

# STOP STICK®

## Tire Deflation/ Pursuit Termination Device

### SAFE

- Plastic housing provides officer safety during deployment and removal from the roadway.
- Deployment sleeve, with attached 80-foot (24m) cord, allows the deploying officer to stand a safe distance from the road.
- Engineered to deflate tires without blowout; hollow Teflon® coated quills act as valves, releasing air at a safe, controlled rate.
- Eliminates the need for time-consuming, costly and potentially hazardous repair to deflation device.
- No debris left on roadway.



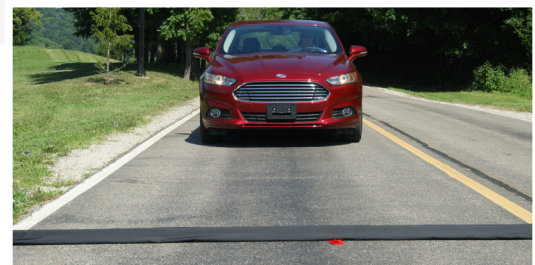
### SIMPLE



- STOP STICK® offers the fastest deployment of any tire deflation device.
- Sleeved, trunk-mounted STOP STICKS allow for fast, easy access.
- Lightweight construction - just over 1 pound (.516kg) - makes deployment and retrieval virtually effortless.
- In-sleeve deployment allows an officer to throw device from the side of the road and quickly remove it by pulling the cord reel.
- Multi-directional spikes ensure correct deployment (any side can be facing down).
- Simple design is not dependent on complicated and unreliable technology such as wires.

### EFFECTIVE

- Deflates tires on virtually all vehicles including cars, buses and tractor-trailers.
- Over 30,000 successful documented deployments.
- Can be used by departments with, or without, pursuit policies.



## ACCESSORIES

The two items below are included with each rack.  
May also be purchased separately.

**SLEEVE** Double-sewn nylon ripstop construction.



**CORD REEL** 80 feet (24m) of woven polyester line with comfortable, easy-to-hold handle - an added safety feature for officer deployment.



## STORAGE AND MOUNTING OPTIONS

**MOUNTING TRAY**

- Mountable in Cars, or SUVs, for quick deployment
- Less than one pound
- Dimensions
  - Length 36 ½ in.
  - Height 6 ¾ in.



**STORAGE BAG**

- Can be moved between vehicles as needed
- Less than one pound
- Dimensions
  - Length 39 in.
  - Height 9 in.
  - Depth 9 in.



**HOLSTER**

- Durable metal enclosure for SUV or Car storage
- Roughly 5 pounds
- Dimensions
  - Length 37 ½ in.
  - Height 9 ¼ in.
  - Depth 4 in.



# Pursuit Prevention / Perimeter Protection

The best way to stop a pursuit. Don't let it start. With Stop Stick, Ltd.'s line of pursuit prevention and perimeter protection products, law enforcement personnel can quickly and easily secure vehicles and venues. Intended for use when a vehicle needs stopped immediately, these devices will deflate tires in 5 seconds or less.

## **Piranha**

At 3 ½ inches in length and with a weight of 5.2 , the Piranha is a compact, easy-to-deploy and effective tire-deflation device. The Piranha provides added control during operations where potential for subject flight is anticipated. Excellent support for SWAT Teams, Tactical Units, Traffic Stops/DUI, Detectives, Surveillance, Drug Raids and more.



## **Terminator** + **Patrol Terminator**



In high-risk stop situations, such as a DUI, or whenever the officer senses the need, the Patrol Terminator® and Terminator® provide a preemptive advantage. Eliminating the subject's ability to flee successfully, it gives officers an edge when they need it most, facilitates better control of high-risk stop situations and helps prevent dangerous pursuits from occurring. Self-righting end caps allow officers to deploy the device without taking their eyes off the situation. At 17 ½ inches and 24 inches in length, these devices offer enough road coverage to ensure a suspect has nowhere to go.

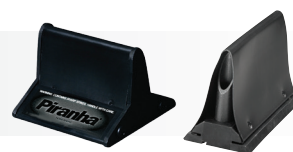
## **Barracuda**

Stop vehicle entry into restricted areas, with Barracuda. Capable of deflating the tires of cars, trucks, buses and tractor-trailers quickly and safely, Barracuda enables fast, easy cordoning of areas to restrict ingress/egress or to control traffic flow. With 3 feet of coverage, Barracuda is excellent for Secured/Gated Area Checkpoints, Sobriety Checkpoints, Border Patrol, Emergency-Site Control, Perimeter Security, Special Events, SWAT Teams.



