

Rolled Erosion Control Products

Definition

Rolled erosion control products (RECPs) consist of prefabricated blankets or netting which are formed from both natural and synthetic materials.

Description and Purpose

The predominantly used RECPs generally fall into the following two categories, each having unique characteristics:

- Erosion control blanket (ECB): A temporary degradable rolled erosion control product composed of processed natural or polymer fibers mechanically, structurally or chemically bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment.
- Turf reinforcement mat (TRM): A rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix. TRM's, which may be supplemented with degradable components, are designed to provide immediate erosion protection, enhance vegetation establishment and provide long-term functionality by permanently reinforcing vegetation during and after maturation. TRM's are typically used in hydraulic applications, such as high flow ditches and channels, steep slopes, stream banks, and shorelines, where erosive forces may exceed the limits of natural, unreinforced vegetation or in areas where limited vegetation establishment is anticipated.

The practice may also be called Erosion Control Blanket, Mulch Blanket, or Erosion Control Matting

Pollutant controlled

- Suspended Sediment

Companion and Alternative BMPs

- Seeding/Vegetation
- Mulching

Advantages and Disadvantages

Advantages

- Can provide for some degree of immediate stabilization
- Numerous manufacturers, each with a number of different products, allow for the selection of a product which meets the individual characteristics of each site.

- Stabilizes disturbed slope and protects surface from erosive forces of raindrop impact.
- Promotes growth of vegetation.
- Most products degrade over time, eliminating potential maintenance issue.

Disadvantages

- Various products and manufacturers have different design and construction standards. Designer must rely on manufacturer's data.
- Permanent stabilization and protection is dependent on the establishment of vegetation unless TRMs are used.

Location

Rolled erosion control products should be used on bare ground that is highly susceptible to erosion, such as steep slopes and channels, and in locations where establishing vegetation may otherwise be difficult.

General Characteristics

- Several factors, such as soil conditions, steepness and length of slope, depth of flow, runoff velocities, and time required to establish desired vegetation, influence the choice of product.
- RECPs and TRMs are manufactured from a wide variety of different materials including coconut fiber (coir), jute, nylon, polypropylene, PVC, straw, hay, or wood fibers. These materials may be used individually, or in combination to form nets or blankets.
- The products function by protecting the ground surface from the impact of raindrops and stabilize the surface until vegetation can be established. RECPs and TRMs also promote the growth of vegetation by helping to keep seed in place, and by maintaining a consistent temperature and moisture content in the soil.
- Most RECPs are either biodegradable or photodegradable and will decompose over a period of time.
- RECPs should generally be installed parallel to the direction of water flow.

Materials

- Seed
- Fertilizer
- RECP
- Degradable Stakes/Pegs/Pins

Design Specifications

- RECPs are produced by a number of manufacturers, and are available in a wide variety of different configurations. Competing products from different manufacturers can have completely different material compositions and construction, but be intended to serve the same purpose. Given the wide variety of RECPs available, product selection and specification can be difficult.

- Table 1 is modified from the product selection guide produced by the ECTC and classifies products based upon longevity and product description.
- Factors such as the slope on which the RECP is to be placed and the sheer stress that the RECP will experience shall be used to determine which RECP product is adequate for the application it is intended for.
- Stake placement and installation should follow manufacturer recommendations

Construction Guidelines

1. Prior to placing a RECP, a topsoil seedbed should be prepared, smooth graded, and seeded and fertilized. It is imperative that seeding occur prior to placement of the RECP to ensure proper contact between seed and soil. Some manufacturers can embed the specified seed mixture into the product during the manufacturing process (if this process is used, follow the manufacturer's recommended installation specifications).
2. After seeding, the appropriate RECP may be placed and anchored with stakes or staples. The manufacturer will provide specifications for the pattern and spacing of anchor stakes or staples, overlap between rolls (typically 6 inches), and any additional product requirements.
3. It is important that the stakes or staples be properly installed to prevent "tenting" of the product as the vegetation begins to grow and push up on the matting. This can impact vegetative establishment and the product can become entangled in mowing equipment.
4. At the tops of slopes and at the entrance to a channel, the leading edge of the RECP should be trenched into the ground, approximately 6 inches, anchored in place with stakes or staples, and backfilled. This prevents runoff from lifting the leading edge, and flowing between the ground and the RECP.
5. Subsequent segments of RECPs should have their upstream edges trenched in, and the downstream edge should slightly overlap the next section to prevent water from flowing under the product.

