



[Western States Rural Transportation Consortium](#)

[California Oregon Advanced Transportation Systems
\(COATS\)](#)

Update—January 12th, 2011

California Oregon Advanced Transportation Systems (COATS) **Radar Speed Trailer deployment warrants**

Project Update – January 12th, 2011

The information provided in this document represents a summary of past research and results that have been conducted specific to radar speed signs. Note that this document is presented for informational purposes only and does not represent a final project report. A more detailed literature review and project final report will be available at a later date.

School Zone Research Results

Trailer Based						
Study	Application	Locale	Traffic	Speed Limit	Mean Speed Change	General Effectiveness
Casey and Lund	Urban 2-lane	Santa Barbara, CA	n/a	25 mph	Mean speeds fell between 1.5 and 5 mph	14% speed reduction when speeds exceeded limit by 10mph 7% speed reduction when speeds exceeded limit by 5mph
Permanent						
Lee et.al	Urban arterial	South Korea	n/a	20 mph	5 mph reduction (2 weeks) 3.5 mph reduction (12 months)	Before - 26.5% speeding After (two weeks) - 9.9% speeding After (12 months) - 5.5% speeding
Ullman and Rose	Unspecified 2-lane	Texas	n/a	35 mph	School zone - 9 mph (short term) and 9 mph (long term) Transition zone - 2-3 mph (short term) and 1 mph (long term)	Primary reduction observed in school zones 85th% speeds reduced 10 mph (short term) and 8 mph (long term)
Thompson, et.al	Suburban local roads	Maine	n/a	15 mph	2 to 4 mph reduction	Vehicles exceeding the speed limit fell by 4 to 20%, depending on site Over 70% of vehicles still exceeded the speed limit
Saito and Ash	Urban/suburban two and multi-lane roads	Utah	n/a	20 mph	1 to 3 mph reduction	85th percentile speeds reduced by 2 to 4 mph
KLS Engineering	Urban two and multi lane arterials	Washington D.C.	10000 - 30000 (ADT)	15 mph	1 to 7 mph reduction Some minor increases observed (1-3 mph)	Speed reductions found to be statistically significant in only 25% of cases
Garden Grove	Arterial streets	California	8000 - 29000 (ADT)	35 - 40 mph	Mean speeds not examined	85th percentile speeds reduced by 1.5 to 9.8 mph
Hallmark, et.al.	Semi-rural two lane	Iowa	2343 (ADT)	25 mph	5.4 mph reduction after 3 months	85th percentile speeds reduced 7 mph (3 months)
No evaluations of portable post-mounted devices have been made to date.						

Work Zone Research Results

Trailer Based						
Study	Application	Locale	Traffic	Speed Limit	Mean Speed Change	General Effectiveness
Pesti and McCoy	Rural 4 lane divided interstate	Nebraska	38000 (ADT)	55 mph	3 - 4 mph reduction	20 - 40% increase in vehicles complying w/ speed limit Long-term reductions in speeds over 5 weeks
McCoy, Bonneson and Kollbaum	Urban 4 lane divided interstate	South Dakota	9000 (AADT)	55 mph	4 to 5 mph reduction	Before - 74+% speeding After - reduced by 20 - 25%
Carlson, et.al	Rural 4 lane divided U.S highway Short term work zones (1-12 hours)	Texas	7000 (AADT)	55 mph	2 mph (cars) 3 mph (trucks)	Speeding before versus after: Cars - 5.5 - 7.0% reduction Trucks - 9.6 - 24.4% reduction
Teng, et.al.	Interstate and principal arterial	Las Vegas, NV	n/a	45 mph (principal arterial) 55 mph (interstate)	8-9 mph reduction	Size of displayed messages and use of flashing showed significant impact on speeding likelihood and speed reduction
Saito and Bowie	Urban interstates (number of lanes varied)	Utah	n/a	55-65 mph	7 mph reduction	Display appeared to lose effectiveness after one week
Chitturi and Benekohal	Rural 4 lane divided interstate	Illinois	n/a	n/a	4.4 mph reduction (immediate) 6.7 mph reduction (3 weeks)	All speed reductions found to be statistically significant
Fontaine, et al.	Rural two and four lane short-term work zones	Texas	n/a	n/a	5 mph reduction	Reduced percent of vehicles exceeding speed limit
Changeable Message Sign-Radar Combination						
Study	Application	Locale	Traffic	Speed Limit	Mean Speed Change	General Effectiveness
Garber and Srinivasan	Suburban interstates and primary highway	Virginia	n/a	45 mph (primary) 55 mph (interstates)	Interstate - 5 - 10 mph reduction Primary - 8 - 12 mph reduction	Speed reductions at all sites and exposure durations found to be statistically significant
Garber and Patel	Rural 4 lane divided interstate Three signs used at beginning, midpoint and end of the work zone Employed messages rather than vehicle speeds	Virginia	8400 - 33000 (AADT)	45 - 55 mph	4 - 17 mph mean speed reduction between 1st and 2nd sign 1 - 3 mph mean speed reduction between 2nd and 3rd sign	6 - 11 mph reduction in 85% speeds between 1st and 2nd sign 2 - 3 mph reduction in 85% speeds between 2nd and 3rd sign
Wertjes	Rural 4 lane divided interstate	South Dakota	4560 (ADT)	55 mph	In advance of taper - 1.7 mph reduction At taper - 1.6 mph reduction End of taper - 0 mph reduction	85th percentile speeds reduced In advance of taper - 68.2 - 66.5 mph At taper - 63.5 - 61.9 mph End of taper - 59.3 - 59.4 mph
Wang, et.al.	Rural, two-lane highway	Georgia	n/a	45 mph	7 - 8 mph reduction	Speed variance decreased significantly following deployment Long term speed reductions between 1 and 3 mph observed
Sorrell, et.al	Rural, two-lane highway and interstate	South Carolina	n/a	45 - 55 mph (two-lane) 45 mph (interstate)	7 - 9 mph reduction (interstate) 5 - 7 mph reduction (two-lane)	85th percentile speeds reduced 6 - 9 mph (interstate) 2 - 4 mph (two-lane)
Post-Mounted Sign						
Study	Application	Locale	Traffic	Speed Limit	Mean Speed Change	General Effectiveness
Maze	Rural 4 lane divided interstate in advance of a crossover	Iowa	n/a	55 mph	3 mph reduction	85th percentile speeds reduced by 5 mph

