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Researching The Use of Tire Deflation Devices
For Ending Police Pursuits Safely

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ABSTRACT

Police agencies across the nation face a difficult decision every time a routine traffic stop turns into a vehicle pursuit. Police agencies have to decide whether or not to pursue the fleeing motorist or to terminate the pursuit by weighing the need to apprehend versus the safety of other citizens. However sometimes it is necessary to continue the pursuit when the need to apprehend is greater. Because of this law enforcement agencies should look at the available technology to stop fleeing vehicles. Tire deflation devices are one of several types of technology available. Stop Stick and Stinger Spike Systems are two types of tire deflation devices that have been out on the market for several years, and their effectiveness has been questioned.

In order to evaluate the effectiveness of tire deflation devices such as Stop Stick and Stinger Spike Systems, a survey was taken of police agencies across the United States that currently use of tire deflation devices. The data from the surveys indicated that agencies that currently use tire deflation devices have had a high success rate versus the number of deployments in vehicle pursuits. The data also indicated that each deployment of the device may not always stop the pursuit, but it reduced the speeds of the pursuit significantly. The data further revealed that injuries to officers during deployment were low and several agencies attributed the injuries to training issues.

It is concluded that tire deflation devices are a safe and effective way for police agencies to stop fleeing suspects or slow down their attempt to flee. The larger number of police units equipped with tire deflation devices increases the effectiveness of the device.

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INTRODUCTION

Since 1983, there have been several studies conducted on police pursuits and the risks involved. Researchers have all reported similar findings of the risks, according to the National Law Enforcement and Corrections Technology Center (NLECTC) bulletin, "High Speed Pursuits: New Technologies Around the Corner," (Paynter, 2000). The bulletin revealed: 1) collisions occur in 32 percent of police pursuits; 2) 22 percent of these collisions will result in property damage; 3) while 13 percent will result in personal injury. A fatality will occur in 1.2 percent of all pursuits; and about 70 % of all pursuit related injuries and fatalities will involve occupants in the pursued vehicle, 14 percent will involve law enforcement; and 15 percent will involve innocent third parties. As the data indicates, police pursuits are dangerous for everyone involved. Agencies will need to search for innovative and effective ways to end police pursuits safely.

This paper will research the use of tire deflation devices in ending police pursuits safely. This is important to law enforcement agencies across the nation, because agencies are faced with the chase/don't chase question every time an officer has a fleeing suspect using a vehicle to elude him or her. With litigation being brought against government entities for injuries or deaths resulting from police pursuits, agencies need to find ways to safely end police pursuits, and still apprehend the fleeing suspect. The purpose of the research is to examine if tire deflation devices such as Stop Sticks, and spike systems, are effective ways to safely end police vehicle pursuits. Tire deflation devices have been around for a while and their effectiveness is questioned. Have agencies implemented the use of tire deflation devices and if so, what is their success rate? It is hypothesized that tire deflation devices are safe and effective in ending police pursuits.

The methods of inquiry will be surveys of other departments who have implemented the use of Stop Sticks or spike systems. The survey will address the effectiveness of tire deflation devices in ending police pursuits safely and which, if any, is the most effective: Stop Sticks or spike systems. A review of the literature available on Stop Sticks and spike systems will be researched for the effectiveness of the tire deflation devices. The manufactures of the tire deflation devices will be contacted for product information and literature. The manufactures of the devices will also be asked to perform product demonstrations. The anticipated finding of the research will show that the deployment of tire deflation devices such as Stop Sticks and spike systems are effective ways to end police pursuits safely. Second, agencies that have implemented the use of tire deflation devices to end pursuits safely have had success with the implementation.

Agencies across the nation could be affected by the findings of this research. With litigation against officers and agencies resulting from high-speed vehicle pursuits, agencies will be looking for safe and effective ways to end police pursuits. The Rowlett Police Department will also benefit from the research in making an informed decision whether or not to implement the use of tire deflation devices such as Stop Sticks or spike systems.

REVIEW OF LITERATURE

The International Association of Chiefs of Police IACP, defines a police pursuit as: 'an active attempt by an officer in an authorized emergency vehicle to apprehend fleeing suspects who are attempting to avoid apprehension through evasive tactics.' (McGue, 1996).

