Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed
July 2014

This chart summarizes studies about engineering countermeasures used to manage speeds. Studies where an increase in speed were reported are also shown since this information is also relevant in selection of countermeasures.

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Vertical Deflections Within the Roadway																	
Speed Hump—rounded, raised area placed across the roadway, typically 12 to 14 feet long	pedestrian	urban	local	1 (1999)	178	—	48 to 11544	46 to 110443	—	—	—	35	27	-8	—	various	
	pedestrian	urban	local	2 (2005)	7	—	400 to 4362	401 to 3384	—	—	—	32	26	-6	—	VA	
	pedestrian	urban	local	3 (2000)	4	—	475 to 1506	433 to 1343	—	—	—	36	31	-5	—	WA	
	pedestrian	urban	local	4 (2005)	1	25	1300	—	22	23	1	37	29	-8	1-mon	FL	
	pedestrian	rural/urban	local	5 (2002)	3	25	218 to 746	—	24	18	-6	28	22	-6	1-mon	IA	
	pedestrian	urban	—	1 (1999)	4	—	—	—	—	—	—	36	29	-7	—	—	with speed table
	pedestrian	urban	—	1 (1999)	2	—	2456 to 3685	2593 to 2931	—	—	—	38	25	-13	—	—	with choker

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Speed Cushion—raised area typically 6 to 7 feet wide that allows most emergency vehicles to straddle the hump	pedestrian	urban	—	1 (1999)	1	—	3323	2321	—	—	—	35	28	-7	—	various	
	pedestrian	—	—	2 (2005)	2	—	1042 to 1556	693 to 1563	—	—	—	31 to 37	26 to 30	-5 to -7	—	VA	
Speed Table—a long speed hump typically 22 feet in length with a flat section in the middle and ramps on the ends	pedestrian	urban	—	1 (1999)	72	—	198 to 14500	242 to 14400	—	—	—	37	31	-6	—	various	
	pedestrian	urban	residential	6 (2003)	19	—	198 to 2102	364 to 2061	—	—	—	38	29	-9	—	GA	
	pedestrian	rural community	2-lane	7 (2007)	1	—	1200	—	27	24	-3	33	29	-4	1-mon	IA	
	pedestrian	rural community	local	5 (2002)	3	25	218 to 746	—	24	18	-6	28	22	-6	1-mon	IA	removable speed table
	pedestrian	urban	—	1 (1999)	2	—	6500 to 8440	6400 to 6780	—	—	—	37	29	-8	—	—	with center island
	pedestrian	urban	residential	8 (2001)	1	30	1600	—	34	23	-11	38	27	-11	within 12-mon	MN	raised crosswalk
Raised Intersection—a raised plateau, with ramps on all approaches, where roads intersect	pedestrian	urban	—	1 (1999)	2	—	—	—	—	—	—	37	38	1	—	various	
	pedestrian	urban	local	9 (2004)	1	—	—	—	—	—	—	30	30	0	12-mon	NY	
Horizontal Deflections/Roadway Narrowing																	
Choker/Bulb-out—mid-block curb extensions that narrow road by extending the sidewalk or widening the planting strip	pedestrian	urban	—	1 (1999)	4	—	750 to 6150	331 to 5040	—	—	—	34	30	-4	—	various	
	pedestrian	urban	residential	10 (1997)	6	—	—	—	—	—	—	30	29	-1	—	—	
	pedestrian	urban	residential	8 (2001)	1	—	950 to 1050	—	34	31	-4	38	34	-4	within 12-mon	MN	choker with crosswalk
	pedestrian	urban	residential	8 (2001)	1	—	950 to 1050	—	33	31	-2	37	34	-3	within 12-mon	MN	choker + "SLOW" + landscaping
	pedestrian	rural community	2-lane	11 (2010)	—	—	—	—	39	39	0	—	—	—	—	simulator	curb + gutter bulb-outs
Neck Down—intersection curb extensions that narrow a road by extending the width of a sidewalk	pedestrian	urban	—	1 (1999)	3	—	2800 to 8110	4660 to 5660	—	—	—	29	30	1	—	various	
	pedestrian	urban	local street	9 (2004)	2	—	—	—	23	25	2	27	31	4	12-mon	NY	

