

Running head: TRAFFIC CALMING – SPEED HUMPS EFFECT

Traffic Calming – Speed Humps
Effect on Emergency Response Times

Randel R. Jaeger

Des Plaines Fire Department, Des Plaines, Illinois

CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where language of others is set forth, quotation marks so indicate, and appropriate credit is given where I have used language, ideas, expressions, or writings of another.

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Abstract

In the past several years, the City of Des Plaines has received numerous requests from citizens and public officials for the installation of speed humps. They are viewed as the solution to control speeding vehicles and relieve traffic congestion in residential neighborhoods. The public's lack of knowledge of traffic calming methods has led to the requests for speed humps; when other methods may be more appropriate or beneficial to use. Since the City has no formal traffic calming policy, the requests have been denied, even though they may be valid. As more requests are being received, pressure from the public is increasing for their installation. The fire department is concerned that City will begin to approve the use of speed humps, which have a negative effect on fire apparatus response times to emergencies. Through descriptive research, this study identified the purposes for traffic calming and the most popular methods used in the Chicagoland area. The effects traffic calming has on fire apparatus response times were examined along with criteria required to develop a traffic calming policy. Literature review was conducted to better understand the subject. Surveys were conducted of Chicagoland fire departments to ascertain their experience with traffic calming. Interviews were conducted with individuals that have experience with traffic calming in their municipality. The research results concluded that traffic calming is effective and provides the regulations required to reduce the speed of vehicles and cut-through traffic in targeted areas. It also determined that speed humps absolutely effect response time of fire apparatus. The research outlines what a traffic calming policy should include to provide the desired results for all stakeholders and it is recommended that the City of Des Plaines draft a traffic calming policy.

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Introduction

When a citizen calls 911 with a fire or medical emergency, they expect and deserve a prompt response from the fire department. Most requests are time sensitive and a delay in response may be detrimental to the outcome of the incident. It is the responsibility of the fire department to analyze their response procedures and make them as effective and efficient as possible.

The term “traffic calming” has become the buzzword in the last decade throughout the nation. Speeding vehicles and/or excessive traffic traveling through residential neighborhoods in an attempt to find ways to avoid congested arterial roadways, has citizens in Des Plaines concerned for the safety of their children. For that reason, traffic calming, specifically speed humps, are being requested as a solution to control these issues.

Although traffic calming has been used and accepted in Europe for decades, its use in the United States has been limited. In recent years, the use of traffic calming has become a topic of debate and concern in many communities.

Since the City of Des Plaines has no formal traffic calming policy, the fire department is concerned that the use of traffic calming could cause delays to fire apparatus responding to emergency incidents. A delay in response could result in an undesirable outcome of the emergency and will affect the department’s response time performance goals.

Several municipalities in the nation and the Chicagoland area have implemented the use of traffic calming. It appears that some communities have successfully implemented programs with all concerned parties satisfied with the outcome. While

others communities have installed traffic calming in a haphazard process, which seems to have created undesirable results for the citizens in the neighborhood and are problematic to fire department response times.

Using descriptive research practices, the intent of this study is to answer the following questions: (1) for what purposes should traffic calming measures be utilized, (2) what types of traffic calming measures are the most commonly used in the Chicagoland area, (3) what types of traffic calming are the most disruptive to emergency response times of fire apparatus, and (4) what contents should be included in a policy to implement traffic calming measures in the City of Des Plaines?

A survey of fire departments in the Chicagoland area will be conducted to collect data concerning the implementation, use, and the issues of traffic calming used in their communities. Interviews will be performed with individuals responsible for traffic calming within their municipalities to understand their approach and to ascertain what guidelines they used for their decisions to utilize traffic calming. A literature review will be conducted to better understand the use and benefits of traffic calming, the impact on emergency response times of fire apparatus, and any unexpected issues - either positive or negative - that resulted from its use.

In summary, it appears that the public considers traffic calming as a solution to provide safer streets in their neighbors from speeding vehicles and increased traffic. The fire department is concerned about the negative influence speed humps may have upon emergency apparatus response times. The intent of this research is to determine the purpose of traffic calming, when and where it should be used, what methods, if any, are disruptive to emergency response, and what guidelines should be used for the City

of Des Plaines to create a policy that will provide a sound traffic calming program for the community.

Background and Significance

The City of Des Plaines was incorporated in 1835 and is located in the northwest suburbs of Chicago and abuts O'Hare International Airport on its northern border. The City is comprised of manufacturing, office, retail, and residential districts. The City is densely populated with approximately 57,008 people in a 16 square mile area (CityData.com).

Over the past twenty years, the Des Plaines Fire Department (DPFD) has experienced a dramatic increase in emergency responses primarily due to emergency medical requests. The number is expected to increase in the future due to the aging baby boomers and an expected increase in population in the city over the next twenty years. As noted in the DPFDD Annual Report (2007), In 2003, the fire department responded to a total of 6681 emergency calls, of which 4790 were medical requests, compared to 2007, when total emergency response were 7648 calls, of which 5038 were medical requests (p. 14).

The City of Des Plaines established in 1989, the Staff Traffic Advisory Committee (STAC). The purpose of STAC is to review traffic and parking issues within the City and make recommendations to correct any and all issues pertaining to those matters. The membership of STAC is made up of the Director of Engineering (Chairman), Police Chief, Fire Chief, Director of Public Works, and the City Attorney.

