



Engineering Speed Management Countermeasures: *A Desktop Reference of Potential Effectiveness in Reducing Crashes November 2023*

This chart summarizes studies about the effectiveness of engineering speed management countermeasures in different scenarios. Studies where an increase in crashes was reported are also shown since this information is relevant to selection of countermeasures. For the most current information on Crash Modification Factors (CMF), please go to the CMF Clearinghouse at: www.cmfclearinghouse.org

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Category	Countermeasure	Safety Focus	Area	Roadway	Crash Modification Factor (CMF)	CMF Crash Type	CMF Crash Severity	CMF Clearinghouse Star Rating	CMF Study AADT Range	CMF Study Speed Limit Range	CMF Study Location(s)	Notes related to CMF Study	CMF ID	Reference/ Study ID (Year)
Vertical Deflections Within the Roadway	Speed Hump— rounded, raised area placed across the roadway, typically 12 to 14 feet long	pedestrian	urban/suburban	local	0.5	all	ABC	★★★	not specified	not specified	United Kingdom	speed hump	134	1(2004)
	Speed Table— a long speed hump typically 22 feet in length with a flat section in the middle and ramps on the ends	pedestrian	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found
	Speed Cushion— raised area that allows most emergency vehicles to straddle the hump	pedestrian	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found
	Raised Intersection — a raised plateau, with ramps on all approaches, where roads intersect	pedestrian/intersection	not specified	4-leg intersection	1.05	all	KABC	★★★	not specified	not specified	United Kingdom	raised intersection	414	1(2004)
Horizontal Deflections/ Roadway Narrowing	Choker/Bulb-out—mid-block curb extensions that narrow road by extending the sidewalk 'or widening the planting strip	pedestrian/intersection	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found
	Neck Down— intersection curb extensions that narrow a road by extending the width of a sidewalk	pedestrian/intersection	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found
	Chicanes— curb extensions that alternate from one side of the street to the other forming S-shaped curves	pedestrian	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found
	Center Island— raised or painted island along the centerline that narrows travel lanes	pedestrian	urban/suburban	minor arterial	0.69	vehicle/pedestrian	all	★★★★	1,245-46,000	not specified	AZ, FL, IL, MA, NY, NC, OR, VA, WI	raised median with or without marked crosswalk-study sites were a combination of intersection and midblock locations	8799	2(2017)
			urban/suburban	minor arterial	0.74	all	all	★★★★	1,245-46,000	not specified	AZ, FL, IL, MA, NY, NC, OR, VA, WI	raised median with or without marked crosswalk-study sites were a combination of intersection and midblock locations	8800	2(2017)
			urban/suburban	minor arterial	0.71	all	ABC	★★★★	1,245-46,000	not specified	AZ, FL, IL, MA, NY, NC, OR, VA, WI	raised median with or without marked crosswalk-study sites were a combination of intersection and midblock locations	9014	2(2017)
			urban/suburban	principal arterial	0.54	vehicle/pedestrian	all	★★★	2,000-15,000	25-35	AZ, CA, FL, KS, LA, MD, MA, MO, NC, OH, OR, PA, TX, UT, WA, WI	raised median+marked crosswalk	175	3(2002)
			urban/suburban	principal arterial	0.7	all	all	★★	10,500-57,000	not specified	FL	raised median	5044	4(2012)
			urban/suburban	principal arterial	0.66	all	KABC	★★	10,500-57,000	not specified	FL	raised median	5043	4(2012)