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							Before	After	Before	After	Change	Before	After	Change			
Chicanes—curb extensions that alternate from one side of the street to the other forming s-shaped curves, also includes lateral shifts which shift traffic to one side of the road for an extended distance and then back	pedestrian	urban	—	10 (1997)	2	—	1380 to 3200	790 to 2400	—	—	—	33	27	-6	—	various	
	pedestrian	urban	residential	3 (2000)	4	—	1380 to 1965	790 to 1993	—	—	—	31	22	-9	at least 4 years	WA	
	pedestrian	urban	arterial (school zone)	12 (1998)	1	—	8000	—	—	—	—	31	28	-3	—	Canada	
	pedestrian	rural community	2-lane	11 (2010)	—	—	—	—	39	30	-9	—	—	—	—	simulator	
	pedestrian	rural community	2-lane	11 (2010)	—	—	—	—	39	33	-6	—	—	—	—	simulator	painted chicane
Center Island—raised or painted island along the centerline that narrows travel lanes	pedestrian	urban	—	1 (1999)	—	—	—	—	—	—	—	—	—	—	—	various	
	pedestrian	urban	—	1 (1999)	2	—	6500 to 8440	6400 to 6780	—	—	—	37	29	-8	—	—	
	pedestrian	urban	local street	9 (2004)	1	—	—	—	30	28	-2	36	33	-3	12-mon	NY	
	pedestrian	rural	—	13 (2002)	2	—	—	—	—	—	—	44	38	-6	1-mon	MN	
	pedestrian	rural	within community (2-lane)	13 (2002)	1	30	900	—	34	29	-5	44	38	-6	2-wks	MN	
	pedestrian	rural	within community (2-lane)	13 (2002)	1	30	900	—	35	31	-4	44	38	-6	6-wks	MN	
	pedestrian	rural	community entrance (2-lane)	7 (2007)	2	25	2669	—	31	29	-1	36	35	-1	1-mon	IA	combined + tubular channelizers
	pedestrian	rural	community entrance (2-lane)	14 (2008)	—	35	—	—	41	43	2	51	50	-1	—	simulator	median
	pedestrian	rural	community entrance (2-lane)	14 (2008)	—	35	—	—	41	40	-1	52	46	-6	—	simulator	median + gateway
	pedestrian	rural	community entrance (2-lane)	14 (2008)	—	35	—	—	41	41	0	52	50	-2	—	simulator	median in series
	pedestrian	rural	community entrance (2-lane)	14 (2008)	—	35	—	—	41	40	-1	51	46	-5	—	simulator	median in series with crosswalk
	pedestrian	rural	community entrance (2-lane)	15 (2013)	3	25	593 to 1448	—	28	27	1	35	34	-1	1-mon	IA	temporary curbing

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							Before	After	Before	After	Change	Before	After	Change			
(*cont'd*) **Center Island**—raised or painted island along the centerline that narrows travel lanes	pedestrian	rural	community entrance (2-lane)	15 (2013)	3	25	593 to 1448	—	29	27	-2	35	33	-2	12-mon	IA	temporary curbing
	pedestrian	rural	community entrance (2-lane)	16 (1999)	5	—	—	—	38	29	-9	44	33	-11	—	Austria	braking islands
	roadway departure	rural	2-lane	17 (2008)	8	50 to 55	—	—	—	—	-4	—	—	-5	—	Austria	painted island + edge line
Reduce Lane Width with Markings—narrowing of the lanes using pavement markings, median, etc.	pedestrian	rural community	2-lane	7 (2007)	2	30	1680	—	28	29	1	34	35	1	1-mon	IA	narrowing with pavement marking
	pedestrian	rural community	2-lane	7 (2007)	2	30	1680	—	28	29	1	34	35	1	12-mon	IA	narrowing with pavement marking
	pedestrian	urban	residential	18 (1984)	2	—	—	—	34	34	0	—	—	—	1-wk	FL	narrowing using edgeline + centerline
	intersection	rural	intersection (2-lane)	19 (2008)	9	50 to 55	—	—	—	—	-4	—	—	-5	3-mon	PA, KY, MO, FL	edgeline + centerline
	roadway departure	urban	high speed intersection 4-lane	20 (2008)	—	—	—	—	—	—	-4	—	—	—	—	—	2.7 ft. lane width reduction
	roadway departure	urban	freeway exit	21 (2000)	—	—	—	—	31	30	-1	—	—	—	1-mon	VA	narrowing using herringbone markings
	roadway departure	rural day	2-lane	22 (2005)	3	—	—	—	57	58	1	—	—	—	1-mon	TX	edgeline + centerline
	roadway departure	rural night	2-lane	22 (2005)	3	—	—	—	60	59	1	—	—	—	1-mon	TX	edgeline (existing centerline
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.	pedestrian	urban	4-lane undivided	23 (2001)	1	—	—	—	—	—	-4	—	—	—	—	CA	4- to 3-lane
	pedestrian	urban	4-lane undivided	23 (2001)	1	—	—	—	35	32	-3	—	—	—	—	IA	4- to 3-lane
	pedestrian	urban	4-lane undivided	23 (2001)	1	—	—	—	—	—	—	—	—	-1	—	IA	4- to 3-lane
	pedestrian	urban	minor arterial	8 (2001)	1	35	5400 to 9100	—	45	43	-2	51	49	-2	—	MN	4- to 3-lane

