

Activities 100 through 117 Surface and Shoulders General Instructions

Definitions

Roadbed: For maintenance purposes, the roadbed includes:

- The paved or unpaved roadway surface, including shoulders.
- Curbs if present.
- Unpaved aggregate slopes extending out to the subgrade (bottom elevation of pavement base material extended to the outside of the roadway template).
- Sidewalks and bicycle/pedestrian paths whether contiguous to or separated from the roadway surface.
- Roadway: The paved or unpaved roadway surface, including paved shoulders and contiguous bicycle paths but excluding sidewalks and separated bicycle/pedestrian paths.
- Shoulders: The area between the edge of traveled way and curb, if present and the outside edge of subgrade, as described in “roadbed” above. A shoulder may include both paved and unpaved areas.
- Traveled way: The portion of the roadway surface within the traffic lanes (between the fog lines), exclusive of paved or unpaved shoulders.

Perform maintenance work, on elements of the roadbed, such that the roadway alignment is not altered and the cross section and gradeline are smooth and not significantly altered from that originally constructed or subsequently reconstructed.

Perform work to maintain those areas at the level allowed by, and consistent with the policies set forth in:

- Chapter 5 of this Guide – Planning, Budgeting, and Reporting Maintenance Activities
- *Role of Maintenance*, Section 3 – Maintenance and Operational Activity Priorities
- Performance Budget and
- *Desired Conditions of Maintenance Features on State Highways*.

Plan and implement methods to control erosion, sediment and pollutants or contaminants, including those discussed in the Control of Erosion, Sedimentation, and Pollutants or Contaminants section of this Guide and the *ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices*.

As appropriate, implement and maintain devices and processes including those described in the *Erosion Control Field Manual*.

Plan, implement, and maintain traffic control as addressed in the *Oregon Temporary Traffic Control Handbook*.

For mobility requirements, maintenance activities (conducted by internal staff or their contractors) and their impacts to traffic must be considered prior to starting work.

Before beginning any excavation work in areas where utility or other non-ODOT facilities could be buried, contact the Oregon Utility Notification Center (OUNC) 1-800-332-2344 so the facility owners can mark the location of their facilities.

Water is one of the greatest causes of roadway deterioration, often causing the base and subgrade material to be unable to support the surfacing and traffic loads. Ensure that water can adequately drain from the surface and from the roadway substructure. Where necessary, drain excess subsurface water with underdrains or similar structures. Also refer to the Drainage section of this Guide for further discussion.

Roadway Surfacing

The wearing course of highways includes the following types:

1. Bituminous Materials. This is the predominant type of surfacing and generally is a hot mix or emulsified asphalt concrete. Some highways may have an oil mat or bituminous macadam as the wearing course. The surface may have also been treated with a chip seal or other treatment.
2. Portland Cement Concrete Pavement. Types include continuously reinforced, jointed reinforced, and jointed unreinforced.
3. Crushed Aggregate. A small length of the State Highway system still has crushed aggregate as surfacing. Crushed aggregate may also be used as a temporary surfacing during construction or repairs, especially emergency repairs.

As the highway system has evolved, different types and successive layers of surfacing have been placed. The surface of a highway may be composed of only one type of surfacing or may be composed of multiple types of surfacing.

The base course of highways includes the following types:

1. Aggregates, generally crushed. This is the predominant type.
2. Treated Aggregates. The treatment could include Portland cement or asphalt cement.
3. Treated Soil or Other Material. The treatment generally is Portland cement or lime.
4. Untreated Soil.

Generally, before performing activities such as striping or pavement legend marking, perform surface repairs that affect the integrity of the striping, markings, or other following work.

Materials for Maintaining Roadways

A Professional Engineer must approve some repairs or modifications to the roadway, including an asphalt concrete overlay over 2 inches in thickness or changing or adding to the roadway configuration. Refer to ODOT *Policy DES 05-02*.