In recent years, STAC has received numerous requests from citizens and public officials for the installation of speed humps throughout the City. It is apparent to the

members of STAC that the public's lack of knowledge of other types of traffic calming measures available has led to the increased requests for speed humps, in which case, other types of traffic calming methods may be more appropriate or beneficial to use.

To further complicate the issue is the limited knowledge that STAC members have concerning traffic calming and the lack of guidance they have to make decisions to employ its use. STAC is reluctant to suggest traffic calming measures even though the request may be valid. This is due in part, to the City not having a traffic calming policy in place. However, in two areas of the City, STAC has recommended and approved the use of lane striping in an attempt to reduce vehicle speeds on an experimental basis.

As more requests are being received by STAC for speed humps, pressure from the community is increasing for their installation. Since the fire department has only one vote on the STAC committee, the fire department is concerned that STAC will begin to approve the use of speed humps and other traffic calming methods without analyzing the impact they may have upon fire apparatus response times.

The fire department agrees that in certain instances traffic calming measures could be beneficial. The fire department would like STAC to develop a comprehensive traffic calming policy that will address all aspects of the issues and are not detrimental to the response times of fire apparatus.

In 2005, the City of Des Plaines contracted with Emergency Services Consultants Incorporated (ESCI) to perform a study that would analyze current staffing, apparatus, and fire station locations based upon a response objective of six minutes or less to ninety percent of all emergency requests.

In 2006, ESCI issued their report, Des Plaines Fire Department Deployment Study, and recommended five different scenarios that offered various solutions and costs in an attempt to achieve the desired response time objectives. The fire department staff recommended to the City Council, one of the five recommended solutions to utilize. Currently, the fire department response time performance is six minutes or less to seventy-four percent of all calls and the proposed solution estimated an achievable response time of six minutes or less to eighty-three percent of all calls (Kouwe, 2006, p. 89).

Another concern to the fire department is the amount of rail and motor vehicle traffic within the city limits. There are three major rail lines that dissect the City of Des Plaines. All three handle a large volume of the rail traffic that enters the Chicagoland area. This accounts for thirty-two active at grade rail crossings located within the Des Plaines community. Fire apparatus regularly experiences time delays caused by rail traffic.

The ESCI study confirmed the anticipated increase in rail traffic in the coming years and the associated projected delays to vehicular traffic. Specifically stated was “the City’s fire department experiences a total of 2,476 minutes of delay annually, a figure that is equivalent to over forty-one hours of annual delay” (Kouwe, 2006, p. 64). The study further projects that by the year 2020, “the City’s fire department will experience a total of 5,519 minutes of response delay annually, a figure equivalent to over ninety-two hours of delay annually” (Kouwe, 2006, p. 64).

Motor vehicle traffic congestion experienced in the City of Des Plaines is also a concern of the fire department. Two major Interstate Highways I-94 and I-294 both

travel through the City, as does state routes, 12, 14, 45, 58, and 83. Traffic congestion within the City of Des Plaines is becoming unbearable which is also adding to the fire department concerns with response times.

The fire department has made some conscious efforts to counteract response time delays due to increased traffic congestion. Over the past 15 years, traffic pre-emptive devices (opti-com) have been installed throughout the City on most traffic signals and the last few are scheduled to be completed at the end of 2008. This system allows fire apparatus, equipped with the emitters, to control traffic signals that they are approaching. This turns the light green in the direction of travel and clears the intersection of traffic prior to the fire apparatus entering the crossing. This increases safety at the intersection for motorist and pedestrians. It also allows the responding fire apparatus to proceed through the intersection at a reasonable rate of speed, which results in an improved response times.

The significance of this research project to the Des Plaines Fire Department is clear. Since the fire apparatus are already experiencing unreasonable response time delays due to rail traffic and motor vehicle congestion, the possibility of compounding that delay by using inappropriate traffic calming is inconceivable. If traffic calming measures are going to be approved by STAC for the Des Plaines community, it is imperative that the type of methods used will have no impact or be the least disruptive to the response times of fire apparatus responding to emergencies. Furthermore, the City of Des Plaines should benefit by the development of a comprehensive traffic calming policy, which should address all of issues of concerned parties.

This study directly relates to and supports the USFA operational objective, to promote within the community a comprehensive, multihazard, risk reduction plan, and responding in a timely manner to emerging issues.

Literature Review

Traffic calming encompasses many different methods and can incorporate various types of devices in an effort to provide safer streets for pedestrians and motorists. Traffic calming has been defined by a subcommittee of the Institute of Transportation Engineers (ITE) as “Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users” (Ewing, 1997, p. 2). Furthermore, “Traffic calming measures rely on the laws of physics rather than human psychology to slow down traffic” (Ewing, 1997, p. 3).

In the City of Des Plaines, the majority of requests for speed humps come from citizens concerned about motorized vehicles exceeding the posted speed limit in their residential neighborhoods. Many citizens are taking a proactive stance rather than a reactive one regarding traffic calming. This was noted by Noyes & Associates:

Traffic calming addresses the too many cars, going too fast past my house, concern expressed by an increasing number of residents. This concern includes the blatant disregard for posted speed limits on residential streets, drivers diverting off congested arterial streets onto neighborhood streets; safety concerns associated with speed and cut-through traffic issues; environmental impacts of speed and volume (primarily noise); and the desire to address these issues in a manner that will improve neighborhood quality of life (1998, p. 1).

