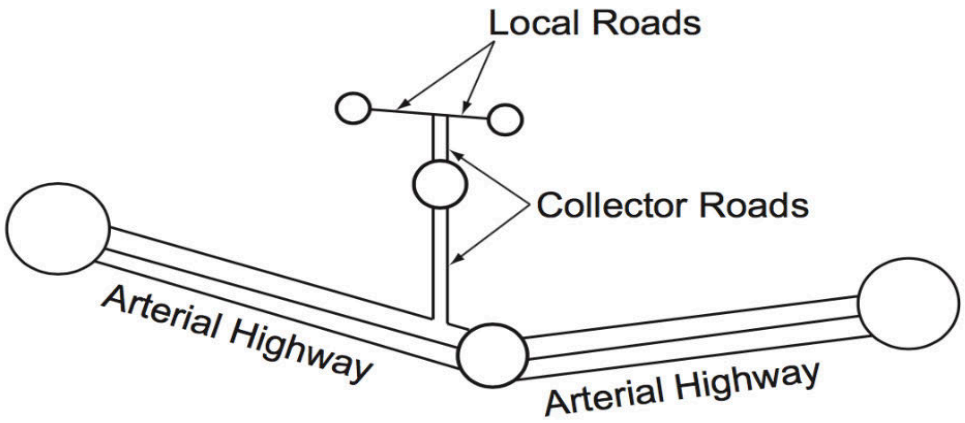
MID-AMERICA
TRANSPORTATION CENTER

SUMMER INTERNSHIP REPORT 2021

By Gurkirat Singh

As a recent Civil Engineering graduate from University of Nebraska-Lincoln, I got the opportunity to Intern with Mid-America Transportation Center. I was hired Dr. Ernest Tufuor as a MATC research Intern and I am grateful to him as well.

