



Federal Highway Administration

Nine Proven Safety Countermeasures

Countermeasure	Description	Contact	Cost Range	Data, Benefits, and Additional Information
#1 Road Safety Audits	Road Safety Audit (RSA) is a safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team.	Randy	Very low cost: Costs are in the form of time and team coordination.	Crash reduction percentages from 20-80% have been recorded on past projects where a RSA was done. Lifecycle costs are reduced since safer designs often carry lower maintenance costs. Societal costs of collisions are reduced by safer roads and fewer severe crashes. More information at: http://safety.fhwa.dot.gov/rsa/ .
#2 Rumble Strips and Rumble Stripes	Rumble strips are ground into the pavement and are outside of the travel lane. Rumble stripes are ground into the pavement and painted over with the appropriate striping.	Matt	Low cost: Cost will vary based on the application. Prices range between \$0.20 and \$3.00 per linear foot	Over 50% of California's fatal crashes are a result of road departure. This application provides an audible warning and physical vibration to alert drivers they are leaving the roadway. The application of rumble stripes or strips has shown good results in reducing run off the road (ROR) crashes. More information at: http://safety.fhwa.dot.gov/roadway_dept/rumble/index.html .
#3 Median Barriers	Median Barriers separate opposing traffic on a divided highway and are used to redirect vehicles striking either side of the barrier.	Matt	Medium to high cost: Cost will vary depending on the material used. Cable barrier systems can be installed on average for \$76,500 per mile.	Cross-median crashes can be some of the most severe and most result in a serious injury or death. Median Barriers can significantly reduce the occurrence of cross-median crashes and the overall severity of median-related crashes. More information at: http://safety.fhwa.dot.gov/tools/median_barrier.htm .
#4 Safety Edge	Safety Edge is a paving technique where the interface between the roadway and graded shoulder is paved at an angle to eliminate vertical drop-off.	Ken	Very low cost: The technique requires a slight change in the paving equipment (approximately \$1,200).	Research between 2002-2004 shows that pavement edges may have been a contributing factor in as many as 15-20% of ROR crashes. When a driver drifts off the roadway and tries to steer back onto the pavement the action may result in over-steering. Safety Edge minimizes that occurrence by reducing the vertical angle between the shoulder and pavement. More information at: http://safety.fhwa.dot.gov/roadway_dept/docs/sa07023/ .

<p>#5 Roundabouts</p>	<p>Roundabouts are circular intersections with specific design and traffic control features that ensure low travel speeds (<30mph) through the circulatory roadway.</p>	<p>Jeff</p>	<p>High cost: Installations may require additional R.O.W.. A reduction in serious crashes may justify the costs.</p>	<p>Roundabouts offer substantial safety advantages and can reduce the occurrence of right angle crashes and have the potential to reduce fatal and injury crashes from 60–87%. Geometric features provide a reduced speed environment and excellent operational performance. More information at: http://www.tfrc.gov/safety/00068.htm</p>
<p>#6 Left- and Right-Turn Lanes</p>	<p>Installation of turn lanes reduces crash potential, motorist inconvenience, and improves operational efficiency.</p>	<p>Jeff</p>	<p>Medium to high costs: Some installations may require additional R.O.W.</p>	<p>Rear-end crashes are the most frequent type of collisions at intersections. Adding turn lanes provides separation between turning and through traffic and reduces these types of conflicts. It is desirable to offset opposing left turn lanes to increase visibility of approaching vehicles. More information at: http://safety.fhwa.dot.gov/intersections/intersectionsap.htm.</p>
<p>#7 Yellow Change Intervals</p>	<p>Yellow Change Intervals should be appropriate for the speed and distance traveled at a signalized intersection.</p>	<p>Matt</p>	<p>Very low cost: Time and interagency coordination are required.</p>	<p>Yellow Change Intervals that are not consistent with normal operating speeds create a dilemma zone in which drivers can neither stop safely nor reach the intersection before the signal turns red. Increasing yellow time to meet the needs of traffic can dramatically reduce red light running. More information at: http://safety.fhwa.dot.gov/intersections/rlr_report/chap3.htm.</p>
<p>#8 Median and Pedestrian Refuge Areas</p>	<p>Median and Pedestrian Refuge Areas provide additional protection for pedestrians and lessen their risk of exposure to oncoming traffic.</p>	<p>Ken</p>	<p>Low cost: Retrofit improvement, even lower costs for new roadway projects.</p>	<p>Pedestrian fatalities account for approximately 700 deaths or 17% of all fatalities in California. Providing raised medians or pedestrian refuge areas has demonstrated a 46% reduction in pedestrian crashes. Raised medians or refuge areas are especially important at multi-lane intersections with high volumes of traffic. More information at: http://safety.fhwa.dot.gov/ped_bike/univcourse/swless15.htm.</p>
<p>#9 Walkways</p>	<p>Pathways, sidewalks, or paved shoulders should be provided wherever possible, especially in urban areas and near school zones where there are high volumes of bikes and pedestrians.</p>	<p>Ken</p>	<p>Medium to high cost: Based on the amount and type of application.</p>	<p>“Walking along road” pedestrian crashes are approximately 7.5% of all pedestrian crashes. The presence of a path, sidewalk or paved shoulder can provide a significant reduction in “walking along road” pedestrian crashes. More information at: http://www.fhwa.dot.gov/environment/bikeped/design.htm#d4.</p>

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