# Pursuit Prevention / Perimeter Protection

## Piranha



Length	3 1/2 inches	Quill Diameter	3/8 <sup>th</sup> inch
Weight	5.2 ounces	Deflation Time	3-5 seconds
Quills	2	Replaceable Cartridges?	Yes
Quill Length	2 inches	Roll Over End Caps?	No

## Terminator

### Patrol Terminator



Length	24 inches	Length	17.5 inches
Weight	2 pounds	Weight	1.7 pounds
Quills	7	Quills	5
Quill Length	2 inches	Quill Length	2 inches
Quill Diameter	3/8 inch	Quill Diameter	3/8 <sup>th</sup> inch
Deflation Time	3-5 seconds	Deflation Time	3-5 seconds
Replaceable Cartridges?	Yes	Replaceable Cartridges?	Yes
Roll Over End Caps?	Yes	Roll Over End Caps?	Yes

## Barracuda



Length	36/50 inches	Quill Diameter	3/8 <sup>th</sup> inch
Weight	3/3.7 pounds	Deflation Time	3-5 seconds
Quills	11/15	Replaceable Cartridges?	Yes
Quill Length	2 inches	Roll Over End Caps?	Yes



# **Guidelines for Use of** **STOP STICK**

## **Instructor Lesson Plan**

**To be completed after reviewing the STOP STICK User Training Video**

**Issue No. 8**  
**January 2015**



365 Industrial Drive Harrison, OH 45030 USA Phone: 513 202 5500 [www.stopstick.com](http://www.stopstick.com)

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

*Student Lesson:*

*Instructor's Notes:*

Before reading these guidelines, WATCH the STOP STICK User Training Video and READ your agency's Pursuit Policy.

### **⚠ WARNING**

**Deployment of STOP STICKS in the Deployment Sleeve with the retractable Cord Reel attached is the sole recommended method for deployment of STOP STICKS. Any officer authorized to deploy STOP STICKS must be properly trained in this deployment method.**

**You or others can be killed or seriously injured if you don't follow safety messages.**

Your safety and the safety of others is very important. We have provided many safety messages in this lesson plan. A safety message alerts you to potential hazards and instructs you on how to avoid or reduce the hazard. Each safety message is preceded by a safety alert symbol **⚠**. Please carefully read and follow these important messages.

## I. INTRODUCTION

STOP STICK is one of a series of law enforcement tools offered by StopTech, Ltd., to assist law enforcement agencies in stopping and preventing vehicle pursuits. In the course of this lesson, you will be instructed on methods of deployment for STOP STICK.

## II. LEARNING OBJECTIVES

At the conclusion of this training, each participant should be able to:

1. Describe the basic construction of STOP STICK.
2. State, orally or in writing, the recommended surface for successful deployment of STOP STICK.
3. State, orally or in writing, the primary recommended method of deployment.

## INSTRUCTIONS

Depending upon student participation, this lesson should take from **30 to 45 minutes** to complete.

The STOP STICK User Training Video should be utilized in coordination with the Lesson Plan.

Be sure to properly address the information contained in each point of the STUDENT LESSON PLAN. The information that is printed on this portion of the INSTRUCTOR'S LESSON PLAN is meant to assist you in instructing your students.

On the STUDENT LESSON PLAN this portion is blank, and is intended for students to list their personal notes.

## TRAINING AIDS

For every 3 students participating in your class, you should have **at least one (1) complete Rack of STOP STICKS** – a complete Rack consists of one (1) tray, three (3) STOP STICKS, one (1) cord reel, and one (1) sleeve.

### **You will also need:**

1. A STUDENT LESSON PLAN for each participant of the class.
2. STOP STICK User Training Video.
3. Copies of your department's or agency's pursuit policy – provide one copy for each student.

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

### *Student Lesson:*

4. State, orally or in writing, the safety and tactical considerations when deciding to deploy STOP STICK.
5. State, orally or in writing, the type of vehicles STOP STICKS should NOT be deployed against.

### III. OVERVIEW and NOMENCLATURE

STOP STICK is 3 feet (91cm) in length and weighs 1.1 pounds (.516kg). STOP STICK is comprised of the following components and sub-assemblies:

1. 36 Teflon® coated hardened steel QUILLS; 1 7/8 inches (4.76cm) in length, assembled in three rows of 12.
2. 72 Teflon® coated steel SPIKE TIPS, 3/8 inches (.95cm) in length, inserted into each end of all QUILLS.
  - a. The TIP and QUILL assemblies are 2 5/8 inches (6.67cm) from tip to tip.
3. A collapsible polymer CORE, to orient the QUILL/SPIKE TIP assemblies.
4. The polymer CORE, is encased in a TARTAN tape glass filament FRAME, to contain the QUILL/SPIKE TIP assemblies during impact.
5. A polypropylene HOUSING, to contain the inner subassemblies and to protect the officer from injury while handling the STOP STICK.
6. Molded polymer male and female END CAPS, which allow multiples of STOP STICK to be linked together.
7. Accessories:
  - a. Reusable nylon SLEEVE.
  - b. CORD REEL with 80 feet (24m) of 150 pound (68kg) test braided polyester cord.
  - c. MOUNTING TRAY, designed for trunk mounting with reflective STOP STICK sticker.
8. Two WARNING LABELS appear on each STOP STICK. Be sure to READ AND FOLLOW all safety messages on-product and in this lesson! If you haven't seen these warnings before, turn to the last page of this lesson plan to read these important messages.