Monitoring

Inspect weekly and after every storm event that results in a discharge from the site until adequate vegetation is established.

Maintenance

- Repair erosion and/or undermining at the top of the slope.
- Repair undermining beneath RECP(s), pull back the RECP(s), fill and compact eroded area, reseed and then secure RECP(s) firmly.
- Reposition or replace RECPs that have moved along the slope or channel and secure firmly.
- Replace damaged RECPs.

References

- Erosion Control Technology Council, 2006. *Standard Specification for Rolled Erosion Control Products*.
- Ontario. *Rolled Erosion Control Product (RECP) BMP 11*.
- Statewide Urban Design and Specifications, 2008. *Design Manual 7E-7*.

Table 1. Rolled Erosion Control Product Comparison

Desired Time Scale		Type Code	Product Category	Material Composition	Max Slope Gradient (H:V)	Max Channel Shear Stress ¹	
Description	Length					(lb/sq ft)	(Pa)
Short-Term	3-12 months	1A	Single-Net Erosion Control Blanket	Processed degradable natural and/or polymer fibers mechanically bound together by a single rapidly-degrading synthetic or natural fiber netting	3:1	1.50	72
			Open-Weave Textile	Processed rapidly-degrading natural or polymer yarns or twines woven into a continuous matrix			
		1B	Double-Net Erosion Control Blanket	Processed degradable natural and/or polymer fibers mechanically bound together between two rapidly-degrading synthetic or natural fiber nettings	2:1	1.75	84
Extended-Term	24 months	2A	Erosion Control Blanket	Processed slow-degrading natural or polymer fibers mechanically bound together between two slow-degrading synthetic or natural fiber nettings to form a continuous matrix	3:2	2.00	96
			Open-Weave Textile	Processed slow-degrading natural or polymer yarns or twines woven into a continuous matrix			

(continued)

¹ Shear stress unvegetated rolled erosion control product can sustain without physical damage or excessive erosion (>12.7 mm (0.5 in) soil loss) during a 30-minute flow event, based on historical experience and large-scale testing of products with Manning's roughness coefficients of 0.01-0.05. Test methods include ASTM D6459, or others deemed acceptable by the engineer.

