

2019 Research Showcase

18-3: Calibration of the Highway Safety Manual Predictive Models for Rural Two-Lane Roads for Vermont

& STIC Annual Meeting

PROJECT TITLE

18-3: Calibration of the Highway Safety Manual Predictive Models for Rural Two-Lane Roads for Vermont

STUDY TIMELINE

October 2018 – September 2019

INVESTIGATORS

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VTRANS CONTACTS

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This fact sheet was prepared for the 2019 VTrans Research Showcase & STIC Annual Meeting held at the Dill Building in Berlin, VT, on September 11, 2019 from 8:30 am– 1:00 pm.

Fact sheets can be found for additional projects featured at the 2019 Symposium at

<http://vtrans.vermont.gov/planning/research/2019showcase>

Additional information about the VTrans Research Program can be found at

<http://vtrans.vermont.gov/planning/research>

Additional information about the VTrans STIC Program can be found at

<http://vtrans.vermont.gov/boards-councils/stic>

Introduction / Problem Statement

The 2010 Highway Safety Manual (HSM) provides predictive equations for quantifying the safety effects of planning and designing roadway alternatives. These equations have been, however, developed based on data sets from a small number of states and they must be calibrated to local conditions in order to ensure that the results at the local levels are accurate.



Figure 1 Unassigned Crash Along Rural Highway Segment

Methodology

Once the calibration data sets were ready, calibration factors were calculated from the calibration data sets for 2-way, 2-lane rural highways in Vermont, on segments and at intersections. The HSM predictive model was applied to predict total crash frequency for each site during the calibration period 2014-2016, then a series of crash modification factors (CMFs) were applied based on the physical characteristics of the site. The results of the predictive model were then compared to the *actual* number of observed crashes at the sites to calculate the calibration factor. Negative binomial regression was also used to re-estimate the predictive equations themselves, and the goodness of fit of each approach was compared.

Next Steps

The project has not yet been completed, so it is not clear yet if the calibration factors or the re-estimated equations will be preferable. This process should be repeated every 4-5 years, as new crash data becomes available and the tracking of physical characteristics of roadway segments and intersection improves.

Potential Impacts and VTrans Benefits

Once VTrans has a calibrated set of equations, VTrans will be able to predict crashes more accurately and be able to better evaluate project alternatives. The HSM equations are a great tool to quantify safety, but because they are not calibrated for Vermont, VTrans has not been able to fully benefit from their use.