			urban	two/multi-lane	0.81	all	KABC	★★★	1,000-1,58,000	not specified	FL	raised median	7789	5(2014)
rural	multi-lane	0.76	all	KABC	★★★	1,000-1,58,000	not specified	FL	raised median	7792	5(2014)			

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Horizontal Deflections/ Roadway Narrowing (continued)	Reduce Lane Width with Markings — narrowing of the lanes using pavement markings, median, etc.	roadway departure	rural	all highways	1.02	all	all	★★★	186-15,106	not specified	ID	12-ft to 11-ft	5336	6(2012)
			rural	all highways	1.05	all	all	★★★	186-15,106	not specified	ID	12-ft to 10-ft	5330	6(2012)
			urban	principal arterials, minor arterials, and collectors	1.28	all	all	★★★	100-19,480	20-55	NE	12-ft to 10-ft	8157	7(2015)
			urban	principal arterials, minor arterials, and collectors	1.32	all	KABC	★★★	100-19,480	20-55	NE	12-ft to 10-ft	8158	7(2015)
			urban	minor arterials and collectors	0.57	all	KABC	★★★★	100-19,480	20-55	NE	12-ft to 9-ft	8163	7(2015)
			urban	principal arterials, minor arterials, and collectors	1.27	all	all	★★★	100-19,480	25-60	NE	11-ft to 10-ft	8167	7(2015)
			urban	minor arterials and collectors	0.53	all	all	★★★★	100-19,480	25-60	NE	11-ft to 9-ft	8172	7(2015)
			urban	minor arterials and collectors	0.41	all	KABC	★★★★	100-19,480	25-60	NE	11-ft to 9-ft	8173	7(2015)
			urban	minor arterials and collectors	0.57	all	all	★★★★	100-19,480	25-50	NE	10-ft to 9-ft	8177	7(2015)
			urban	minor arterials and collectors	0.46	all	KABC	★★★★	100-19,480	25-50	NE	10-ft to 9-ft	8178	7(2015)
			rural	not specified	0.69	all	all	★	not specified	not specified	FL,KY,MO,PA	lane narrowing through rumble strips and painted median	2932	8(2010)
			rural	not specified	0.8	all	KABC	★	not specified	not specified	FL,KY,MO,PA	lane narrowing through rumble strips and painted median	2933	8(2010)
			rural	not specified	1.05	all	ABC	★★★	not specified	not specified	United Kingdom	used 8-in edgeline	85	1(2004)
			Road Diet — reducing the number of lanes by reallocating roadway space for other uses (e.g. bike lanes, center turn lanes, medians, parking, shoulder lanes, etc.)	all	urban/suburban	not specified	0.53	all	all	★★★★★	3,718-13,908	not specified	IA	4-to 3-lane with center turn lane
	all	all			0.71	all	all	★★★	3,390-22,500	not specified	RI	4-to 3-lane with center turn lane	11230	10(2022)
	all	all			0.63	all	KABC	★★★	3,390-22,500	not specified	RI	4-to 3-lane with center turn lane	11231	10(2022)
	urban	principal arterial			0.56	all	all	★★★	2,000-28,500	not specified	FL	4-to 3-lane with center turn lane	7828	5(2014)
	urban	principal arterial			0.63	all	KABC	★★★	2,000-28,500	not specified	FL	4-to 3-lane with center turn lane	7829	5(2014)
	urban	minor arterial			0.71	all	all	★★★★★	not specified	not specified	not specified	4-to 3-lane with center turn lane	199	11(2008)
	urban/suburban	minor arterial			0.62	all-segment level	all	★★★★	2,600-17,000	not specified	VA	4-to 3-lane with center turn lane+bike lanes or buffered bike lane	11128	12(2022)
	urban/suburban	minor arterial			0.36	all-segment level	KABC	★★★	2,600-17,000	not specified	VA	4-to 3-lane with center turn lane+bike lanes or buffered bike lane	11129	12(2022)
	urban/suburban	minor arterial			0.65	all-stop and signalized intersection	all	★★★★	2,600-17,000	not specified	VA	4-to 3-lane with center turn lane+bike lanes or buffered bike lane	11133	12(2022)
urban/suburban	minor arterial	0.54			all-stop and signalized intersection	KABC	★★★	2,600-17,000	not specified	VA	4-to 3-lane with center turn lane+bike lanes or buffered bike lane	11134	12(2022)	