Law enforcement officers have been pursuing evildoers ever since the early days, and with the invention of motor vehicles capable of high speeds, these pursuits have become very dangerous. With this potentially dangerous activity and, coupled with the limited options for the pursuit conclusion, the outcome of pursuits can be devastating. Law enforcement doesn't want innocent bystanders, officers, and/or the fleeing suspect to be injured or killed nor does the profession want the fleeing suspect to escape or get away with his/her crime. Law enforcement does not want to be involved in litigation stemming from pursuits that end in tragedy, this is why it is important to have options for bringing pursuits to an acceptable conclusion. One option in bringing pursuits to an acceptable conclusion is the use of controlled tire deflation devices. Controlled deflation devices are placed in the path of the pursued vehicle to cause the deflation of the pursued vehicle's pneumatic tires without unreasonable loss of control of the pursued vehicle. These devices insert hollow tubes into the tire when the pursued vehicle drives over the device. Due to the tires going flat within a short distance, the pursued vehicle is forced to stop or at the least his/her speed is significantly reduced. When agencies decide they want to implement the use of controlled deflation devices they should look very closely at safety factors built into the devices. Agencies should also examine the potential dangers associated with the device, special safety equipment needed for the device, the ease and speed of deployment. The safer and easier the device is to use will significantly decrease the risks associated with deployment. Controlled deflation devices can be a strategic element in the positive outcome of police pursuits, and more so if every law enforcement agencies squad car's were equipped with these devices. (Brave and Edblad, 1996)

Law Enforcement has welcomed the use of tire deflation devices as a way to terminate pursuits. The tire deflation devices on the market are reasonably priced, and have proven to be effective in the ending of vehicle pursuits, or at the least, in reducing the speed of vehicle pursuits, by slowly deflating one or more tires on the pursued vehicle (Eisenberg, 1999). Tire deflation devices that are available range in price from \$300 \$400, and when one weighs the cost verses the savings from the reduction in civil lawsuits, with the likelihood of the pursuit ending without injury or death, the purchase is clearly a wise investment. Several agencies who have implemented the use of tire deflation devices equip all or selected units with the tire deflation devices. Clearly, as more units are equipped with tire deflation devices, the chances for the device to be effective increase. (Eisenberg, 1999)

Agencies have chosen to stay with time-proven methods such as tire deflation devices, until more affordable and reliable technologies become available (Paynter, 2000). Stop Stick Ltd. offers a common tire-deflation device, used by departments across the country. When Stop Stick Ltd. created their device, they had two main concerns: 1) officer safety and 2) ease of use. Stop Stick Ltd. was successful with both when they created their device (Paynter, 2000). Stop Stick Ltd.'s device has a polymer housing encasing the spikes for officer safety. "An officer can jump on the product and it won't hurt him," boasts Gary Uthe, executive vice president of the Harrison Ohio-based company. The force and weight of the vehicle running over the product is what makes it work. "Stop Stick" comes in triangular-shaped 3 foot sections that can be linked together and loaded in a black nylon sleeve. "Stop Sticks" come with an 80-foot cord to use for deployment from the side of the road. All the officer has to do is throw the sleeved

device 30-40 feet ahead of the pursued vehicle. Each 3-foot section of "Stop Stick" has 36 hollow teflon-coated quills inside. When the pursued vehicle drives over the device, several of the hollow quills puncture the tires, that act like air release valves causing the air to escape at a controlled rate. To remove the device from the roadway, all the officer has to do is simply reel in the cord, or quickly pull the device from the road after the pursued vehicle passes. The "Stinger Spike System," from University Park, IL, Federal Signal Corporation, works in the same manner as "Stop Stick." To use the "Stinger Spike System," the officer pulls or slides the device across the road whereupon it opens and expands automatically. After the pursued vehicle drives over the spike strip, the officer pulls a rope attached to the spike system to retrieve it. "Stinger Spike Systems," just like "Stop Sticks," uses hollow tubes that penetrate the tires, causing air to escape slowly, generally 12-20 seconds, without causing a blowout. (Paynter, 2000)

"Stop Stick" deflates escape hopes of fleeing suspects. The Arizona Department of Public Safety utilized a new tire-deflating device "Stop Stick" in an effort to bring vehicle pursuits to a safe conclusion. In one incident, the Phoenix Police Department was pursuing two armed bank robbery suspects. As the pursuit traveled down the frontage road of Interstate 17, the suspects vehicle collided with several vehicles, injuring one person. Aware of the pursuit, the DPS officers deployed "Stop Sticks" ahead of the pursuit, flattening the suspect's front and rear tires ending the pursuit. The suspects were placed into custody and the money recovered. Arizona DPS officers initiated a pursuit with a fugitive from California, who kidnapped a car salesman and stole a 1994 pick-up truck. The DPS officers pursued the fugitive at high rates of speed, and were able to deploy "Stop Sticks" ahead of the pursuit to flatten the truck's front and rear tires. With

the truck tires flat the truck stopped, the suspect was apprehended, the victim was unharmed and the vehicle was recovered (Arizona DPS, 1995).

