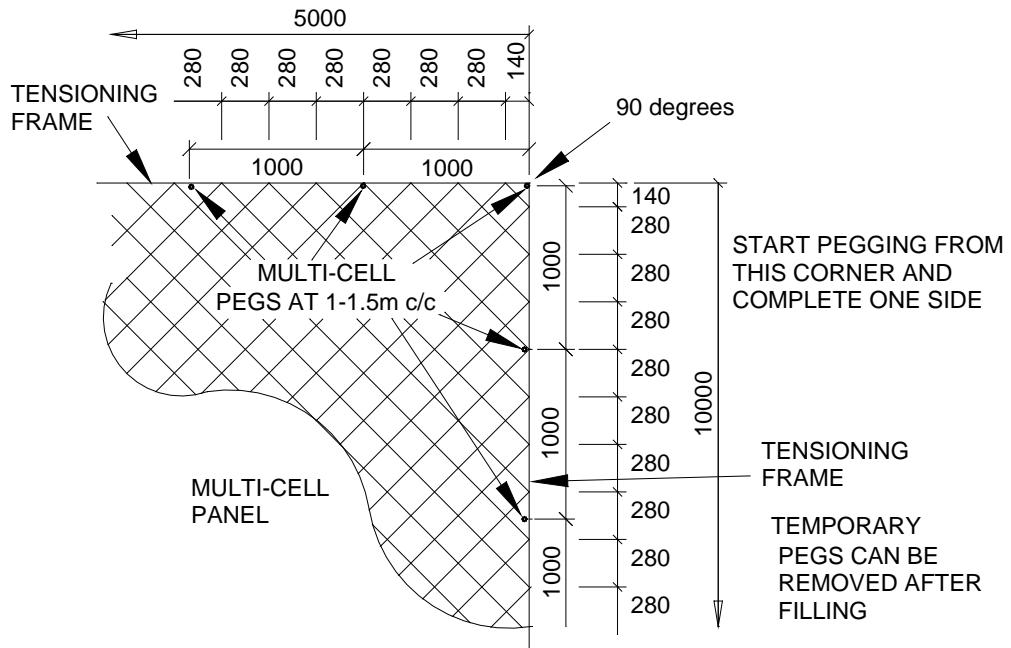


Figure 1

- Make sure that the cells are sufficiently tensioned, to make sure that the cell wall remains upright once a vertical pressure is removed.
- The next Multi-Cell® panel is joined at corresponding cells by vertically threading standard wire nails or by clipping into existing pegs. (See Figure 2)

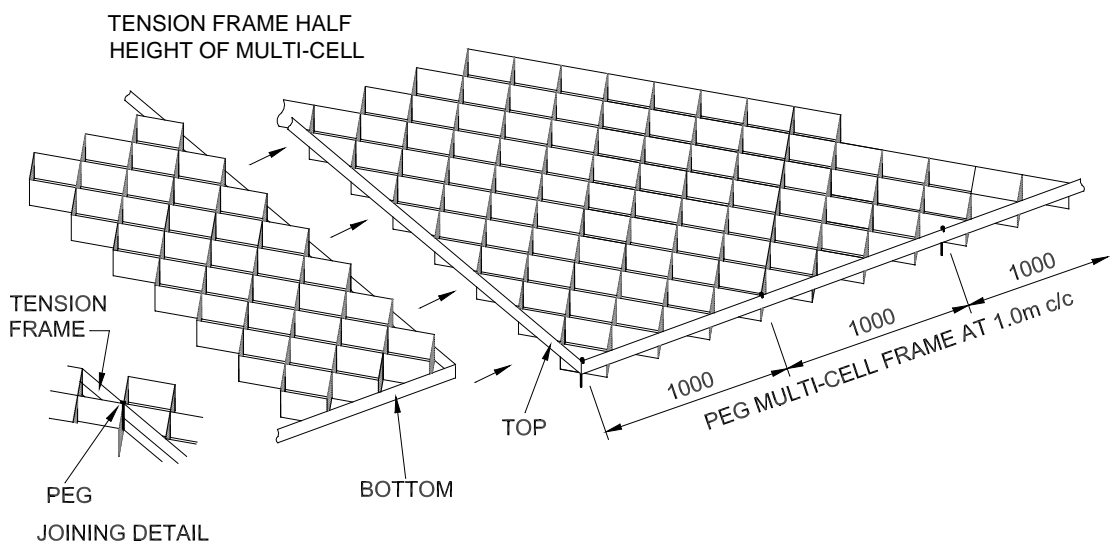


Figure 2

- Where changes in direction occur, insert binding wire/builders twine centrally through the cell walls at the inflection point of the profile. Tension the wire and peg along the wire with hooked pegs to press down the panel to the surface.
- For the construction of canals it is advisable to install under-scour protection at regular intervals (see Figure 3)

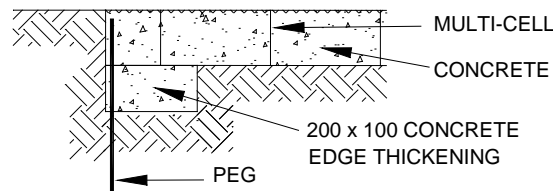


Figure 3

(d) Placement of Fill

- Filling of material can begin once the Multi-Cell® sections have been anchored down.
- *Filling with granular material*
Place the first batch of material with caution to prevent total collapse of the cells. Once the initial platform is established, stockpile onto this base and work the material into adjacent partially filled cells.
- *Filling with concrete, soilcrete, or stabilised soil.*
Mixing, placing, vibrating, finishing and curing should be carried out in the conventional manner. Temporary edge rails and a vibrating screed bar can significantly accelerate the procedure. Float concrete surface to the required finish
- Infill from the crest of slope to the toe of slope.
- Limit the drop height of material to a 1 m maximum

4.2 Load Support

(a) Site Preparation

- Prepare and compact material below.
- For low volume roads compact 100 – 150 mm base to a minimum of 93% Mod AASHTO. Make sure the final level of the base is the exact thickness below the final finished road surface.

(b) Setting out of Multi-Cell®

- Set out area to be covered by Multi-Cell®. Lay the first panel, expand and peg the tension frame, 1 to 1,5 m across the long side (Figure 1). Y10 or Y12 pegs can be used.

- Make sure that the cells are sufficiently tensioned, to make sure that the cell wall remain upright once a vertical pressure is removed.
- The next Multi-Cell® panel is joined at corresponding cells by vertically threading standard wire nails or by clipping into existing pegs (See Figure 2).
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