The District Manager and Transportation Maintenance Manager must ensure that only appropriate materials are used for maintenance of roadways, as well as other highway features.

For some materials such as hot mix asphalt concrete mixture, the District Manager should generally use contract methods to establish a price agreement for purchasing such material from local suppliers. Refer to discussion in the Purchase and Acquisition of Materials and Services section of this Guide.

For permanent repairs, only use maintenance materials that are:

- Similar to the existing roadway materials, or designed to be use to repair the existing roadway.
- Appropriate for repairing or maintaining the existing roadway.

Generally, use hot mix asphalt concrete, emulsified asphalt concrete, or similar material or processes for permanent repairs on bituminous surfaces.

Maintenance forces may use other materials; including asphalt cold patch mixture, for temporary, short-term repairs. Such materials should be replaced with appropriate materials as soon as feasible.

Sources for additional information:

- Pavement Services Manager or representative of the Pavement Services Unit in the Construction Section.
- *Oregon Standard Specifications for Construction* and current Special Provisions.
- *Oregon Standard Drawings*.
- *Qualified Products List*.
- Construction Project Manager.
- Area Manager or Technical Services Resource Manager.

Maintenance of Bituminous Surfaces

The maintenance of bituminous surfaces involves the following causes and general types of repairs:

1. Potholes, Breaks, and Settlements. These can be described as failures of the localized area. Causes for these failures include:
 - Cracking of the surface layer, possibly because the surfacing has exceeded its useful life.
 - Delamination of the surface layer from the underlying layer or layers.
 - Failure of the underlying support materials, possibly due to the presence of excess water.
 - Unstable surfacing materials.
 - Creation of an open joint between adjacent paved areas or between different surfacing materials, such as along Portland cement concrete pavement.

To repair failures resulting from the first two causes, generally perform Activity 100. If the failure involves large areas, generally perform Activity 101 as necessary after repairing the underlying material as needed. Use contract methods as appropriate to perform extended amounts of this activity on a section of highway. The District Manager should attempt to schedule a resurfacing contract as appropriate, preferably as part of the Region's Statewide Transportation Improvement Program.

Perform Activity 107 where appropriate.

Perform Activity 110 to seal cracks and joints and restrict the intrusion of water.

If conditions are not conducive to perform permanent repairs, temporarily fill potholes or similar failures with appropriate material to accommodate traffic and perform more permanent repairs when conditions are acceptable.

2. Moving or Shoving of Surfacing. This distress often occurs at intersections or in areas traveled by frequent, heavy loads. Causes for these failures include:
 - Unstable asphalt concrete mixture, possibly involving excess asphalt cement.
 - Delamination of the wearing course from underlying layers, possibly caused by excess tack coat, or water between the surfacing layers.

Repair minor, very, localized areas under Activity 100, using very stable asphalt concrete mixture.

Perform Activity 107 to improve "rideability" of the distressed area, although this is normally not a long-term fix.

Perform Activity 107, using a very stable asphalt concrete mixture, to restore the surfacing, especially for the second cause.

3. Excessive asphalt cement on the roadway surface, creating loss of friction during wet conditions. Traffic may cause damage the surfacing during warm weather such as “picking” or rutting. Causes for these failures include:
 - Unstable asphalt concrete mixture.
 - Excess asphalt cement in the mixture.

Perform Activity 104 to sand affected areas, during periods of warm weather, if traffic is picking up the excess asphalt cement.

Repair minor, localized areas under Activity 100.

Perform Activity 107 to remove the excess asphalt from the surface to improve friction, if the underlying surfacing is stable.

If the situation causes the surfacing to become unstable, or the situation is unacceptable, perform Activity 107.

4. Lean Roadway Surface. On a lean surface, the asphalt cement is often oxidized or brittle and the surface appears dry and may exhibit some raveling, loss of aggregate, or cracking.

Perform Activity 104 to protect and restore the surface. Generally, use contract methods to perform extended amounts of this activity on a section of highway. The District Manager may also plan other resurfacing work to avoid failure of the roadway surfacing.