### *Instructor's Notes:*

#### TRAINING AIDS (cont'd)

##### Optional items:

1. Dry erase or chalk board to draw examples of potential deployment circumstances.
2. An automobile for deployment demonstration purposes.
3. TV and VCR or DVD player.



Complete STOP STICK Rack Kit



Complete STOP STICK SUV Kit

As you address points 1 through 8, hold up a STOP STICK for all to see. Depending on the class size, pass around one or more STOP STICKS for the students to handle for themselves.

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

*Student Lesson:*

*Instructor's Notes:*

### IV. DEPLOYMENT OF STOP STICK

#### **▲ ALWAYS follow the policies and procedures of your Agency when deploying STOP STICK.**

STOP STICK training materials are intended to supplement the formal Pursuit Policy of your agency. Stop Stick, Ltd. recommends that these "Guidelines For Use" be incorporated into your agency's written Standard Operating Procedures (SOP). However, the training, policies, and procedures of your agency – including when and how to deploy STOP STICK – supersede any written or verbal instructions from Stop Stick, Ltd.

#### **A. Before Deploying STOP STICK**

Before deciding to deploy STOP STICK, many factors must be considered. The following are some important safety and tactical issues to think about.

#### **Safety Considerations:**

The circumstances of each pursuit are very different, but safety is always the most important factor. Suspects can abruptly swerve, stop, or otherwise maneuver their vehicle in an unexpected manner while attempting to avoid STOP STICK.

ALWAYS plan ahead for pursuits in your area, Determine the most suitable, and safest, locations for deployment. Then, when a pursuit is necessary, you can proceed to one of these pre-planned locations or direct other officers to where they can best deploy STOP STICK.

Officers should also be prepared to find substantial cover in the location, such as a large tree, guard rail, or other object or sufficient structure capable of stopping an approaching vehicle.

**Patrol vehicles are not adequate cover.**

ALWAYS avoid deploying STOP STICK in locations or situations that limit the ability of the fleeing suspect to safely maneuver their vehicle. These situations can endanger you, other officers, the public, and the suspect.

STOP STICK is designed for a controlled release of air from the target vehicle's tires, usually within 20-30 seconds. **However, under some circumstances tire deflation can increase the possibility that a driver may lose control of the vehicle and crash, resulting in SERIOUS or FATAL INJURIES.**

NEVER deploy STOP STICK if you believe the location or circumstances of your pursuit make it unsafe to do so!

Stop Stick, Ltd.

F-19-ILPSS, Date 01.08.2015

As you review the safety and tactical considerations for deploying STOP STICK, refer to your agency's pursuit policy. Note any differences and instruct students to ALWAYS follow the policies and procedure of your agency.

Stop Stick Ltd., strongly encourages you to provide each student with a printed copy of your existing pursuit policy, while attending this training session.

#### **Safety Considerations:**

This is good time during the training to talk about important safety considerations in using STOP STICK.

Handle STOP STICK with caution.

Always plan ahead.

Avoid deploying STOP STICK:

- in areas with heavy traffic.
- in populated areas or locations with pedestrians nearby.
- near road construction.
- near steep embankments, curves, or obstacles that limit the deploying officer's view of traffic and the approaching pursuit.

Following these precautions (i.e., limiting TRAFFIC and PEDESTRIANS) can reduce the likelihood of injuries – if a driver were to lose control of the vehicle and crash.






Discuss the types of vehicles that STOP STICK **CANNOT** be used against; specifically, any vehicle with less than four (4) wheels.



# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

### *Student Lesson:*

-  **LIMIT TRAFFIC on the roadway.** Heavy or congested traffic increases the chance of an accident, resulting in injury or property damage. Whenever possible, limit or isolate traffic from the pursuit or location where STOP STICK is being deployed.
-  **RESTRICT PEDESTRIANS.** Bystanders, observers and other pedestrians in the surrounding area are especially vulnerable to injury if they are struck by a vehicle. NEVER deploy STOP STICK with pedestrians in the immediate vicinity.
-  **NEVER use STOP STICK on vehicles with fewer than four wheels.** Vehicles such as motorcycles and 3-wheeled ATVs are less stable and persons driving these vehicles are more likely to lose control when their tires deflate.
-  **To reduce the risk of serious or fatal injuries resulting from a vehicle crash**  
**Use EXTREME CAUTION when:**
  - Pursuits reach **EXCESSIVE SPEEDS**; suspects have an increased risk of losing control of the vehicle if tires are deflated while driving at above normal highway speeds.
  - Fleeing suspects appear to be under the influence of **DRUGS** or **ALCOHOL** or similar impairments which may increase the risk of losing control of the vehicle.
-  **ONLY deploy STOP STICK when you have a safe location to observe the target vehicle.** You could be struck if suspects unexpectedly swerve, stop, or lose control of their vehicle. You must be able to safely observe the target vehicle and other traffic.