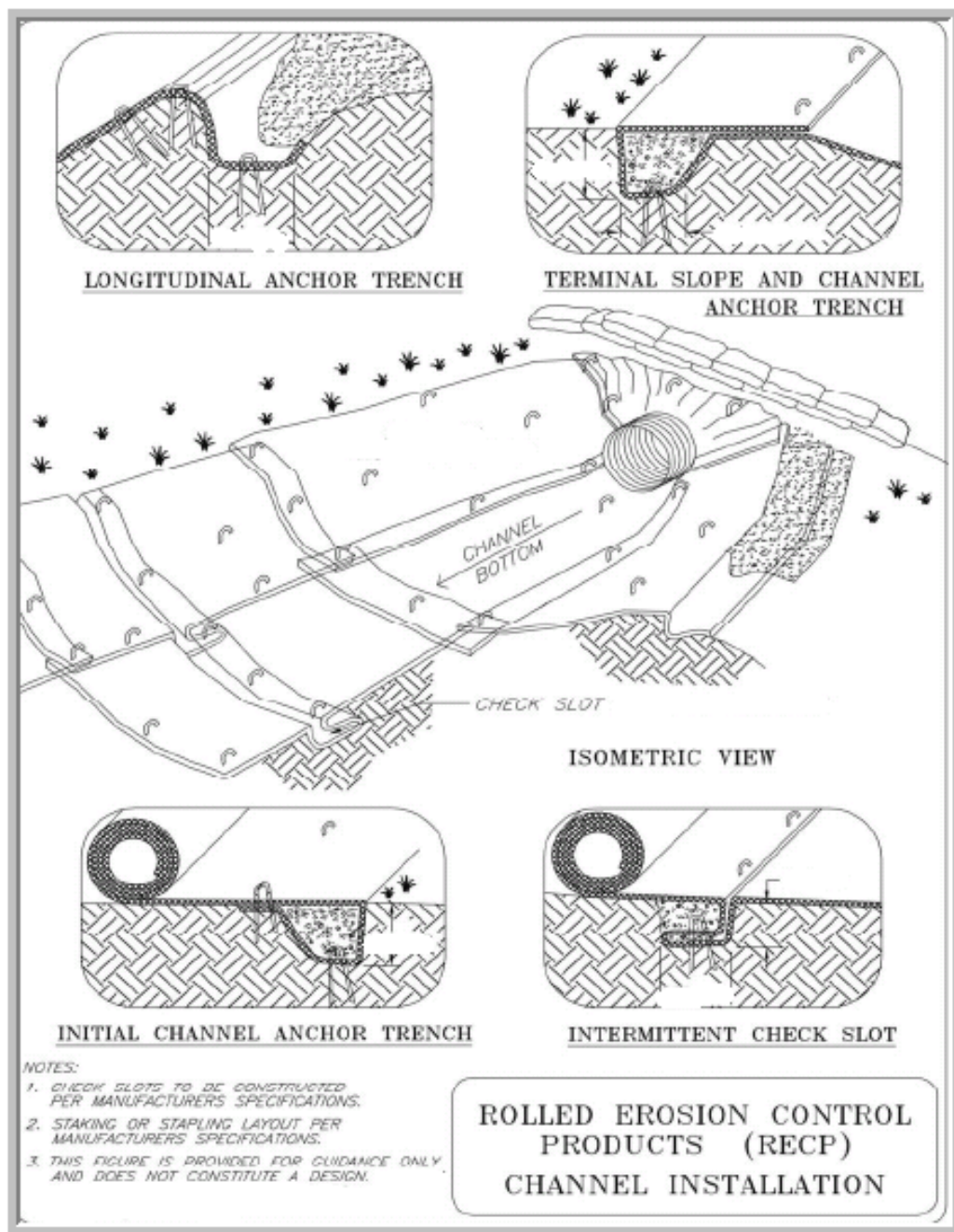
Table 1. Rolled Erosion Control Product Comparison (continued)

Desired Time Scale		Type Code	Product Category	Material Composition	Max Slope Gradient (H:V)	Max Channel Shear Stress ²	
Description	Length					(lb/sq ft)	(Pa)
Long-Term	36 months	3A	Erosion Control Blanket	Processed slow-degrading natural or polymer fibers mechanically bound together between two slow-degrading synthetic or natural fiber nettings to form a continuous matrix	1:1	2.25	108
			Open-Weave Textile	Processed slow-degrading natural or polymer yarns or twines woven into a continuous matrix			
Permanent	--	4A	Turf Reinforcement Mat	Non- or partially degradable synthetic fibers, filaments, nets, wire mesh, and/or other elements, processed into a permanent, three-dimensional matrix of sufficient thickness	1:2	6.00	288
		4B				8.00	384
		4C				10.0	480

Source: Adapted from Erosion Control Technology Council, 2006. *Standard Specification for Rolled Erosion Control Products*.

