

Signalization strategies reduce crashes involving left turning vehicles

Summary

Recent analysis shows that low-cost safety countermeasures implemented by Austin Transportation Department at signalized intersections have reduced crashes involving left turning vehicles. These changes include implementing protected left-turn signal phasing, installing flashing yellow arrows, and enhancing signage and signal heads, all of which are part of Vision Zero's strategy of designing an intuitive and predictable transportation system that promotes safe behaviors. ATD is utilizing these results to help inform the development of more formal guidelines for implementing these types of changes at other locations throughout Austin to improve systemwide safety.

Problem Statement

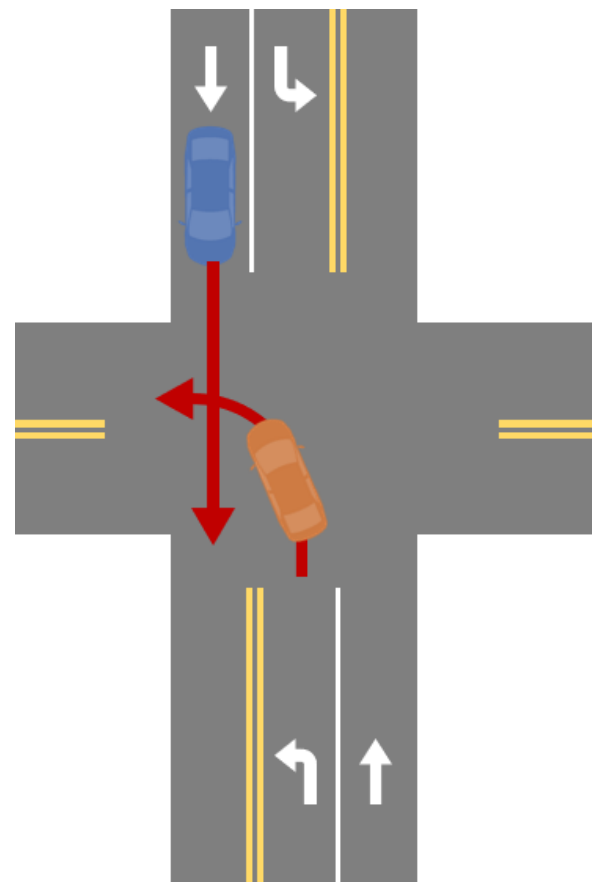
Between 2015-2019 there were 130 crashes resulting in serious injury or death involving one motor vehicle turning left and one motor vehicle going straight in the opposite direction in Austin. **This type of collision accounted for nearly 8% of all severe, non-freeway crashes over that time period**, making it the second highest single severe crash type in the city. These crashes are often the result of left-turning drivers' inability to accurately judge the speed of oncoming vehicles, poor visibility, or simply driver frustration and risk-taking. To address this common crash type there is a need to deploy proven safety countermeasures at signalized intersections across the city.

The Solution

Vision Zero leveraged its custom crash analysis tools to identify signalized intersections with a high concentration of these "Opposite Direction—One Straight—One Left Turn" crashes. These tools allowed staff to take a deep dive into each location to understand the time-of-day and day-of-week time periods in which these crashes were occurring most frequently, as well as the specific turning movements that were most problematic at each location. ATD traffic signal engineers utilized this information to make recommendations for low-cost changes that could address this crash type based on each location's unique conditions and context.

Recommended countermeasures included a combination of the following:

- Converting to "**protected-only**" phasing, whereby left turners have a dedicated turning phase with a green left arrow and no conflicting vehicle or pedestrian movements.
- Installing **Flashing Yellow Arrows** for the permissive left-turn phase (i.e. when left turners are *permitted* to turn when there are gaps in oncoming traffic) to raise driver awareness.
- Installing more **prominent signage or signal heads** to more clearly communicate driver expectations and lane assignments.



There were 130 "Opposite Direction—One Straight—One Left Turn" crashes that resulted in serious injury or fatality in Austin over the past five years.