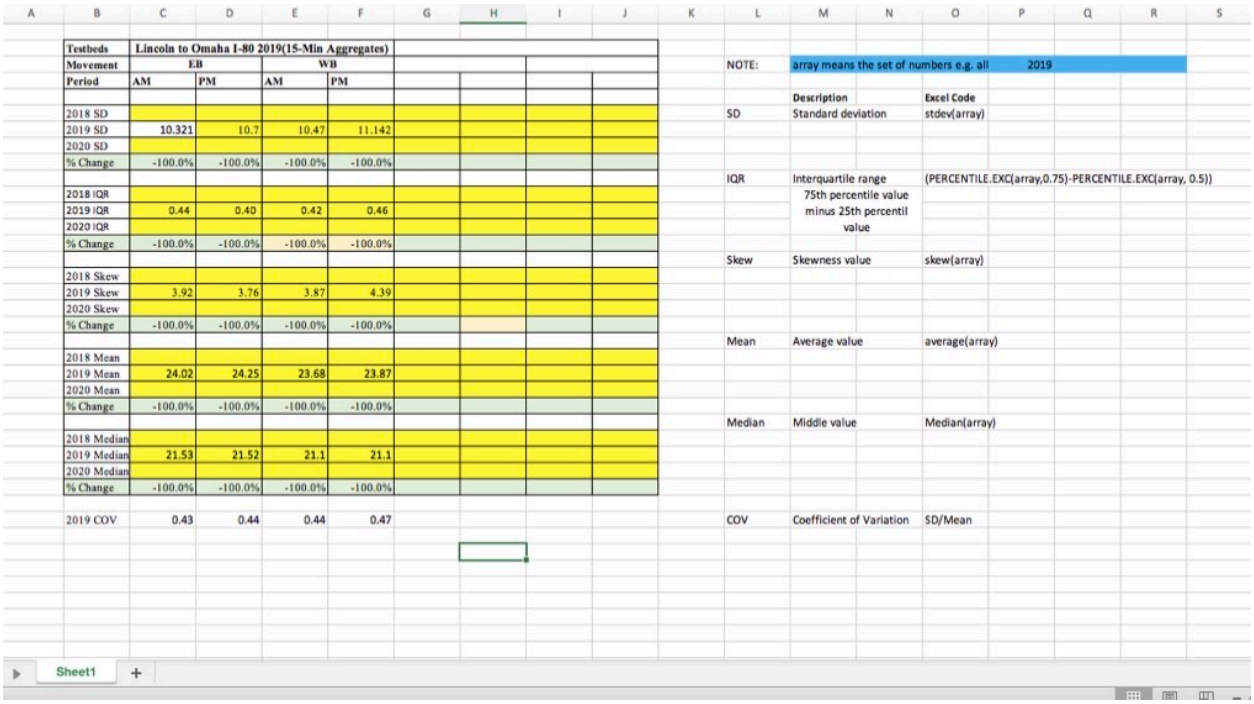


Note. Image from AASHTO_Green Book_2011 6th edition

Initially, I was given the task do some literature study on the classification of roads and came across its various types, such as Local/Residential streets, Collector roads, Major arterial roads and Expressways/Freeways. Later, I spotted these roads from my residence till Omaha and discussed my observations with the supervisor via presentation.

Then, I learned about NPMRDS Analytics and chose the I-80 from Lincoln to Omaha segment. It was a 54 miles of selected roadway and 2019 year was the selected time period to analyze the data for trucks and passenger vehicles, considering the 15 minute granularity. The weekdays data for the whole year was downloaded in the form of excel files and the recorded times, such as morning peak traffic time from 6:00 am – 10:00 am, with the evening traffic time taken was 3:00 pm – 7:00 pm and the free flow from 12:00 am – 2:00 am was considered for west/east bound. All these time frames were compiled into one excel sheet for calculation of standards

deviation, interquartile range, skewness value, average value, middle value and coefficient of variation. These results were computed via excel formulas, for example stdev(array), (PERCENTILE.EXC(array,0.75)-PERCENTILE.EXC(array,0.5)), skew(array), average(array), Median(array) and standard deviation divided by mean.



Testbeds	Lincoln to Omaha I-80 2019(15-Min Aggregates)			
Movement	EB		WB	
Period	AM	PM	AM	PM
2018 SD				
2019 SD	10.321	10.7	10.47	11.142
2020 SD				
% Change	-100.0%	-100.0%	-100.0%	-100.0%
2018 IQR				
2019 IQR	0.44	0.40	0.42	0.46
2020 IQR				
% Change	-100.0%	-100.0%	-100.0%	-100.0%
2018 Skew				
2019 Skew	3.92	3.76	3.87	4.39
2020 Skew				
% Change	-100.0%	-100.0%	-100.0%	-100.0%
2018 Mean				
2019 Mean	24.02	24.25	23.68	23.87
2020 Mean				
% Change	-100.0%	-100.0%	-100.0%	-100.0%
2018 Median				
2019 Median	21.53	21.52	21.1	21.1
2020 Median				
% Change	-100.0%	-100.0%	-100.0%	-100.0%
2019 COV	0.43	0.44	0.44	0.47

NOTE:	array means the set of numbers e.g. all 2019	
	Description	Excel Code
SD	Standard deviation	stdev(array)
IQR	Interquartile range 75th percentile value minus 25th percentil value	(PERCENTILE.EXC(array,0.75)-PERCENTILE.EXC(array, 0.5))
Skew	Skewness value	skew(array)
Mean	Average value	average(array)
Median	Middle value	Median(array)
COV	Coefficient of Variation	SD/Mean

Sheet1

Note. Results computed via excel formulas for I-80

Likewise, the data for I-80 from Des Moines to Newton was analyzed for 15 minute aggregate and the roadway length of 63 miles was considered starting from Exit 141 to Exit 168. The Cheyenne, Wyoming I-80 was analyzed to just compare the results of the other two I-80's. On the other hand, I-29 and I-70 for the Kansas City data was recorded with similar road lengths. All of these five segments were used for the 2019 time period for trucks and passenger vehicles with 15 minute aggregate. Currently, I am working on Chicago I-90 and have been assigned the task to divide the 10 sections. Then, analyzing the recorded data from March to April for 15 minute aggregate with the 2020 time period.

In a nutshell, I have learned and experienced NPMRDS analytics and classification of roads. My interest has inclined more towards the NPMRDS analytics as it was interesting to note the varying results on different roadways with regards to the same time aggregate and time period. Overall, my experience with Nebraska Transportation Center has been great and I am grateful to Dr. Ernest Tufuor for teaching me new softwares.