# FEM Simulation for INDOT Temporary Concrete Anchored Barrier

Introduction

Longitudinal portable concrete barriers (PCBs) are used to keep errant vehicles on the roadway. By doing this, workers, work areas and construction equipment at highway worksites are protected, and separation of two-way traffic is achieved. PCBs used in the crash test and finite element model (FEM) are attached to each other by pin-and-loop connections. In this report, information about the crash test conducted by the Indiana Department of Transportation (INDOT), FEM simulating the crash test, validation process of the FEM and implementation of the L-shaped steel plates to the validated FEM are presented.

Findings

- Constructed benchmark FEM captures the results of the crash test successfully. The results were verified and validated using the Roadside Safety Verification and Validation Program (RSVVP) and the criteria of Appendix E of the NCHRP 350 report.
- The maximum deflection of the barriers was around 63 inches in both the benchmark simulation and the crash test.
- Implementing L-shaped steel plates reduced the maximum displacement of the barriers to 5.5 inches. No overturning of the barriers was observed. After the impact, the concrete barriers returned to close to their original positions.
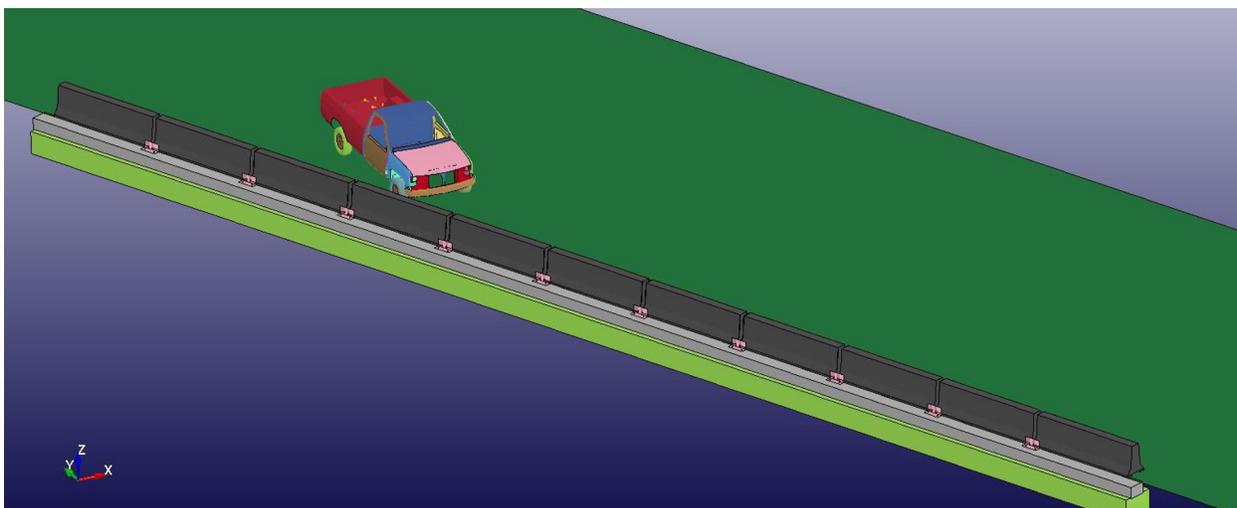
General view of model before impact.

- No significant damage in the concrete pavement was observed around the most critical steel plate. Minor damage around the critical plates was observed due to the anchorage–concrete pavement interaction.
- The steel plate located close to the impact bent over but no failure of the plates and anchorages was observed.
- The exit angle of the vehicle also decreased in the model with increment when compared to the benchmark model.
- The benchmark analysis can be used for further analysis for different types of increments.

Recommended Citation