

TECHNICAL MEMORANDUM

TO: Terry Woehl, NDDOT
FROM: Kshitij Sharma, ATAC
Subject: **Spot Speed Studies – US 85 @ ND 68**
Date: November 18, 2014

This memorandum documents the Spot Speed Studies conducted on US 85 in the vicinity of ND 68 in McKenzie county, ND.

BACKGROUND

NDDOT had requested ATAC to conduct spot speed studies at two locations along US 85. The two locations are:

1. Site 1
US 85 south of ND 68
RP 158.722
Posted Speed Limit 65mph

2. Site 2
US 85 north of ND 68
RP 159.635
Posted Speed Limit 65mph

Two studies with minimum sample size of 250 vehicles were requested per location. Both northbound and southbound directions of travel were to be observed.

METHODOLOGY

For the purpose of these spot speed studies, Operating Speed Method, generally known as the 85th percentile speed method was used. In addition to the 85th percentile speed, the following parameters were calculated:

- Mean Speed
Average speed of vehicles observed.
- Mode Speed
Most frequently observed speed.
- Median Speed
50th percentile speed.
- Pace

Window of 10mph range encompassing highest number of observed vehicles.

- Vehicles in pace
Percent of observed vehicles driving at speeds within pace.
- Over 65mph
Total percent of vehicles speeding.
- Over 70mph
Percent of vehicles speeding over 70mph.
- Standard deviation
Measure of spread or dispersion of observed speeds.

Also, based on the observed data, the following charts were created:

- Frequency Distribution Chart
Normal frequency distribution chart plotted against speeds. This chart includes Pace.
- Cumulative Frequency Distribution Chart
Cumulative frequency distribution chart plotted against speeds. This chart shows 85th percentile speeds.

METHODOLOGY

For the purpose of these spot speed studies, Operating Speed Method, generally known as the 85th percentile speed method was deployed. The dates and times of observation are listed in table 1.

Note that due to rapidly decreasing/increasing instantaneous speeds or otherwise non-free-flow conditions, some vehicles were intentionally left out from the observations including:

- Emergency vehicles in pursuit or responding to emergency situations
- Vehicles deliberately driving slower (indicated by actively flashing beacons)
- Turning vehicles including vehicles in two way turn lane
- Vehicles entering the roadway from a complete stop close to the study location
 - All vehicles turning right onto US-85 from the driveway of travel center located in the southeast corner of the intersection of US 85 and ND 68

Table 1. Observation dates and times for spot speed study sites.

Location	Date	Direction	Time From	Time To
Site 1	November 13, 2014	Northbound	10:00 am	1:30 pm
		Southbound	10:00 am	12:30 pm
	November 14, 2014	Northbound	2:00 pm	4:30 pm
		Southbound	2:00 pm	4:45 pm
Site 2	November 13, 2014	Northbound	2:00 pm	5:00 pm
		Southbound	2:00 pm	4:15 pm
	November 14, 2014	Northbound	10:00 am	1:00 pm
		Southbound	10:00 am	1:30 pm

RESULTS

As aforementioned, various parameters were calculated from speed observations. A summary of the results is presented in table 2.

At all of the locations studied, the 85th percentile speed was found to be extremely close to the posted speed limit. This implies that most of the traffic is observing the posted speed limit, as expected.

Also, vehicles travelling southbound at site 1 were observed to be travelling at speeds varying more than other locations/directions. This can also be seen in results as the speeds observed have higher standard deviation and there are lesser number of vehicles travelling in pace.

Table 2. Summary of spot speed study results.

Parameter	Site 1				Site 2			
	NB		SB		NB		SB	
	13-Nov ¹	14-Nov	13-Nov	14-Nov	13-Nov	14-Nov	13-Nov	14-Nov
85th Percentile (mph)	66	66	66	66	66	65	66	66
Mean (mph)	62	62	61	61	63	63	63	63
Standard Deviation (mph)	4.2	4.6	5.7	5.4	4.0	3.6	3.9	3.8
Mode (mph)	62	64	62	63	63	65	64	64
Median (mph)	62	62	61	61	63	63	63	63
Pace (mph)	57-67	57-67	57-67	56-66	58-68	58-68	58-68	58-68
In pace (%)	77	75	68	67	88	86	86	86
Over 65mph (%)	20	19	21	18	27	15	24	22
Over 70mph (%)	2	4	3	1	1	2	2	2

¹ Sample size is 243.

APPENDICES

Appendix A: Frequency Distribution Charts.

Appendix B: Cumulative Frequency Distribution Charts.