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Surface Treatments and Markings																	
Transverse Rumble Strips—raised or grooved patterns installed on the roadway travel lane or shoulder pavements perpendicular to the direction of travel	pedestrian	rural	high-speed intersection	20 (2008)	3	70	—	—	—	—	—	—	—	-1	5-mon	—	
	pedestrian	rural	intersection	24 (2003)	11	—	—	—	—	—	—	55	54	-1	1-mon	TX	
	roadway departure	rural	2-lane	25 (2005)	3	—	—	—	46	46	-0	49	52	3	1-wk	KY	cars
	work zone	rural	work zone (2-lane)	26 (2000)	2	—	1250 to 1850	—	—	—	-2	—	—	—	1-day	TX	cars
	work zone	rural	work zone (2-lane)	26 (2000)	2	—	1250 to 1850	—	—	—	-2	—	—	—	1-day	TX	trucks
Transverse Bars—lines placed across the lane perpendicular to direction of travel	pedestrian	rural	community entrance (2-lane)	15 (2013)	3	—	843 to 1947	—	38	37	-1	44	44	0	1-mon	IA	
	pedestrian	rural	community entrance (2-lane)	15 (2013)	3	—	843 to 1947	—	37	38	1	44	43	-1	12-mon	IA	
	work zone	rural	work zone (4-lane divided)	39 (2003)	1	—	—	—	—	—	-2	—	—	-2	—	Canada	
	work zone	rural	work zone	40 (2001)	1	70	18000	—	64	63	-1	68	67	-1	—	KS	
Converging Chevrons—on-pavement chevrons	roadway departure	rural	freeway to freeway ramp	36 (2003)	—	—	39010	—	64	49	-15	70	53	-17	20-mon	WI	
	roadway departure	rural	freeway to freeway ramp	37 (2008)	—	30 adv.	18000	—	47	47	0	53	52	-1	1-mon	TX	
	roadway departure	rural	freeway to freeway ramp	37 (2008)	—	30 adv.	18000	—	48	48	0	53	53	0	6-mon	TX	
	roadway departure	rural	S-curve (2-lane)	38 (2006)	1	35/15 adv.	—	—	—	—	—	37	33	-4	15-mon	OH	
	pedestrian	rural	intersection	8 (2001)	1	30	4000	—	36	32	-4	41	35	-6	1-wk	MN	
	pedestrian	rural	intersection	8 (2001)	1	30	4000	—	36	34	-2	41	39	-2	2-yr	MN	
	pedestrian	rural	intersection	8 (2001)	1	30	4000	—	36	31	-5	41	35	-5	4-yr	MN	
	pedestrian	rural	community entrance	7 (2007)	2	25	2200 to 2420	—	30	29	-1	36	35	-1	1-mon	IA	
	pedestrian	rural	community entrance	7 (2007)	2	25	2200 to 2420	—	30	29	-1	36	33	-3	12-mon	IA	
	roadway departure	rural	freeway to freeway ramp	35 (2010)	—	—	18000 to 18600	—	31	29	-2	35	33	-2	1-mon	GA	
	roadway departure	rural	freeway to freeway ramp	35 (2010)	—	—	18000 to 18600	—	31	30	-1	35	34	-1	9-mon	GA	converging chevrons