The Backup News-single stories reported on 11/15/99 that "Stop Sticks" helped end a police chase. A State Capitol police officer in Raleigh, NC was attempting to stop a driver of a van whom the officer suspected of being intoxicated. Instead of stopping, the driver of the van sped off and led the officer on a three-county high-speed pursuit at speeds up to 100 mph involving five different law enforcement agencies. Just outside the Goldsboro city limits, Wayne County Sheriffs deputies deployed "Stop Sticks," deflating one tire. With only one tire deflated, the driver of the van continued his flight at a high rate of speed. The driver jumped a curb as his vehicle entered a parking lot of a radio station and drove into a grassy field. The driver of the van clipped a radio tower guide wire, and then slammed into a second guide wire where the vehicle came to a halt. Both the driver and the passenger were treated for minor lacerations before taken into custody. The Wayne County Sheriff stated that "Stop Sticks" was the quickest way they knew to stop pursuits without getting someone hurt, and added that most drivers usually stop after one their tires are blown out. (Opland, 1999)

The Backup News-single stories reported on 02/19/01: "Stop Sticks Stop Car; Fleeing Suspect Captured." In Brecksville, Ohio, the pursuit began when officers observed Freddy Carraballo Jr. speeding in a stolen car. The officers attempted to stop Carraballo, but he refused, and led the officers on a high-speed pursuit reaching speeds up to 130 mph. The officers were able to successfully deploy "Stop Sticks," and Carraballo ran them over subsequently losing control of his vehicle striking two light

poles before coming to a halt. Carraballo then attempted to escape by foot but was apprehended by two officers. (Rogers, 2001)

The Backup News-single stories reported on 03/05/01: "Trucker Leads 30-Mile Pursuit." The pursuit stemmed from an accident on Interstate 15 after the driver of a semi drove off from the accident scene. The spokesman for the Utah Highway Patrol stated a 27-year-old suspect Jeffery Kirk fled the scene of an accident, leading the officers on a high-speed pursuit. The pursuit reached speeds up to 80 mph. The officers were able to successfully deploy spike strips, but they failed to stop the tractor-trailer. The pursuit ended when the driver stopped in the yard of the trucking company. (Mongeau, 2001)

The Backup News-single stories reported on 03/07/01: "City Wants Stop Sticks For Police." The Oklahoma Highway Patrol was in a high-speed pursuit of a 14-year-old female named Traci Hooper. Traffic was heavy as she entered a busy section of Seminole, Oklahoma. Hooper had avoided three roadblocks just prior to crashing into a light pole at a speed of 70 mph. The impact with light pole sheared the car into half and killed Hooper. No one else was injured, but the conclusion could have been worse. A school bus loaded with children passed through the intersection just minutes after the chased ended. The city officials of Seminole said that the police should have equipment to prevent high-speed chases from entering busy intersections. The City Manager of Seminole said he wanted to purchase "Stop Sticks" for the police to stop pursuits from entering busy intersections. The Chief of Police of Seminole stated he like the idea, but cautioned them on depending on Stop Sticks in preventing chases. Just like roadblocks the drivers can avoid "Stop Sticks" too by driving around them. (Mongeau, 2001)

The Backup News-single stories reported on 11/22/99: "Spike Strips Halt High Speed Chase." In Riverside, California a high-speed pursuit ended as the suspect vehicle drove over strategically placed spike strips. The spike strips flattened at least one tire on the suspect vehicle. The vehicle came to rest and the driver led the pursuing officers on a brief foot chase, before being apprehended. (Cooley, 1999)

The Wisconsin State Journal reported on 12/28/01: "Iowa Man Arrested After High-Speed Chase." A 34-year-old Iowa man led Sheriff's Deputies from two states on a high-speed pursuit. The pursuit began in Greenwood, Iowa and crossed over into Wisconsin's Grant County. The pursuing officers from Iowa gave up the pursuit when it crossed over the state line and short time later deputies from Grant County picked up the pursuit. Grant County deputies pursued the suspect as fast as 60 mph in a 25 mph zone, and 105 mph when he entered onto the highway. The suspect, who was later identified as Gary Greenwood, hit a set of "Stop Sticks," which were deployed by sheriff's deputies on the highway flattening the right front tire of Greenwood's vehicle. With Greenwood's front right tire flat he continued his flight. The deputies were able to deploy a second set of Stop Sticks at an intersection of the highway deflating his left front and right rear tires. With 3 tires flat Greenwood continued his flight and was finally brought to a stop when the deputies utilized a moving roadblock. (Wisconsin, State Journal, 1997)