Once you are in a safe location, always advise pursuing units when and where STOP STICK is being deployed. Then look for an escape route in case you need to move away from your present position to a safer location.

### **Tactical Considerations:**

1. Remember that planning ahead for the use of STOP STICK includes determining the best locations for deployment and knowing where protection for the deploying officer exists.
2. For best performance, deploy on dry, hard surfaces such as concrete or blacktop. STOP STICK may fail to puncture the tires of a target vehicle on soft, loose materials such as dirt or gravel roads.

### *Instructor's Notes:*

### **Safety Considerations (cont'd)**

Consider that the driver may attempt to continue operating the target vehicle after deployment of STOP STICK and the dangers this poses.

As a class, talk about different scenarios and the circumstances of pursuits that make it dangerous or inappropriate to deploy STOP STICK.

- **Speed** – going too fast can increase the chance a driver will lose control of the vehicle when tires deflate.
- **Reckless and erratic behavior** by the fleeing suspect.
- **Wet surfaces, loose pavement and gravel** may increase the risk a driver will lose control of the vehicle.
- **Weather** – rain, fog, snow, ice, etc. can increase the chance of a driver losing control of their vehicle -- and reduce visibility below safe levels.

**ASK:** Who could be hurt? Why? What are the potential consequences of a suspect losing control of his vehicle?

Be sure to stress choosing a location that allows for **OFFICER SAFETY** and **MANEUVERABILITY** after deploying STOP STICK, as well as the safety of bystanders, pedestrians and other motorists.

Only deploy STOP STICK when you have a safe location to observe the target vehicle.

Advise pursuing units when STOP STICK is being deployed.

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

### *Student Lesson:*

**⚠️ AVOID deploying STOP STICK on wet surfaces, gravel or loose pavement.** These surfaces may increase the risk a person will lose control of the target vehicle when tires deflate.

3. Regardless of the method of deployment, consider deploying STOP STICK so that a suspect has limited ability to avoid striking the device.
  - Try to deploy STOP STICK at the last possible moment, so that a suspect has limited ability to avoid striking the device by driving the vehicle to either side of the sleeved STOP STICKS.
  - Is it possible to deploy in the middle of a bridge?
  - What types of natural barriers or man-made obstacles would prevent suspects from avoiding STOP STICK?
4. If deploying near an intersection, deploy STOP STICK just before entering the intersection on the road the target vehicle is traveling. Deploy before reaching any driveways or parking lots near the intersection. Deploying just after an intersection, driveway or parking lot allows the target vehicle to turn and avoid STOP STICK.
5. ONLY deploy STOP STICK after you have identified a SAFE LOCATION to observe the pursuit.
  - What makes a good escape route or safe location?
  - What are some safe locations to deploy STOP STICK on your current patrol?

**⚠️ ALWAYS move to a SAFE LOCATION after deploying STOP STICK.** The cord reel has 80 ft. (24m) of cord to allow you to move as far as possible from the road so that you can avoid fleeing or pursuing vehicles.

### **B. Deploying STOP STICK**

**⚠️ ALWAYS advise pursuing units when and where STOP STICK is being deployed.**

Provide fellow officers with ample warning to avoid striking the device. STOP STICK is an equal opportunity tire deflator, it cannot distinguish police tires from suspect tires.

### *Instructor's Notes:*

#### **Tactical Considerations**

#### **STRESS THESE KEY POINTS:**

- **plan ahead** for best deployment locations
- adequate **line of sight** – for traffic and the approaching pursuit
- “best practices” for deployment near **intersections**
- a **safe location** for the officer – concealment, protection, or escape route if suspect vehicle swerves
- **communication** with other officers – always advise pursuing vehicles when/where STOP STICK is deployed
- deploy STOP STICK at last possible moment so suspect has **limited ability** to avoid the device.

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

### *Student Lesson:*

**Pre-Load** is the sole recommended method of deployment. Pre-load three/four unconnected STOP STICKS in the supplied nylon sleeve; with the cord reel attached to the end of the sleeve. Then place the loaded sleeve in the mounting tray until needed.

