

Offset Left Turn Lanes

CRASH REDUCTION STRATEGY SUMMARY

WHAT?

An offset left turn lane is a dedicated lane that is shifted closer to oncoming traffic that increases sight distance which improves left turn safety.

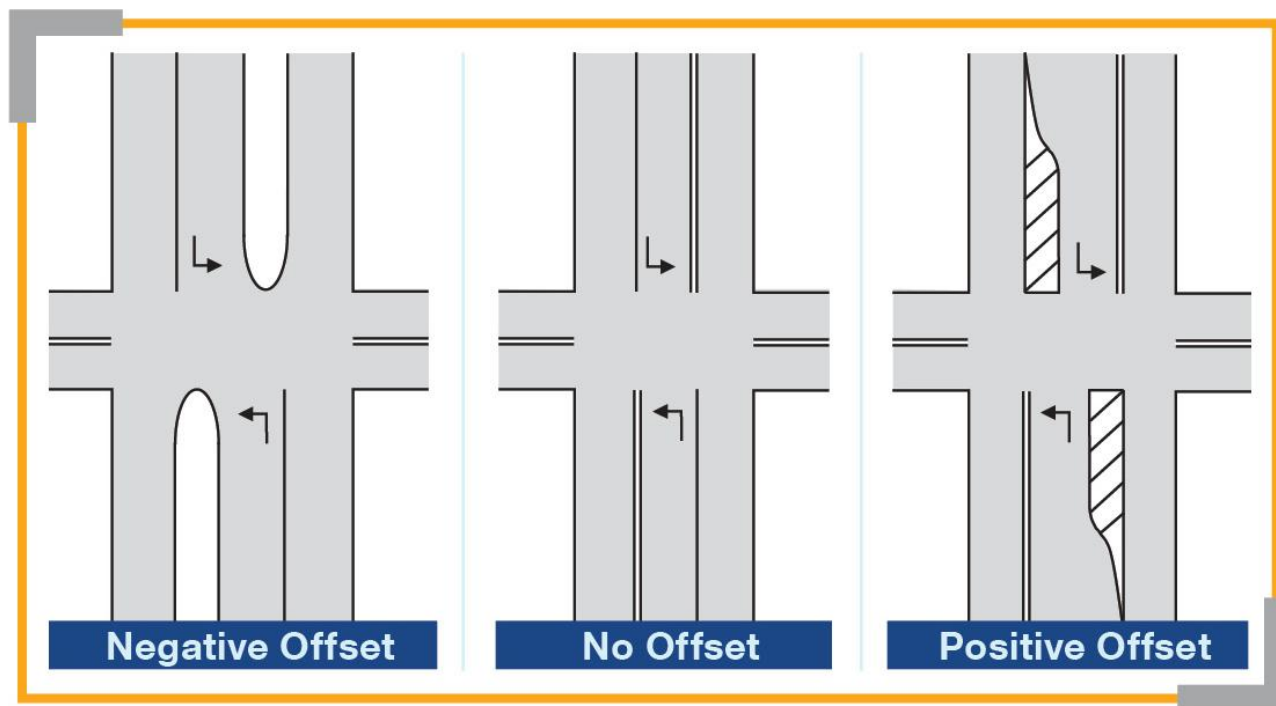
WHY?

Adding a positive offset to a dedicated left turn lane increases the sight distance to oncoming vehicles. It can be a striped lane or have actual barriers separating vehicles from through movements. The primary purpose of a left turn lane is to provide room for deceleration and storage for vehicles turning left. At a conventional intersection with no dedicated left turn lane, vehicles turning left can have a sight distance problem, especially when oncoming vehicles are also turning left. The

introduction of a left turn lane helps reduce this problem. A positive offset can remove this problem entirely. Such offsetting could require additional right-of-way and the geometry constraints of the intersection may not permit this.

Right angle collisions are a concern with left turn movements. Oncoming through traffic may be traveling at high speeds, and oncoming vehicles turning left can block the line of sight. Adding a positive offset to the left turn lane can increase the sight distance of oncoming through vehicles, and has been shown to increase safety (Naik et al., 2009). Offset left turn lanes can increase safety by increasing the sight distance of oncoming traffic, while increasing flow at major intersections.

Figure 1 – Left Turn Offset Types



Source: Persaud et al., 2010.

SAFETY BENEFITS

The following table summarizes the safety benefits of the implementation of offset left turn lanes.

Table 1 – Summary of Safety Benefits

	Yes	No
FHWA Proven Countermeasure		X
Included in the HSM	X	
14A.6.2 – Provide a positive offset for left-turn lanes (No CMF)		
Included in the CMF Clearinghouse *	X	
Introducing zero or positive offset left turn lane of crossing roadway, 0.80, 3 stars		
Install positive offset left turn lanes, CMF 0.50, all, 2 stars		

* Note: CMFs with less than a 4 star rating, may not be reliable and are not to be used in crash reduction.

Other Safety Studies

A study completed in Florida reduced the negative offset of left turns and found no significant improvements in crashes. However a study in Wisconsin and Nebraska found that modifying left turns with no offset or a negative offset to a positive offset created an 8% reduction in crashes at intersections with a frequency of nine or more crashes per year (Persaud et al., 2010). At high-crash intersections, introducing a positive offset for left turning vehicles can have a significant effect.

How?

Offset left turn lanes are most appropriate on high volume intersections or on major roads with high left turn volumes. Good candidates for installation would include signalized intersections with permissive left turn lanes and unsignalized intersections with high volumes of left turns and/or high speeds.

The recommended offset distance can vary from intersection to intersection based on the intersection geometry (approach angles,

speed, curvature, etc.) As such, offset left turns are recommended to be designed so that the left turning vehicle has a sufficient clear departure sight triangle.

SUMMARY

Offset left turn lanes can be implemented at any intersection with sufficient right-of-way. Offset left turn lanes should be considered at intersections with permissive left turn movements and at unsignalized intersections with high left turn volumes and speeds. Introducing offset left turn lanes has shown a crash reduction factor of 0.80 (Wang and Abdel-Aty, 2007). This CMF has a star rating of three with CMF Clearinghouse which is too low to include in a crash reduction analysis in Nevada, but indicates the potential for crash reduction in some situations and should be considered where space permits.

WORKS CITED

- Naik, B., Appiah, J., Khattak, A. J., & Rilett, L. R. (2009). Safety Effectiveness of Offsetting Opposing Left-Turn Lanes: A Case Study. *Journal of the Transportation Research Forum*, 48(2), 71-82.
- Persaud, B., Lyon, C., Gross, F., & Eccles, K. (2010). Safety Evaluation of Offset Improvements for Left-Turn Lanes. *Transportation Research Record*, 2171, 44-51.
- Tarawneh, M. S., & McCoy, P. T. (1996). Effect of Offset Between Opposing Left-Turn Lanes on Driver Performance. *Transportation Research Record*, 61-72.
- Wang, X., & Abdel-Aty, M. (2007). Right-Angle Crash Occurrence at Signalized Intersections. *Transportation Research Record* 2019, 156-168.

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