However, traffic calming is not limited to residential neighborhoods. In the United States, roads are generally classified as arterials, collectors, and local streets. “Area wide traffic calming schemes seek to calm both main roads and the residential roads in areas so as to ameliorate the impact of any traffic transfer as a consequence of traffic calming” (Siu, 2002, ¶1.4).

It is important to note that traffic calming differs from traffic regulations. “Traffic control devices, notably stop signs and speed limit signs, are regulatory measures that require enforcement. By contrast, traffic calming measures are intended to be self-enforcing” (Ewing, 1999, p. 2).

There are usually several issues of concern that evoke a request for traffic calming. Speeding vehicles racing down local streets, traffic cutting through neighborhoods attempting to avoid traffic congestion on arterials that cannot handle the traffic demand or to circumvent construction areas, and traffic collision reduction. Depending upon the climate in the area some of those issues are cyclical. According to Beaubien (1998) “the Northern Hemisphere climates will automatically see a reduction in speeding vehicles on local street because of the winter months between November and March” (p. 4)

Once a traffic issue is identified and analyzed, then a course of action can be considered. There are three major categories of traffic calming measures used to control speed: vertical measures, horizontal measures, and narrowing or the perception of narrowing of the roadway (Ewing, 1999, p.31).

“Vertical deflections include raised crosswalks, raised intersections, sidewalk extensions, speed humps and tables, and textured crosswalks. Reducing traffic speed

is a more likely result of vertical deflections than is a reduction of traffic volume” (American Public Works Association [APWA], 2007, p. 11). Horizontal deflections causes a driver to reduce speed by limiting the driver’s line of sight and making them steer around horizontal curves. Horizontal deflections include; chicanes traffic circles, and curb extensions. (APWA, 2007, p.21).

Narrowing of roadways cause a driver to reduce speed because of the perceived limited area they create for the vehicle and distractions they cause to the human senses usually caused by “plantings, street furniture, or other vertical elements to draw attention to the constriction and visual bound space” (Ewing, 1999, p.39).

By far the most common type of traffic calming is the speed hump. Ewing and Kooshiam (2008) found “The predominance of speed humps, as traffic calming measures, is confirmed by a recent ITE survey in which 84 of 165 responding agency’s throughout North America, indicated their use of humps” (p. 4). Speed humps are easily installed, cost effective, and are proven to cause a reduction in speed to vehicles approaching and traveling over the device. The most common speed hump is usually 12 feet in length and 3 to 4 inches tall with a rounded, flat, or parabolic shaped top (Johnson & Nedzesky, 2004). This is most commonly installed on residential streets and is intended to maintain the speed of vehicles within the 15 to 25 MPH range. A survey conducted by McCourt (1998), indicated that speed humps appear to produce the greatest speed reduction followed by traffic circles and narrowed streets (p. 3). However, “regular repetition of calming devices at 400 ft and 600 ft intervals is required to maintain slower speeds along the length of a street” (Walter, 1995, p. 48).

Portland Oregon has successfully tested a program to use speed humps on arterials and collector streets as well as local streets. Oregon law permits fire and emergency vehicles to use any portion of the street they need when responding to an emergency, including using the opposing traffic lanes. The City successfully tested a chicane using two halves of a 22-foot speed hump, separated by a distance that allowed fire vehicles to maneuver around the speed humps and into on-coming traffic (West, 2000, p. 2).

The main public opponent to traffic calming is usually the local fire departments. The trend in the fire service is the adoption of response time performance standards. It is common knowledge in the fire service that an expedient response to fire and medical emergencies increases the successful intervention of services provided.

A study was conducted by the Portland Bureau of Fire, Rescue, and Emergency Services (1996) where speed humps and traffic circles are commonly used. The results of their research found that, traffic circles caused a delay of 1.3 to 10.7 seconds, 14 foot humps caused delays of 1.0 to 9.4 seconds, and 22 foot humps caused 0.0 to 9.2 seconds of delay for each hump encountered and depending on the length and weight of the apparatus (p. 4). The Phoenix, Arizona Fire Department also had concerns when traffic calming was being introduced into their City. The traffic calming policy that was adopted by the City does not permit the use of traffic calming on arterials and collector streets, or streets that are routinely used by emergency vehicles (Dittberner, 1998, p. 5).

There is another group that is also concerned with traffic calming. Americans Against Traffic Calming (AATC) – is a website produced in Austin, Texas and promotes that citizens from all walks of life put out the call for much needed traffic calming

“reform”. This site has many different websites links to people and organizations against the use of traffic calming because of the negative affects it has upon the handicapped, people with medical conditions, and emergency response times (AATC, Website, Homepage).

When a community is looking to implement a traffic calming solution, they must address two basic issues, “Identify the nature and extent of traffic related issue on a given street or in a given area” and “selecting and implementing cost-effective measures for solving identified problems” (Ewing, 1999, p. 17). The City of West Palm Beach identified that traffic calming was an important part of their city’s redevelopment plan, which also contributed to a reduction in crimes related to drugs and prostitution. “Slower speeds on streets, increase in pedestrian traffic caused a natural surveillance to occur in the traffic calming areas” (Lockwood, & Stillings, 1998).

There are other devices that can compensate for the negative impact caused by speed humps and should also be considered to some extent when developing a traffic calming program. A study conducted by the Portland Bureau of Fire, Rescue, & Emergency Services (1996) stated “Traffic signal preemption devices, the locating of new fire stations, fire vehicle modifications to minimize weight-to-horsepower ratios, securing and cushioning certain pieces of equipment, and improving vehicle suspensions” (p. 5).