As appropriate, perform Activity 110 to seal cracks in the surfacing and restrict the intrusion of water into the surfacing.

5. Uneven roadway surface, rutting, maintenance or utility repairs and loss of friction. Causes for these failures include:
 - Traffic wear.
 - Earth movement.
 - Studded tires use,

Perform Activity 100 to repair areas where unstable underlying materials are causing the surfacing to fail.

Perform Activity 107 to restore an acceptable ride or improve friction. Generally, use contract methods to perform extended amounts of this activity on a section of highway.

Also, consider work under Activity 101 to correct the uneven surfacing. Consider resurfacing by contract if this condition affects a large section of highway.

Activity 107 generally will not correct longitudinal rutting unless a very stable asphalt concrete mixture is properly constructed as the inlay.

Maintenance of Portland Cement Concrete Pavement

The maintenance of Portland cement concrete pavement involves the following:

1. Joints. This includes the joints, both longitudinal and transverse, between abutting sections of Portland cement concrete, as well as joints with other abutting pavement material.

Joints allow the concrete to expand or contract due to temperature fluctuation and to shrink due to normal curing of the concrete. Maintenance of joints involves removal of unacceptable material in the joint and placement of acceptable filler material to allow movement of the joint and prevent intrusion of unacceptable material including water.

Perform Activity 110, including removing unacceptable material and placing filler, as needed.

2. Cracks in the Concrete. In continually reinforced concrete pavement, the surface will appear cracked, especially in cool weather, due to normal expansion or contraction of the pavement. Since these cracks allow normal movement of the concrete, they generally do not require any maintenance or treatment.

In other concrete pavement, perform Activity 110 to clean and fill cracks larger than 1/16 inch in width.

3. Broken or Damaged Concrete. Perform Activity 109, as appropriate, to repair broken or damaged concrete. Take care to not disturb or damage remaining, adjacent, or underlying material. Install subsurface drainage, as needed, to remove subsurface water. To reduce hindrance of traffic consider using quick-setting concrete material.
4. Sunken Grade. Perform Activity 109 to inject grout, asphalt cement, or other appropriate material under the sunken section of concrete pavement in order to restore the "rideability" of the affected area.

Temporarily repair a sunken section of concrete pavement by placing a patch of asphalt cement concrete, but remove that material as appropriate before performing the permanent repair of the area.

5. Rutted surface or loss of friction. Perform Activity 107 to reduce rutting or improve friction characteristics. Generally, use contract methods to perform extended amounts of this activity on a section of highway.

Perform Activity 101 to fill ruts, using mixture especially intended for that purpose. This is not a permanent fix.

Perform Activity 109 to repair localized sections.

Maintenance of Aggregate Surfacing

Perform Activity 112 to:

- Restore a smooth riding surface.
- Restore needed surface drainage, including normal roadway crown.
- Return loose material into the surfacing.
- Control dust.

Use a grader to pull loose material toward the center of the roadway and then spread the loosened and mixed material. Add additional surfacing material as needed. As appropriate, compact the aggregate surfacing.

Generally, perform this activity when the material is damp to minimize dust and allow the loosened material to be compacted. As appropriate, apply water to control dust and allow compaction.

Maintenance of Shoulders (Paved and Unpaved)

Perform Activities 116 or 117 to:

- Remove debris or prevent build-up of debris to allow the shoulder area to be used by vehicles, pedestrians, and bicyclists.
- Ensure proper drainage of the roadway.

Address deterioration of, or repair damage to, the paved surface as described in Maintenance of Bituminous Surfaces covered earlier in this section.

Perform Activities 112 to:

- Restore the desired cross section shape.
- Remove or minimize unwanted vegetation or build-up of debris.
- Allow vehicles to safely traverse the area in an emergency, including repairing dropoff of 2 inches or more at the edge of the paved surface and restoring smooth slopes.
- Ensure proper drainage.

