

Gravel Road Basics for Local Officials

Main Class Takeaways*

1. Protect your investments
2. Get water away
3. Build on a firm foundation
4. Use quality materials
5. Compact well
6. Build for traffic loads and volumes
7. Pave only when above items are done!
8. Keep good records

*Adapted from “The Basics of a Good Road”
— Vermont Local Roads 1984



Core Factors of a Good Road

1. Drainage



2. Shape



3. Material Quality



4. Material Thickness



Michigan's
Local Technical
Assistance Program

Center for
Technology & Training

Michigan Technological University • Department of Civil & Environmental Engineering

Glossary

ADT and AADT: Average daily traffic and annual average daily traffic.

Aggregate: A mixture of gravel, sand, and fine-sized rock particles (also referred to as “gravel”).

Angularity: The shape of an individual aggregate particle. A more angular aggregate has more fractured and jagged faces and less-rounded faces.

Backslope: The surface leading from the base of a ditch away from a road.

Base: The layer beneath a road surface; usually large-sized aggregate and drainable.

Capillary Action: The ability of liquid to flow through other materials, in spite of counteractive forces like gravity.

Clear Zone: An unobstructed, traversable roadside area that allows a driver to stop safely, or regain control of a vehicle that has left the roadway.

Crown: The way a road’s outer edges are lower than the center so that water can drain to roadside curbs or ditches.

Crust: The hard, compact layer that forms on top of an unpaved road’s surface layer.

Dust Control/Stabilization: The application of a chemical product or other material to an unpaved road’s surface layer for the purpose of reducing dust loss or strengthening the road.

Foreslope: The surface leading from a road edge into the base of a ditch.

Frost Susceptibility: The degree to which a road is affected by soil expansion (frost heave) or loss of load-bearing ability during spring thaw.

Gradation: The distribution of large and small sized aggregate in a sample of gravel.

High Shoulder (Secondary Ditch): The condition of gravel cast off from unpaved roads forming into berms that prevent water from leaving a road’s traveled way.

Parabolic Crown: A road crown that has become rounded in shape.

Permeability: The degree to which a surface or material allows water to flow through it.

Saturated Zone: The ground layers that remain intermittently or permanently saturated by sub-surface water.

Slope: The percent or ratio of vertical change to horizontal change between two points on a straight line. Road surfaces are expressed as percentages (4%) and ditch slopes are ratios (1V:4H).

Subbase: Road layer laid on subgrade; made of smaller-sized, permeable aggregate. If present, this layer is typically thicker than the base or surface layers.

Subgrade: The lowest layer of a road, made up of native soil.

Superelevation: The characteristic of a road having an outer edge higher than the inside edge, with the surface being shaped straight from the upper to lower edge; especially important when going around a curve.

Traveled Way: The area of a road on which vehicles are intended to drive.

Unpaved: Having a gravel or earth surface instead of a semi-permanent surface like asphalt or concrete.

Resources

from <http://michiganltap.org/other-available-publications>

- Gravel Roads Construction & Maintenance Guide
<https://www.fhwa.dot.gov/construction/pubs/ots15002.pdf>
- Michigan LTAP Motor Grader Manual
<https://michiganltap.org/sites/ltap/files/publications/technical/motor-grader-manual.pdf>
- Inventory-Based Rating System™
<https://ctt.mtu.edu/inventory-based-rating-system>
- At the Crossroads
<https://www.pavementpreservation.org/wp-content/uploads/2011/12/crossroads.pdf>

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