

PROBLEMS ASSOCIATED WITH TRAFFIC CALMING DEVICES

By Kathleen Calongne

Boulder, CO

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Traffic calming devices, such as speed humps and traffic circles are spreading to communities across the United States, without regard to their risks. The U.S. Department of Transportation (USDOT) has avoided the examination of the problems associated with intentionally imposing vertical and horizontal deflection on vehicles and vehicle passengers, in order to encourage the proliferation of devices on city streets.

Deflection devices built to slow passenger vehicles, create even greater delays to emergency response vehicles. The longer wheel-base, stiff suspension, high vehicle weight, as well as the sensitive equipment and injured victims transported by these vehicles, require drivers to slow almost to a stop to negotiate the devices safely.

An unethical attempt has been made to silence the objections of rescue personnel to delays to emergency response by deflection devices. Fire chiefs, as city appointees, fear professional retribution and often will not voice concern until the level of risk becomes intolerable. Emergency calls are *not* the rare events some members of transportation and city staff would like to believe. The City of Houston, Texas for example, responds to an average of 150,000 emergency medical calls and 100,000 fire calls per year. There is an average of 250,000 deaths from sudden cardiac arrest (SCA) alone each year in the United States. American Heart Association (AHA) statistics indicate that 90% of these incidents occur outside of the hospital environment. By comparison, there are approximately 5,000 pedestrian deaths per year in the United States. Few of these occur on local neighborhood streets. A ten-year study of pedestrian deaths by the U.S. Department of Health and Human Services, 1982 - 1992 found 35% of pedestrian victims were intoxicated. National Highway Traffic Safety Administration (NHTSA) statistics, Safety Facts 2000, found similar results with intoxication on the part of 31% of pedestrian victims. AHA statistics for SCA, show survivability is directly related to the response times of cities. For example, an AHA study in 1996 showed that Seattle with a response time of less than 7 minutes saved 30% of its SCA victims. New York, with an average response time of 12 minutes saved only 2%.

While delay from individual devices is sometimes measured, the cumulative effect of *series of devices* is often ignored. Series of devices turn seconds of delay into minutes, as vehicles fail to regain cruising speed between the devices. Calming devices impose permanent, 24-hour delays to emergency response, unlike traffic congestion which occurs periodically. A study conducted by the fire department of Austin, Texas, 1997, showed an increase in the travel time of ambulances of up to 100% transporting victims.

Members of city councils and transportation divisions often portray delay to emergency response by calming devices as simply a tradeoff for increased safety from speeding cars. They avoid making the analysis which shows which risk is greater. Ronald Bowman, a scientist in Boulder, Colorado developed an analysis to compare these risks. The results show that even minor delay to emergency response by calming devices imposes far greater risk on the community than vehicles, speeding or not. The result of Bowman's analysis, showed a risk factor of 85 - 1 from an additional one minute of delay (predicted to result from the installation of all the devices proposed for the City of Boulder at the time) before one life might be saved by the devices -- if it can be shown that the devices do save lives. Bowman's analysis, based on the curve of survivability for victims of cardiac arrest and severe trauma (AHA) has been verified by a professional mathematician and can be viewed online at: <http://members.aol.com/raybowman/risk97/eval1.html>

The Bowman analysis was applied to the City of Austin, Texas by Assistant Fire Chief, Les Bunte, with similar results. The report can be viewed online at: http://home.cfl.rr.com/gidusko/texts/tfc_calm.pdf

The results of these analyses show that deflection devices are **a tradeoff of the perception of increased safety from speeding vehicles for the real risk to citizen survivability from delay to emergency response**. While the Institute of Transportation Engineers' (ITE) Guidelines for the Design and Application of Speed Humps, 1997, states humps should never be placed on emergency response routes, humps and physical devices of all kinds have been installed on critical emergency response routes in cities where these projects exist. The proliferation of devices has resulted in temporary or permanent moratoriums on devices in cities such as Berkeley California, Boulder Colorado, Portland Maine and Portland Oregon.

People with disabilities complain of lasting pain and injury caused by traveling over deflection devices in vehicles. Significant testimony about the physical and psychological barrier deflection devices make to access to public rights-of-way has been given to the U.S. Access Board in Washington DC. A web site addressing the problems of the disabled with deflection devices such as speed humps, speed tables and raised crosswalks can be found at: <http://www.digitalthreads.com/rada>.

Calming devices have been used to divide communities along racial and socioeconomic lines. The U.S. Department of Housing and Development (HUD) identified gates implemented as part of a traffic calming project in Houston, Texas as discriminatory, ordering them removed. Gates were replaced with speed humps to create a similar, though less obvious, barrier between neighborhoods.