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Horizontal Deflections/ Roadway Narrowing (continued)	Road Diet — reducing the number of lanes by reallocating roadway space for other uses (e.g. bike lanes, center turn lanes, medians, parking, shoulder lanes, etc.	all	urban/suburban	minor arterial	0.53	all-signalized intersection	all	★★★★★	2,600-17,000	not specified	VA	4-to 3-lane with center turn lane+bike lanes or buffered bike lane	11135	12(2022)
			urban/suburban	minor arterial	0.41	all-signalized intersection	KABC	★★★	2,600-17,000	not specified	VA	4-to 3-lane with center turn lane+bike lanes or buffered bike lane	11136	12(2022)
			urban	not specified	0.76	all	all	★★	6,800-22,141	not specified	LA	4-to 5-lane with center turn lane without changing roadway width	10374	13(2019)
			urban	not specified	0.7	non-intersec-tion	all	★★★★★	6,800-22,141	not specified	LA	4-to 5-lane with center turn lane without changing roadway width	10375	13(2019)
Surface Texture and Markings	Transverse Rumble Strips — raised or grooved patterns installed on the roadway travel lane perpendicular to the direction of travel	intersection	rural	3-leg	0.82	all	all	★★★	245-11,700	not specified	MO,ND,OR	stop controlled intersection	9032	14(2015)
			rural	3-leg	0.63	all	KABC	★★★	245-11,700	not specified	MO,ND,OR	stop controlled intersection	9033	14(2015)
			rural	4-leg	0.87	all	all	★★★	165-6,700	not specified	AR,KS,MO,ND,OR	stop controlled intersection	9045	14(2015)
			rural	4-leg	0.71	all	KABC	★★★★★	165-6,700	not specified	AR,KS,MO,ND,OR	stop controlled inter-section	9046	14(2015)
	Transverse Markings – pavement markings placed across the lane perpendicular to direction of travel	roadway departure	urban	not specified	0.68	all	all	★	not specified	not specified	not specified	converging chevron	112	15(1996)
	Pavement Marking Legends – speed limit or other on-pavement signing	roadway departure	rural	two lane rural highways	0.65	all	all	★★★★★	100-15,998	not specified	PA	in-lane curve warning pavement markings	10312	16(2019)
			rural	two lane rural highways	0.69	all	KABC	★★★★★	100-15,998	not specified	PA	in-lane curve warning pavement markings	10313	16(2019)
			rural	two lane rural highways	0.77	run off road	all	★★★★★	100-15,998	not specified	PA	in-lane curve warning pavement markings	10314	16(2019)
			rural	two lane rural highways	0.71	nighttime	all	★★★★★	100-15,998	not specified	PA	in-lane curve warning pavement markings	10315	16(2019)
			rural	two lane rural highways	0.77	nighttime	KABC	★★★★★	100-15,998	not specified	PA	in-lane curve warning pavement markings	10317	16(2019)
		intersection	rural	two lane rural highways	0.54	all	all	★★★	1,890-16,270	not specified	PA	intersection shaped pavement markings	9054	14(2015)
			rural	two lane rural highways	0.51	all	KABC	★★★	1,890-16,270	not specified	PA	intersection shaped pavement markings	9055	14(2015)
			rural	3-leg two lane rural highways stop controlled	0.33	all	all	★★★★★	90-5,700	not specified	AR,MN,NE,VT	“Stop Ahead” pavement markings	9063	14(2015)
			rural	3-leg two lane rural highways stop controlled	0.24	all	KABC	★★★	90-5,700	not specified	AR,MN,NE,VT	“Stop Ahead” pavement markings	9064	14(2015)
			rural	4-leg two lane rural highways stop controlled	0.34	all	all	★★★★★	105-4,800	not specified	AR,MN,NE,VT	“Stop Ahead” pavement markings	9072	14(2015)