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							Before	After	Before	After	Change	Before	After	Change			
Optical Speed Bars—transverse stripes on travel lane (sometimes spaced progressively closer to create the illusion of traveling faster)	pedestrian	rural	intersection	20 (2008)	4	—	—	—	—	—	-1	—	—	-1	—	—	
	pedestrian	rural	community entrance	7 (2007)	3	25 to 30	886 to 1870	—	39	38	-1	47	46	-1	1-mon	IA	
	pedestrian	rural	community entrance	7 (2007)	2	25 to 30	234 to 662	263 to 646	39	34	-5	47	42	-5	1-mon	IA	with DSFS —"YOUR SPEED XX"
	pedestrian	rural	intersection	27 (2010)	1	—	4,450	—	53	51	-2	62	60	-2	6-mon	New Zealand	herringbone pattern
	pedestrian	rural	community entrance	28 (2011)	1	—	2800	—	37	29	-8	—	—	—	—	Italy	with dragon's teeth
	intersection	rural	intersection (2-lane)	29 (2013)	1	37	—	—	42	31	-11	48	3	-13	12-mon	Spain	with RPM + reflectors to guardrail
	intersection	rural	intersection	30 (2000)	—	62	—	—	—	—	-6	—	—	—	simulator	Australia	full lane width
	intersection	rural	intersection	30 (2000)	—	62	—	—	—	—	-4	—	—	—	simulator	Australia	optical speed bar
	roadway departure	rural	horizontal curves	25 (2005)	3	—	—	—	46	46	0	49	49	0	1-wk	KY	transverse bars
	roadway departure	rural	horizontal curves	25 (2005)	3	—	—	—	46	45	-1	49	51	2	1-yr	KY	transverse bars
	roadway departure	rural	4- lane undivided	31 (2007)	2	45	12000	—	55	52	-3	—	—	—	1-wk	VA	transverse bars
	roadway departure	rural	4- lane undivided	31 (2007)	2	45	12000	—	56	49	-7	—	—	—	3-mon	VA	transverse bars
	roadway departure	rural	curve (2-lane)	32 (2007)	2	45 -65/ 40 adv.	—	—	48	49	1	52	56	4	4-mon	NY, MI, TX	optical speed bar
	roadway departure	rural	curve (2-lane)	31 (2007)	—	—	5215	—	46	44	-2	—	—	—	1-wk	VA	optical speed bar
	roadway departure	rural	curve (2-lane)	31 (2007)	—	—	5215	—	46	45	-1	—	—	—	3-mon	VA	optical speed bar
	roadway departure	rural	2-lane	33 (2009)	—	55 day 45 night	—	—	64	62	-2	71	69	-2	1-wk	AZ	optical speed bar
	roadway departure	rural	2-lane	33 (2009)	—	55 day/ 45 night	—	—	64	59	-4	71	68	-3	3-mon	AZ	optical speed bar
	roadway departure	rural	curve (freeway)	34 (2008)	—	50	—	—	57	54	-3	60	59	-1	1-wk	WI	optical speed bar
	roadway departure	rural	freeway exit ramp	32 (2007)	1	65/ 30 adv.	—	—	38	34	-4	44	39	-5	4-mon	NY, MI, TX	optical speed bar
	roadway departure	rural	2-lane	27 (2010)	1	—	2500	—	51	50	-1	60	59	-1	2-wk	New Zealand	herringbone

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							Before	After	Before	After	Change	Before	After	Change			
(*cont'd*) **Optical Speed Bars**—transverse stripes on travel lane (sometimes spaced progressively closer to create the illusion of traveling faster)	roadway departure	rural	2-lane	27 (2010)	1	—	2500	—	51	48	-3	60	60	0	6-mon	New Zealand	herringbone
	roadway departure	rural	freeway ramp	21 (2000)	4	—	—	—	33	30	-3	—	—	—	2-wk	NY, VA	herringbone markings
	pedestrian	rural	intersection	27 (2010)	1	—	4,450	—	53	52	-1	61	61	0	2-wks	—	Herringbone
"SLOW" Legend on Pavement	pedestrian	urban	residential	8 (2001)	1	30	950	—	28	29	0	32	33	1	—	MN	
	roadway departure	urban	curve (2-lane) day	41 (1998)	1	35/15 adv	5000	—	34	33	-1	—	—	—	2-wk	VA	with curve symbol
	roadway departure	urban	curve (2-lane) night	41 (1998)	1	35/15 adv	5000	—	35	32	-3	—	—	—	2-wk	VA	with curve symbol
	roadway departure	rural	curve	15 (2012)	2	55/none to 35 mph	780 to 1880	—	49	48	-1	54	53	-1	1-mon	IA	with curve symbol+ bars
	roadway departure	rural	curve	15 (2012)	2	55/none to 35 mph	780 to 1880	—	49	48	-1	54	53	-1	12-mon	IA	with curve symbol + bars
Speed Limit XX Pavement Legend	pedestrian	rural	within community	7 (2007)	1	25	2200	—	30	30	0	35	34	-1	1-mon	IA	
	pedestrian	rural	within community	7 (2007)	1	25	2200	—	30	29	-1	35	33	-2	12-mon	IA	
	pedestrian	rural	within community	7 (2007)	1	25	2420	—	28	28	0	32	3	-1	1-mon	IA	with lane narrowing
	pedestrian	rural	within community	7 (2007)	1	25	2420	—	28	29	1	32	33	1	12-mon	IA	with lane narrowing
	pedestrian	rural	community entrance	7 (2007);15 (2013)	5	25 to 35	1009 to 2850	—	37	35	-2	42	40	-3	1-mon	IA	with red colored pavement
	pedestrian	rural	community entrance	7 (2007);15 (2013)	2	25 to 35	1009 to 2850	—	40	39	-1	46	45	-1	12-mon	IA	with red colored pavement
	pedestrian	rural	community entrance	15 (2013)	3	25 to 35	1009 to 3070	—	35	34	-1	40	39	-1	1-mon	IA	colored pavement + dragon's teeth
"50 MPH" + Curve Symbol	roadway departure	urban	curve (divided 4-lane highway)	42 (2005)	1	—	—	—	67	60	-7	—	—	—	1-mon	TX	
"CURVE AHEAD" Pavement Legend	roadway departure	rural	curve	42 (2005)	1	—	990	—	56	61	5	—	—	—	3-mon	TX	
	roadway departure	rural	curve	42 (2005)	1	—	1160	—	60	59	-1	—	—	—	3-mon	TX	
Vertical Delineation																	
Center Island Using Tubular Channelizers	pedestrian	rural community	community entrance (2-lane)	7 (2007)	2	25	2669	—	30	29	-1	36	35	-1	1-mon	IA	

