



Dual Left Turn Lane Evaluation

NCDOT has completed a safety study of 36 signalized intersections in North Carolina where dual left turn lanes (DLTL) had been installed with no other major changes during the study period.

Background

Dual left turn lanes are often installed to improve the operational performance of an intersection and prior to this study there was little research on the affect on safety when converting a single left turn lane to a dual left turn lane.

This study, using an Empirical Bayes methodology, looked at intersections that had at least 1 dual left turn lane installed between 2004 and 2021 and were predominately urban and 4-leg. Sites that had major changes before, during, and after DLTL construction were excluded. Most sites had protected left turn phasing along treated approaches before and after DLTL installation, but a few sites had phasing changes along the treated approach that increased protection from before to after. Additionally, 1 of the sites had protected-permitted left turn phasing along the treated approaches before and after DLTL installation.



Aerial View of a 4-Leg study site
Source: Google Earth Pro

The treatment group was further cleansed to include only the sites with no minor geometric changes and with protected left turn phasing along treated approaches before and after DLTL installation, resulting in 18 “clean” sites. The results from these 18 sites were used to isolate the effect of the DLTL installation.

Results

The overall results from the 18 “clean” locations indicate a:

- 16% reduction in fatal and injury crashes
- 1% increase in property damage only crashes

Other key points of the study:

- A DLTL with accompanying protection increases for left turn phasing (going from protected permitted to fully protected) is expected to produce a much greater safety benefit.
- Overall, there was a 17% in frontal impact crashes. However, there was a better safety impact on angle crashes (35% reduction) than left turn frontal impacts (3% reduction). This could be a result of the operational improvements- delay reductions leading to drivers taking less risks.
- There was a 24% increase in sideswipe crashes.
- Due to a limited sample of the data, the study was unable to draw conclusions on pedestrian and bicycle crashes.