1. At the time of need, use the red handles to remove the sleeved STOP STICKS from the mounting tray.
2. Unlock the cord reel. When all lanes of traffic are clear, use the red handles to throw the sleeved STOP STICKS to the opposite side of the road.
3. **Communicate to the pursuing officers that the STOP STICKS are in position.**
4. Once the sleeved STOP STICKS are on the opposite side of the road, position yourself in a safe location for the impending deployment, while using your peripheral vision to monitor approaching traffic.
  - a. While waiting for the target vehicle to arrive, reel in any slack with the cord reel.
  - b. Keep the cord line flat on the road surface; allowing non-target vehicles to drive over the dispensed cord, without interfering with the impending deployment of the sleeved STOP STICKS.
5. Lock the cord reel and hold it by the handle with both hands while awaiting the target vehicle. Never wrap the cord around your hand or any portion of your body.

**⚠ NEVER wrap the cord around your hand or any portion of your body.**
6. As the target vehicle approaches, carefully step backward with the cord reel in hand, to pull the sleeved STOP STICKS into the path of the target vehicle.
  - a. Before pulling the sleeved STOP STICKS into position, ensure there are no other vehicles between the target vehicle and the point of deployment.

**⚠ NEVER rush a deployment.** Allow enough time to correctly deploy sleeved STOP STICKS. As you pull them into the road, turn to watch where you are going and retreat to a safe location.
7. After the sleeved STOP STICKS have been struck, remove them from the roadway by pulling the cord reel with both hands.

### *Instructor's Notes:*

**Pre-Load** is the sole recommended method of deployment because it affords the maximum in **OFFICER SAFETY**, while also containing STOP STICKS after they have been struck. This also allows for **safe, easy and efficient removal** of STOP STICKS from the road by simply pulling them from the road with the attached cord reel.

Remember that on **multi-lane roads**, it may be advisable to have officers deploying from both sides of the roadway.

Allow **all participants** of the class an opportunity to practice “loading” the STOP STICKS into the sleeve; attaching the cord reel to the sleeve; and placing the sleeved STOP STICKS in the tray.

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

### *Student Lesson:*

- ⚠ ALWAYS use caution when removing STOP STICK from the road.** DO NOT enter the roadway if pursuing vehicles have not passed. Handle carefully, STOP STICK may break open exposing sharp spikes after being struck by a vehicle.

8. Always follow the policies and procedures of your agency when deploying STOP STICK. Those policies supersede any written or verbal instructions from Stop Stick, Ltd.

### C. After Deploying STOP STICK

If STOP STICK was struck by any vehicle:

- the device is no longer fully functional and should be replaced as soon as possible.
- fill out the provided “Pursuit Reporting Form” and fax it to 513 202 0240. Or, this form can be filled out online at [www.stopstick.com](http://www.stopstick.com) under “Contact Us”.
- if you have any questions about replacement(s), contact Stop Stick, Ltd. at 513 202 5500.

If STOP STICK was not struck by any vehicle:

- inspect the sleeved STOP STICKS for damage.
- if undamaged, return sleeved STOP STICKS to the tray for the next deployment situation.

### V. CARE AND MAINTENANCE

With reasonable care, your STOP STICK will be ready to aid you in preventing or terminating a pursuit that creates a hazard to you and the public.

Follow these simple guidelines to ensure your STOP STICK is ready for use:

- Periodically inspect STOP STICK to ensure it is undamaged and ready for deployment. This should be part of your pre-shift routine, like inspecting your fire extinguisher.
- When STOP STICK is stored in the tray, be sure other items in the trunk are not loaded too high. Either STOP STICK could be damaged or the STOP STICK could potentially damage an item it impacts.

### *Instructor's Notes:*

**DO NOT** wrap the cord around **ANY PORTION** of your body.

**ASK:** What could happen if the cord is wrapped around your hand and it becomes entangled with a vehicle?

**ASK:** What could happen if you are rushed to deploy STOP STICKS?

- **damage to vehicles.**
- **potential injuries** – ways that deploying officers could be hurt.
- **failure to deflate tires.**

Before **STEPPING BACKWARD**, ensure it is safe – officers won't trip or fall into path of pursuit.

### **STRESS THESE KEY POINTS:**

- When pulling STOP STICKS into the path of the target vehicle, keep in mind that the **suspect may take evasive action** to avoid striking STOP STICKS. With that in mind remember, that STOP STICKS cannot be “pushed” back over ground that they have already been “pulled” over.
- Whenever a cord reel is rewound for reuse, rewind the cord by pulling out approximately five feet of cord and place the cord between two fingers with a small amount of tension when rewinding. This process reduces the opportunity for the line to become bound inside the cord reel as it is rewound.

# Guidelines For Use of STOP STICK

## Instructor Lesson Plan

*Student Lesson:*

*Instructor's Notes:*

### VI. CONCLUSION

Installation of STOP STICK in each agency patrol vehicle provides a viable alternative to extended vehicle pursuits that endanger you, the public, and the fleeing suspect.

