

# StrataWeb Geocells for Slope Protection

Development of the road sector though essential, is a humungous drain on financial and natural resources. While there is increasing emphasis from several authorities both executive and judiciary towards conservation, minimised use of resources also optimises costs. Any system that curtails use of scarce resources should be favoured. This article highlights the use of StrataWeb geocells as a unique economic solution that also fosters conservation.

StrataWeb is light-weight but strong three dimensional honeycomb-like cellular confinement system. The honeycomb structure is one of the strongest structural systems even used by nature. StrataWeb are fabricated from ultrasonically-welded HDPE strips that are expandable at site to form the honeycomb structure (Figs. 1 and 2). These cells are filled with non-cohesive material which provides rigidity to the geocell system. The StrataWeb is perforated and texturized.



Fig1: Collapsed panel of StrataWeb



Fig 2: Expanded panel of StrataWeb

## Applications

StrataWeb geocells are deployed in infrastructure applications in two ways:

- As load carrying mechanisms, to spread imposed load, particularly for flexible pavements of roads.
- As erosion protection systems for embankment slopes by either efficient use of concrete cover or helping to nurture vegetation.

This piece is confined to the use of StrataWeb as a protection system of earth embankment slopes.



Fig 3: Highway embankment – NH 202; example of facilitating placement of pcc with StrataWeb



Fig. 4: Landfill Project near Delhi; example of turfing with StrataWeb

## StrataWeb on Slopes

StrataWeb is provided along the slope surface to prevent erosion of the slope surface due to run-off along the slope. In this case, StrataWeb may be filled with plain cement concrete (pcc) (Fig. 3) or with soils with fertiliser and seeds (Fig. 4). The seeds germinate and the roots of the vegetation hold the soil of the slope together.

## The Advantages of Perforations and Texturizing

Walls of the cells are perforated for pore-water pressure relief and also textured within for better soil-cell wall



Fig. 5: Perforations in StrataWeb

interaction. Perforations (Fig. 5) on the walls of the cells serve several purposes:

- Perforations are essential for lateral drainage / dissipation of pore-water pressures from within the protected slope as well from within the cells.
  - Perforation and the texturized surface of the StrataWeb ensures better containment for soil and concrete infill to ensure infill interlocking.
  - Perforations provide a better grip for roots in a vegetated system, creating a stable mass.
- They also allow passage of nutrients for vegetation to move from cell to cell for slope protection.
  - Perforations reduce weight of the system, essential for stability on slopes.
  - Perforations make StrataWeb easy to handle as the weight reduces even while the joint strength is maintained. Perforations do not compromise on the performance of StrataWeb in any way.

### Conclusions

StrataWeb has several advantages as slope protection system:

- They are economical.
- The material is easy to transport owing to its flat and collapsible structure (Fig. 1).
- StrataWeb is environmentally friendly. Use of the material leaves a smaller carbon footprint due to minimal natural resource requirements and carbon sequestration, since carbon is impregnated in the HDPE to render it UV-proof.
- Owing to the simplicity of application, it is rapid to install in almost any weather. It does not require any skilled manpower for its placement.
- Once placed on the slope as per Strata specifications, the material barely requires any maintenance. However if greenery is required this will have to be nurtured from time to time. □