Erosion Control Practices Fact Sheet
Topsoiling with Cellular Confinement

Caltrans
New Technology Report

Description:

For use on cut slopes from 1v:2h up to 1:1 where perennial vegetation is desired. This practice combines topsoiling with a geotextile cellular confinement system.
Keywords: Bioengineering, upslope, soil, amendment.

Topsoiling with Cellular Confinement

Erosion Control Function:

Improves cover and soil structure. Reduces runoff and sediment transport by confining soils within geotextile cells. Reduces formation of channels.

Caltrans BMP ID
None

SWMP Category
IB: Permanent

Caltrans Slope Type
Cut

Status
Approved Case by Case

Design Elements:

Need to determine percent slope, upslope watershed contribution, and competence of subsoil or substrate. Survey local plant communities for native revegetation plant palette. Patented cellular confinement devices are commercially available.

A polypropylene honeycomb product such as GeowebTM is used. Interconnected cells are typically about 100 mm deep by 300 mm long by 300 mm wide. The geotextile must have perforated walls and be secured by an anchor and tendon system. 15 mm diameter rebar is typical for anchors. Topsoil is placed into cells and lightly compacted. Compaction is not to exceed 85%. Seed is then broadcast on top, and a hydromulch or erosion control blanket is applied on top of the seed. See also Topsoiling practice.

Effectiveness:

Medium

Confidence Level in Effectiveness Rating
Medium

Notes:

Ancillary Facilities:

Drainage from upslope must be diverted or dissipated. The top of the cellular confinement geotextile must be anchored over the crest of a slope or in a trench below grade. Additional “dead man” anchors or other earth anchors may be required. Installation of anchors may require a pneumatic hammer. Apply mulch or erosion control blanket over cellular confinement system.

Specifications:

Climate Zone
Mountain
Coastal
Valley
Desert

Location
Urban
Rural

Soil Category
Not rocky

Aspect
North
East
South
West

Steepness
Max 1v:1h
< 1v:1h

Cost: High

Can be as high as $10-$15/m2 = $100,000 to $150,000 per hectare.

Issues and Concerns

Maintenance:

Requirements

Inspect weekly in winter for slope instability. Typically, redirect water from rills, fill rills with soil, compact soil in cells, and secure with erosion control blanket or top with mulch.

Staffing/Equipment

Hand tools to refill cells or repair mulch cover or erosion control blanket as needed.

Project Development:

Construction

Patented devices are required; several manufacturers of cellular confinement devices are available. Installation of anchors may require a pneumatic hammer. Spreading and light compaction may be accomplished by hand tools or excavator. Topsoil compaction should not exceed 85%.

Construction Complexity Medium

Constraints

Subsoil must be competent. Not appropriate for solid rock surfaces.

Advantages

Established vegetation will reduce surface erosion and provide aesthetic benefits.

Report Sources:

Presto Products Company, http://www.prestogeo.com.

John McCullah, Salix Applied Earthcare.
http://www.biodraw.com.

Additional Information:

Soil Stabilization Products Company, Inc.
http://www.sspco.org.

Geotechnical Fabric Report, May, 1996.

Geofabrics Journal, Volume 2, Number 1, February, 1996.