Many local police departments are using portable speed trailers, photo radar detectors, and installing red light camera enforcement. All three are becoming very popular to enforce motor vehicle laws (McCourt 1998). In Gwinnett County, Georgia, speed watch programs are being used to enforce speed limits in residential

neighborhoods. This program relies on citizen in a specific neighborhood to work together and enforce speed limits through community effort and peer pressure (Womble, 1990, p.16 & 17).

In summary, traffic calming is self enforcing and provides for pedestrians safety by reducing speeding vehicle and cut-through traffic. Although mainly used on local streets in residential neighborhoods, it can be used on arterials and collector streets as well. Prior to implementing traffic calming, studies should be conducted to validate the need. There are three major categories of traffic calming: vertical measures, horizontal measures, and narrowing of the roadway. By far the most common type of traffic calming is the vertical deflection (speed hump). Fire Departments are concerned that traffic calming will negatively effect emergency response times as illustrated in the study conducted by the Portland Fire Department. Other opponents against traffic calming are the disabled and people with medical conditions that it affects. The use of newer traffic devices and technology can be used in place of traffic calming and/or to compensate for the delays it causes. Requests for traffic calming have to be evaluated and justified prior to the installation of a traffic calming method.

Procedures

This project began with the author's review of various literature regarding the development and use of traffic calming methods. The literature was obtained through the Learning Resource Center at the National Fire Academy, Des Plaines Public Library, and through extensive searching on the Internet.

A survey was developed and sent to fire chiefs of 50 fire departments in the Chicagoland area via an on-line survey provider, Survey Monkey (see Appendix A).

The questions will attempt to ascertain information needed to answer the research questions (see Appendix B, & C).

This study investigated speed humps used in the neighboring communities of Mt. Prospect and Park Ridge, Illinois. Time studies were not conducted to determine the extent of delay caused, because it was self evident. The speed limit on the street where the tests were conducted is 25 MPH and the speed limit to traverse the speed hump is posted at 15 MPH.

Rather, a test was conducted to determine if fire apparatus could safely drive over the speed humps at the posted speed limits indicated for the hump. A 2005, ford explorer, a 1994, Darley fire engine which weighs 53,000 pounds and carries 750 gallons of water, and a 2000, ford E-450 ambulance were used to drive over the speed humps at the posted speed of 15 MPH on streets with a posted speed limit of 25 MPH.

In the Mt. Prospect test, the vehicles were driven on See Gwun Avenue between Lonquist and Golf Road. The Park Ridge study was conducted on Meacham Avenue between N.W. Highway and Elm Street.

On Wednesday, October 22, 2008, at 1:45 P.M., Mathew Lawrie, traffic engineer of the Village of Mount Prospect was interviewed. Questions were asked to ascertain the history of traffic calming in his community and the effectiveness of the speed humps installed on See Gwun Avenue (see Appendix D).

On Thursday, October 23, 2008, at 3:15 P.M., Wayne Zingshiem, Director of Public Works of Park Ridge was interviewed. The same questions were asked to determine the history of traffic calming in his community and the issues regarding the speed hump installed on Meacham Avenue.

The same three vehicles used in the Mt. Prospect and Park Ridge experiments were used in the City of Des Plaines to determine if the traffic circle located at Golf Road and Wolf Road had any effective on response times, as well as the lane striping that was installed on Thacker Street between First Street and Wolf Road.

This research project was limited by the author's inability to fully analyze the entire scope of the project. Only speed humps, lane striping, and a traffic circle were evaluated. Since there are so many different methods of traffic calming, this study concentrated on these three because: (a) two of the three, humps and striping, are the most commonly used traffic calming devices in the Chicagoland area and (b) a traffic circle exists in the City of Des Plaines. Many of the other types of traffic calming methods, e.g., chicanes, raised intersections, and roundabouts, were not located in the Chicagoland area so their effects on fire apparatus response could not be analyzed.

Results

Through descriptive research, the results of a survey of fifty fire departments in the Chicagoland area, tests conducted by the author on speed humps, lane striping, and a traffic circle, information and evidence was obtained to answer the research questions.

The results confirmed that traffic calming in the Chicagoland area is primarily used for two reasons: (a) to be a self enforcing traffic regulating method used to control the speed of vehicles and (b) used to discourage drivers from using certain roadways as a cut-through to avoid traffic congestion on major arterials streets. Of the 50 departments surveyed, the results indicated that 19 of the 25 communities that responded to the survey use some form of traffic calming for this purpose.

The research also indicated that traffic calming methods are primarily used on local streets in residential neighborhoods. This is consistent with the research, which indicated that the majority of the requests for traffic calming originated from residents. Mathew Lawrie, traffic engineer for Mt. Prospect, indicated that the majority of the residents on See Gwun Avenue requested speed humps to be installed to reduce cut through traffic and the speeding of vehicles on their street. After the humps were installed, studies were conducted and revealed that there was a 50% displacement of traffic to parallel streets that did not have traffic calming in place and residents found the speed humps to be a nuisance. Within one-year of their installation, an overwhelming number of the citizens that requested the speed humps changed their mind and are now requesting that they be removed. The City of Mt. Prospect is in the process of evaluating other traffic calming methods, narrowing of the roadway, e.g., extended curbs, lane striping, and the use of extensive vegetation to replace the speed humps.