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							Before	After	Before	After	Change	Before	After	Change			
Post Mounted Delineators—reflective buttons place on post at edge of road	roadway departure	rural	curve (2-lane)	25 (2005)	3	—	—	—	46	46	0	49	50	1	1-wk	KY	
	roadway departure	rural	curve (2-lane)	11 (2010)	—	—	—	—	43	35	-8	—	—	—	—	simulator	one side of curve
	roadway departure	rural	curve (2-lane)	11 (2010)	—	—	—	—	43	34	-9	—	—	—	—	simulator	both sides of curve
Streaming PMD	roadway departure	rural	curve (2-lane)	11 (2010)	—	—	—	—	43	24	-19	—	—	—	—	simulator	
Chevrons with Reflective Post	roadway departure	rural	curve (2-lane)	46 (2010)	2	—	—	—	56	54	-2	65	63	-2	1-mon	TX	
Reflective Post Added to Existing Chevrons	roadway departure	rural	curve (2-lane)	47 (2012)	4	—	830 to 2280	—	50	50	0	56	55	-1	1-mon	IA	
	roadway departure	rural	curve (2-lane)	47 (2012)	1	—	1710	—	54	53	-1	59	57	-2	12-mon	IA	
Layered Landscaping—roadside plantings used to create vertical friction	pedestrian	rural	community entrance (2-lane)	14 (2008)	—	35	—	—	43	44	1	54	53	-1	—	simulator	at treatment
	pedestrian	rural	community entrance (2-lane)	14 (2008)	—	35	—	—	42	40	-2	51	45	-6	—	simulator	300 ft. downstream of treatment
Landscaped Median	roadway departure	urban	collector	48 (2000)	1	—	11400	10900	37	33	-4	43	37	-6	—	CO	with curbside islands
Dynamic Signing																	
Speed Activated Speed Limit Sign—a blank out sign that displays "SPEED LIMIT XX" for vehicles exceeding threshold speed	roadway departure	urban	collector	55 (2013)	1	30	—	—	33	27	-6	36	30	-6	2-mon	CO	with striping between travel/ parking lanes + signing
	roadway departure	urban	collector	55 (2013)	2	30	—	—	—	—	—	39	34	-5	1-yr	CO	with physical narrowing + pedestrian refuge
	roadway departure	urban	collector	55 (2013)	3	30	—	—	—	—	—	37	33	-4	1-yr	CO	
	roadway departure	urban	collector	55 (2013)	1	30	—	—	—	—	—	37	32	-5	3-yr	CO	
Speed Limit Sign with LED	pedestrian	rural	community entrance	15 (2013)	2	25	980 to 2240	—	33	30	-3	42	28	-4	1-mon	IA	
	pedestrian	rural	community entrance	15 (2013)	2	25	980 to 2240	—	33	30	-3	42	38	-4	12-mon	IA	

