CONTINUOUS GREEN T–INTERSECTIONS (CGT)

INTRODUCTION

Angle crashes are among the most severe crashes that occur at intersections, including T-intersections, across the United States. Research has shown that a primary reason for the high number of crashes is driver inability to judge gaps in opposing traffic. In some cases, substandard sight distance can compound this problem. Research also demonstrates that the number and severity of crashes at T-intersections can be reduced by some engineering countermeasures. The experience of the Colorado Department of Transportation (CDOT) demonstrates how transportation agencies can improve safety at T-intersections.

The CDOT was concerned about the high number of crashes at some of its rural T-intersections controlled by traffic signals. Recognizing that inadequate stopping sight distance can cause crashes, CDOT installed continuous green T-intersection (CGT) at two intersections experiencing a high incidence of crashes, many with injuries[1]. The CGT design allows main line through traffic to pass through a signalized intersection without stopping while eliminating conflicting left-turning vehicular movement. The crash reduction averages in this report reflect the percent reduction per year based on the difference between the total number of "before" and "after" crashes, observed over a period of 4 years at each intersection, between 1994 - 2006. The "before" and "after" observation periods were 24 months at both intersections.

This article summarizes the application of CGT treatment that reduced crashes at T-intersections[2]. The intersections are described below.

INTERSECTION IMPROVEMENTS

1) US-50 and SH 141, Grand Junction, CO

CDOT converted the traffic control at the intersection of eastbound (EB) US-50 and SH 141 from a fully-signalized intersection to a CGT in 2004 (Figure 1). A separate left-turn deceleration lane was provided for exclusive left-turning movement to SH-141. Similarly an acceleration lane was provided from SH-141 onto EB US-50. ~~The "before" and "after" observation periods were 24 months.~~ Data showed that 16 crashes occurred before the improvement was made; 7 crashes occurred after the change. This treatment has proven effective in reducing crashes, and CDOT experienced a crash reduction of 56.3 percent and injury crash reduction of 83.3 percent per year at this intersection. Angle crashes were eliminated.

2) US-160 and US-550, Durango, CO

CDOT converted the traffic control at the intersection of westbound (WB) US-160 and US-550 to a CGT in 2004 (Figure 2). After conversion, US-160 had a single through lane running WB with a separate deceleration lane; US-550 had one acceleration lane for WB movement. ~~The "before" and "after" observation periods were 24 months.~~ Data showed that 19 crashes occurred before the improvement was

[1] Existing intersections met minimum Manual on Uniform Traffic Control Devices (MUTCD) standards.

[2] Engineers should only consider the CGT at T-intersections with moderate-to-low left-turn volumes from the cross-street, and high arterial through volumes.

made; 7 crashes occurred after the change. Installing this countermeasure reduced total crashes by 63.2 percent, injury crashes by 50 percent, and angle crashes by 93.3 by percent per year.

The Cost of Improved Safety

CDOT had no implementation issues with these countermeasures and the costs for implementing the enhancements were approximately $300,000 for each intersection, which included the new signal as well as the raised median work. The CGT was implemented within 3 months.

The safety enhancements installed at these Colorado signalized intersections cumulatively reduced total crashes by 60 percent, injury crashes by 70 percent, and angle crashes by 96.8 percent per year.

As the CDOT experience demonstrates, CGTs can effectively improve safety and reduce traffic crashes (particularly angle crashes) and their resulting injuries and/or fatalities. For more detailed data and results on this success story and other proven intersection safety treatments from across the country, please see the following website: http://safety.fhwa.dot.gov/intersection. For more information, contact Ed Rice, Intersection Safety Team Leader, FHWA Office of Safety (ed.rice@dot.gov), or Zane Znamenacek, Region 3 Traffic Operations Engineer, CDOT (Zane.Znamenacek@dot.state.co.us).

IMAGES COURTESY CDOT (used with permission).

Figure 1: US-50 and SH 141, Grand Junction, CO

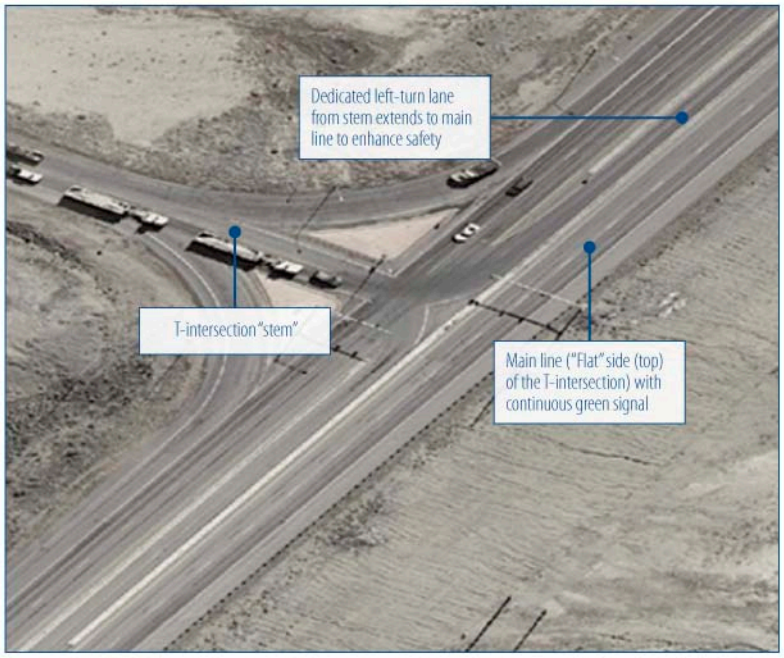

Figure 2: US-160 and US-550, Durango, CO