

### Identifying Key Influencers of Accidents at Railroad-Highway Crossings: A Tennessee Case Study

Railroad-Highway Crossings (RHCs) are crucial junctions where rail tracks intersect with roadways, and ensuring their safety is a significant concern. This study presents an analysis of accident and crash frequencies at RHCs in Tennessee, intending to identify the most impactful factors on RHC safety. The research design encompassed an exhaustive review of descriptive statistics, followed by the application of a rigorous statistical methodology - a Negative Binomial (NB) regression model. The descriptive analysis explored several influential factors, including the number of train trips per day, crossing lanes, traffic volume and type, control type at the RHC, and the presence of advance preemption signals, illumination, and pavement marking stop lines. Findings reveal that the number of train trips, peak hour volume, and percentage of passenger cars positively influence collision likelihood. More significantly, passive controls tend to be less effective than gates or flashing lights. Unlit crossings and crossings without advance preemption signals or pavement-marked stop lines were associated with a higher likelihood of collisions.