			rural	4-leg two lane rural highways stop controlled	0.31	all	KABC	★★★★★	105-4,800	not specified	AR,MN,NE,VT	“Stop Ahead” pavement markings	9073	14(2015)
rural			3-leg stop controlled	0.4	all	all	★★★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	402	17(2008)	
rural	3-leg stop controlled	0.45	all	ABC	★★★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	398	17(2008)			

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Surface Texture and Markings (continued)	Pavement Marking Legends – speed limit or other on-pavement signing	intersection	rural	4-leg stop controlled	0.77	all	all	★★★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	403	17(2008)
			rural	4-leg stop controlled	0.88	all	ABC	★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	399	17(2008)
			rural	all way stop controlled	0.44	all	all	★★★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	404	17(2008)
			rural	all way stop controlled	0.58	all	ABC	★★★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	400	17(2008)
			rural	one or two way stop controlled	0.87	all	all	★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	405	17(2008)
			rural	one or two way stop controlled	0.92	all	ABC	★★★	not specified	not specified	AK,MD	“Stop Ahead” pavement markings	401	17(2008)
	In-roadway Warning Lights	pedestrian	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found	no crash studies found
Vertical Delineation	Vertical Treatments – vertical objects such as post mounted delineators which are placed along the roadway to provide better delineation and/or provide a feeling of friction	roadway departure	rural	not specified	0.85	run off road	all	★★	1,050-8,230	not specified	KS	post-mounted delineators	9727	18(2017)
			rural	not specified	0.9	run off road	KABC	★★	1,050-8,230	not specified	KS	post-mounted delineators	9728	18(2017)
			not specified	Principal Arterial, Freeways, and Expressways	0.52	all	all	★★★★★	7,400-13,975	not specified	Italy	chevron signs, curve warning signs, and sequential flashing beacons	1914	19(2009)
			not specified	Principal Arterial, Freeways, and Expressways	0.62	all	KABC	★★★★★	7,400-13,975	not specified	Italy	chevron signs, curve warning signs, and sequential flashing beacons	1921	19(2009)
			not specified	Principal Arterial, Freeways, and Expressways	0.52	run off road	all	★★★★★	7,400-13,975	not specified	Italy	chevron signs, curve warning signs, and sequential flashing beacons	1919	19(2009)
Gateway Entrance Treatments	Landscaping – roadside plantings used to create vertical friction	roadway departure	all	all	0.98	all	all	★★★	3,300-34,000	not specified	CA	gateway monument	2429	20(2011)
Dynamic Signing	Dynamic Speed Feedback Signs – displays message for drivers traveling over the threshold speed	roadway departure	rural	horizontal curve (2-lane)	0.95	all	all	★★★★★	400-8,400	50-65	IA, FL, WA, AZ, OR, OH, TX	“YOUR SPEED XX” + curve advisory sign	6885	21(2013)
Intersection Treatments	Roundabout — large, raised, circular islands at the middle of major intersections, around which all oncoming vehicles must traverse	intersection	not specified	not specified	0.28	all	K	★★★★★	not specified	not specified	multiple countries	meta analysis	9156	22(2017)
			not specified	not specified	0.56	all	ABC	★★★★★	not specified	not specified	multiple countries	meta analysis	9157	22(2017)
			all	Principal Arterial, Freeways, and Expressways	0.6	all	all	★★★	2,060-17,150	25-55	MO,WI	stop-controlled interchange (terminal) into roundabout	11132	23(2021)
