

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 sheepfoot 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, disking, 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 reseeded.
- 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.

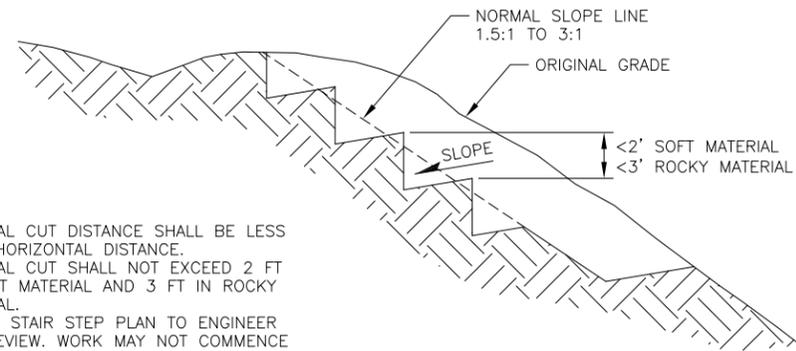
SPECIFICATIONS

Standard Specification

- 684 – Surface Roughening

Drawing

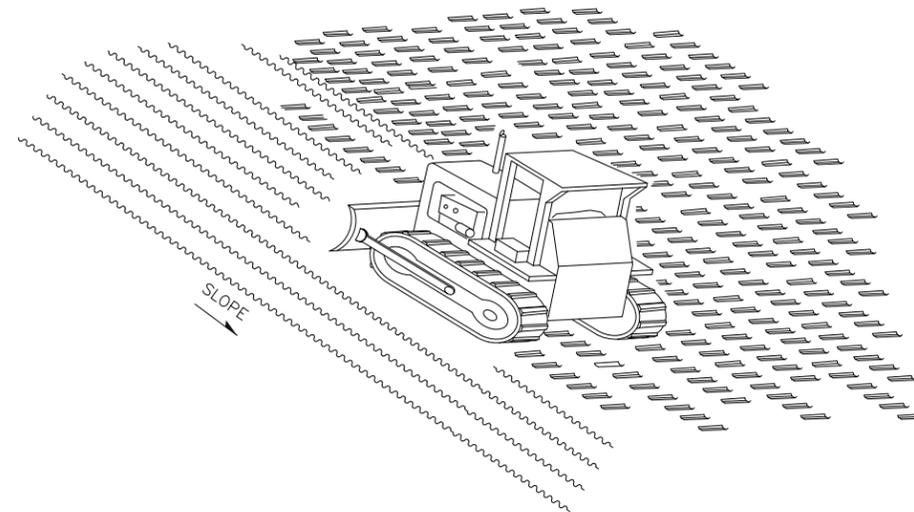
- BMP-30.00 – Surface Roughening



NOTES:

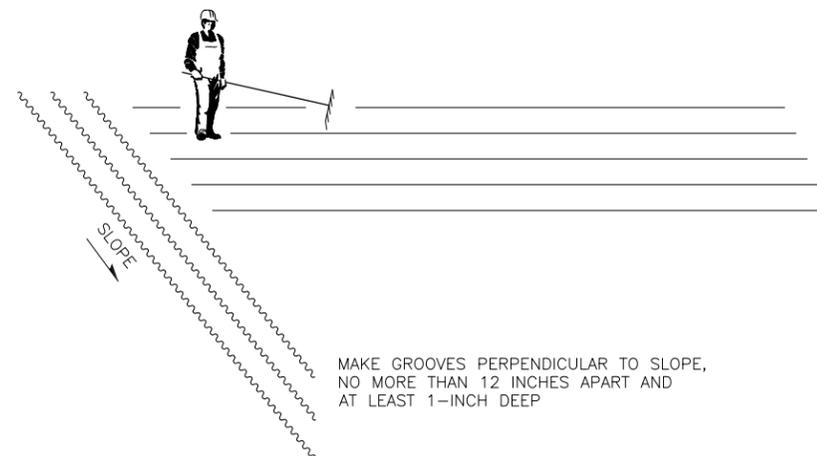
1. VERTICAL CUT DISTANCE SHALL BE LESS THAN HORIZONTAL DISTANCE.
2. VERTICAL CUT SHALL NOT EXCEED 2 FT IN SOFT MATERIAL AND 3 FT IN ROCKY MATERIAL.
3. SUBMIT STAIR STEP PLAN TO ENGINEER FOR REVIEW. WORK MAY NOT COMMENCE UNTIL AFTER APPROVAL.

DETAIL 1: STAIR STEP GRADING



TRACK WITH MACHINERY UP AND DOWN THE SLOPE TO PROVIDE GROOVES TO CATCH SEED AND RAINFALL AND TO REDUCE RUNOFF.

DETAIL 2: TRACKING



MAKE GROOVES PERPENDICULAR TO SLOPE, NO MORE THAN 12 INCHES APART AND AT LEAST 1-INCH DEEP

DETAIL 3: MANUAL RAKING

EQUIPMENT

TRACKED EQUIPMENT (SUCH AS BULLDOZERS), SHEEPSFOOT OR PUNCH ROLLERS, RAKES, HOES, HARROWING TOOLS OR OTHER EQUIPMENT AS APPROVED BY THE ENGINEER.

INSTALLATION

1. GROOVE THE SLOPE TO CREATE A SERIES OF RIDGES AND DEPRESSIONS THAT RUN ACROSS THE SLOPE, ALONG THE CONTOUR OF THE GROUND.
2. ON FILL SLOPES STEEPER THAN 3:1, ENSURE THAT THE FACE OF THE SLOPE CONSISTS OF LOOSE, UNCOMPACTED FILL 4 INCHES TO 8 INCHES DEEP.
3. DO NOT BLADE OR SCRAPE THE FINAL SLOPE FACE. DO NOT BACK BLADE DURING THE FINAL GRADING OPERATION.
4. WHEN ROUGHENING WITH TRACKED MACHINERY (DETAILS 1 OR 2), LIMIT THE NUMBER OF PASSES TO AVOID UNDUE COMPACTION OF THE SOIL.
5. AVOID EXCESSIVE ROUGHNESS THAT WOULD HINDER UNIFORM PLANT ESTABLISHMENT, SUCH AS A LARGE PERCENTAGE OF THE AREA WITH FURROWS DEEPER OR CLODS LARGER THAN 4 INCHES.

SEED, FERTILIZE, AND MULCH AREAS THAT ARE ROUGHENED AS SOON AS PRACTICABLE.

INSPECTION

ENSURE THE AREA HAS AN ADEQUATE DEPTH AND COVERAGE OF ROUGHENING. INSPECT THE AREAS ACCORDING TO ESTABLISHED SCHEDULES AS REQUIRED BY THE CGP AND THE SWPPP.

MAINTENANCE

REGRADE AND RESEED AS SOON AS PRACTICABLE IF RILLS OR CHANNELIZATION OF RUNOFF APPEAR.

REVISIONS		
Date	Description	By

State of Alaska
Department of Transportation
& Public Facilities
SURFACE ROUGHENING

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P
R
O
V
E
D

NOT TO SCALE

Date 12/2015 X/XX/XX