Wayne Zingshiem, Public Works Director of Park Ridge confirmed that the majority of the residents living in areas where speed humps were installed requested the installations. Park Ridge is in the process of analyzing their impact on the community.

The traffic circle in the City of Des Plaines is one instance where traffic calming is used on and arterials and collector streets. This circle has been in place since 1928 and two main arterials converge as well as three collector streets. The survey results indicated that the City of Evanston prohibited the use of traffic calming methods on designated emergency traffic routes. These are paths that are used frequently by

emergency response vehicles and are generally arterial and collector streets or routes to hospitals.

The results of the survey indicated that 68% of the departments who responded to the survey indicated that speed humps and lane striping are the two most common methods of traffic calming used in the Chicagoland area. Curb extensions and raised medians each accounted for 47%, followed by traffic circles at 21%.

The results of this study indicated that speed humps is the most disruptive traffic calming device to emergency apparatus response times in comparison to a traffic circles and lane striping. In the studies conducted, the ford explorer could safely travel over the speed hump at the posted indicated speed limit of 15 MPH, however, there was some minor discomfort to the vehicle occupants and loose objects in the back of the vehicle were tossed about slightly. The fire engine went over the speed hump at the posted limit, which was much too fast for that size and weight of vehicle. The suspension of the apparatus did not absorb the shock of the hump as expected. This resulted in the driver of the vehicle, who was secured by a three point seatbelt, to experience extreme discomfort. Items in the vehicle that were not secured were tossed about the cab and within the storage compartments. The same results were experienced using the ambulance. On a second attempt at 10 MPH, the engine and ambulance were still affected by the hump to only a slightly less degree. On a third attempt at 5 MPH the engine and ambulance drove over the speed hump and the results were satisfactory and the shock to the driver and apparatus were within acceptable limits.

The research concluded that speed humps will cause fire apparatus response times to increase for two reasons, (a) the speed limit of the street is 25 MPH and the posted speed limit to travel over the hump is 15 MPH, and (b) the humps appear to be designed for cars to travel over the hump at the posted speed limit, not for the weight and size of the fire apparatus.

The research as revealed the due to the weight and size of fire apparatus there was increased wear and tear on the vehicles suspension and in extreme circumstances have injured firefighters riding on the vehicles. Two of the survey respondents, Hoffman Estates and the City of Evanston reported severe damage (over \$1,000) to fire apparatus, specifically ladder truck suspension, due to speed humps. The City of Evanston and Village of Mount Prospect each reported one minor injury to personnel who hit their heads on the roof of the apparatus cab due to traveling over a speed hump.

The City of Des Plaines has a traffic circle located on Golf Road that is classified as an arterial roadway. Although this circle creates traffic back-ups during rush hour, studies conducted demonstrated that it had no more of an impact on response times than any other arterial intersection. In fact, when approaching the circle the driver's line of sight to crossing traffic is much better than a typical intersection. All three test vehicles slowed down approaching the circle to 15 MPH and proceed through without any issues. It appears that the traffic circle is a very efficient traffic device. The City of Naperville's survey response indicated their time studies demonstrated that traffic circles have little to no impact on response times in residential areas.

The perception of and the narrowing of roadways appears to be one of the most desired and common methods of traffic calming in the Chicagoland area. The survey results indicated that 65% of communities use lane striping. Since fire department personnel are well acquainted with their communities, this method of traffic calming has little, if any effect, on response times. Tests conducted in Des Plaines with the Explorer, fire engine, and ambulance demonstrated that a driver acquainted with these methods can navigate them without a reduction in the posted speed limit.

What was interesting and also alarming in the survey results was the answer to the question that asked if departments evaluated the effect traffic calming is having on response times. Only 21% of the department's stated they did conduct test compared to 79% that didn't.

Concerning the establishment of a traffic calming policy, the survey indicated that of the 19 communities that use traffic calming, only seven (37%) have a formal traffic calming policy in place. Of those seven, all defined what methods and types of traffic calming devices can be used and also indicated departments within their community that need to be consulted prior to installing a traffic calming method. Six stated who can request traffic calming and where it can be used, five had policies that prioritize requests for the implementation of traffic calming, defined who paid for the study and installation, and what studies needed to be conducted prior to the implementation.

Discussion

Traffic calming is a very complex topic because it touches on so many different and various issues. The human factor is the first, and by far, the most complicated subject of all. Citizens want to feel safe in their neighborhoods. They should not have to

worry about their children safety and fear that a speeding vehicle may strike them. Nor should not have to tolerate the increased volume of traffic that is created by cut through traffic in their area because of arterial and collector streets that can't handle the traffic demands of the municipality as noted by Noyes & Associates (1998, p. 1).

Fire departments are concerned with the negative effects certain types of traffic calming methods have on response times, the possible damage to expense apparatus, and possible injury to personnel riding on responding vehicles. This research has demonstrated that speed humps are detrimental to all of the above and are the most widely used in the Chicagoland area. Lane striping appears to cause no time delays.

Concerning traffic circles, the result of this research conflicts with the time studies performed by Portland Bureau of Traffic Management (1996), which indicated fire apparatus, experienced delays of up to a 10.7 seconds. This illustrates that each community must use caution when considering the use of this method and project time studies on the design and size of traffic circle it wishes to use.

