

UNPAVED ROAD MAINTENANCE

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By

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Gravel Roads – Managing Maintenance

Three primary issues:

- Managing frequency of blade maintenance.
- Maintaining shape on traveled way and shoulder.
- Specifying good surface gravel (aggregate)

Frequency of Blade Maintenance

Driven by:

-Climatic conditions

-Traffic volume

-Quality of surface gravel

-Equipment and operator availability



Maintaining Shape on Traveled Way and Shoulder

Challenges:

- Operator skills
- Operator/supervisor knowledge
- Surface gravel quality
- Volume and type of traffic

Crown

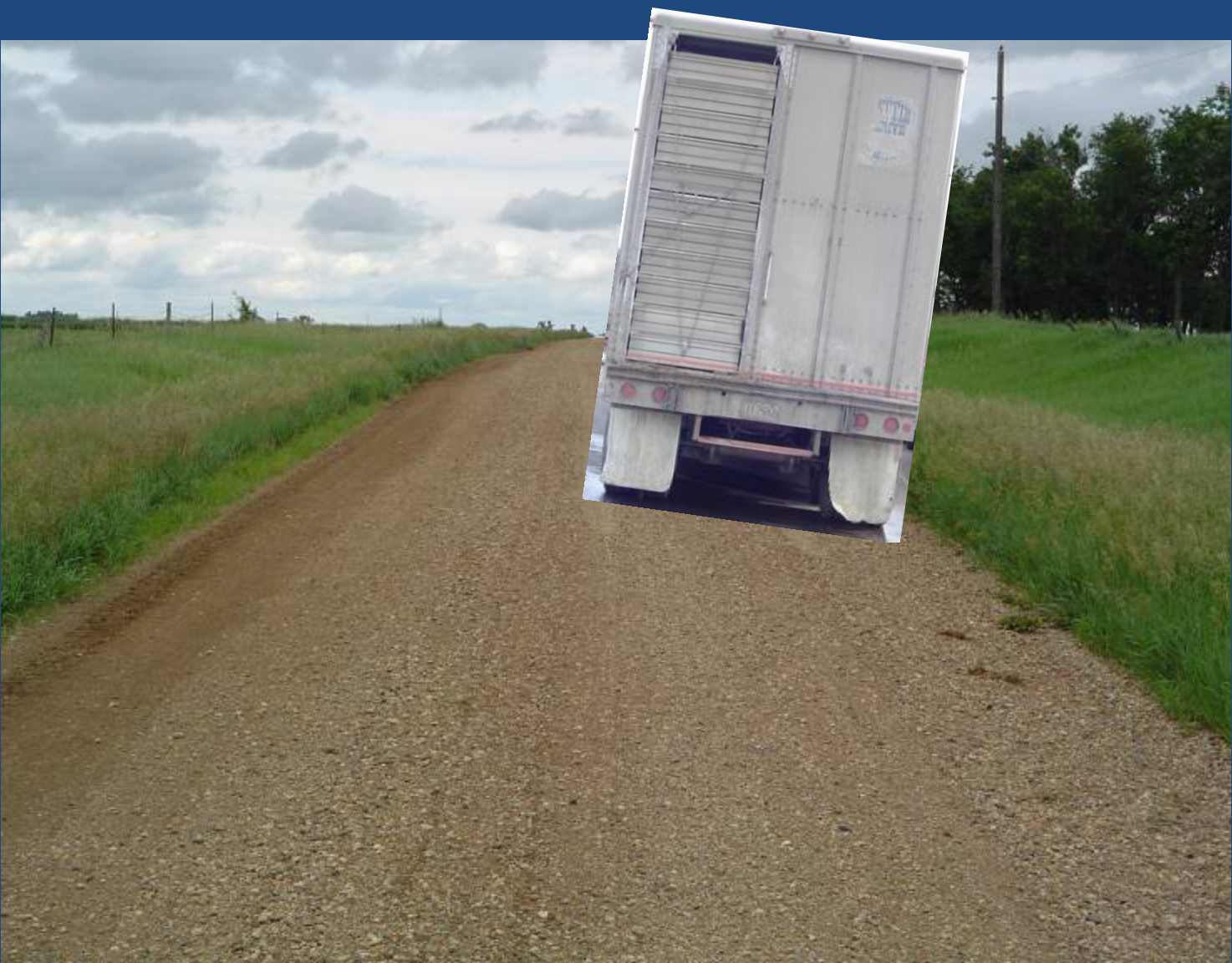


One of the biggest challenges in gravel road maintenance.





Some roads have too little crown, some have too much.