While calming devices are built on the premise they will reduce accidents, a comprehensive study commissioned by the ITE and the Federal Highway Administration (FHWA) on traffic calming projects in the United States concludes:

“Traffic calming in the U.S. is largely restricted to low volume residential streets. Collisions occur infrequently on such streets to begin with, and any systematic change in collision rates tends to get lost in the random variation from year to year. This limits our confidence in drawing inferences about safety impacts of traffic calming.

(Traffic Calming: State of the Practice, Reid Ewing, 1999, P. 123)

The USDOT defines traffic calming devices as *geometric design features of the roadway*, rather than *traffic control devices*. The USDOT recommends standards for the design and warrants for the use of devices that are approved traffic control devices in the Manual on Uniform Traffic Control Devices (MUTCD). The definition of traffic calming devices as geometric design features of the road has allowed devices to proliferate on city streets as a decision of local governments.

An increase in accidents has occurred after some installations. Experimental speed humps placed on a street at a school in Portland, Maine registered an increase in accidents of 35%. Accidents increased 100% after the installation of an experimental traffic circle in Boulder, Colorado. However, the circle in Boulder and the humps in Portland *remain on the street today*.

People across the United States are opposing the installation of deflection devices on city streets that damage vehicles, injure vehicle passengers, increase pollution and gas consumption and delay emergency response. I have researched traffic calming projects since 1996, and have compiled my research into a 400-page report on the “Problems Associated with Traffic Calming Devices.” I offer the report to all interested individuals at my cost. The following is a summary of some of the issues addressed in my report.

SUMMARY OF PROBLEMS ASSOCIATED WITH TRAFFIC CALMING DEVICES IN THE UNITED STATES

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EMERGENCY RESPONSE CONCERNS -- Delay to emergency response vehicles by traffic calming devices has resulted in moratoriums as well as removal of devices in cities around the country. Fire Departments warn of the increased risk caused by the proliferation of devices once a calming project has begun. A video taped discussion by the Fire Department of Portland, OR states the department was denied participation in the implementation of Portland's calming project, and in fact was prevented by its Transportation Division from voicing concerns publicly. An analysis by Ronald Bowman of Boulder, CO shows that communities are at far greater risk from delayed emergency response by calming devices than from vehicles. The analysis, verified by a professional mathematician, can be viewed online at:

<http://members.aol.com/raybowman/risk97/eval1.htm>

The Bowman analysis was applied to the City of Austin, TX by Assistant Fire Chief, Les Bunte with similar results. The Bunte report can be viewed online at:

http://home.cfl.rr.com/gidusko/texts/tfc_calm.pdf

Delay caused by humps on a street in Gaithersberg, MD may have contributed to the death of a child in a burning home. A firefighter descended into the basement of the home to rescue a child when "flashover" occurred, forcing his exit from the building. A resident of Houston, TX is brain dead after paramedics, unable to open a gate installed as part of calming project, were forced to take a longer route to the victim's home. Gates on some Houston streets have been ordered open because of concerns for emergency response. So many humps were installed in one direction on a street leading from a Houston fire station that fire trucks only turn the opposite direction out of the station, regardless of the location of the call.

There are documented injuries of firefighters who have hit the roofs of their cabs, encountering speed humps unexpectedly. Some injuries have placed firefighters on temporary or permanent disability.

CIVIL RIGHTS VIOLATIONS -- Residents in Houston filed a complaint with HUD that gates installed as part of a calming project were used to segregate communities along racial and socioeconomic lines. HUD found the City of Houston in violation of the civil rights of its residents, ordering the gates removed. The gates were replaced with humps to effectively, though less overtly, discourage access to the neighborhoods.

VIOLATION OF THE FEDERAL CLEAN AIR ACT -- Funds allocated for a traffic calming experiment by the Congestion Mitigation and Air Quality (CMAQ) Program to the City of Portland, ME were rescinded when it was shown that the project of humps increased emissions by 48% *without taking into consideration increased emissions from braking and acceleration required to negotiate the devices*. The State of Maine has been ordered under the federal Clean Air Act to show evidence of compliance in reducing pollutants. Section 113, "Federal Enforcement," states fines including imprisonment will be levied against entities responsible for knowingly increasing the release of pollutants into the air in cities on federal notice to improve air quality. The experiment has not been removed.

An Austrian study, in 1994, using a mobile exhaust fume measuring-device registered an increase in vehicle emissions of ten times on streets with speed humps.

