

## Surface Roughening



Source: Clackamas County, 2000

### BENEFITS

	L	M	H
Flow Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Erosion Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sediment Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Runoff Reduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Diversion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Description:** Surface roughening is a temporary practice incorporated during grading, that reduces soil loss by reducing the flow velocity of runoff. Surface roughening may also be used as a method of reducing dust (See [Section 7E-16 - Dust Control](#)).

**Typical Uses:** For slopes where additional grading is anticipated prior to permanent/temporary stabilization. To reduce runoff velocity, trap sediment, increase infiltration, and aid in the establishment of vegetative cover. Typically performed as an end-of-day practice.

#### **Advantages:**

- Simple and cost-effective.
- Immediate, short-term control.
- Reduces both wind and water erosion.

#### **Limitations:**

- Could increase soil compaction, requiring additional seedbed preparation.
- Not a stand-alone practice - it must be used in conjunction with other erosion and sediment control measures.

**Longevity:** Short-term, depends on precipitation

**SUDAS Specifications:** Refer to [Section 9040, 3.23](#)

## A. Description/Uses

Disturbed, non-vegetated areas that are graded smooth and have compacted soil cause increased runoff and reduce the ability of vegetation to be re-established, resulting in erosion. Surface roughening abrades the soil surface with horizontal ridges and depressions across the disturbed area. The use of this practice helps lessen erosion and sediment transport during grading operations.

## B. Design Considerations

Surface roughening is not a stand-alone measure, and should always be used in conjunction with other erosion and sediment control practices. Surface roughening may be applied after grading activities cease (temporarily), but will be resumed again within 21 days. Surface roughening might also be employed on an actively graded slope, prior to an impending storm, to provide some level of erosion protection.

Roughening methods include creating furrows across the slopes and tracking up and down the slope. The type of roughening depends on the steepness of the slope and the soil type.

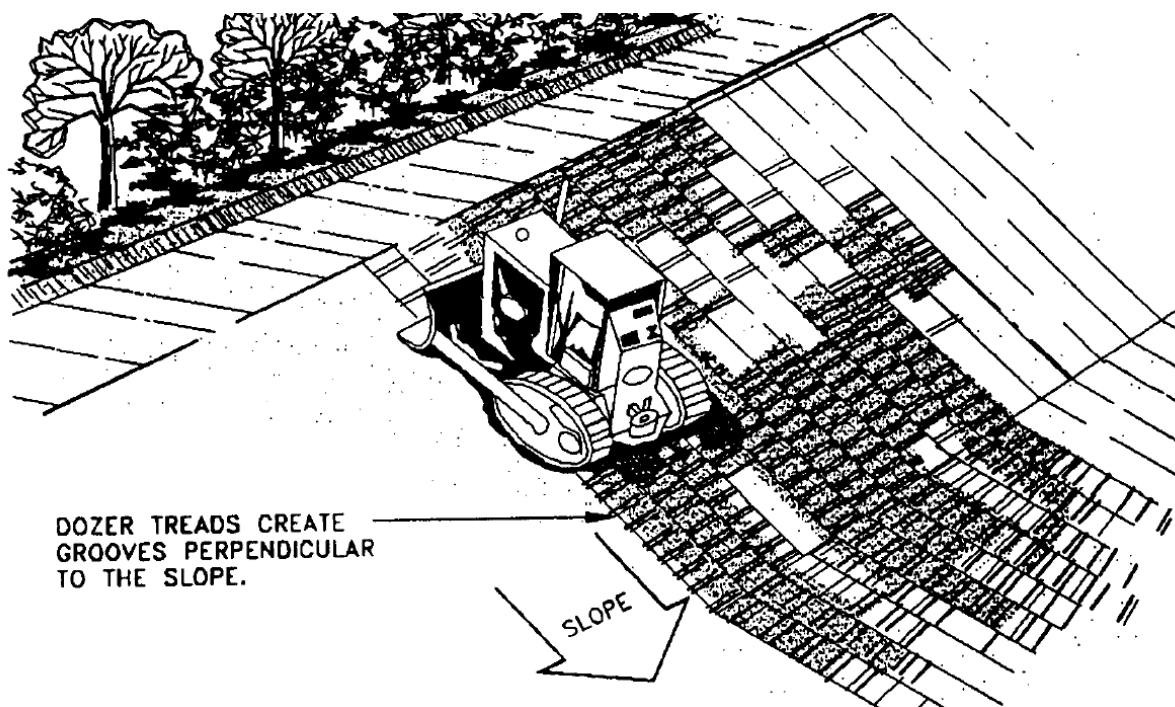
1. **Directional Tracking:** Tracking uses the depressions formed by the tracks from bulldozers and other construction vehicles. The vehicle is driven up and down the slope, leaving behind horizontal depressions in the soil. These depressions interrupt the runoff's flow, reducing its velocity and erosive capacity.

Directional tracking is the least effective, but likely most convenient, method of surface roughening. Directional tracking should only be performed on slopes that are 3:1 or flatter, as its use on steeper slopes may not prevent concentrated flow from developing. For slopes steeper than 3:1, grooving/furrowing should be used (see information below).

Directional tracking is ideally suited for sandy soils, as they do not compact as severely. Its use on clay-based soils should be limited, unless no other alternatives are available. As few passes of the machinery should be made as possible in order to limit compaction.

It is imperative that the equipment track perpendicular to the contour, creating groves that are parallel to the contour. Tracking along the contour will create vertical grooves and ridges for the runoff to follow, actually increasing the erosion potential.

2. **Grooving:** Grooving is a method of surface roughening that creates a series of ridges and depressions along the contour of the slope. Grooving may be accomplished with rippers, disks, spring harrows, chisel plows, or any equipment capable of operating safely on the slope. The grooves created should be no more than 15 inches apart and should not measure less than three inches in depth. Grooving is more effective erosion control practice than vehicle tracking and may be used with all soils types and all slopes.

**Figure 7E-19.01:** Typical Directional Tracking on a Bare Slope

Source: US Army Corps of Engineers, 1997

Regardless of the method used, after the disturbed area has been roughened it should be protected from vehicular traffic as it may greatly reduce the efficiency of the roughening and require the practice to be repeated. At no time should slopes be bladed or scraped to produce a smooth, hard surface.

### C. Application

Surface roughening is a simple method of providing at least a minimal level of short-term erosion protection for slopes which are still under construction, but on which work is being halted for a short period of time. Surface roughening should be provided on all slopes at the end of the workday. It can also be done, in conjunction with mulching, after the fall seeding period has passed to stabilize a site and carry it through the winter months.

### D. Maintenance

Surface roughening is a short-term practice that needs to be reapplied whenever the roughened surface is removed by re-grading or weather conditions. Typically, surface roughening on a slope will need to be reestablished after each rain event, regardless of intensity.