

Blading Aggregate Surfaces

Surface Material

The surface of unpaved roads is composed of a mixture of coarse aggregates and fine material (fines). The fines prevent voids from occurring in aggregate mixtures. Fines are like cement holding the aggregate together. Dust indicates that fines are blowing away. Insufficient fine material prevents the formation of a hard-wearing surface.

Smoothing

- Road surfaces are smoothed by dragging. Dragging disturbs the road surface as little as possible.



Tilt moldboard to get dragging action

- Smoothing is usually performed when aggregates and fines are moist. The technique may be used in dry weather to remove excess loose aggregate from the road surface. Moisten the aggregate prior to blading a dry road.
- Using the curve of the grader's moldboard to get a dragging or rolling action helps compact the road surface as it is bladed.
- Dragging speed depends on the grader, tire pressure and road surface condition. Excess speed causes the grader to bounce, making satisfactory results impossible to achieve. Normally, three miles per hour in second gear is advised.

How to Smooth the Road Surface

- Make sure the grade blade is in good condition.
- Shift moldboard so end of blade is placed at road edge and beginning of shoulder.
- Tilt moldboard forward for a dragging, rather than cutting, action.
- Angle moldboard about 30° to 45° and spread loose material toward center of road.
- Lean or tilt front wheels 10° to 15° in direction the aggregate is rolling across blade.

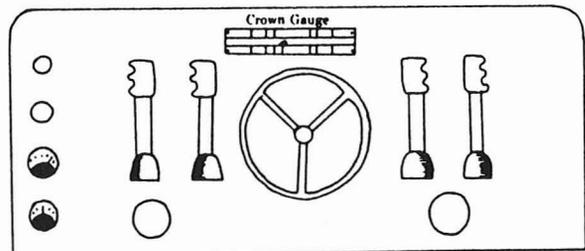


Tilt front wheels slightly

- To prevent aggregate from drifting onto ends of bridges, culverts, intersections and railroad crossings, periodically blade the road surface against traffic flow.
- Keep a shovel handy. Stop to repair poor surface drainage conditions, holes or rutted areas.
- Never leave a windrow of aggregate at the edge of the road. It will prevent water from draining and may create a false ditch, reducing the road width.

When Blading Straight Sections-Maintain a Crown

- Raise the blade-end nearest the center of the road so that it is higher than the other end.
- Use crown gauge and set the blade to obtain a 1/2" per foot cross-slope. A crown 1/2" per foot, on a road with surface width of 20 feet, is a crown five inches high.



Crown gauge mounted on control panel

When Blading Curved Roads-Maintain Superelevation

- Use crown gauge to set and adjust the blade correctly.
- About 50 to 100 feet before the curve, eliminate surface crown by gradually raising the blade-end nearest the outside curve edge.
- At the point where the curve begins, the outside curve edge should be at the same height above the center of the road as the inside curve edge is below center.
- Blade the outside edge of the curve higher than the inside edge: Superelevate or bank the road. Do not blade a crown on the curved part of the road.
- Slope shoulder on the superelevated part of the road downward from the road edge to ditch.
- Gradually change the road surface back from superelevation to crown.

Reshaping

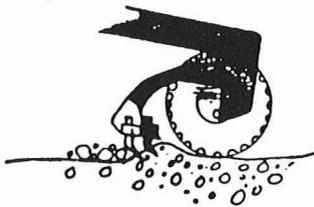
- Weather, traffic and insufficient maintenance can scatter aggregates, flatten crowns, make potholes and deep ruts, and produce a washboard-like surface. These conditions cannot be corrected by smoothing the surface -- the aggregate base must be reshaped.

- Reshaping remixes the aggregate base to obtain a correct blend of fines and aggregates. When remixing, additional aggregates and fines may be needed on shoulders and in rough or washed-out places.



Reshaping cuts away washboard ridges and breaks up potholes

- After the aggregate base is remixed, it is bladed to obtain a smooth road surface and a proper crown. Traffic will compact the base and form a smooth wearing surface.
- As with smoothing, reshaping is performed when the aggregate is moist. If reshaping is done in dry weather, water must be added to moisten the aggregate.



Scarifier helps break crust

How To Reshape Aggregate Road Surfaces and Shoulders

- Check to see if more aggregate or fines need to be added to surface and shoulders, particularly in rough or washed-out places.
- Tilt moldboard so that it is in cutting position.
- Angle moldboard at about 30° to 45°. Using a mixing action, move and roll aggregate toward center of road.
- Lean or tilt front wheels 10° to 15° from the vertical into direction aggregate is rolling across blade.
- Blade with enough pressure to cut shoulders and washboard ridges.
- Scarifying, when necessary, should go as deep as the average pothole or washboard -- usually two to three inches.
- Watch blade action closely. Adjust the controls as needed for good cutting and mixing action.
- Check to see if more passes in the same direction are needed to cut to the bottom of potholes and ridges.
- Windrow remixed aggregate to center of road.
- Distribute aggregate evenly over roadway edges and shoulders.
- Blade material into a crown.
- Blade shoulder so that slope to the ditch is at least equal to that of the road.

Run-off and Erosion Control Guidelines for Highway Crew Leaders

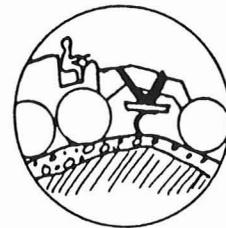
Eroded ditch banks and clogged streams and culverts often reduce the effective life of a road

During highway construction and maintenance activities, greater attention can be given to environmental and long-term cost considerations. Accelerated run-off and soil erosion can cause pollution of land and water. Private property values and citizens rights are often adversely affected.

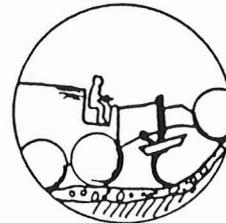
Failure to practice conservation increases maintenance costs. Digging and/or cleaning road ditches without conservation considerations leads to accelerated soil erosion. Eroded ditch banks and clogged streams and culverts often reduce the effective life of road improvements.

The Resource Conservation and Development Area of New Hampshire and the Carroll County Conservation District are seeking input from state and local road crews, contractors, and town officials on the need for and use of a pocket-sized handbook, *Run-off and Erosion Control Guidelines for Highway Crew Leaders*. Our objective is to develop a handbook that addresses the needs of the people who perform roadside maintenance and construction.

The survey attached to this newsletter has been designed to enable you to tell us if this type of booklet could be helpful and what information you feel should be included. Please fill out the survey, detach it, fold it with the address on the outside, place a stamp on it, and put it in the mail. ■



Do not scrape aggregate off a hilltop



Do not pile loose aggregate in a valley

Adapted from: **Blading Aggregate Surfaces**, National Association of County Engineers, 1986. ■