BMP 30.00. Surface Roughening

DESIGN CONSIDERATIONS

Objectives
Surface roughening measures are intended to aid in the establishment of vegetative cover from seed, to reduce runoff velocity and increase infiltration, and to reduce erosion.

A rough, loose soil surface provides more favorable moisture conditions for seed germination than hard, smooth surfaces. It provides interstitial space for seed deposition and germination and root growth.

Description
Surface roughening establishes a rough soil surface by creating horizontal grooves, furrows, or depressions running parallel to the slope contour over the entire face of the slope. The most common measures include:

- **Stair-Step Grading** - This is done by cutting “steps” along the contour of a slope, and is applicable to slopes with a gradient greater than 3:1, which have material soft enough to be bulldozed.

- **Tracking** - This is done by running tracked machinery (such as bulldozers) up and down slopes to leave horizontal depressions in the soil.

- **Mechanical methods** – This is done by drawing or rolling equipment such as punch or sheepsfoot rollers over the surface.

- **Manual Raking** - This is done manually by using hand tools such as rakes or hoes to create grooves at least 1-inch deep and no more than 12 inches apart.

Other Names
Contour grading, serration, cat tracking, track walking

Applicability
Surface roughening measures provide simple, inexpensive, and immediate short-term erosion control for bare soil where vegetative cover is not yet established on construction slopes greater than 5 vertical feet. By themselves, they are not soil stabilization and must be seeded, fertilized, and mulched as soon as possible.

Selection Considerations
Selection of slope roughening measures should be based on slope grade, slope type (cut or fill), type of equipment available, and soil type.

1. **Cut slopes steeper than 3:1.** Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
2. **Fill slopes steeper than 2:1.** Use tracking to roughen the face of the slope. If soil is loose, such as sandy soil, manual raking is more suitable.
3. **Fill slopes between 2:1 and 3:1.** Use tracking or mechanical methods to roughen the face of the slope, if necessary.
4. **Cuts, fills, and graded areas no steeper than 3:1.** Roughen these areas by tracking, mechanical methods, manual raking, or by using tilling, diskig, or harrowing implements.

Surface roughening is suitable for all erodible soils. Stable, sloping rocky faces may not require roughening, while erodible slopes steeper than 3:1 require special attention to surface roughening.

Relationship to Other ESC Measures
Diversions at the upper perimeter of the area function to prevent runoff from causing erosion on the exposed soil. Hydromulch/seed on slopes for erosion control. Silt fences and sediment basins at the lower perimeter of the area function to prevent off-site sedimentation.

Common Failures or Misuses

- Roughening washed away by heavy rain, necessitating re-roughening and reseeding.

- Failure of upslope control measures (diversions), resulting in excessive flows over area and erosion of soil.

- Surface roughening alone is not considered stabilization.
• Surface roughening must not be used as a means to keep an area “actively worked” to reset the stabilization deadline.

• Track walking in the wrong direction is a common failure that provides valleys for the water to concentrate in.

**SPECIFICATIONS**

Standard Specification

• 684 – Surface Roughening

Drawing

• BMP-30.00 – Surface Roughening
DETAIL 1: STEP STEP GRADING

1. Step with machinery up and down the slope to prepare ground to detail step and disturbance caused to details.

DETAIL 2: TRACKING

2. Track with machinery up and down the slope to prepare ground to detail step and disturbance caused to details.

DETAIL 3: MANUAL RAKING

3. Rake dressed perpendicular to slope and cross-cuts with mat at least 1/3 run.

EQUIPMENT

Use equipment such as bulldozers, skidsteers, or backhoes, based upon material available to the contractor.

INSTALLATION

1. Provide a guide to ensure a series of areas and depressions than run across the slope being the contour of the ground.

2. On fill slopes, ensure that the face of the slope consists of loose uncompacted fill or grades to a graded edge.

3. Do not close or compact the final slope face until it has been designated as such.

4. When grading with tracked machinery (cover 1 or 2), limit the number of passes to avoid undue compaction of the soil.

5. Note outstanding areas that would require further plant establishment, such as bare areas of the area with numerous cracks or areas larger than 1 ft.

6. Site, design, and site areas that are roughened as soon as practicable.

INSPECTION

Ensure the road is suitable for safe and efficient operation of the machinery. Conduct inspections to established schedules as required by the contractor, the owner, and any permits.

MAINTENANCE

Remove any debris as soon as practicable if the surface is compromised of properly surface.

SURFACE ROUGHENING

NOT TO SCALE

Date: 12/2015