

Evaluation of Stop Sign Beacons at Rural Intersections

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Because crashes at rural intersections frequently result from failure to yield, agencies attempt to find countermeasures that encourage drivers to stop and yield appropriately. In this research, two promising low-cost rural intersection countermeasures were selected and evaluated for their impact on safety: post-mounted beacons and retroreflective strips on stop sign posts. The post-mounted beacons were set to activate only when an approaching vehicle's speed surpassed a predetermined threshold.

High-crash rural stop-controlled intersections were identified using in-house crash and roadway data and then filtered for suitability via site visits. The retroreflective strips were installed on stop signs at 14 intersections on both minor street approaches. The post-mounted beacons were installed on stop signs at 10 approaches at 6 intersections. Driver behavior was used to assess the countermeasures. Because the post-mounted beacon was expected to noticeably impact driver behavior while the retroreflective strips were not, driver behavior data were only collected at locations where post-mounted beacons were installed. Video data were collected using trailer-mounted cameras at all 10 approaches where post-mounted beacons were installed 1 month before and 1 month after installation. For 6 of the 10 approaches, data were also collected 12 months after installation. Several driver behavior metrics, including type of stop, stopping position, braking point, and number of times braking, were reduced for a random sample of vehicles for each approach in each evaluation period and were compared before and after installation.

Overall, the post-mounted beacon had an overwhelmingly positive safety benefit, as measured by several changes in driver behavior. Most approaches where the countermeasure was installed experienced increases in the number of drivers making full stops, braking within 450 to 500 ft of the intersection, stopping at or before the stop bar, and braking only once. Ideally, these improvements in driver behavior will result in reduced crashes at the study intersections. Because the retroreflective strips were not evaluated, the researchers propose to conduct a crash analysis when at least three years have elapsed after installation.

Keywords: rural intersection, stop sign beacon, countermeasures