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Speed Feedback Sign—displays the speed of drivers traveling over the threshold speed with the message "YOUR SPEED XX	pedestrian	urban	school zone	50 (2005)	3	35 to 45	—	—	49	44	-5	55	49	-6	1-wk	TX	
	pedestrian	urban	school zone	50 (2005)	3	35 to 45	—	—	49	42	-7	54	51	-3	4-mon	TX	
	pedestrian	rural	community entrance	7 (2007); 15 (2013)	1	25	295	367	38	37	-1	46	45	-1	1-mon	IA	
	pedestrian	rural	community entrance	7 (2007); 15 (2013)	1	25	295	318	38	37	0	46	45	-1	12-mon	IA	
	pedestrian	rural	community entrance	51 (2006)	4	30 to 45	—	—	46	41	-5	51	46	-5	1-mon	MN	
	pedestrian	rural	community entrance	51 (2006)	4	30 to 45	—	—	47	40	-7	51	46	-5	12-mon	MN	
	pedestrian	rural	community entrance	52 (2009)	12	25 to 40	—	—	42	36	-6	—	—	—	1-wk	PA	
	intersection	urban	signalized intersection	50 (2005)	2	45 to 55	—	—	51	47	-4	57	54	-4	1-wk	TX	
	intersection	urban	signalized intersection	50 (2005)	2	45 to 55	—	—	51	49	-2	57	55	-2	4-mon	TX	
	roadway departure	urban	collector (2-lane)	53 (2004)	4	25	2700 to 4900	—	29	28	-1	34	32	-5	1-mon	WA	
	roadway departure	urban	collector (2-lane)	53 (2004)	4	25	2700 to 4900	—	28	27	-1	33	28	-5	2-yr	WA	
	roadway departure	urban	collector/ minor arterial	54 (2009)	16	25	—	—	—	—	—	—	—	-2	1-yr	WA	
	roadway departure	urban	collector/ minor arterial	54 (2009)	16	25	—	—	—	—	—	—	—	-3	5 to 8-yr	WA	
	roadway departure	urban	collector/ minor arterial	54 (2009)	16	30 to 35	—	—	—	—	—	—	—	-4	1-yr	WA	
	roadway departure	urban	collector/ minor arterial	54 (2009)	16	30 to 35	—	—	—	—	—	—	—	-6	5 to 8-yr	WA	
	roadway departure	urban	2-lane	54 (2009)	9	25 to 35	—	—	—	—	—	40	36	-4	1-mon	WA	
	roadway departure	urban	2-lane	54 (2009)	4	25 to 35	—	—	—	—	—	37	33	-4	12-mon	WA	
	roadway departure	urban	2-lane	54 (2009)	9	25 to 35	—	—	—	—	—	39	35	-4	2 to 3-yr	WA	
	roadway departure	urban	2-lane	54 (2009)	11	25 to 35	—	—	—	—	—	38	33	-5	4+ yr.	WA	
	roadway departure	urban	curve (2-lane)	54 (2009)	1	30	—	—	—	—	—	41	38	-3	1-mon	WA	
	roadway departure	urban	curve (2-lane)	54 (2009)	2	30 to 35	—	—	—	—	—	42	38	-4	2 to 3-yr	WA	

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
(*cont'd*) **Speed Feedback Sign**—displays the speed of drivers traveling over the threshold speed with the message "YOUR SPEED XX"	roadway departure	urban	curve (2-lane)	54 (2009)	1	30	—	—	—	—	—	41	35	-6	4+ yr.	WA	
	roadway departure	rural	interstate (curve)	56 (2006)	2	45 adv.	16750	—	56	53	-3	—	—	—	2 to 4-mon	OR	passenger cars
	roadway departure	rural	interstate (curve)	56 (2006)	2	45 adv.	16750	—	51	49	-2	—	—	—	2 to 4-mon	OR	trucks
	roadway departure	rural	curve (2-lane)	57 (2013)	11	50 to 65/30 to 50 adv.	—	—	—	—	-2	—	—	-3	1-mon	AZ, FL, IA, OH, OR, TX, WA	
	roadway departure	rural	curve (2-lane)	57 (2013)	11	50 to 65/30 to 50 adv.	—	—	—	—	-3	—	—	-3	12-mon	AZ, FL, IA, OH, OR, TX, WA	
	roadway departure	rural	curve (2-lane)	57 (2013)	11	50 to 65/30 to 50 adv.	—	—	—	—	-2	—	—	-2	2-yr	AZ, FL, IA, OH, OR, TX, WA	
	roadway departure	rural	curve (2-lane)	50 (2005)	2	55/20 adv.	—	—	36	33	-3	42	39	-3	1-wk	TX	
	roadway departure	rural	curve (2-lane)	50 (2005)	2	55/20 adv.	—	—	36	35	-1	42	40	-2	4-mon	TX	
	roadway departure	rural	curve (2-lane)	58 (2012)	3	—	455 to 710	—	54	51	-3	61	57	-4	1-mon	MN	passenger cars
	work zone	rural	interstate	62 (2011)	3	55	28000	—	61	57	-4	66	61	-5	1-wk	NE	passenger cars
	work zone	rural	interstate	62 (2011)	3	55	28000	—	58	55	-3	62	59	-3	1-wk	NE	trucks
	work zone	rural	interstate	62 (2011)	3	55	28000	—	61	56	-5	66	60	-6	5-wk	NE	passenger cars
	work zone	rural	interstate	62 (2011)	3	55	28000	—	58	56	-3	62	59	-3	5-wk	NE	trucks
	work zone	rural	arterial	63 (2006)	1	—	—	—	—	—	—	66	63	-3	—	TX	
Speed Feedback Sign with Action Message—"YOUR SPEED XX" + "SLOW DOWN"	roadway departure	urban	2-lane	54 (2009)	9	25	—	—	—	—	—	34	32	-2	1 to 6-mon	WA	
	roadway departure	urban	2-lane	54 (2009)	3	25	—	—	—	—	—	33	-31	-2	12-mon	WA	
	roadway departure	urban	2-lane	54 (2009)	5	25	—	—	—	—	—	33	31	-2	2 to 3-yr	WA	
	roadway departure	urban	curve (2-lane)	54 (2009)	1	25	—	—	—	—	—	36	31	-5	1 to 6-mon	WA	
	roadway departure	urban	curve (2-lane)	54 (2009)	1	25	—	—	—	—	—	36	31	-5	4+ yr.	WA	
	intersection	rural	signalized intersection	20 (2008)	3	50 to 55	—	—	—	—	-2	—	—	-1	—	WA, TX	at sign
	work zone	rural	interstate	63 (2006)	1	—	—	—	—	—	—	65	63	-2	—	TX	
	pedestrian	rural	community entrance	7 (2007)	1	25	2870	—	31	26	-5	59	52	-7	3-mon	IA	SLOW DOWN 25