			all	Principal Arterial, Freeways, and Expressways	0.35	all	KABC	★★★	2,060-17,150	25-55	MO,WI	stop-controlled interchange (terminal) into roundabout	11130	23(2021)
			all	all	0.8	all	all	★★★★★	1,970-14,726	not specified	GA, IA, MI, MN, MO, NC, VA, WA	two-way stop-controlled intersection into mini roundabout	11240	24(2022)
			all	all	0.39	all	KABC	★★★	1,970-14,726	not specified	GA, IA, MI, MN, MO, NC, VA, WA	two-way stop-controlled intersection into mini roundabout	11241	24(2022)
			all	all	3.25	all	all	★★★★★	5,454-11,640	not specified	GA, IA, MI, MN, MO, NC, VA, WA	all-way stop-controlled intersection into mini roundabout	11243	24(2022)

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Intersection Treatments (continued)	Roundabout — large, raised, circular islands at the middle of major intersections, around which all oncoming vehicles must traverse	intersection	all	all	1.74	all	KABC	★★★	5,454-11,640	not specified	GA, IA, MI, MN, MO, NC, VA, WA	all-way stop-controlled intersection into mini roundabout	11244	24(2022)
			all	not specified	0.56	all	all	★★★	not specified	not specified	USA (17 states)	minor-road 4-leg stop-controlled intersection into roundabout	227	25(2007)
			all	not specified	0.18	all	ABC	★★★	not specified	not specified	USA (17 states)	minor-road 4-leg stop-controlled intersection into roundabout	228	25(2007)
			rural	not specified	0.29	all	all	★★★	not specified	not specified	USA (17 states)	minor-road stop-controlled intersection into roundabout	229	25(2007)
			rural	not specified	0.13	all	ABC	★★★	not specified	not specified	USA (17 states)	minor-road stop-controlled intersection into roundabout	230	25(2007)
			urban	not specified	0.71	all	all	★★★	not specified	not specified	USA (17 states)	minor-road stop-controlled intersection into roundabout	231	25(2007)
			urban	not specified	0.19	all	ABC	★★★	not specified	not specified	USA (17 states)	minor-road stop-controlled intersection into roundabout	232	25(2007)
			suburban	not specified	0.68	all	all	★★★	not specified	not specified	USA (17 states)	minor-road stop-controlled intersection into roundabout	236	25(2007)
			suburban	not specified	0.29	all	ABC	★★★	not specified	not specified	USA (17 states)	minor-road stop-controlled intersection into roundabout	237	25(2007)
			all	Principal Arterial, Freeways, and Expressways	0.95	all	all	★★★	7,493-30,700	35-45	MO,WI	signalized interchange (terminal) into roundabout	11166	23(2021)
			all	Principal Arterial, Freeways, and Expressways	0.59	all	KABC	★★★	7,493-30,700	35-45	MO,WI	signalized interchange (terminal) into roundabout	11146	23(2021)
			urban/suburban	not specified	0.81	all	all	★★★★	5,300-52,500	15-35	CO, FL, IN, MD, MI, NY, NC, SC, VT, WA	signalized intersection into two-lane roundabout	4194	26(2013)
			urban/suburban	not specified	0.29	all	ABC	★★★	5,300-52,500	15-35	CO, FL, IN, MD, MI, NY, NC, SC, VT, WA	signalized intersection into two-lane roundabout	4195	26(2013)
			urban/suburban	not specified	0.74	all	all	★★★	5,300-52,500	15-35	CO, FL, IN, MD, MI, NY, NC, SC, VT, WA	signalized intersection into single-lane roundabout	4196	26(2013)
			urban/suburban	not specified	0.45	all	ABC	★★★	5,300-52,500	15-35	CO, FL, IN, MD, MI, NY, NC, SC, VT, WA	signalized intersection into single-lane roundabout	4197	26(2013)
			urban/suburban	not specified	0.79	all	all	★★★★	5,300-52,500	15-35	CO, FL, IN, MD, MI, NY, NC, SC, VT, WA	signalized intersection into single- or multi-lane roundabout	4184	26(2013)
urban/suburban	not specified	0.34	all	ABC	★★★★	5,300-52,500	15-35	CO, FL, IN, MD, MI, NY, NC, SC, VT, WA	signalized intersection into single- or multi-lane roundabout	4185	26(2013)			