#### ▲ IMPORTANT SAFETY REMINDERS

The following warnings appear on every STOP STICK:

**▲ WARNING**

Deflating tires increase the risk a driver may lose control of the vehicle resulting in **SERIOUS** or **FATAL INJURIES**

- **DO NOT** use STOP STICK without proper **TRAINING**
- **NEVER** use STOP STICK on **MOTORCYCLES**

Visit [www.stopstick.com](http://www.stopstick.com) or call 513-202-5500 for more information

**▲ CAUTION**

STOP STICKS contain **SHARP SPIKES**

**NEVER** bend STOP STICK or push spikes through housing

**DO NOT** attempt to repair, dismantle or open STOP STICK

Visit [www.stopstick.com](http://www.stopstick.com) or call 513-202-5500 for more information  
Stop Stick, Ltd. Made in USA  
Patent # 5,330,285 5,452,962

**Risk Management experts say that the greater risk to our safety and those around us occurs while we are also things we do the least often. But with the use of on-going training, pre-planning and frequent practice, you may be able to decrease the heightened dangers of high risk/low frequency activities.**

**Practice using STOP STICK so you are ready to deploy it properly when you need to end a pursuit.**

**ASK:** Are there any questions?

Take a moment to answer any questions from the class.

After completing the lesson plan, have all participants go to a controlled area (i.e., parking lot, large room, etc.) to demonstrate their proficiency in safely deploying STOP STICK.

Stop Stick, Ltd., strongly encourages you to take this lesson plan along and ask students about the safety and tactical considerations as they practice!

**HANDS-ON-ACTIVITY:** Give EVERY participant an opportunity practice throwing sleeved STOP STICKS across the road. The student should be able to consistently throw a set of sleeved STOP STICKS a minimum distance of 36 feet (11m), which is equivalent to the width of three standard traffic lanes.

It is important to note that because sleeved STOP STICKS can be thrown 30-40 feet (9-12m), deploying officers can and should stay a safe distance from the roadway.



**Homeland  
Security**

Science and Technology

**U.S. Department of Homeland Security**



System Assessment and Validation for Emergency Responders

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

Located within the Science and Technology (S&T) Directorate of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems, and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL).

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, contact the SAVER Program Support Office.

RKB/SAVER Telephone: 877-336-2752

E-mail: [saver@dhs.gov](mailto:saver@dhs.gov)

Web site: <https://www.rkb.us/saver>

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# Summary

## Portable Tire Deflation Devices

(AEL reference number 14SW-01-WALL)

*In order to provide emergency responders with information on currently available tire deflation device technologies, capabilities, and considerations, Texas A&M Engineering conducted a comparative assessment of portable tire deflation devices for the System Assessment and Validation for Emergency Responders (SAVER) Program in August 2006. The assessment included both simulated deployment evaluations and operational testing of the systems on concrete pavement at two vehicle speeds: 35 miles per hour (mph) and 70 mph.*

### Background

Law enforcement officials use tire deflation devices as a way to disable target vehicles. They work by utilizing a row of spikes to pierce tires, effecting a controlled deflation. Tire deflation devices can end road chases without the danger caused by a tire blowout. Tire deflation devices must be capable of safely releasing the air pressure of the tire in a predictable, controlled manner so the vehicle operator can maintain control.

### Assessment

Prior to the assessment, 12 law enforcement subject matter experts (SMEs) were chosen from various jurisdictions to participate in a focus group. The focus group's primary assignment was to develop evaluation criteria; however, they were also tasked with recommending possible uses and operational outcomes to support the assessment plan development.

The SAVER Program also conducted a market survey to investigate currently available tire deflation devices. The primary objective of the market survey was to provide an overview of the tire deflation devices available to law enforcement officers as well as their capabilities, features, and considerations.

The tire deflation devices included in the assessment were identified through the market survey conducted by Texas A&M Engineering in April 2006. The following portable tire deflation devices were assessed:

- MagnumSpike!<sup>TM</sup> fold-out system, purchased through Phoenix International
- MagnumSpike! roll-out system, purchased through Phoenix International
- Stinger Spike System<sup>®</sup>, purchased through Federal Signal Corporation
- STOP STICK<sup>®</sup> system, purchased through StopTech, Ltd.

The tire deflation devices were assessed according to the following SAVER criteria: affordability, capability, deployability, maintainability, and usability. Each factor was weighted and given a percentage of importance by the focus group for the purposes of the assessment.

Assessment activities were developed based on input from the focus group. The assessment had a two-phase approach.

Phase I included six law enforcement patrol officers simulating deployment of the systems. The SMEs reviewed the system safety, use, and setup literature provided by the manufacturers, and then used the systems by removing the systems from a trunk compartment, deploying them on asphalt surfaces, and reconfiguring them in storage containers. No spiking of vehicles was included in the Phase I assessment.

