

UNSIGNALIZED INTERSECTION SAFETY STRATEGIES



Realign Intersection Approaches to Reduce or Eliminate Intersection Skew

WHERE TO USE

Unsignalized intersections with a high frequency of crashes resulting from insufficient intersection sight distance and awkward sight lines at a skewed intersection.



Photo by: FHWA

DETAILS

When roadways intersect at skewed angles, the intersections may experience one or more of the following problems:

- Vehicles may have a longer distance to traverse while crossing or turning onto the intersecting roadway, resulting in an increased time of exposure to the cross-street traffic.
- Older drivers may find it more difficult to turn their heads, necks, or upper bodies for an adequate line of sight down an acute-angle approach.
- The driver's sight angle for convenient observation of opposing traffic and pedestrian crossings is decreased.
- Drivers may have more difficulty aligning their vehicles as they enter the cross street to make a right or left turn.
- Drivers making right turns around an acute-angle radius may encroach on lanes intended for oncoming traffic from the right.
- The larger intersection area may confuse drivers or cause them to deviate from the intended path.
- Through-roadway drivers making left turns across an obtuse angle may attempt to maintain a higher than normal turning speed and cut across the oncoming traffic lane on the intersecting street.
- The vehicle body may obstruct the line of sight of drivers with an acute-angle approach to their right.

Realignment of intersection approaches to reduce or eliminate intersection skew may be desirable to improve safety at a skewed intersection.



KEY TO SUCCESS

Identify candidate locations where there exist crash patterns related to the intersection angle. Any intersection with a pattern of right-angle or turning crashes should be checked to determine whether the skew angle of the intersection is contributing to these crashes.

ISSUES

When realigning a skewed intersection approach, it is possible to create such a sharp horizontal curve that the curve itself becomes a safety concern. Thus, the designer should be alert to avoid trading one safety concern for another.

Realignment may negatively affect adjacent properties.

TIME FRAME ●●○

This strategy requires an implementation time of 1 to 4 years. At least 1 year is necessary to work out the details of intersection approach realignment and to communicate the plan to affected business owners and residents. Where relocation requires right-of-way acquisition and/or demolition of existing structures, an extensive project development process up to 4 years long may be required.

COSTS ●●●●

Reducing or eliminating the skew angle of an intersection involves the realignment of at least one intersection approach. The cost of this type of construction project is usually high. Furthermore, additional right-of-way will generally need to be acquired.

EFFECTIVENESS

PROVEN: A recent study concluded from a review of the literature that realigning intersection approaches to reduce or eliminate intersection skew improves safety at unsignalized intersections. The study concluded the safety effectiveness of realignment to be as follows:

$AMF = e^{0.0040 \times SKEW}$ for three-legged intersections and $AMF = e^{0.0054 \times SKEW}$ for four-legged intersections

Where: AMF = Accident modification factor

SKEW = Intersection skew angle (degrees), expressed as the absolute value of the difference between 90 degrees and the actual intersection angle.

Example: Three-leg intersection with a 15 degree skew on the approach.

$AMF = e^{0.004 \times 15} = 1.06$ (6% more crashes than an approach with no skew)

COMPATIBILITY

Reducing or eliminating the skew angle of an intersection may be done in conjunction with most other strategies for improving safety. Indeed, in many cases, the purpose of realigning an intersection approach may be to make those other strategies feasible.

For more details on this and other countermeasures: <http://safety.transportation.org>

For more information contact:

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