The KOAT TheNewMexicoChannel.com reported on 08/01/2001: "Pickup Strikes, Kills Police Officer." Police Officer Lloyd Aragon of the New Mexico State Police was killed as he and a fellow officer were laying down a spike belt in an effort to stop a fleeing vehicle involved in a theft. Officer Aragon and Officer Cunningham were en route to court when they heard the pursuit over the radio. Officers Aragon and

Cunningham were trying to assist their fellow officer in stopping the truck. Officers Aragon and Cunningham deployed the spike belt across 1-40 in an effort to spike the suspect vehicles tires. The driver of the suspect vehicle avoided the belt by driving into the median, and ran over Officer Aragon, subsequently killing him. The suspect vehicle continued traveling down 1-40 and pulled off the highway at the next exit where the driver lost control of the vehicle. (Pickup Strikes and Kills Officer, 2001)

The National Law Enforcement and Corrections Technology Center (NLECTC) conducted an equipment performance report related to tire deflation devices against self sealing and run-flat tires that are currently being marketed for luxury and high performance vehicles. NLECTC reported that tire deflation devices have been marketed to law enforcement for approximately 10 years to give them a tool in stopping or at least shortening police pursuits safely, without endangering lives. The tire deflation devices are designed to cause the pursued vehicles tires to deflate at a rapid but controlled manner. The ultimate outcome for the suspect who is fleeing in a vehicle equipped with standard tires is, instability and poor handling at high rates of speed, therefore usually resulting in faster apprehension of the suspect. Over the last few years tire manufacturers have introduced new tires that allow drivers to safely operate their vehicles for miles after the tires have lost air pressure. These types of tires are currently only manufactured for luxury or high performance vehicles, and as after market replacement tires. These types of tires are expensive which usually makes it cost prohibitive for the normal tire consumer. In spite of the expensive price for the tires, the tire manufacturers have suggested they would like to equip all passenger vehicles with these tires. The NLECTC project objective was to determine the effectiveness of tire deflation devices against self

sealing or run-flat tires. NLECTC tested several different brands of self-sealing and run-flat tires against four different types of tire deflation devices, "Stinger," Safe Stop Magnum," "RoadSpike," and "Stop Stick." NLECTC evaluated the results by using five performance tests, Serpentine, Road Course, Simulated High-Speed Pursuit Conditions, High-Speed-Straight-Line, and Ability to Seal Against Deflation Devices. NLECTC concluded that self-sealing were not any better than pneumatic tires in withstanding tire deflation devices. Run-flat tires were engineered to be driven at slow to normal speeds, essentially in a straight line when deflated. Thus the effectiveness of the tire deflation device is increased when the suspect increases his/her speed, and begins evasive action such as, sharp turns, and desperate maneuvers. (National Institute of Justice, 2000)

METHODOLOGY

Police pursuits are clearly dangerous for everyone involved, and law enforcement agencies across the nation need to look at resources available to them to reduce the risks involved. An affordable and readily available resource is tire deflation devices. Are tire deflation devices an effective way to end police pursuits safely? Have agencies that implemented or allow the use of tire deflation devices been successful in deploying them to end police pursuits safely?

It is hypothesized that tire deflation devices are safe and an effective way to end police pursuits. Two of the most commonly used tire deflation devices are "Stop Sticks" manufactured by Stop Tech Ltd., and "Stinger Spike Systems" manufactured by Federal Signal Corporation. Tire deflation devices are safe and effective in ending police pursuits when they are properly deployed. A key element in safe deployment of tire deflation

devices is training. Tire deflation devices do not always end or stop the pursuit, but when deployed properly the fleeing vehicle's speed is usually reduced significantly.

Stop Tech Ltd., and Stinger Spike Systems were contacted to acquire product information. In addition to acquiring product information, both manufactures were asked to perform product demonstrations. The internet was searched for articles related to pursuits and tire deflation devices. Law enforcement journals and newspaper articles were also researched. Training videos from the manufactures were reviewed as well as live product demonstrations.