Phase II included scenario testing of each system on concrete at two speeds (35 mph and 70 mph). Each evolution consisted of “warming” up the tires until their pressure was consistent, then driving a test vehicle over a prepositioned tire deflation device (see figure 1). Six total evolutions per tire deflation device were conducted on the concrete surface: three evolutions with the vehicle driven at 35 mph and three evolutions with the vehicle driven at 70 mph.

Observations on all tire deflation devices assessed in Phase II were obtained from technicians and engineers from Texas A&M Engineering, who also rated the devices.

## Assessment Results

The assessment results are a snapshot of the comparative performance of four models of tire deflation devices representing the known market at the time of assessment. Table 1 lists the scores, on a 100-point scale, for the composite rating and the

### SAVER Program Category Definitions

**Affordability:** This category groups criteria related to life-cycle costs of a piece of equipment or system.

**Capability:** This category groups criteria related to the power, capacity, or features available for a piece of equipment or system to perform or assist the responder in performing one or more responder-relevant tasks.

**Deployability:** This category groups criteria related to the movement, installation, or implementation of a piece of equipment or system by responders at the site of its intended use.

**Maintainability:** This category groups criteria related to the maintenance and restoration of a piece of equipment or system to operational conditions by responders.

**Usability:** This category groups criteria related to the quality of the responders’ experience with the operational employment of a piece of equipment or system. This includes the relative ease of use, efficiency, and overall satisfaction of the responders with the equipment or system.

SAVER category ratings based on the devices that were included in the assessment.

The STOP STICK tire deflation device system had the highest overall rating followed by Stinger, the MagnumSpike! roll-out system, and the MagnumSpike! fold-out system.

Assessment results included observations by SMEs and Texas A&M Engineering technicians and engineers. Their ratings, organized by SAVER category, are detailed in the following paragraphs.

**Table 1. Tire Deflation Devices Assessment Results<sup>1</sup>**

System	Composite Score	Affordability (5% Weighting)	Capability (35% Weighting)	Deployability (30% Weighting)	Maintainability (10% Weighting)	Usability (20% Weighting)
STOP STICK®	77	54	67	90	61	87
Stinger Spike System®	68	70	65	63	88	72
MagnumSpike!™ Roll-Out	55	100	63	54	38	38
MagnumSpike! Fold-Out	53	86	64	49	38	37

Note:

<sup>1</sup> Scores contained in the report may be listed in a different numerical scale. For the purposes of the SAVER Summary, listed SAVER category scores are unweighted and rounded to the nearest whole number using a 100-point scale.



**Figure 1. Vehicle Being Spiked**

**Affordability.** At the time of the assessment, the MagnumSpike! roll-out system had the lowest price followed by the MagnumSpike! fold-out, the Stinger, and the STOP STICK, respectively. The purchase cost for all tire deflation device systems was between \$260 and \$380.

**Capability.** Based on feedback from the SMEs in Phase I, the users rated the STOP STICK system higher than the other systems in spike effectiveness and overall system effectiveness.

In Phase II, Texas A&M Engineering technicians and engineers noted that the capability to deflate the tires that were used in the test, as measured by the number of spiked tires per vehicle and by the rate of deflation for spiked tires, was similar for all systems.

**Deployability.** In Phase I, SMEs rated the STOP STICK system higher than the other systems. Users had positive comments for all aspects of the STOP STICK system's deployability including its storage location in the vehicle and its ease when deploying the system and retrieving the system for redeployment.

All tire deflation devices were prepositioned for the assessment activities; therefore, deployability was not assessed in Phase II.

**Maintainability.** Based on feedback from the SMEs in Phase I, the users rated the STOP STICK system higher than the other systems. Ratings were based on overall system durability and the maintainability of the spikes and frame.

Observations by Texas A&M Engineering technicians and engineers were based on requirements to rehabilitate tire deflation device systems after the vehicles had encountered them. The Stinger scored higher than the other systems in the Phase II maintainability assessment.

**Usability.** Based on feedback from the SMEs in Phase I, the users rated the STOP STICK system higher than the other systems in training materials, controls usability, user safety, and overall system usability.

Based on observations by Texas A&M Engineering technicians and engineers, the Stinger scored higher than the other systems based on the number, type, and projection of loose spikes, ease of cleanup, and controllability of spiked vehicles.

## Other Assessment Results

**Safety.** Field tests confirm several safety concerns that were identified for the MagnumSpike! systems during deployment tests. In particular, numerous spikes turned into projectiles after the system was impacted by a vehicle. During MagnumSpike! deployments that resulted in the system being turned over, users were unable to correct problems without putting themselves at risk of being struck by vehicles or failing to accomplish the mission.

**Design and Effectiveness.** Based on the assessment results, evaluators were not able to identify a difference among manufacturers in how fast the spiked tires deflated. The speed of deflation appears to be mostly due to the total effective size of the hole made in the spiked tires rather than a particular spike design.