As aggregate shoulder material is lost, place additional crushed aggregate material to restore the unpaved shoulder area to the proper, smooth slope and dimensions.

Take care to not contaminate the crushed aggregate shoulder material with dirt or other material from ditch maintenance or other activities.

Take care to not disturb survey monumentation. If the monumentation is disturbed, notified the Region Survey Manager. The Region Survey Manager can clarify when or if the County Surveyor should also be notified.

Control Vegetation on shoulder areas as set forth in the District's Integrated Vegetation Management (IVM) Plan.

Bicycle Considerations

Consideration should be given to impacts on bicycles during maintenance preservation projects that address the treatment of the highway surface and the location of joints on the shoulder.

1. Overlays

- Overlays, including thin lift overlays, should extend across the entire shoulder.

2. Inlays

- If shoulder is in poor condition, inlay the shoulder. Refer to *Desired Conditions of Maintenance Features on State Highways*.
- If the shoulder is 2 feet wide or less, inlay the shoulder. If the shoulder is 2 to 4 feet wide, consider inlaying the entire shoulder from a cost, convenience of construction and travel lane smoothness perspective.
- If the shoulder is in fair or better condition and wider than 4 feet:
 - Extend the inlay joint a nominal distance beyond the fog line stripe, typically 2 feet, if there is a significant potential for truck traffic driving on the shoulder. Otherwise place the inlay joint on the fog line stripe.
 - Consider feasibility of constructing a smooth travel lane if the shoulder or a portion of it is left in place. Paving smoothness (for automobile travel lane) may be specified in accordance with current guidance without any additional regard for inlay joint smoothness, refer to Oregon Standard Specifications section 00745.60(e).
 - Do not place a longitudinal construction joint within a designated standard width bicycle lane.

3. Chip Seals or Micro-Surfacing

- These treatments should extend to either the fog line stripe or 1 foot beyond the fog line stripe to protect it from plows. Extend the treatment to the edge of pavement if the shoulder needs to be treated based upon condition.

4. Exceptions

- No bicycle consideration should be made where bicycles are currently prohibited on roads or where a separate bike path runs along the roadway.
- Unless local knowledge of bicycle usage suggests otherwise, give no consideration to bicycles on roads with less than 2500 ADT, bicyclists typically ride in the automobile travel lane and these roadways typically do not have shoulders.

If the District Manager believes that the extra width of a treatment, referenced within this guidance, does not actually improve the travel of bicyclists on a particular project, consult with the Region Manager and the Maintenance and Operations Engineer.

Bicycle paths can be either part of, or separated from, the highway shoulders. When loose rock and debris accumulate in bicycle areas, the bicyclists tend to ride in the vehicle lanes, increasing the risk for both the motorist and the bicyclist. For that reason, ODOT generally must sweep bicycle paths and highway shoulders more often than other areas.

Maintenance of Approaches and Other Surfaced Roadside Features

Maintenance of road approaches is the responsibility of the abutting property owner. Maintenance of roadways that intersect State Highways is the responsibility of the owner of that roadway.

Generally, do not perform maintenance activities over or onto road approaches or intersecting roadways unless ODOT will incur no cost in doing so. When performing activities such as Major Surface Repair or Snow Removal on the adjacent State Highway, feather that work onto the road approach or intersecting roadway to avoid dropoffs, berms, or other hazards.

Maintain turnouts at the same level as the adjacent roadway shoulder. Turnouts include viewpoints, mailbox turnouts, auxiliary lanes, and chain-up areas.

ODOT is generally responsible to maintain curbs and sidewalks in rural areas. In urban areas, the city or adjacent property owner is often responsible to maintain the curb and sidewalks. The Transportation Maintenance Manager must be aware of maintenance responsibility for curbs and sidewalks.

Many older curb and sidewalk areas are not compliant with the Americans with Disability Act (ADA). When performing any betterment projects in curbed areas, the District Manager must ensure that ADA access is constructed where appropriate and feasible.