A survey was composed and sent to several agencies that currently use tire deflation devices (Appendix A). The survey was composed of written questions to gather information related to what type of tire deflation device each agency used, implementation date, statistics on the effectiveness, injuries or deaths, training, and an opinion question about tire deflation devices ending police pursuits safely. Using the manufacture customer lists from Stop Tech and Stinger Spike Systems, surveys were mailed to agencies in the State of Texas, Arkansas, New Mexico, Colorado, Kansas, Oklahoma, Maryland, Maine, Nebraska, Virginia, and Vermont. A total of 70 agencies were mailed surveys and 58 agencies responded.

A follow up survey was composed and sent to the 58 responding agencies to solicit additional information (Appendix B). The follow up survey consisted of three questions. The 58 responding agencies were asked; how many times have they deployed the device, how many times the device was successful, and how many times the device was not successful, but continued at reduced speeds. Of the 58 responding agencies sent the follow up survey 100% were returned.

The information obtained was analyzed by looking at the total number of pursuits where tire deflation devices were deployed. Did the pursued vehicle stop within minutes of the successful deployment? Did the pursued vehicle continue after a successful hit? Has there been any injuries or deaths during deployment or after deployment. Is training a key element of successfully deploying tire deflation devices to end police pursuits safely? How long has tire deflation devices been used by law enforcement as a tool to end police pursuits?

FINDINGS

The survey instrument used was a questionnaire requesting information related to tire deflation devices. The survey was only sent to agencies that currently utilize tire deflation devices. The questions solicited responses such as, what type of tire deflation device each agency used. What year did they implement the use of tire deflation devices? Do they keep statistics on the tire deflation device, related to their effectiveness? Have they experienced any injuries or deaths during or after deployment? Do they provide the officers training in the use of tire deflation devices? Do they think the tire deflation device they use is an effective way to end police pursuits safely? A follow up survey was conducted to solicit additional information. The follow up survey consisted of three questions. The agencies were asked; How many times or approximate have they deployed the device? How many times after deployment was the device successful in stopping the target vehicle? How many deployments did the device not end the pursuit, but continued at a reduced speed?

In addition to the survey the manufactures of "Stop Stick" and "Stinger Spike Systems" were contacted and asked for product information and to perform product

demonstrations. Stop Stick performed a product demonstration in August 2001. Using a Ford Crown Victoria 1999 model (provided by Rowlett Police Department) being driven at a speed of approximately 50 mph, the "Stop Stick" representative deployed the device across the roadway. The device landed on the grass on the adjacent side of the road. The only part of the device that was in the roadway was the cord, which is used to retract the device from the roadway. Several vehicles drove over the cord without any interference to the device or the passing vehicles. When the target vehicle approached the "Stop Stick," the representative pulled the device into the path of the target vehicle. The target vehicle drove over the device puncturing three tires:, both front tires, and the right rear tire. All three tires were flat in approximately 20 seconds. The driver of the target vehicle commented that, when he drove over the device, it was hardly noticeable. The driver of the target vehicle added that after the tires deflated, controlling the vehicle in turns became more difficult.

Late August 2001, "Stinger Spike Systems" representative performed a product demonstration. The representative was not able to do a complete demonstration and puncture tires. The representative went over the device's history, operation technique, and maintenance. The representative demonstrated how to properly deploy the device and retract it after deployment. The representative also demonstrated how to replace the hollow quills after a successful hit.

Of the 70 surveys that were mailed out to agencies that currently use tire deflation device, 58 (82.8%) agencies responded to the survey. Of the 58 surveyed agencies, 35 (60.3%) use "Stop Stick", 17 (29.3%) use "Stinger Spike System", and 6 (10.3%) use both (See figure 1.)

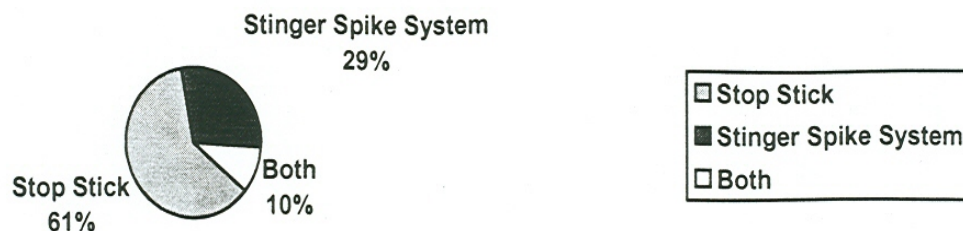


Figure 1. TDD's Used by Manufacture.

