



10 Basic Tips to Help Maintain and Keep Your Roads in Good Condition

1. Keep water away from the road - Drainage cannot be overemphasized in road construction and maintenance. Water affects the entire serviceability of a road. Too much water in the base material weakens the road. Water allowed to remain on top of a gravel or black-topped road weakens the surface and, combined with traffic, causes potholes and cracking. If improperly channeled, water causes soil erosion and breakdown of pavement edges. Improper drainage resulting in water remaining on the surface is the basis for many lawsuits against government agencies. Whether it is mud in the spring or frost heaves in the winter, the presence of water in roads is nothing but trouble.



A good surface drainage system is the best way to lessen water damage on a road. Proper surface drainage prevents water from infiltrating the pavement surface and allows a constant thin sheet to the side ditches, which carries the water away from the roadway. A surface drainage system has four main components: road crown, shoulders, ditches, and culverts.

The road crown, or super elevation of the road surface, drains water off the road surface. Shoulders are an extension of the road surface and allow for the continued flow of water to the ditches.

Ditches are used to carry water away from the roadway. They need to be kept clean and protected from erosion. Water left in the ditch can sometimes leak back into the base. Water collected and carried in the ditch has to be directed away from the roadway at frequent intervals, sometimes using culvert pipe. Culverts usually channel water from one side of the road to the other, helping to control the flow and speed of water to reduce erosion. Road managers are guided by the following principles: water runs downhill, water needs outlets at the bottom of all grades; and puddles mean problems.

2. Build on a firm foundation - A highway wears out from the top, but it falls apart from the bottom. This is another way of saying that the road base determines the service-life of a road. The base supports everything above it, including traffic.

Without adequate support, the road will deteriorate rapidly. A good road requires a suitable foundation composed of stable material. A road material is stable if it has negligible soil settlement with a change in moisture content and does not deform excessively under repeated loads whether the material is wet or dry.

3. Use the best soils available - The supply of natural, good-quality soils and aggregates is beginning to disappear. Blended or crushed gravel is a more expensive alternative. The quality of soils used by a road manager often depends on local availability and budget. In deciding what is available, consider the long term consequences of using lower-quality material. Using inferior base material may require excessive maintenance during the road's life and, perhaps, expensive rehabilitation. The adage "pay me now or pay me later" applies to road building.

4. Compact soils well - The more dense the material is, the stronger it is. When soil is improperly compacted, future traffic loads can bring changes in moisture content, causing settling and failure of the roadway.

Compaction is achieved by pressing soil particles together, which expels some of the air from the mass, making the material more dense. Well-graded soils having a fairly even distribution of particle sizes will compact more easily than poorly graded soils that have mostly one particle size. Crushed or angular particles will compact to a more stable condition than rounded particles of similar size. A certain amount of moisture is necessary for good compaction.

5. Design for winter maintenance - In areas that receive substantial snowfalls, roads that are designed for winter maintenance should be adequate for the rest of the year. Consider the following: if the traveled way is wide enough to allow a snowplow and a school bus to meet, it should be wide enough for the rest of the year. If ditches and roadside areas are wide enough to store snow, chances are they will accommodate spring thaws and grades should be a minimum of 1% for drainage purpose and should not be greater than 10% if at all possible. If the road is steeper, it is difficult for heavy equipment to maneuver, especially in the wintertime.

Sight distance should be considered in designing a road. For safety's sake, a driver should be able to see 75 to 100 feet up the road for every 10 miles per hour driving speed.

6. Build for traffic loads and traffic volume - Thin ice on a pond may support a young skater, but it will crack and break apart under the weight of an automobile. Similarly, a road built to serve residential traffic will break down when it starts carrying a number of large trucks. Road managers know that roads, like bridges, should be designed with the expected traffic type and volume in mind.

A rule of thumb is to design a road to accommodate the largest vehicles that will use the road under normal operation. If in doubt, design the road for the largest piece of equipment that maintains it in all kinds of weather. Road managers can get information and guidance from their state transportation agencies about the type and thickness of pavement mixes to apply to a gravel road. Generally speaking, a low-volume road with some truck traffic may provide good services with a "chip seal" or "sand seal." As traffic volumes and weights increase, cold-mix asphalt and hot-mix asphalt pavement may be better alternatives.

7. Pave only roads that are ready - Some agencies make the mistake of paving over a road that is not properly prepared in their haste to get rid of another dusty gravel road. The result may be a complete waste of money. Paving will not cure the other problems that the gravel road may have. It still must be built of well-compacted layers of free-drainage soil, be able to carry expected traffic loads, and be able to drain well. The cost of rebuilding a mistake is much higher than not making the mistake and doing it right the first time.

8. Build from the bottom up - A road that has a poor base and poor drainage cannot be adequately improved with a top dressing of gravel or new pavement. It may be necessary, in some cases, to dig out the old road, put in new materials, and build up the road in layers. Before doing anything to correct a road surface problem, road managers should take into consideration what is causing the problem underneath. Improper drainage, insufficient depth of base, or poor quality gravel may be the culprit. These should be corrected before spending money on the surface.

9. Protect your investment - Roads and bridges need regular maintenance to keep them from deteriorating. The increased weight and frequency of traffic on roads, combined with adverse weather conditions, means an increased rate of road and street deterioration. Regular road and bridge maintenance preserves our road investment and prevents costly major rehabilitation later on.

Maintenance activities include:

- Roadway surfaces: blading and shaping, patching, resurfacing, dust control; and snow and ice removal
- Drainage: cleaning and repairing culverts and ditches
- Roadside: cutting bushes, trees and grass; repair and prevention of roadside erosion
- Bridges: clearing channels, repair of rails, decks and structure; cleaning and painting
- Traffic services: sign maintenance; and cutting vegetation to maintain visibility
- Special projects: restoration or improvements; emergency work such as removing slides, repairing washouts, and repairing retaining walls

10. Keep good records – Road managers know their roads like the back of their hands. Most of them are walking history books when it comes to the roads they have managed every day. This knowledge is of little use, however, when the road manager is ill, moves, or retires.

Good record keeping makes roadwork much easier for everybody. It is easier to formulate budgets and to show the citizens a plan for roadwork. Recording which type of work was done, when it was performed, and what materials were used can help significantly in making later decisions.