Additional Deployment Location Results

Trailer Based						
Study	Application	Locale	Traffic	Speed Limit	Mean Speed Change	General Effectiveness
Casey and Lund	Urban residential, commercial and undeveloped 2 and 4 lane roadways	Santa Barbara, CA	200-1200 vph	30 - 45 mph	10% mean speed reduction alongside trailer and 7% downstream	Reductions brief, speeds rose once trailers removed
Bloch	Urban, residential two-lane roads	Riverside, CA	800 - 2400 (veh/ln/day)	25 mph	6.1 mph reduction beside trailer 2.9 mph reduction downstream 0.6 mph reduction downstream following removal	Minimal changes in speeds one week following removal
Donnell and Cruzado	Transition zones on two lane highways	Pennsylvania	n/a	45 - 55 mph (initial) to 25 - 40 (transition)	4.6 - 7.9 mph reduction (1 week) Reductions measured downstream of signs similar	3.1 to 9.2 mph increase 1 week following removal
Permanent sign						
Study	Application	Locale	Traffic	Speed Limit	Mean Speed Change	General Effectiveness
Traffic Engineering Division	Urban, arterials, collectors and local roads	Orange County, CA	n/a	n/a	4 mph reduction on all roads	Statistically significant reductions in 85th percentile speeds observed No carryover effects observed
Ullman and Rose	Sharp horizontal curve Approach to signalized intersections	Texas	n/a	30-55 mph	Signal approach - 3 mph (short term) and 0-4 mph (long term) Curve - 2-3 mph (short term) and 0-2 mph (long term)	85th percentile speeds reduced 2-4 mph (short term) and 0 -4 mph (long term)
Sandberg, et. al	Speed transition zones (rural to urban)	Minnesota	4000 - 12000 (ADT)	45 - 55 mph (initial) to 30 - 45 (transition)	1 week - 6 - 7 mph reduction 2 months - 3 - 8 mph reduction 7 months - 3 - 7 mph reduction 1 year - 6 - 8 mph reduction	85th percentile speeds 1 week - 6 - 8 mph reduction 2 months - 5 - 11 mph reduction 7 months - 5 - 7 mph reduction 1 year - 5 - 9 mph reduction
Hallmark, et.al.	Transition zones on two lane highways	Iowa	300 - 2300 (ADT)	55 mph (initial) to 25 (transition)	1 month - 1 mph reduction 3 months - 0 mph reduction 9 months - 1 to 5.2 mph reduction 1 year - 1 to 3.4 mph reduction	85th percentile speeds: 1 month - 2 mph reduction 3 months - 1 mph reduction 9 months - 1 to 4 mph reduction 1 year - 2 to 3 mph reduction
Chang, et al.	Collector and arterial streets	Washington	2700 - 4900 (ADT)	25 mph	1.19 and 2.21 mph reduction	Only one site found to have statistically significant speed reduction
Tribbett, et. al	Rural Interstate	California	7650-9300 (AADT)	50 - 60 mph	1 to 5 mph reduction	Results were mixed, as some sites saw significant speed reductions, while others saw increased speeds