The Transport Research Laboratory (TRL), a research agency of the Department of Transportation in the United Kingdom, conducted emissions tests in 1997 on streets with road humps and found the following results as reported in TRL Report 307:

“Schemes with a 75 metre hump spacing . . . showed increases in CO and HC of around 70 – 80% and 70 – 100% respectively, and an increase in CO₂ of around 50-60%. No_x emissions were predicted to be about 0-20% lower after calming.”

To calculate the possible effect of smoother driving after the installation of humps (without braking and acceleration) the TRL measured the change in emissions associated with moving from a constant speed of 30 mph to a constant speed of 20 mph and found the following results:

CO and HC increased by 40 – 80%, CO₂ by 30 – 40% and NO_x by 20 – 30 %.

A more recent study by the TRL, Report 482 in 2001, registered increases in all emission pollutants after traffic calming:

For petrol catalyst vehicles: CO 59%, HC 54%, NO₂, 8%, CO₂ 26%

The study states that speed humps created the largest increase in pollutants of all calming devices tested.

VIOLATION OF THE ADA -- A moratorium on speed humps is presently in effect in Berkeley, CA because of emergency response concerns and because of complaints from the disabled community. Persons with some disabilities state the lasting pain and injury caused by deflection devices makes them virtual barriers to accessibility. The Department of Justice regulations for Title II of the Americans with Disabilities Act (ADA) define “facility” to include “roads”. Title II states an alteration to a facility must make the facility accessible and usable to the *maximum extent feasible*.

The report, Building a True Community, 2001 by the Public Rights-of-Way Access Advisory Committee of the U.S. Access Board in Washington D.C, acknowledges significant testimony from people with a variety of disabilities that vertical and horizontal deflection devices are not only painful, but worsen existing conditions while traveling by vehicle. The U.S. Access Board publication, Accessible Rights of Way: sidewalks, street crossings, other pedestrian facilities, 1999, states that drivers with disabilities report the jarring from crossing speed humps even at low speeds can be painful and dangerous, resulting in the devices being “a barrier to roadway use.” Both publications suggest, in the absence of research, that entities consider other traffic calming measures. A lawsuit was filed against the City of Bethesda, MD by a disabled resident for placing speed humps on streets providing access to his home. Speed humps were removed from streets in San Diego County, CA because of problems experienced by disabled residents. A website addressing the concerns of the disabled with deflection devices can be found at: <http://www.digitalthreads.com/rada>.

LIABILITY AND LAWSUITS -- In August 1998, Florida Judge Robert Bennet ruled in favor of two residents of the City of Sarasota who filed suit against the city for placing devices on city streets that are not approved traffic control devices in the federal Manual on Uniform Traffic Control Devices (MUTCD). States have adopted the MUTCD as a guide for the recommended placement and design of devices that are approved traffic control devices. Compliance with warrants for the devices provides protection from liability. The decision was overturned on appeal, on the basis that the plaintiffs did not have standing to sue, not on the merits of the ruling.

The legal departments of some cities have reasoned the absence of standards and warrants for the design and use of traffic calming devices from the MUTCD indicates lack of authorization for cities to build the devices on streets.

Calming devices are typically marked with the yellow diamond shaped sign, recommended in the MUTCD to warn drivers of street hazards. Cities are required to keep streets free of hazards. Drivers can injure themselves and their vehicles driving over the devices at posted speed limits. Devices are typically designed to lower speeds *below* posted speed limits. The legal department of Sunnyvale CA expressed concern cities could be liable not only for injury caused by a device, but for injury and property damage resulting from actions taken by drivers because of a device, such as swerving around them. Legal departments express concern cities could be liable for personal injury and property loss wherein response to an emergency situation was delayed by calming devices.

CONFLICT -- It has been said that "traffic calming" has become "people calming." Even pro-calming data acknowledges the volatility of the debate. Diversion of traffic to other streets always accompanies an installation of devices. Residents who must travel over the devices are often irate about the discomfort of the devices, the increased vehicle noise from loads shifting over devices and the visual pollution of the signs and pavement markings needed to warn drivers of devices. Division and angst often remain in the neighborhood, long after an installation is complete.

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RESOURCES

ARTICLES

Reuben Castenada and Steven Gray, "Maryland Boy, 13, Dies in Fire at Friend's Sleepover," THE WASHINGTON POST, June 15, 1998 (Firefighter Stottlemeyer descends into basement to rescue child as flashover occurs forcing his exit from the home.)

Jen Chaney, "Fatal fire renews speed hump debate," GAITHERSBURG GAZETTE, July 8, 1998 (Impact of delay caused by humps on street on rescue of child.)