Another note of concern speed humps cause is that pertaining to the transportation of the sick and injured. The AATC is very concerned about the methods of traffic calming used and the affects they have on people with spinal and cervical injuries. I would agree with their concerns. Ambulances transporting patients, especially on backboards with suspected back or spinal injuries should avoid streets with speed humps. If that is not possible, the driver should first come to a complete stop prior to the hump and then proceed over at the lowest speed possible.

There is also the issue of how to deal with the requests for traffic calming from the citizens and elected officials. Realistically, there would be no need for such devices

if everyone obeyed the posted speed limits and/or waited in traffic. However, such is not the case; hence traffic calming is a man-made problem that will cost citizens throughout the United States that choose to pursue this option, millions of dollars to implement.

It is apparent from the research conducted that for a municipality to successfully implement a traffic calming program, a comprehensive traffic calming policy must be developed prior to implementation. This policy should address all stakeholder concerns and define parameters of the program as noted in the publication, Traffic Calming: “State of the Practice” (Ewing, 1999, p. 17).

Other types of self regulatory devices are starting to appear, such as the police department’s use of speed trailers, camera radar, and red light enforcement (McCourt, 1999, p. 5). This is a very effective tool that is being utilized at arterial and collector street intersections to help increase pedestrian safety and reduce the number of accidents. This could become a popular method used for traffic calming in residential neighborhoods in the future that also provides a crime prevention aspect at the same time.

Recommendations

The research suggests that traffic calming is an issue that many municipalities are or will have to address. Traffic calming can be successfully implemented and provide the desired results if approached in a sensible manner with all stake holders concerns addressed. To provide a successful traffic calming program there has to be both citizen and local government involvement in the development and implementation of a policy.

It is recommended that the City of Des Plaines STAC committee members first educate themselves with all aspects of traffic calming. Once this is accomplished, the committee should draft a policy for traffic calming for the Des Plaines community. Based on the research, the policy should include the following criteria:

1. Public education – the majority of citizens are not aware of the pros and cons to using traffic calming. Moreover, there is a lack of knowledge of the many different traffic calming methods available. Municipalities should take the time to ensure that their residents understand traffic calming in its entirety.
2. Request/Application process – there needs to be a formal means to request a traffic study in a designated neighborhood.
3. Evaluation process - Once an application is received, there must be a formal evaluation process in place to determine if the request is valid. Time and volume studies need to be conducted to demonstrate a need for this type of intervention.
4. Approved devices – what type of devices will the municipality approve and not approve and the reasons for the decisions. Fire department concerns pertaining to traffic calming methods that are detrimental to response time objectives need to be addressed.
5. Installation process – a time line for installation needs to be addressed. There may be a need for a prioritization process depending on the funds available, and based on the severity of the need.
6. Funding source – how is the project going to be funded?

7. Evaluation period – is the traffic calming method producing the effects desired?
8. Procedure for removal – Parameters must be established to address request for the removal of installed traffic calming methods.
9. Future development – incorporate anticipated traffic calming needs into future City developments.

Once this policy is drafted, it will be extremely important to educate the elected officials and citizens regarding all aspects of the policy. At this time, it is in draft form, meetings should take place to receive input from the elected officials, citizens, business community, and other concerned parties. Once this is completed, the draft policy should be finalized and implemented.

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Appendix A

Fire Departments Surveyed

Addision Fire Department	Palatine Rural Fire Protection District
Arlington Heights Fire Department	Park Ridge Fire Department
Aurora Fire Department	Rolling Meadows Fire Department
Bolingbrook Fire Department	Rosemont Public Safety
Buffalo Grove Fire Department	Saint Charles Fire Department
Crystal Lake Fire Department	Schaumburg Fire Department
Downers Grove Fire Department	Skokie Fire Department
Elgin Fire Department	Wheaton Fire Department
Elk Grove Fire Department	Wheeling Fire Department
Elk Grove Township Fire Department	Wilmette Fire Department
Evanston Fire Department	Winnetka Fire Department
Geneva Fire Department	Wood Dale Fire Protection District
Glencoe Public Safety	
Glenview Fire Department	
Gurnee Fire Department	
Hanover Park Fire Department	
Highland Park Fire Department	
Highwood Fire Department	
Hoffman Estates Fire Department	
Itasca Fire Protection District	
Joliet Fire Department	
LaGrange Fire Department	
LaGrange Fire Protection District	
Libertyville Fire Department	
Lincolnwood Fire Department	
Lisle Woodridge Fire Protection District	
Morton Grove Fire Department	
Mount Prospect Fire Department	
Mundelein Fire Department	
Naperville Fire Department	
Niles Fire Department	
North Maine Fire Protection District	
Northbrook Fire Department	
Northfield Fire Department	
Oak Park Fire Department	
Oaklawn Fire Department	
Orland Park Fire Protection District	
Palatine Fire Department	

Appendix B
Survey Questions

Traffic Calming- Fire Departments

1. Default Section

My name is Randy Jaeger, Fire Chief for the Des Plaines Fire Department in Illinois. Currently, I am enrolled in the Executive Fire Officer Program (EFOP) at the National Fire Academy and I am conducting a survey on traffic calming measures used by municipalities for a research project. The purpose of this research is to: a) analyze the various types of traffic calming methods available and used by municipalities, b) determine if municipalities have traffic calming policies, and c) determine what issues, both positive and negative, that are associated with traffic calming.

The results of this research will also be used by the City of Des Plaines Fire Department to make recommendations to the City's "Staff Traffic Advisory Committee" concerning the use of traffic calming measures within the City.