Of the 58 surveyed agencies, 3 (5.2%) implemented the use of tire deflation devices within the years of 1990-1992, 9 (15.5%) within the years 1993-1995, 22 (37.9%) within the years 1996-1998, and 24 (41.3%) within the years 1999-2001 (See figure 2.)

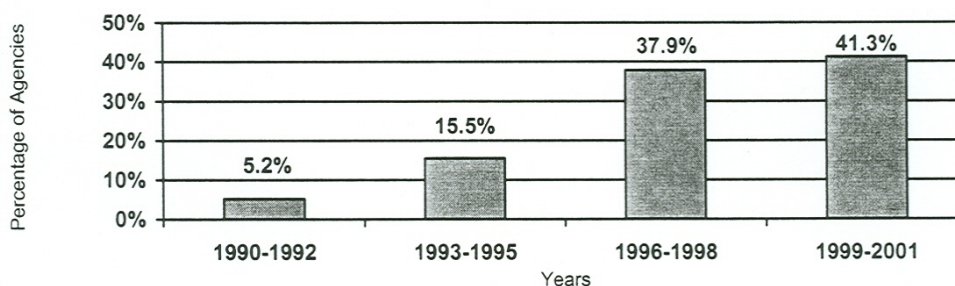


Figure 2. TDD Implementation

Only 23 (39.6%) of the surveyed agencies keep some type of statistics on the effectiveness of their tire deflation device they use, and 35 (60.3%) stated they did not keep any stats. For the most part agencies that kept stats on the effectiveness of their tire deflation device, use a form provided by the manufacture to record "hits", and they mail the form into the manufacture for a replacement stick/spike.

Of the 58 surveyed agencies 52 (89.6%) reported they have not experienced any injuries or deaths while deploying their tire deflation device or after deployment. 5 (8.6%) of the surveyed agencies reported officers receiving minor injuries such as, cuts, scratches, and rope burns as a result of deployment of the tire deflation device. 1 (1.7%) of the surveyed agencies reported a death of an officer as a result of the deployment of the tire deflation device (See figure 3.) The 5 agencies that reported minor injuries during deployments attributed them to training issues. 56 (96.5%) of the 58 agencies reported they provide training for their officers in the deployment of the tire deflation device, and 2 (3.4%) reported they did not provide their officers with training. A few of the respondents commented that their officers only receive training from watching a training video provided by the manufacture.

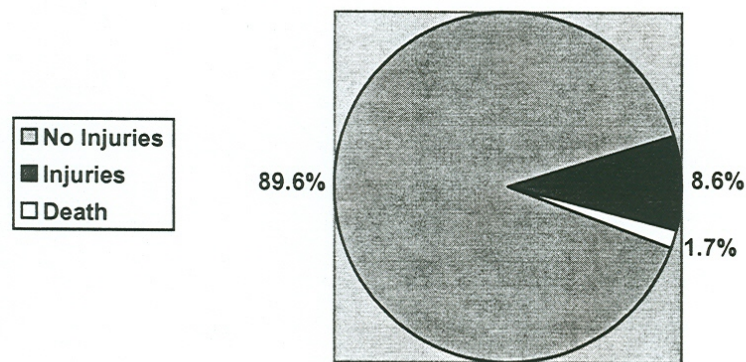


Figure 3. Deployment Casualties.

56 (96.5%) of the surveyed agencies believe that the tire deflation device that they are currently using, are effective in ending police pursuits safely, and 2 (3.4%) believed they are not effective in ending police pursuits safely. The 56 agencies who believe that the tire deflation device they are currently using was effective added responses such as: may not always end the pursuit, but it reduces the speed of the pursuit, the more cars

equipped with tire deflation devices increases their effectiveness, a very successful tool in assisting officers in police pursuits, if deployed correctly they are effective. The 2 agencies who believed tire deflation devices were not effective in ending police pursuits safely, gave common reasons such as: not enough training in the use of the device, and officers can't get into position to deploy the device.

The surveyed agencies were asked how many times have they deployed the device since the implementation by their department. 58 surveyed agencies reported the following: 8 (13.7%) agencies reported a deployments, 31 (53.4%) agencies reported 1 to 5 deployments, 15 (25.8%) agencies reported 6 to 10 deployments, 1 (1.7%) agency reported approximately 30 deployments, 2 (3.4%) agencies reported 95 to 100 deployments, and 1 (1.7%) agency reported approximately 200 deployments (See Figure 4.)

