Project Title: Investigating the Monetary Benefits of Crash Reduction on Interstate Highways by Employing Express Intercity Transit Services

Team members: Mohammadreza Hashemi, Andisheh Ranjbari, Navid Tafaghodi Khajavi, Katherine Dolma

1. Description of Progress

Data

The crash and roadway inventory databases were obtained from HSIS (Highway Safety Information System). Since, the research question is to find the correlation between the frequency of crashes and roadway geometry attributes, one the main challenges was to merge these databases together. The team reviewed the details of the two databases and concluded that the key would be the mile-point location of crashes.

Moreover, to graphically show crashes on the roads, the team decided to explore the feasibility of using the mile-point markers on the State routes in Washington State to convert the crash location information from county, route and milepost to Latitude and Longitude.

Study Area

The target roads for this study are interstate highways in the the State of Washington. The shapefile of the State roads was obtained from WSDOT (Washington State Department of Transportation) website to review and to extract the relevant roads. The interstate highways in the State of Washington are I-5, I-82 and I-90, with a total length of 706.45 miles.

Based on the crash dataset, the total number of crashes on interstate highways over the seven-year period (2007-2013) are 66,362.

Crash Modeling

The following steps are completed to prepare the data for crash frequency modeling:

1. The crash databases for each of the seven years of study are merged together. The merged file is filtered to select the crashes occurred on target roads.
2. The homogenous segmentation method is applied to divide the routes into smaller segments. The total length of 706.45 miles of interstate highways is divided into 5,534 homogeneous segments.
3. The crashes are assigned to the homogeneous segments, each encompassing seven years of data.
4. A new database is prepared as an input for the Negative Binomial regression model, which will be used for crash modeling, including the total number of crashes on each segment and other geometry attributes of the roads.

The preliminary crash frequency model is developed using AADT (Average Annual Daily Traffic), segment length, median width, shoulder width, and the number of lanes. The final crash frequency model will be used for the next sections of this research.

Project Title: Investigating the Monetary Benefits of Crash Reduction on Interstate Highways by Employing Express Intercity Transit Services

Team members: Mohammadreza Hashemi, Andisheh Ranjbari, Navid Tafaghodi Khajavi, Katherine Dolma

2. List of Meetings and Attendance

The four team members reside in four different states in the US, and so all of the group meetings so far have taken place online via phone/Skype. The team met 3 times in 2017 to kickoff the project, to discuss the research directions and to define individual tasks. In 2018, the team has had 2 smaller skype meetings to discuss certain parts of the project and to explore the roles and responsibilities for each team member.

The team also uses a shared Google Drive account and a group email thread to communicate on a regular basis. Meeting minutes is summarized below.

Date	Agenda	Attendance
10/16/2017	Kick-off Meeting	MH, NT, AR, KD
10/23/2017	Discussion of WSDOT crash dataset – What we had and what additional data and/or supplementary datasets were needed.	MH, NT, AR, KD
11/13/2017	Literature Review – Discussed examples on the existing statistical analysis methods and research papers on the effects of multiple factors on interstate highways crash frequencies.	MH, NT, AR, KD
2/11/2018	Discussed the responsibilities for each team member. Explored the potential application of machine learning approaches on crash dataset.	MH, NT
2/18/2018	Discussed the bridge between the crash and demand models and the potential adoption of existing travel demand models and/or mode choice models for the next phase of the project.	MH, AR

3. Outputs Presentation

The team plans to present the outcomes of this research project at one of the following conferences:

Conference	Dates and Location	Submission Deadline
TRB[1] Annual Meeting	January 13-17, 2019 | Washington, DC	August 1, 2018
ITE[2] Annual Meeting	July 21-24, 2019 | Austin, TX	TBA
ITE[2] Western District Annual Meeting	June 23 – 26, 2019 | Monterey, California	TBA

[1] Transportation Research Board

[2] Institute of Transportation Engineers