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Speed Feedback Sign plus New Curve Advisory Speed Sign	roadway departure	rural	curve (2-lane)	58 (2012)	3	—	455 to 710	—	54	50	-4	61	57	-4	12-mon	MN	PC
	roadway departure	rural	curve (2-lane)	58 (2012)	3	—	455 to 710	—	53	50	-3	53	50	-3	1-mon	MN	center of curve,
	roadway departure	rural	curve (2-lane)	58 (2012)	3	—	455 to 710	—	53	50	-3	53	49	-4	12-mon	MN	center of curve
"YOUR SPEED XX"	pedestrian	rural	community entrance	7 (2007); 15 (2013)	2	25 to 30	234 to 662	263 to 646	39	34	-5	47	42	-5	1-mon	IA	with optical speed bars
"SLOW"	pedestrian	rural	recreational area	13 (2002)	1	35	—	—	36	36	0.	43	44	1	1-mon	MN	
Speed Activated Curve Warning Sign and "SLOW DOWN" Action Message	roadway departure	rural	curve (2-lane)	59 (2002)	3	30 to 50	—	—	39	35	-4	—	—	—	—	United Kingdom	
	roadway departure	rural	curve (2-lane)	57 (2013)	11	50 to 70/35 to 50 adv.	—	—	—	—	-2	—	—	-2	1-mon	AZ, FL, IA, OH, OR, TX, WA	
	roadway departure	rural	curve (2-lane)	57 (2013)	11	50 to 70/35 to 50 adv.	—	—	—	—	-3	—	—	-2	12-mon	AZ, FL, IA, OH, OR, TX, WA	
	roadway departure	rural	curve (2-lane)	57 (2013)	11	50 to 70/35 to 50 adv.	—	—	—	—	-2	—	—	-2	2-yr	AZ, FL, IA, OH, OR, TX, WA	
"TOO FAST FOR CURVE"	roadway departure	rural	curve (interstate)	60 (2003)	1	50	—	—	—	—	-3	—	—	—	—	WI	trucks
"50 MPH CURVES" + "YOUR SPEED XX"	roadway departure	rural	interstate	61 (2000)	5	55 to 65/50 to 60 adv.	—	—	64	63	-1	—	—	—	—	CA	passenger cars
"50 MPH CURVES" + "YOUR SPEED XX"	roadway departure	rural	interstate	61 (2000)	5	55 to 65/50 to 60 adv.	—	—	58	56	-2	—	—	—	—	CA	trucks
Flashing Beacon	work zone	rural	2-lane	64 (2007)	3	45	—	—	—	—	-3	—	—	-3	—	SC	
	work zone	rural	multi-lane	64 (2007)	1	45	—	—	—	—	-3	—	—	-3	—	SC	
	work zone	rural	interstate	64 (2007)	1	45	—	—	—	—	-6	—	—	-5	—	SC	
Variable Speed Limit	roadway departure	rural	freeway	65 (2005)	2	—	—	—	—	—	—	82	77	-5	—	WA	
Curve Warning Sign with Flashers— flashing lights on sign	roadway departure	rural	2-lane curve	25 (2005)	2	—	—	—	47	46	-1	51	50	-1	—	—	