## Conclusion

Users preferred the STOP STICK system, followed by the Stinger system and then the MagnumSpike! systems. The STOP STICK system benefits preferred most by users were its easy deployability and retrievability, which increased usability.

All reports in this series, as well as reports on other technologies, are available in the SAVER section of the Responder Knowledge Base (RKB) Web site at <https://www.rkb.us/saver>.



### Self-Reported Stop Stick Deployments in Wisconsin

1996 - May 15, 2019

County	Jurisdiction	Total Deployments	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	
Number of Jurisdictions self-reporting each year			18	29	33	21	19	18	9	19	8	16	23	15	23	23	17	21	21	18	15	23	19	24	18	14	
Barron	Stanley	1																									
Bayfield	Washburn	1																									
Brown	Brown County	4																									
	Green Bay	2																									
	Suamico	3																									
	Wrightstown	1																									
Buffalo	Buffalo County	2																									
Calumet	Calumet County	1																									
Chippewa	Bloomer	7																									
	Cadott	1																									
	Chippewa Falls	6																									
	Cornell	2																									
Columbia	Columbus	1																									
Crawford	Crawford County	1																									
	Prairie Du Chien	1																									
Dane	DeForest	1																									
	Fitchburg	5																									
	Middleton	6																									
	Stoughton	2																									
Douglas	Superior	3																									
Eau Claire	Altoona	1																									
	Augusta	1																									
	Eau Claire	5																									
	Eau Claire County	3																									
Florence	Florence County	1																									
Fond Du Lac	Fond Du Lac County	24																									
	Osceola	2																									
	Ripon	7																									
Grant	Grant County	1																									
	Hazel Green	4																									
	Muscoda	2																									
	Platteville	4																									
	Potosi	1																									
	Cuba City	2																									
Green	Green County	3																									
	Monroe	1																									
	Monticello	1																									
	Brodhead	1																									
Iowa	Iowa County	2																									
	Mineral Point	1																									
	Pulaski	1																									
	Ridgeway	1																									

County	Jurisdiction	Total Deployments	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
Jefferson	Jefferson County	7																								
	Johnson Creek	3																								
	Jefferson	2																								
Kenosha	Kenosha	1																								
LaCrosse	Onalaska	1																								
Lafayette	Darlington	1																								
	Lafayette County	2																								
Langlade	Antigo	4																								
Lincoln	Merrill	3																								
Manitowoc	Manitowoc	1																								
Marathon	Athens	1																								
	Marathon County	3																								
	Mosinee	3																								
	Spencer	2																								
	Wausau	5																								
	Everest	2																								
Menominee	Menominee County	8																								
Milwaukee	Bayside	6																								
	Brown Deer	5																								
	Cudahy	1																								
	Fox Point	4																								
	Glendale	79																								
	Greenfield	17																								
	Milwaukee	20																								
	Milwaukee County	4																								
	Oak Creek	19																								
	River Hills	6																								
	Shorewood	1																								
	Wauwatosa	23																								
	West Allis	64																								
	Whitefish Bay	16																								
Outagamie/Waupaca	New London	3																								
Ozaukee	Cedarburg	2																								
	Mequon	19																								
	Thiensville	3																								
Polk	Dresser	1																								
	Polk County	1																								
Portage	Portage County	1																								
	Stevens Point	1																								
Price	Price County	9																								
Racine	Mount Pleasant	6																								
Richland	Richland Center	5																								
Rock	Beloit	14																								
	Evansville	1																								
	Janesville	20																								
	Rock County	24																								

County	Jurisdiction	Total Deployments	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	
Rusk	Rusk County	4																									
Sauk	Baraboo	3																									
	Spring Green	1																									
Sheboygan	Sheboygan	10																									
	Sheboygan County	1																									
St. Croix	Baldwin	11																									
	Hammond	3																									
	Hudson	6																									
	Somerset	3																									
	St Croix County	24																									
Stephenson	Stephenson County	1																									
Superior	Hayward	1																									
Vernon	Genoa	1																									
Walworth	Darien	2																									
	Delavan	5																									
	East Troy	1																									
	Elkhorn	3																									
	Lake Geneva	1																									
	Linn	2																									
	Walworth County	13																									
	Whitewater	1																									
Washara	Hancock	1																									
	Waushara County	2																									
Washburn	Minong	1																									
Washington/Dodge	Hartford	2																									
Waukesha	Brookfield	3																									
	Brookfield (Town)	10																									
	Chenequa	1																									
	Delafield	6																									
	Dousman	1																									
	Hartland	1																									
	Menomonee Falls	15																									
	Muskego	8																									
	New Berlin	17																									
	Pewaukee	4																									
	Summit	3																									
	Waukesha County	26																									
Waupaca	Waupaca County	6																									
	Weyauwega	2																									
Winnebago	Menasha	2																									
	Neenah	7																									
<b>Total</b>		<b>757</b>																									