



Stop Vs. Yield Signs

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This document is a summary of the literature relating to the installation of stop or yield signs on low-volume intersections. Stop signs have become the common way of establishing right-of-way at many low volume intersections where a yield sign might have had the same effect.

The literature is summarized by operational, safety, and speed control subjects in the following sections. In summary, stop and yield signs have their advantages when used properly. By placing stop signs where the guidelines are met and the sign is needed it is likely to increase the number of drivers complying with stop signs. Citizen requests have been a growing reason for placing stop signs in residential areas. This is often ineffective and traffic calming can be better accomplished through education of drivers in the neighborhood or other road features. Yield signs have been found most effective at intersections with a low average daily traffic. There have been mixed results when switching from stop to yield control in terms of operations and safety.

Operations:

Studies have found that volume and approach speed have a large effect on operating characteristics. In a synthesis by the FHWA, recommendations based on volume are given for when to use stop or yield control. The synthesis found that yield control had the greatest benefit when an average daily traffic is between 200 and 800 (2). Volume was also found to effect the number of vehicles forced to stop. As the volume on the major street increases, so will the number of vehicles forced to stop increase (1). The number of drivers choosing to stop was found to depend more on the setting. In urban areas, not as many drivers will stop, but they are more likely to enter the intersection at a slower speed (1).

Some studies found operational benefits when stop signs were replaced with yield signs. One study, *Stop, Yield, and No Control at Intersections* by FHWA, found a composite saving in road user costs (time and operating costs) of about 8% when switching from a stop to yield sign (1). Most of the savings come from reducing the amount of delay time. Fuel consumption was included in the vehicle operating costs but was found to have a minimal contribution when tires, oil, and other maintenance are factored into vehicle operation cost. A slight increase in pollution was also found at stop signs instead of yield signs.

Safety:

Safety has a significant role in when a stop sign or a yield sign should be used. A survey was conducted among several state agencies in NCHRP Report 320 and showed that safety is a major concern when considering the use of a yield sign (4). In an article in a 1983 issue of Public Roads, Rosenbaum found in a review of other's work that control type had no major effect on crash experience at low-volume intersections.

When switching from a stop sign to a yield sign several factors needed to be considered. Yield signs may be acceptable at certain intersections, but if sight distance is not sufficient, a stop sign may be needed. Volume has a major affect on when each control

should be used. The crash percentages greatly increase at major street volumes greater than 2000 vehicles per day (3). Report 320 concluded that switching from stop to yield would likely increase the number of crashes by one every two years (4).

Report 320 also included several before and after studies in the cities of Pueblo, Colorado and Rapid City, South Dakota. Pueblo converted a large number of intersections from stop to yield but the number of crashes was so small that no statistical analysis was completed. It was noted that several of the crashes were caused by failure to yield the right-of-way. Several of the intersections were converted back to stop-controlled intersection at the end of the study. There were public complaints of high speed and drivers not observing the yield sign.

Rapid City only converted 19 intersections and the results were mixed. Seven of the intersections saw an increase in the number of crashes, 10 stayed the same, and two of the intersections saw decrease in the number of crashes. Overall, the number of crashes increased from 12 to 26 in Rapid City, but several of the control sites also had an increase in the number of crashes. Overall, the cities had mixed results when switching from stop to yield control.

The FHWA synthesis also showed that the type of crash varied with the type of control. At yield-controlled intersections rear-end crashes were over 50% of the crashes while at stop signs right-angle crashes accounted for 50% of the crashes (3).

Speed Control:

Citizen requests have also become a reason for seeing more and more stop signs on street corners (5). Many citizens feel that the best way to slow traffic down in their area is to install more stop signs. In some cases, this works, but in others it may actually increase the peak speed between stop signs (5). Improper placement of stop signs may also create a lack of respect for them. More stop signs can increase the number of stops, add delays, and cause driver anxiety. Drivers become more likely not to stop.

The FHWA synthesis reported a study conducted in Troy, Michigan in 1976 on stop sign observance. The study found that stop sign compliance began to decline and the number of vehicles not stopping ranged from 15 to 47% when additional stop signs were installed (3). Beaubien expanded on the 1976 study in *Controlling Speeds on Residential Streets* (6). This article looks further into the stop sign problems in the City of Troy. Beaubien found that many residents would like the speed to be as low as possible in residential areas. Upon further examination, it was concluded that the residents are actually a majority of the problem (6). Therefore, instead of placing more stop signs, educating the neighborhoods was a proposed solution. This was done by sending letters to the owners of vehicles who were found to be speeding through residential zones.

REFRENCES

- 1 *Stop, Yield, and No Control at Intersections.* Final Report FHWA/RD-81/084. FHWA, US Department of Transportation, June 1981.
- 2 *Synthesis of Safety Research Related to Traffic Control and Roadway Elements, Volume I,* FHWA TS-82-232. Washington D.C. December 1982.
- 3 Rosenbaum, Merton J. *A Review of Research Related to the Safety of Stop Versus Yield Sign Traffic Control.* Public Roads. December 1983. Vol. 47, No. 3. Pg. 77-83.
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- 5 Chadda, Himmat S., and Carter, Everett C. *Multi-Way Stop – Have We Gone Too Far?* ITE Journal. May 1983. Pg. 19-21.
- 6 Beaubien, Richard F. *Controlling Speeds on Residential Streets.* ITE Journal. April 1989. Pg. 37-39.

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