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Static Signing																	
Chevron Signs—use of standard chevron signing	roadway departure	rural	2-lane	46 (2010)	2	70/45 & 50 adv.	—	—	57	55	-2	65	64	-1	1-mon	TX	
	roadway departure	rural	2-lane	25 (2005)	1	—	—	—	48	48	0	52	52	0	1-wk	KY	at PC
	roadway departure	rural	2-lane	46 (2010)	2	70/45 & 50 adv.	—	—	56	54	-2	65	63	-2	1-mon	TX	with full post delineation
Chevrons with Full Post Delineation	roadway departure	rural	2-lane	47 (2012)	4	50 to 55/35 to 50 adv.	—	—	50	50	0	56	55	-1	1-mon	IA	
Curve Sign + Flags	roadway departure	rural	2-lane	25 (2005)	3	—	—	—	46	45	-1	49	49	0	1-wk	KY	at PC
Arrow (MUTCD: W1-6)	roadway departure	rural	2-lane	25 (2005)	1	—	—	—	43	44	1	46	47	1	1-wk	KY	at PC
Intersection Treatments																	
Roundabout—large, raised, circular islands at the middle of major intersections, around which all oncoming vehicles must traverse	pedestrian	rural	—	66 (2005)	19	—	—	20400	—	—	—	48	28	-20	—	MD, CA, WA, MI, Canada	
	intersection	suburban	Y intersection (2-lane)	67 (2005)	1	—	—	5500	—	—	—	32	24	-8	1 to 3 years	MI	
	intersection	urban	—	68 (2005)	1	—	11000 to 12000	15500	—	—	—	47	33	-14	—	CO	
Traffic Circle—circular, raised island placed within the middle of an intersection	intersection	urban	—	1 (1999)	45	—	240 to 10910	269 to 8280	—	—	—	34	30	-4	—	TX, WA, CA, CO, NC, OH, OR, FL, GA, MD, NE, MA, MN, AZ	
Access Control																	
Half-Closure	pedestrian	urban	—	1 (1999)	11	—	220 to 9540	151 to 9180	—	—	—	30	24	-6	—	—	
Diagonal Diverter	pedestrian	urban	—	1 (1999)	7	—	474 to 2057	177 to 574	—	—	—	28	27	-1	—	—	
Full Closure	pedestrian	urban	—	1 (1999)	2	—	1540 to 1980	850 to 1080	—	—	—	18	13	-3	—	—	
Choker + Speed Hump	pedestrian	urban	—	1 (1999)	2	—	2456 to 3685	2593 to 2931	—	—	—	38	25	-13	—	—	
Half-Closure + Median Barrier	pedestrian	urban	—	1 (1999)	2	—	10160 to 10320	1120 to 2120	—	—	—	38	32	-6	—	—	

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Gateway Entrance Treatments																	
Entrance Treatments—multiple treatments placed at community entrance to reduce speeds into community	pedestrian	rural	community entrance	49 (2000)	1	40	—	—	45	41	-4	50	46	-5	1-mon	United Kingdom	red bars + signing + bulb-outs
	pedestrian	rural	community entrance	49 (2000)	1	20	—	—	35	24	-11	41	30	-11	1-mon	United Kingdom	narrowing + speed cushions
	pedestrian	rural	community entrance	49 (2000)	1	20	—	—	35	15	-10	41	30	-11	12-mon	United Kingdom	narrowing + speed cushions
	pedestrian	rural	community entrance	49 (2000)	1	30	—	—	40	30	-11	47	35	-13	1-mon	United Kingdom	red box + speed limit + dragon's teeth + signing
	pedestrian	rural	community entrance	49 (2000)	1	30	—	—	40	33	-8	47	38	-9	12-mon	United Kingdom	red box + speed limit + dragon's teeth + signing
	pedestrian	rural	community entrance	49 (2000)	1	30	—	—	38	33	-5	43	39	-4	1-mon	United Kingdom	red box + speed limit + dragon's teeth + signing
	pedestrian	rural	community entrance	49 (2000)	1	30	—	—	38	32	-6	43	36	-7	12-mon	United Kingdom	red box + speed limit + dragon's teeth + signing
	pedestrian	rural	community entrance	49 (2000)	1	30	—	—	41	39	-2	47	47	0	1-mon	United Kingdom	red patches + "SLOW" + dragon's teeth + signing
	pedestrian	rural	community entrance	49 (2000)	1	30	—	—	41	37	-4	47	44	-3	12-mon	United Kingdom	red patches + "SLOW" + dragon's teeth + signing
	pedestrian	rural	community entrance	49 (2000)	1	40	—	—	51	45	-6	60	51	-9	1-mon	United Kingdom	red lines of decreasing size and width + signing
	pedestrian	rural	community entrance	49 (2000)	1	40	—	—	51	45	-6	60	53	-7	12-mon	United Kingdom	red lines of decreasing size and width + signing
	pedestrian	rural	community entrance	49 (2000)	1	40	—	—	44	39	-6	50	43	-7	1-mon	United Kingdom	red box + speed limit + signing
	pedestrian	rural	community entrance	49 (2000)	1	40	—	—	44	38	-7	50	43	-7	12-mon	United Kingdom	red box + speed limit + signing

Notes: Information is presented to one significant digit unless the study only provided integer values. In some cases the study only provided resulting changes in speed rather than providing the actual before and after value.

Abbreviations

common state destinations are used and are not listed here (e.g. Iowa = IA)
advisory (adv)
intersection (isect)
month (mon.)
pedestrian (ped)
post mounted delineator (PMD)
rumble strips (RS)
run off road (ROR)
years (yrs.)

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