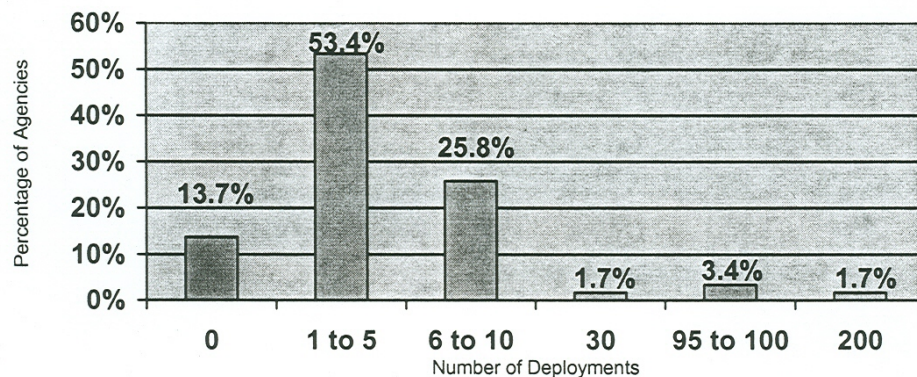


Figure 4. Frequency of deployments, by agency.

50 of the 58 surveyed agencies reported over 600 combined deployments since the implementation of their device to the time the survey was conducted. The surveyed agencies were asked, when they deployed the device, how many were successful in

stopping the target vehicle. 16 (32%) of the 50 agencies that reported deployments stated they had 100% success rate stopping every vehicle. 19 (38%) reported they had an 80% success rate in stopping the target vehicle. 2 (4%) reported they had a 75% success rate. 4 (8%) reported a 60% success rate. 6 (12%) reported they had only a 50% success rate. 2 (4%) reported they were only successful in 40% of deployments. 1 (2%) reported they were only successful in 30% of deployments (See figure 5.)

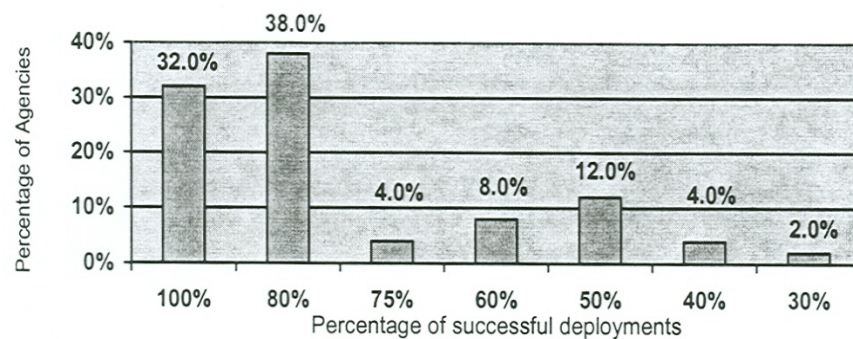


Figure 5. Success rate vs. deployments.

A follow up question was solicited to the surveyed agencies in regards to, how many of the deployments did not stop the pursuit, but continued at a reduced speed. Of the 50 agencies that reported deployments, 16 (32%) reported they had 100% success rate stopping every vehicle. The remaining 34 (58.6%) of the 50 agencies who did not report 100% success rate reported the following: 19 (55.8%) reported 20% of their deployments did not stop the suspects vehicle, but reduced the speeds immediately, 2 (5.8%) reported 25% continued at lower speeds, 4 (11.7%) reported 40% continued at lower speeds, 6 (17.6%) reported 50% continued a lower speeds, 2 (5.8%) reported 60% continued at lower speeds, and 1 (2.9%) reported 70% continued at lower speeds (See Figure 6.)

Some of the agencies commented they had to spike the suspect vehicle more than once to

stop the vehicle. 1 agency noted they spiked a vehicle equipped with run flat tires and eventually had to ram the suspect vehicle.

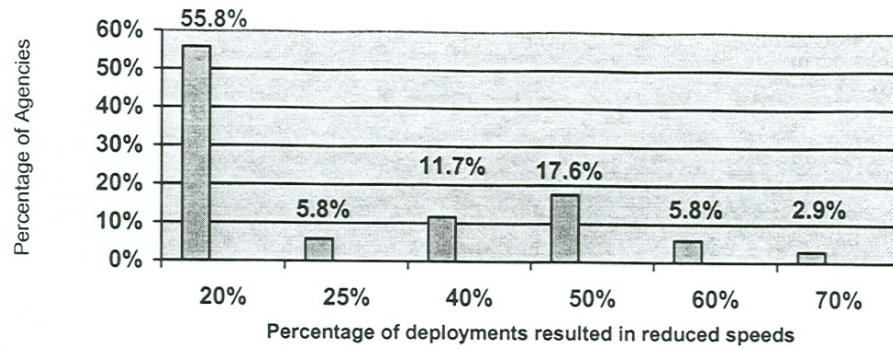


Figure 6. Deployments that resulted in reduced speeds.