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Intersection Treatments (continued)	Diverging Diamond Interchange	Intersection	not specified	Principal Arterial/Freeway	0.42	all	all	★★★	not specified	not specified	UT	at-grade intersection to diverging diamond interchange	9658	27(2015)
			not specified	Principal Arterial/Freeway	0.76	all	all	★★★	not specified	not specified	UT	regular interchange to diverging diamond interchange	10300	27(2015)
			urban/suburban	Principal Arterial/Freeway	0.86	all	all	★★★★	1,295-76,100	not specified	CO, FL, GA, ID, IN, IA, KS, KY, MI, MN, MO, NV, NM, NY, NC, OH, OR, PA, TN, TX, UT, VA, WI, WY	diamond interchange to Diverging Diamond Interchange (DDI) or Double Crossover Diamond (DCD)	10761	28(2021)
			urban/suburban	Principal Arterial/Freeway	0.56	all	KABC	★★★★	1,295-76,100	not specified	CO, FL, GA, ID, IN, IA, KS, KY, MI, MN, MO, NV, NM, NY, NC, OH, OR, PA, TN, TX, UT, VA, WI, WY	diamond interchange to Diverging Diamond Interchange (DDI) or Double Crossover Diamond (DCD)	10762	28(2021)
	Corner Radius	pedestrian/intersection	urban/suburban	Arterial	1.18	vehicle/pedestrian	all	★★★	not specified	not specified	VA,WA	corner right turn radius of 20ft	11215	29(2022)
			urban/suburban	Arterial	1.3	vehicle/pedestrian	all	★★★	not specified	not specified	VA,WA	corner right turn radius of 30ft	11216	29(2022)
			urban/suburban	Arterial	1.39	vehicle/pedestrian	all	★★★	not specified	not specified	VA,WA	corner right turn radius of 40ft	11217	29(2022)
			urban/suburban	Arterial	1.47	vehicle/pedestrian	all	★★★	not specified	not specified	VA,WA	corner right turn radius of 50ft	11218	29(2022)
			urban/suburban	Arterial	1.53	vehicle/pedestrian	all	★★★	not specified	not specified	VA,WA	corner right turn radius of 60ft	11219	29(2022)
			urban/suburban	Arterial	1.59	vehicle/pedestrian	all	★★★	not specified	not specified	VA,WA	corner right turn radius of 70ft	11220	29(2022)
			not specified	all	0.41	all, approach level	all	★★★★	15,558-29,992	25-45	IL	change right-turn lane geometry to increase line of sight	8498	30(2016)
			not specified	all	0.4	right-turn, approach level	all	★★★★	15,558-29,992	25-45	IL	change right-turn lane geometry to increase line of sight	8499	30(2016)
			not specified	all	0.56	all, intersection level	all	★★★★	15,558-29,992	25-45	IL	change right-turn lane geometry to increase line of sight	8496	30(2016)
			not specified	all	0.56	all, intersection level	KABC	★★★★	15,558-29,992	25-45	IL	change right-turn lane geometry to increase line of sight	8497	30(2016)
Signing	Chevron Signs—use of standard chevron signing	roadway departure	rural	2-lane	0.96	Non-intersection	all	★★★★	261-14,770	not specified	WA	chevron signs on horizontal curves	2436	31(2009)
			rural	2-lane	0.84	Non-intersection	KABC	★★★★	261-14,770	not specified	WA	chevron signs on horizontal curves	2438	31(2009)
			rural	2-lane	0.75	Night-time, Non-intersection	all	★★★★★	261-14,770	not specified	WA	chevron signs on horizontal curves	2439	31(2009)
			not specified	not specified	0.95	all	all	★★★★	173-27,235	not specified	IA, KS, MO	oversized chevron signs	8977	32(2017)
			not specified	not specified	0.85	all	KABC	★★★	173-27,235	not specified	IA, KS, MO	oversized chevron signs	8978	32(2017)
			not specified	not specified	1.06	run-off road	all	★★★	173-27,235	not specified	IA, KS, MO	oversized chevron signs	8979	32(2017)
