

Research in Progress

Uncovering the Root Causes to Truck Rollover Crashes on Ramps

Research Need

In the United States, heavy truck related crashes account for about 4% of total crashes, but 8% of total fatal crashes. Crashes involving heavy trucks usually occur on highways and tend to have significant and large-scale traffic impacts. In 2016 alone, truck related crashes in Massachusetts resulted in losses of over \$22M in terms of delay time and \$1.7M due to emissions and wasted fuel consumption.

Nationwide, approximately 11% of total truck crashes were on highway ramps and 44~52% of them involved rollovers. The sharp horizontal curves of highway ramps make them hotspots of truck rollover crashes. Such crashes can block the entire ramp and cause severe congestion. Understanding the major causes of ramp truck rollover crashes is important for developing effective crash risk mitigation strategies and improving highway safety and traffic operational reliability.

Goals/Objectives

The proposed research aims to (1) review literature and best practices on reducing highway ramp truck rollovers; (2) analyze historical ramp truck rollover data in Massachusetts; (3) focus on utilizing traffic cameras and advanced video analytics tools to uncover the causes of truck rollovers on highway ramps and derive surrogate safety performance measures; and (4) establish correlations between truck rollovers and ITS devices, signage and markings, and roadway design practices.

Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

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Performing Organizations:

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Project Start Date:

March 2021

Expected Project Completion Date:

September 2022

Methodology

1. Initial video data collection and preliminary data analysis to assess the quality of the video data and the derived surrogate safety measures
2. Review of literature and best practices to reduce truck rollover crashes on highway ramps
3. Analysis of ramp truck rollover crashes in Massachusetts to identify contributing factors
4. Additional video data collection at high-risk ramps
5. Video data analysis to quantify ramp safety considering ramp geometry, control, design, etc.

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