Dwight Daniels, "Encinitas protesters' parked vehicles hinder laying of speed bumps," THE SAN DIEGO UNION TRIBUNE, Aug. 13, 1998

Editorial, "Meeting air standards Maine's obligation too," PORTLAND PRESS HERALD, October 17, 1997 (Ruling of EPA)

Editorial, "Street Fights," THE HOUSTON CHRONICLE, July 12, 1994 (Closures foster exclusivity rather than community.)

Dan Feldstein, "Brown has 911 gate removed," THE HOUSTON CHRONICLE, August 18, 1998 ("Closure denies emergency access.")

Dan Feldstein, "Subdivision struggles with great barrier rift," THE HOUSTON CHRONICLE, February 22, 1999

Kristen Green, "It's neighbor vs. neighbor over Santee speed bumps," THE SAN DIEGO UNION TRIBUNE, March 7, 2000

Kristen Green, "Disabled woman wins fight to remove speed bumps on her street," THE SAN DIEGO UNION TRIBUNE, May 12, 2000

Jean-Martin Kuntscher, "Speed bumps cause ten times more air pollution," ALLIANCE INTERNATIONALE DE TOURISME, FEDERATION INTERNATIONALE DE L'AUTOMOBILE, September 6, 1994

Lisa Marshall, "Circles called hazards," THE DAILY CAMERA, Boulder CO, December 12, 1996

Paul Marston, "Humps increase exhaust fumes," UK NEWS, ELECTRONIC TELEGRAPH, January 14, 1998

Bruce Nichols, "Houston hits the brakes on speed-humps," THE HOUSTON CHRONICLE, ("Deterrent for drivers raises worries about police, fire response.") August 1, 1999

Amy Reinholds, "Whittier attempts mediation ...Neighbors square off on traffic issue" THE DAILY CAMERA, Boulder CO, January 21, 1997

Amy Reinholds, "Slip-sliding away at Pine St. traffic circle", THE COLORADO DAILY, Boulder, CO, November 20, 1996

Judith Scherr, "Berkeley's bumpy battle," BERKELEY DAILY PLANET, March 27, 2000 (Berkeley Commission on Disability takes stand against humps.)

Mark Shanahan, "Federal government pulls funds from traffic-slowing experiment," PORTLAND PRESS HERALD, August 18, 1998

Matt Schwartz, "HUD labels Dian Street gate discriminatory, asks removal," THE HOUSTON CHRONICLE, October 15, 1998

Joanne B. Walker, "Speed bumps, tables meet legal obstacle," ST. PETERSBURG TIMES, August 1998 (Judge Bennett rules in favor of two Florida residents who filed suit against city for placing devices on streets used for traffic control which are not approved traffic control devices in the Manual on Uniform Traffic Control Devices.)

John Williams, "Street Warfare" (Intersection sealing brings racism calls.) THE HOUSTON CHRONICLE, July 10, 1994

John Williams, "Probe of bias and street closings looks at use of federal money," THE HOUSTON CHRONICLE, December 16, 1994

REPORTS / PAPERS

Accessible Rights-of-Way: Sidewalks, street crossings, other pedestrian facilities, U.S. Architectural and Transportation Barriers Compliance Board, U.S. Access Board, November 1999.

"All Vehicle VOC and NO_x Emission Factors by Speed, Summer and Winter," graph provided by Ron Severence, Maine Department of Environmental Protection, 1997

An Analysis of Leadership, Politics and Ethics in the Stevens Avenue Traffic Calming Project, Part III, Ethics in the Stevens Avenue Project" by Scott Landry, Scot Mattox, Sara & Celeste Vigor, May 14, 1998 (Graduate paper for Muskie Institute at University of Maine Law School)

Boulder Fire Department Master Plan, Kevin Klein for City of Boulder CO, 1996

Building a True Community Final Report, Public Rights-of-Way Access Advisory Committee, U.S. Access Board, January 10, 2001

Deaths Expected from Delayed Emergency Response Due to Neighborhood Traffic Mitigation, Ronald R. Bowman, April 3, 1997

An Evaluation of the Speed Hump Program in the City of Berkeley, October 1997 (Damage to vehicles, impact on ambulance and fire services and people with disabilities.)

Guidelines for the Design and Application of Speed Humps, Institute of Transportation Engineers, 1997

The Impacts of Traffic Calming Measures on Vehicle Exhaust Emissions, United Kingdom, Transport Research Laboratory Report 482, PG Boulter, AJ Hickman

"Motor-Vehicle-Related Deaths Involving Intoxicated Pedestrians" – United States, 1982—1992," Morbidity and Mortality Weekly Report, Vol. 43 / No. 14

911 Emergency Gate Review, Fire Chief Les Tyra, City of Houston Fire Department, November 17, 1998

Possible Neighborhood Traffic Calming Methods, Report to city council of Sunnyvale, CA, February 4, 1997 (Potential liability.)