DISCUSSION/CONCLUSION

Several research studies have focused on police pursuits and the dangers involved. Several of these studies have concluded that pursuits are not just worth the risk involved, however pursuits continue to happen. Suspects continue to flee from officers for different reasons, and agencies continue to pursue, for misdemeanors and felonies. In the suspect's attempt to elude the police, they show no regard for their own life, or that of innocent third parties. This is a serious problem for law enforcement and we, as law enforcement agencies, need to look at innovative and effective ways to stop fleeing suspects as early as possible in pursuits. Law enforcement agencies have tried several conventional and unconventional ways to stop fleeing suspects, from ramming the suspect vehicle to shooting out the suspect's tire (Paynter, 2000). Ramming the suspect's vehicle and shooting out the suspect's tires are very dangerous and could be very costly.

Fairly new and innovative ways of stopping or slowing down the fleeing suspects in police pursuits are tire deflation devices. Tire deflation devices have been around for nearly ten or eleven years but they are still fairly new to the majority of law enforcement agencies. Have agencies that have already implemented tire deflation devices had success in using them to end police pursuits safely? It was hypothesized that tire deflation devices are a safe and effective way to end police pursuits safely.

Several agencies across the nation have implemented the use of tire deflation devices as a tool to end police pursuits safely, and have been successful with their use. Stop Stick and Stinger Spike Systems seem to be the most popular among police agencies. Both Stop Stick and Stinger Spike Systems are equally effective when deployed. Availability of tire deflation devices to as many police units as possible in an agency increases the success rate for a successful deployment. A very important key factor to success in the use of tire deflation devices is training. Agencies that properly train their officers in the use of tire deflation devices will significantly reduce the risk of their officers being injured or killed during the deployment of the device.

The findings of the research support the hypothesis that tire deflation devices are safe and effective in ending police pursuits safely. Agencies that have implemented the use of tire deflation devices have had a high success rate verses deployments in police pursuits. Tire deflation devices may not always end the pursuit upon deployment of the device, but the speeds of the pursuits are significantly reduced as a result of a successful deployment, thus making the pursuit safer.

The result of the study is relevant to agencies that are considering implementing the use of tire deflation devices. Agencies that do not have tire deflation devices or any

means of bringing a pursuit to an end are at the mercy of the fleeing driver of how the pursuit ends. It's a fact, police pursuits will continue to happen, and officers need to be properly equipped and trained with the proper tools to bring them to a safe ending. Tire deflation devices such as Stop Stick and Stinger Spike Systems are safe and an effective way of ending police pursuits or at least slowing down the fleeing driver making the pursuit safer for everyone.

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Appendix A

Survey of Agencies who currently use Tire Deflation Devices

This survey is being conducted in partial fulfillment
Of the Requirements for the
Bill Blackwood
Law Enforcement Management Institute of Texas
By
Marvin D. Gibbs
Rowlett Police Department

Please complete or answer the following:

Agency _____ Your name and rank _____

- 1) What type of tire deflation device does your agency currently use. ____Stop Sticks, ____Spike
- 2) If known, when did your agency implement the use of stop sticks or spike systems (month & year)
_____.
- 3) Does your department keep statistics on the effectiveness of their tire deflation device? Yes or No.
If yes, please specify.

- 4) Has your agency experienced any injuries or deaths while deploying the tire deflation device or
after deployment? Yes or No. If yes please specify.

- 5) Does your agency provide training for your officers on deployment of tire deflation devices? Yes
or No.
- 6) In your opinion, do you think the tire deflation device your agency currently uses is an effective
way to end police pursuits safely? Yes or No. If no please be specific why.

Please provide me with a name and contact number of the person who would be able to provide
me with additional information if needed.

Name & Title: _____ phone # _____
area code number

Appendix B

Follow up survey of Tire Deflation Devices

1. Since the implementation of your agency's use of the tire deflation device can you give me an approx. or exact figure on how many times your agency has deployed the device.
2. When deployed how many were successful in stopping the target vehicle.
3. How many deployments did not stop the pursuit but continued at a reduced speed.