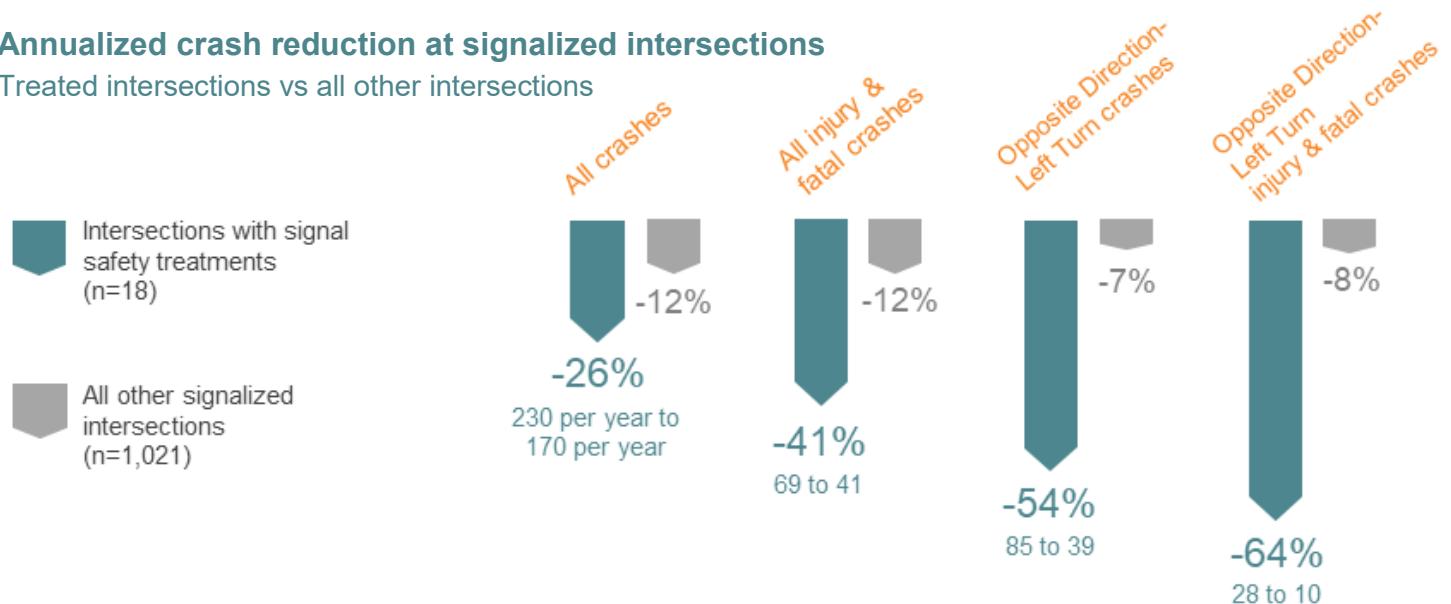
Results

Over the past two years ATD implemented signalization countermeasures at over two dozen locations based on the analysis provided by Vision Zero. For 18 of these locations (those which had at least six months of after data) staff calculated the annualized number of crashes for the three years prior to implementation and the time period following implementation. Staff then compared the safety performance of these intersections with that of all other signalized intersections in the city over roughly the same time period, using March 2021 as the before/after cutoff, which was the mid-point of when the bulk of work was performed.

As seen in the graphic below, there was a substantial reduction in the annualized number of crashes, injury crashes, and Opposite Direction—One Straight—One Left Turn crashes at the 18 intersections where signalization strategies were implemented. This includes a **64% reduction in the annualized number of Opposite Direction-Left Turn injury crashes, which means approximately 18 fewer people were injured or killed per year at these locations.**

Annualized crash reduction at signalized intersections

Treated intersections vs all other intersections



There was also a reduction in these crashes for all other signalized intersections in Austin, however the magnitude was not as large as those that received safety treatments. As is the case with all crash trends occurring during COVID-19 pandemic, it is important to consider how changes in travel patterns and behaviors may have contributed to crash reductions beyond the safety impacts of the signalization changes, and Vision Zero will continue to unpack these dynamics as we gather more data.

Future Work

While not unexpected, these results demonstrate the safety benefits of making small changes to the way we operate and design our traffic signals. The fact that the Opposite Direction—One Straight—One Left Turn crash type accounts for nearly 8% of all severe, non-freeway crashes in Austin means there is a great opportunity to reduce a significant portion of severe crashes through low-cost, proven safety countermeasures like those that were looked at as part of this report. To move towards our goal of zero fatalities and serious injuries, there is a need to rapidly expand these types of treatments to locations throughout the city. In this spirit, Vision Zero is currently working with ATD signal engineers to better understand the effectiveness of each treatment type in different contexts and develop guidelines for implementing these types of changes at other locations throughout Austin to improve systemwide safety.