Speed Hump/UC Plan Presentation Outline, draft report, Susan Sanderson, Transportation Planner, City of Berkeley, (Emergency response concerns from proliferation of speed humps. Humps not the tool felt they were.) 1995.

Sudden Cardiac Arrest, The American Heart Association, 1996

A Survey of Traffic Calming Practices in the United States, Institute of Urban and Regional Development by Asha Weinstein and Elizabeth Deakin, University of California at Berkeley, March 1998, (Conflict in neighborhoods.)

Stevens Avenue Traffic Calming Project, DeLuca-Hoffman Associates Inc., May 27, 1998, Portland, Maine (Increased accidents and pollution from traffic calming project.)

Traffic Calming: State of the Practice, Reid Ewing, ITE/FHWA, 1999

Traffic Calming and vehicle emissions: A literature review, Transport Research Laboratory Report 307, United Kingdom, P. G. Boulter and D. C. Webster, 1997

FEDERAL DOCUMENTS

Americans with Disabilities Act, Title II, State and Local Government, Justice regulations, 28 CFR, 35.151, "New construction and alterations."

Clean Air Act, EPA, Title 1, Part A, Air Quality and Emission Limits, Sec. 113 Federal Limits

Manual on Uniform Traffic Control Devices, Millennium Edition, USDOT/FHWA, 2000

Traffic Safety Facts 2000, National Highway Traffic Safety Administration, USDOT

TIME TRIALS

"An Analysis of Speed Hump Effects on Response Times," City of Austin, TX Fire Department, January 20, 1999

"The Effects of Speed Humps and Traffic Circles on Responding Fire-Rescue Apparatus in Montgomery County, Maryland," Montgomery County Fire and Rescue Commission, August 1997

"The Influence of Traffic Calming Devices on Fire Vehicle Travel Times," Portland Bureau of Fire, Rescue and Emergency Service, January 1996

Memorandum from Nels Tahti, Administrative Analyst, City of Roseville, CA Fire Department (Time trials on streets with series of speed humps), June 4, 1991

LETTERS

Letter from Earl Noe, "I have disabled your car ... because you have so little regard for laws," THE BOULDER PLANET, October 9 – 15, 1996 (Opponent of devices has tires slashed.)

Letter from Karen Craig, Chair, Commission on Disability, Berkeley CA to Berkeley Mayor and City Council, November 10, 1998 (Problems of the disabled with vertical deflection devices.)

Letter from Special Transit of Boulder, CO to Boulder City Council, April 3, 1997 (Problems of disabled riders with vertical and horizontal deflection devices.)

Letter from Steven Beningo, Division Transportation Planner, USDOT, to Commissioner John Melrose, Maine DOT, August 13, 1998, (Rescinds funds for Portland's traffic calming project because of increased emissions.)

LEGAL DOCUMENTS

Affidavit of Settlement for Permanent Disability for fire fighter, George Gosbee, Montgomery County, MD, 1998 (Settlement of \$ 3,000 per month for life for injury sustained when hit speed hump traveling to scene of emergency.)

Appellant's Brief in, Slager v. Duncan and Montgomery County MD to U.S. Court of Appeals, Fourth Circuit (Unpublished opinion, sets no precedent by rules of the court.)

Final Judgment, Twelfth Circuit Court of the State of Florida, June 29, 1998 (Judge Robert B. Bennet rules in favor of Windom and Hartenstine of Sarasota, FL)

Opinion of Attorney General, State of Maryland, No. 86-021, April 2, 1986 (Potential liability.)

Opinion of Thomas R. Powell, Senior Assistant City Attorney, The City of Wichita, KS April 1, 1986 (Potential liability.)

OTHER

Housing Discrimination Complaint, filed by Calvin Hummer, President, Meadow Walk Town Home Association, Houston TX, May 28, 1997

"The Other Pine Intersections," Ronald Bowman, 1996 (Graph showing increase in accidents at intersections with traffic circles on Pine St., Boulder CO.)

Program Application for CMAQ (Congestion Mitigation and Air Quality) funds from City of Portland, July 1994. (City agrees to remove temporary measures if CMAQ determines emissions are not lowered by project.)

VIDEO

"Traffic Calming Devices," 1996, Portland Bureau of Fire, Rescue and Emergency Services, 55 SW Ash St., Portland, OR 97204