Gravel Roads

Sargent County Township Meeting
December 2, 2015
Dale Heglund, PE/PLS, NDLTAP Director
North Dakota Local Technical Assistance Program

North Dakota Township Officers Association

Sargent County - North Dakota -
- Motor Grader Training
- Gravel Roadway Design
- PI
- Pretend Blading
- Technology Transfer
2% for future pave 4% for unpaved

Gravel at or near 4%

2% is ¼” per foot 4% is ½” per foot
High shoulders – Do not allow “berms” “curbs”
" The engineering term is “secondary ditch”
## GRAVEL SURFACE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>% Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1”</td>
<td>100</td>
</tr>
<tr>
<td>¾”</td>
<td>70 - 100</td>
</tr>
<tr>
<td>#4</td>
<td>38 - 75</td>
</tr>
<tr>
<td>#8</td>
<td>22 - 62</td>
</tr>
<tr>
<td>#30</td>
<td>12 - 45</td>
</tr>
<tr>
<td>#40</td>
<td>-</td>
</tr>
<tr>
<td>#200</td>
<td>7 - 15</td>
</tr>
</tbody>
</table>

- P.I.
- LA Abrasion: 50%
- Shale: 12%
- Process Required: -
- Fractured Faces: 10%*

ND Aggregate Surface Spec (Class 13)
Sand
2.00-0.05 mm

Silt
0.05-0.002 mm

Clay
Less than 0.002 mm
Substandard Gravel

Standard Specification

Modified Specification

Buffer Sections

Compacted and Uncompacted Sections

Compacted and Uncompacted Sections
Pretend Blading
1 vehicle
1 year
1 ton dust per mile

Each mile with 100 cars per day
= 100 tons of fines per year!
August 2015

Gravel Roads

Construction & Maintenance Guide
LOCAL ROADWAY SIGNING 101

Subject Expert
Jon Mill, PE/PLS

Presentation Author:
Dale C. Heglund, PE/PLS, NDLTAP Director – November 2015
LOCAL ROADWAY SIGNING — 101

COURSE DESCRIPTION
- MUTCD basics
- Low volume road departures
- Sign color, shape & size
- Sign hierarchy
- Components of roadway
- Vertical & lateral clearance of signs
- Sign offsets
- Sign support & bases
- Clear zones
- Sign inventory
- Sign condition assessment
- Sign policy
- Retroreflectivity

INSTRUCTOR
Ian Mill graduated from Montana State University in 1970. Mill worked for NDDOT in the Valley City District for 11 years as a construction engineer. He is a Professional Engineer, and also a Professional Land Surveyor. Mill was the Burleigh County Highway Engineer for 28 years, and was a contractor with NDDOT on the 2009 Emergency Relief Flood Damage Inspection.

REGISTRATION / FEES
$25 PER PERSON
Register at www.ndltap.org
You must have an account with NDLTAP’s Learning Management System to register for this training.
If you have questions about registration, contact the NDLTAP office: 701-228-9855
sandra.basich@ndsu.edu or
denise.brown.1@ndsu.edu

TARGET AUDIENCE
County, city and township signing personnel
North Dakota State University
Upper Great Plains Transportation Institute
North Dakota Local Technical Assistance Program (ND LTAP)

Support for this program is provided by the North Dakota Department of Transportation, the Federal Highway Administration, and the North Dakota Infrastructure Investment Fund.

Equal opportunity provider. For information on accommodations for persons with disabilities, contact 701-228-9855.
North Dakota Truck Weight Calculator

The Truck Weight Calculator provides a convenient way to determine the maximum legal weight that one or more axles or a vehicle/vehicle combination may carry on ND interstates and state highways. The allowable weight on a vehicle/vehicle combination may increase by either adding additional axles or by increasing the axles. The formula for the calculation is weight-to-weight ratio. The formula was enacted by Congress and the States to limit the weight-to-weight of a vehicle crossing a bridge.

The formula is: $$W = \frac{500(L - N) + 100 + 3L}{N}$$

- $W$ = Maximum weight in pounds on any group of two or more axles
- $L$ = Distance in feet between extremes of any group of two or more consecutive axles
- $N$ = Number of axles in the group under consideration

NDHP Weight Limitations Chart

The legal gross vehicle weight (GVW) on ND state highways is 320,000 pounds unless otherwise posted. On all other highways the maximum GVW is 80,000 pounds unless designated for more, not to exceed 135,000 pounds. All the and axle weights must be legal. No the shall exceed 500 pounds per inch of the width.

The legal GVW on the interstate highway system is 80,000 pounds. An interstate permit is required when a vehicle having a roadside load exceeds 80,000 pounds. The GVW shall not exceed 135,000 pounds. The vehicle combination must have sufficient axles and bridge lengths. All the and axle weights must be exceed 500 pounds per inch of the width, except on the steering axle. The weight on the steering axle shall be determined by the manufacturer's specs and shall not exceed 20,000 pounds. For more information on the interstate permit visit the ND V.P. Motor Carrier website.

Example of Bridge Formula Application on the State Highway System

Example of Bridge Formula Application on the Interstate System

Note: On highways other than the Interstate System, only exterior bridge measurement shall be used to determine the gross vehicle weight of a vehicle or combination of vehicles. Measurements of three or more axles may have a gross weight not exceed 80,000.
ND Truck Weight Calculator

ND Truck Weight Calculation Results
10/6/2015

Given Information for Weight Calculator

<table>
<thead>
<tr>
<th>Highway Type</th>
<th>Interstate Highway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle Count</td>
<td>8</td>
</tr>
</tbody>
</table>

Truck Info

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>123412341234</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial No. (VIN)</td>
<td>123412341234</td>
</tr>
<tr>
<td>Model Year</td>
<td>2015 Freightliner</td>
</tr>
<tr>
<td>Customer or Company Name</td>
<td>Reg. Local Road Confer</td>
</tr>
</tbody>
</table>

Axle Details - Weights

Legal GVW - Interstate: 89,100 lbs.
The maximum legal gross vehicle weight for this vehicle/vehicle combination.

Maximum gross weight legal on axle #2 through the rearmost trailer axle shall not exceed 77,000 lbs.

Weight (per bridge length chart): 89,500 lbs.

Truck image with the Axle Group Number above axle group and Axle Number below each axle.
Distances (the linear measurement from axle center to consecutive axle center) are shown below the axle numbers of the truck image.
A black-centered wheel denotes two tires per axle and a white-centered wheel denotes four tires per axle.

Axle Group Weights

<table>
<thead>
<tr>
<th>Axle Group Number</th>
<th>Axle Number(s) in Group</th>
<th>Legal Axle Group Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>12,100</td>
</tr>
<tr>
<td>2</td>
<td>2 - 3</td>
<td>34,000</td>
</tr>
<tr>
<td>3</td>
<td>4 - 6</td>
<td>43,000</td>
</tr>
</tbody>
</table>
Hans Langseth – 18’6” beard