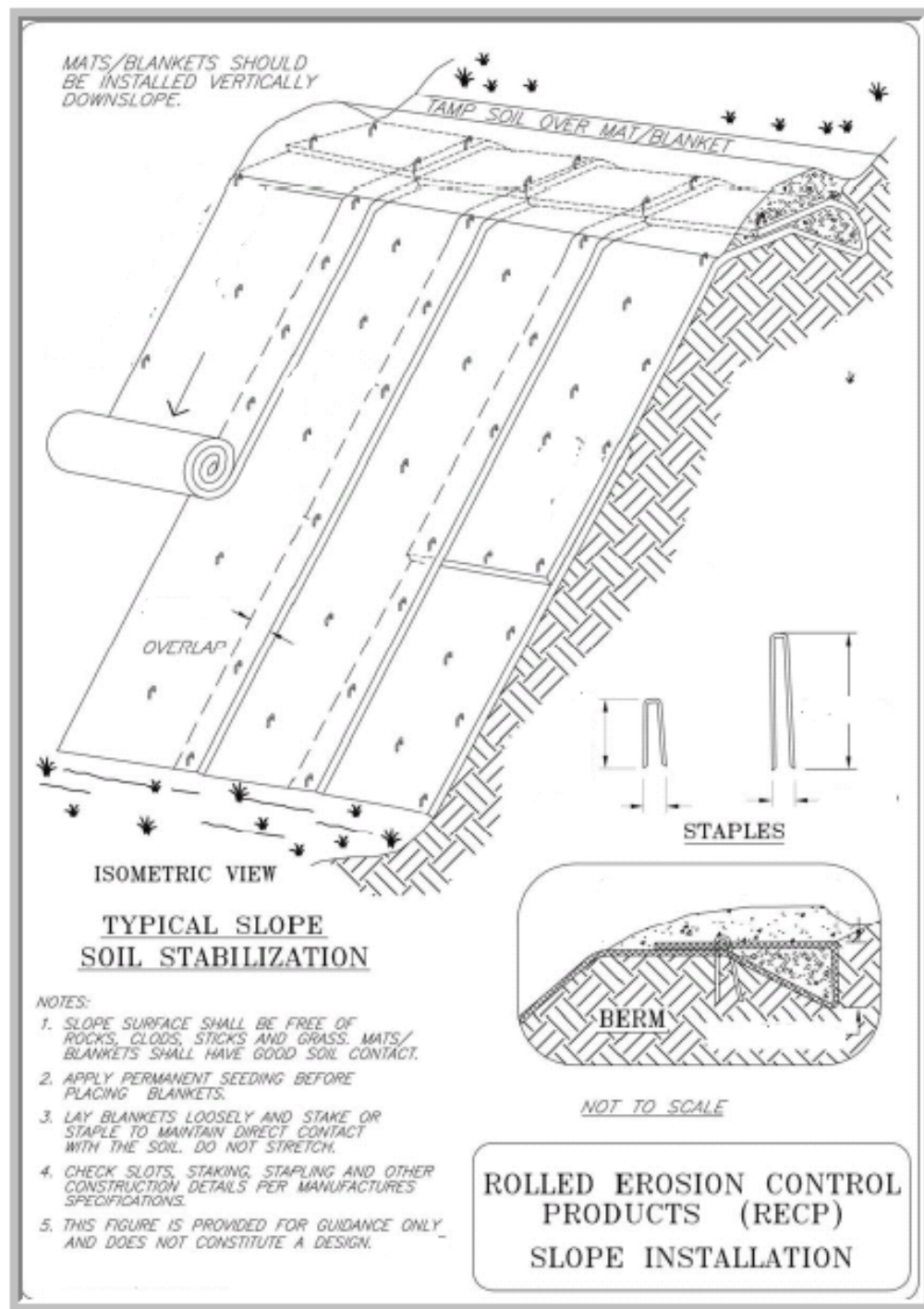
² Shear stress fully vegetated turf reinforcement mat can sustain without physical damage or excessive erosion (> 12.7 mm (0.5 in.) soil loss) during a 30-minute flow event, based on large-scale testing. Test methods include ASTM D6460, or others deemed acceptable by the engineer.

Exhibit 1. Rolled Erosion Control Product Channel Installation



Source: Ontario. *Rolled Erosion Control Product (RECP) BMP 11.*

Exhibit 2. Rolled Erosion Control Product Slope Installation



Source: Ontario. *Rolled Erosion Control Product (RECP) BMP 11.*