Imagine a cattle trailer on this road.



The road has 13 inches of crown on a 20' top

Crown should be near $\frac{1}{2}$ inch per ft (or 4%)



Example: 24 ft roadway should have approx. 6 inches of crown.

This Device is Helpful



The Next Challenge – High Shoulders!





Outstanding example!



Shouldering Operations



Surface Gravel

- The issue of good surface gravel (aggregate) cannot be emphasized enough!!
- Good aggregate surfacing differs from base and other construction aggregates.
- When it's right, problems diminish!

Problems With Specifications

- Many state DOTs do not have a surface aggregate spec.
- Many specifications that do exist are quite loose and do not allow close enough control of gradation.
- Many states going away from plasticity index testing requirement.

Two Fundamental Differences in Surface and Base Aggregates

- The need for more plastic fines to serve as binder for surfacing.
- Smaller top-sized stone that will remain embedded in the surface.

Dramatic Contrast

Similar ADT, Similar geometrics, but different surface materials!



Sample specifications comparison:

Table 1. Example of Gradation Requirements and Plasticity for Two Types of Materials.

Requirement Sieve	Aggregate Base Course Percent Passing	Gravel Surfacing Percent Passing
1"	100	
3/4"	80-100	100
1/2"	68-91	
No. 4	46-70	50-78
No. 8	34-54	37-67
No. 40	13-35	13-35
No. 200	3-12	4-15
Plasticity Index	0-6	4-12

From *South Dakota Standard Specifications*. (16)

Another sample spec:

WisDOT CRUSHED AGGREGATE SHOULDER COURSE Gradation No. 3

<u>SIEVE SIZE</u>	<u>CRUSHED GRAVEL</u>	<u>CRUSHED STONE</u>
1 inch	100	100
3/4 inch	95 -100	95-100
3/8 inch	50 - 90	50-90
No. 4	35 - 70	35-70
No. 10	20 - 55	15-55
No. 40	10 - 35	-
No. 200	9 - 15	5 - 15

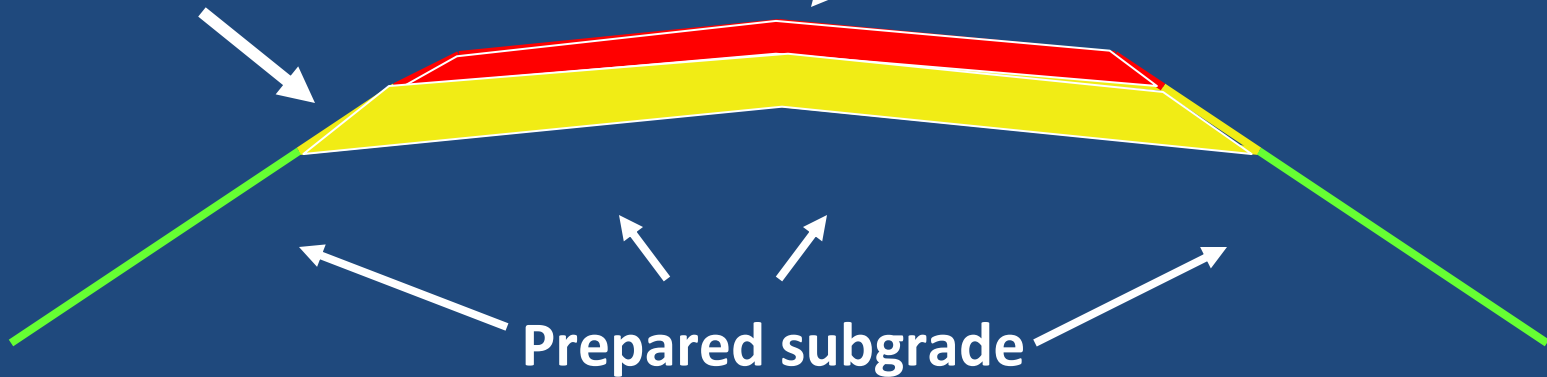
AASHTO's Materials Manual – 2001 edition, Designation M-147 has these recommendations:

“Where it is planned that the soil aggregate surface course is to be maintained for several years without bituminous surface treatment-----, the engineer should specify a **minimum of 8% passing the---No. 200 sieve-----**, and should specify a maximum liquid limit of 35 and **plasticity index range of 4 to 9** in lieu of the limits given in Section 2.2.2.

In Closing – “The Perfect Gravel Road”

Coarse aggregate base, few fines, 6-12 inches thick

Surface layer with good gradation, good PI, – minimum 3 inches thick



Not the “real”, but the ideal!