			not specified	not specified	0.73	nighttime	all	★★★★	173-27,235	not specified	IA, KS, MO	oversized chevron signs	8980	32(2017)

Category	Countermeasure	Safety Focus	Area	Roadway	Crash Modification Factor (CMF)	CMF Crash Type	CMF Crash Severity	CMF Clearinghouse Star Rating	CMF Study AADT Range	CMF Study Speed Limit Range	CMF Study Location(s)	Notes related to CMF Study	CMF ID	Reference/ Study ID (Year)				
Speed Limits	Variable Speed Limits	all	rural	all	0.68	all-winter crashes	KABC	★★★★★	not specified	55-68	Canada	variable speed limits	10760	33(2017)				
			urban	Principal Arterial/Freeways/ Expressways	0.71	all	all	★★★★	not specified	>=40	WA	variable speed limits	8730	34(2017)				
			not specified	Principal Arterial Interstate	0.66	all	all	★★★★	10194-10605	35-75	WY	variable speed limits	11002	36(2021)				
			not specified	Principal Arterial Interstate	0.49	all	KABC	★★★★	10194-11090	35-75	WY	variable speed limits	11003	36(2021)				
			not specified	Principal Arterial Interstate	0.35	rear end	all	★★★★	10194-11090	35-75	WY	variable speed limits	11005	36(2021)				
	Appropriate Speed Limits for All Road Users	all	rural	all	0.44	all	all	★★★★★	not specified	not specified	not specified	MT	posted speed limit 5 mph below engineering recommendations	10248	37(2018)			
			rural	all	0.6	all	KABC	★★★★★	not specified	not specified	not specified	MT	posted speed limit 5 mph below engineering recommendations	10249	37(2018)			
			rural	all	0.84	all	all	★★★★★	not specified	not specified	not specified	MT	posted speed limit 10 mph below engineering recommendations	10251	37(2018)			
			rural	all	1.42	all	KABC	★★★★★	not specified	not specified	not specified	MT	posted speed limit 10 mph below engineering recommendations	10252	37(2018)			
			rural	all	1.21	all	all	★★★★★	not specified	not specified	not specified	MT	posted speed limit 15 mph below engineering recommendations	10254	37(2018)			
			rural	all	1.72	all	KABC	★★★★★	not specified	not specified	not specified	MT	posted speed limit 15 mph below engineering recommendations	10255	37(2018)			
			rural	all	1.64	all	all	★★★★★	not specified	not specified	not specified	MT	posted speed limit 25 mph below engineering recommendations	10257	37(2018)			
			rural	all	4.57	all	KABC	★★★★★	not specified	not specified	not specified	MT	posted speed limit 25 mph below engineering recommendations	10258	37(2018)			
			not specified	not specified	1.17	all	all	★★	not specified	not specified	not specified	AZ, CA, CO, CT, DE, ID, IL, IN, ME, MD, MA, MI, MS, NE, NJ, NM, OH, OK, TN, TX, VA, WV	reduce speed by 5 mph	1238	38(1997)			
			not specified	not specified	0.96	all	all	★★	not specified	not specified	not specified	AZ, CA, CO, CT, DE, ID, IL, IN, ME, MD, MA, MI, MS, NE, NJ, NM, OH, OK, TN, TX, VA, WV	reduce speed by 10 mph	1239	38(1997)			
			not specified	not specified	0.94	all	all	★★	not specified	not specified	not specified	AZ, CA, CO, CT, DE, ID, IL, IN, ME, MD, MA, MI, MS, NE, NJ, NM, OH, OK, TN, TX, VA, WV	reduce speed by 15-20 mph	1240	38(1997)			
			Speed Enforcement	Speed Safety Cameras	all	urban	Principal Arterial Other	0.46	all, non-peak hours	all	★★★★★	not specified	not specified	AZ	fixed speed safety camera	2915	39(2009)	
						urban	Principal Arterial Other	0.52	all, non-peak hours	ABC	★★★★★	not specified	not specified	not specified	AZ	fixed speed safety camera	2921	39(2009)
						urban	Principal Arterial Other	0.74	rear end, non-peak hours	all	★★★★★	not specified	not specified	not specified	AZ	fixed speed safety camera	2913	39(2009)