Your response is highly appreciated and I will forward a copy of the results to you in a timely manner. Please complete this survey no later than August 15, 2008.

Definition of "Traffic Calming" according to the Institute of Transportation Engineers (ITE) - "Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users". Furthermore, "Traffic calming measures rely on the laws of physics rather than human psychology to slow down traffic".

1. Please provide the following information.

Name:

Department:

Address:

City/Town:

State:

ZIP/Postal Code:

Email Address:

Phone Number:

2. Does your community employ the use of traffic calming measures?

- Yes
- No

Traffic Calming- Fire Departments

2. Continue Survey

1. Approximately, how long has your community used traffic calming measures?

- 1 - 5 Years
- 6 - 10 Years
- 11 - 15 Years
- 16 - 20 Years

2. Does your community have a policy in place for the use of traffic calming?

- Yes
- No

3. If you answered yes to the above question, does the policy address the following?

Check all that apply.

- Who can request traffic calming.
- How to prioritize request of traffic calming.
- Where traffic calming can and cannot be used.
- What types of traffic calming can be employed.
- Who pays for the traffic calming.
- What studies need to be conducted prior to the implementation of traffic calming.
- What other municipal departments need to be consulted prior to the approval of traffic calming.
- NA

Traffic Calming- Fire Departments

4. What types of traffic calming measures are used in your community? Please check all that apply.

- Roundabouts
- Traffic Circles
- Speed Humps
- Raised Crosswalks & Intersections
- Lane Striping
- Curb Extensions
- Chokers
- Chicane/Lateral Shift
- Diverters
- Raised Medians

Other (please specify)

5. Which type of traffic calming is used the most in your community and please explain for what reason.

6. Has your department conducted any testing to evaluate the effect traffic calming is having on response times to emergency calls?

- Yes
- No

If yes - (please specify type of traffic calming device and time delay it caused.)

Traffic Calming- Fire Departments

7. In your opinion, what effect is traffic calming having in your community?

- Very Positive
- Positive
- Neutral
- Negative
- Very Negative

Any Comments?

8. Has your fire department experienced any damage to apparatus due to traffic calming measures?

- Yes - severe damage (Repairs over \$1,000)
- Yes - minor damage (Repairs \$999 or <)
- No

What type of measure was involved in the incident, what type of vehicle, what was the damage?

9. Has your fire department experienced any injuries to fire personnel riding in apparatus that were the result of traffic calming measures?

- Yes - significant Injury (off duty for more than 5 days)
- Yes - minor Injury (off duty less than 5 days)
- No

What type of measure was involved in the incident, what type of vehicle, what was the injury?

10. What unforeseen issues (either positive or negative) have surfaced since the implementation of traffic calming in your community?

Traffic Calming- Fire Departments

11. Does your Department have an established response time standard? (This includes: time emergency call is received and processed, call is toned out, turn out time to apparatus, and ends when the responding apparatus wheels stop at the location of the call). If so, please check the appropriate response.

- No
- Yes - 7 minutes or less to 90% of all calls
- Yes - 7 minutes or less to 85% of all calls
- Yes - 6 minutes or less to 90% of all calls
- Yes - 6 minutes or less to 85% of all calls
- Yes - 5 minutes or less to 90% of all calls
- Yes - 5 minutes or less to 85% of all calls

Other (please specify)

12. To what extent has your department's response time standards been impacted by the use of traffic calming measures in your community?

- Substantial positive effect
- Slightly positive effect
- No effect at all
- Slightly negative effect
- Substantial negative effect

Comments

Traffic Calming- Fire Departments

3. Exit Question

1. Thank you for your assistance with this survey. Are you

- Having a great day!
- Having a so so day!
- Not having a good day!

Appendix C
Survey Results

Traffic Calming- Fire Departments

1. Please provide the following information.

		Response Percent	Response Count
Name:	<input type="text"/>	100.0%	25
Department:	<input type="text"/>	100.0%	25
Address:	<input type="text"/>	100.0%	25
City/Town:	<input type="text"/>	100.0%	25
State:	<input type="text"/>	100.0%	25
ZIP/Postal Code:	<input type="text"/>	100.0%	25
Email Address:	<input type="text"/>	100.0%	25
Phone Number:	<input type="text"/>	100.0%	25
		answered question	25
		skipped question	0

2. Does your community employ the use of traffic calming measures?

		Response Percent	Response Count
Yes	<input type="text"/>	76.0%	19
No	<input type="text"/>	24.0%	6
		answered question	25
		skipped question	0

3. Approximately, how long has your community used traffic calming measures?

		Response Percent	Response Count
1 - 5 Years	<input type="checkbox"/>	50.0%	9
6 - 10 Years	<input type="checkbox"/>	33.3%	6
11 - 15 Years	<input type="checkbox"/>	11.1%	2
16 - 20 Years	<input type="checkbox"/>	5.6%	1
		answered question	18
		skipped question	7

4. Does your community have a policy in place for the use of traffic calming?

		Response Percent	Response Count
Yes	<input type="checkbox"/>	36.8%	7
No	<input type="checkbox"/>	63.2%	12
		answered question	19
		skipped question	6

5. If you answered yes to the above question, does the policy address the following? Check all that apply.

		Response Percent	Response Count
Who can request traffic calming.	<input type="checkbox"/>	66.7%	6
How to prioritize request of traffic calming.	<input type="checkbox"/>	55.6%	5
Where traffic calming can and cannot be used.	<input type="checkbox"/>	66.7%	6
What types of traffic calming can be employed.	<input type="checkbox"/>	77.8%	7
Who pays for the traffic calming.	<input type="checkbox"/>	55.6%	5
What studies need to be conducted prior to the implementation of traffic calming.	<input type="checkbox"/>	55.6%	5
What other municipal departments need to be consulted prior to the approval of traffic calming.	<input type="checkbox"/>	77.8%	7
NA	<input type="checkbox"/>	22.2%	2
		answered question	9
		skipped question	16

6. What types of traffic calming measures are used in your community? Please check all that apply.

		Response Percent	Response Count
Roundabouts	<input type="checkbox"/>	5.9%	1
Traffic Circles	<input type="checkbox"/>	29.4%	5
Speed Humps	<input checked="" type="checkbox"/>	64.7%	11
Raised Crosswalks & Intersections	<input type="checkbox"/>	5.9%	1
Lane Striping	<input checked="" type="checkbox"/>	64.7%	11
Curb Extensions	<input type="checkbox"/>	47.1%	8
Chokers	<input type="checkbox"/>	11.8%	2
Chicane/Lateral Shift	<input type="checkbox"/>	5.9%	1
Diverters	<input type="checkbox"/>	17.6%	3
Raised Medians	<input type="checkbox"/>	47.1%	8
		Other (please specify)	5
		answered question	17
		skipped question	8

7. Which type of traffic calming is used the most in your community and please explain for what reason.

	Response Count
	18
answered question	18
skipped question	7

8. Has your department conducted any testing to evaluate the effect traffic calming is having on response times to emergency calls?

		Response Percent	Response Count
Yes	<input type="text"/>	21.1%	4
No	<input type="text"/>	78.9%	15
If yes - (please specify type of traffic calming device and time delay it caused.)			5
answered question			19
skipped question			6

9. In your opinion, what effect is traffic calming having in your community?

		Response Percent	Response Count
Very Positive		0.0%	0
Positive	<input type="text"/>	33.3%	6
Neutral	<input type="text"/>	61.1%	11
Negative		0.0%	0
Very Negative	<input type="text"/>	5.6%	1
Any Comments?			3
answered question			18
skipped question			7

10. Has your fire department experienced any damage to apparatus due to traffic calming measures?

	Response Percent	Response Count
Yes - severe damage (Repairs over \$1,000) <input type="checkbox"/>	10.5%	2
Yes - minor damage (Repairs \$999 or <) <input type="checkbox"/>	0.0%	0
No <input checked="" type="checkbox"/>	89.5%	17
What type of measure was involved in the incident, what type of vehicle, what was the damage?		3
answered question		19
skipped question		6

11. Has your fire department experienced any injuries to fire personnel riding in apparatus that were were the result of traffic calming measures?

	Response Percent	Response Count
Yes - significant Injury (off duty for more than 5 days) <input type="checkbox"/>	0.0%	0
Yes - minor Injury (off duty less than 5 days) <input type="checkbox"/>	10.5%	2
No <input checked="" type="checkbox"/>	89.5%	17
What type of measure was involved in the incident, what type of vehicle, what was the injury?		2
answered question		19
skipped question		6

12. What unforeseen issues (either positive or negative) have surfaced since the implementation of traffic calming in your community?

	Response Count
	14
answered question	14
skipped question	11

13. Does your Department have an established response time standard? (This includes: time emergency call is received and processed, call is toned out, turn out time to apparatus, and ends when the responding apparatus wheels stop at the location of the call). If so, please check the appropriate response.

		Response Percent	Response Count
No	<input type="checkbox"/>	16.7%	3
Yes - 7 minutes or less to 90% of all calls	<input type="checkbox"/>	11.1%	2
Yes - 7 minutes or less to 85% of all calls	<input type="checkbox"/>	5.6%	1
Yes - 6 minutes or less to 90% of all calls	<input checked="" type="checkbox"/>	38.9%	7
Yes - 6 minutes or less to 85% of all calls	<input type="checkbox"/>	11.1%	2
Yes - 5 minutes or less to 90% of all calls	<input type="checkbox"/>	11.1%	2
Yes - 5 minutes or less to 85% of all calls	<input type="checkbox"/>	5.6%	1
	Other (please specify)		1
	answered question		18
	skipped question		7

14. To what extent has your department's response time standards been impacted by the use of traffic calming measures in your community?

	Response Percent	Response Count
Substantial positive effect	0.0%	0
Slightly positive effect	0.0%	0
No effect at all	58.8%	10
Slightly negative effect	41.2%	7
Substantial negative effect	0.0%	0
	Comments	3
	answered question	17
	skipped question	8

15. Thank you for your assistance with this survey. Are you

	Response Percent	Response Count
Having a great day!	66.7%	16
Having a so so day!	29.2%	7
Not having a good day!	4.2%	1
	answered question	24
	skipped question	1

Appendix D

Interview Questions

1. For what purpose is traffic calming used in your municipality?
2. What types of traffic calming methods is used in your community?
3. Did your fire department have input concerning the type of traffic calming used?
4. Does the fire department have any issues concerning the traffic calming in place?
5. Have studies been performed to determine if traffic calming is having an effect on emergency apparatus response times?
6. Does your city have a comprehensive traffic calming policy?
7. What does your traffic calming policy include?
8. What unanticipated benefits or detriments, if any, have occurred because of traffic calming?