urban	Principal Arterial Freeways and Expressways	0.68				all	all	★★★★★	not specified	not specified	not specified	Italy	point to point or section SSC	7711	40(2005)			

Category	Countermeasure	Safety Focus	Area	Roadway	Crash Modification Factor (CMF)	CMF Crash Type	CMF Crash Severity	CMF Clearinghouse Star Rating	CMF Study AADT Range	CMF Study Speed Limit Range	CMF Study Location(s)	Notes related to CMF Study	CMF ID	Reference/ Study ID (Year)
Speed Enforcement (continued)	Speed Safety Cameras	all	urban	Principal Arterial Other Freeways and Expressways	0.63	all	KABC	★★★★★	not specified	not specified	Italy	point to point or section SSC	7718	40(2005)
			not specified	all	0.86	all	all	★★★	not specified	not specified	NC	mobile speed safety camera	2194	41(2008)
			urban	Principal Arterial Other	0.8	all	KABC	★★★★★	2079-22960	not specified	Canada	mobile speed safety camera	7582	42(2015)
			urban	Principal Arterial Other	0.82	speed-related	KABC	★★★★★	2079-22960	not specified	Canada	mobile speed safety camera	7586	42(2015)
			rural	not specified	0.76	all	KA	★★★	8419	31-56	Norway	fixed SSC	8186	43(2015)
Bike Facilities	Bicycle Lane— portion of the roadway designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists	all	urban	all	1.18	all	all	★★	5,000-28,000	not specified	Denmark	bicycle track	2127	44(2008)
			urban	all	1.12	all	KABC	★★	5,000-28,000	not specified	Denmark	bicycle track	2125	44(2008)
			urban	all	0.37	vehicle/bicycle	all	★★	5,000-28,000	not specified	Denmark	bicycle track	2134	44(2008)
			urban	two/multi-lane	0.68	all	all	★★	2,900-59,500	not specified	FL	bicycle lane	7838	5(2014)
			urban	two/multi-lane	0.73	all	KABC	★★	2,900-59,500	not specified	FL	bicycle lane	7839	5(2014)
			urban	two/multi-lane	0.42	vehicle/bicycle	all	★★	2,900-59,500	not specified	FL	bicycle lane	7840	5(2014)
			urban	two/multi-lane	0.4	vehicle/bicycle	KABC	★★	2,900-59,500	not specified	FL	bicycle lane	7841	5(2014)
			urban	all	0.79	all	all	★★★	1,000-160,504	not specified	WA	bicycle lane+ shoulder width reduction	10727	35(2021)
			urban	all	1.31	all	all	★★★	1,000-160,504	not specified	WA	bicycle lane+ lane width reduction	10728	35(2021)
			urban	all	0.75	vehicle/bicycle	all	★★	5,700-98,500	not specified	FL	shared path	9250	45(2017)
			urban/suburban	all	0.61	vehicle/bicycle	all	★★	not specified	not specified	New Zealand	colored bicycle lane at signalized intersection	3258	46(2011)
			not specified	not specified	1.011	all	all	★	not specified	not specified	CA,DC,-FL,IL,MT,NY,OR,TX	seperated bike lane by parking lane	8256	47(2016)
			not specified	not specified	1.515	vehicle/bicycle	all	★	not specified	not specified	CA,DC,-FL,IL,MT,NY,OR,TX	seperated bike lane by parking lane	8222	47(2016)
			not specified	not specified	0.687	all	all	★	not specified	not specified	CA,DC,-FL,IL,MT,NY,OR,TX	seperated bike lane by concrete curb	8259	47(2016)
			not specified	not specified	0.842	vehicle/bicycle	all	★	not specified	not specified	CA,DC,-FL,IL,MT,NY,OR,TX	seperated bike lane by concrete curb	8224	47(2016)
			not specified	not specified	1.301	all	all	★	not specified	not specified	CA,DC,-FL,IL,MT,NY,OR,TX	seperated bike lane by plastic bollards	8261	47(2016)
			not specified	not specified	2.444	vehicle/bicycle	all	★	not specified	not specified	CA,DC,-FL,IL,MT,NY,OR,TX	seperated bike lane by plastic bollards	8233	47(2016)
urban/suburban	not specified	0.37	vehicle/bicycle	all	★★★★	not specified	not specified	CA	bicycle boulevard	3092	48(2011)			

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