Officer Roadside Safety Program
Student Handout Materials

The materials presented in this program are designed to provide the students with officer safety information obtained from recent studies, research articles, and training articles presented by a variety of sources. When possible, the original sources are cited to provide a means for each participant to further research the materials and determine if they wish to incorporate the information in their existing policies and daily safety activities.

Session I – Introduction and Overview

- With the exception of 2011, over the past 19 years, more officers have been killed in vehicle related incidents, than feloniously killed. 2012 recorded 52 officers killed in vehicle related incidents, the single leading cause of deaths for the year.
- 2007 – worst total loss of officers in 30 years (IACP/Officer Down Memorial Page)

How We Die – The Untold Story: Captain Travis Yates, Study of 2007 Officers Killed.

- 60% of all deadly collisions **involved just the police vehicle**.
- Majority involved **running off road** and **striking objects** (trees, buildings, guardrails).
- 1 in 5 officers were **responding to assist other officers.**
- Other calls included **domestic disturbances, traffic infractions, medical calls** and ***routine patrol.***
- 11% occurred in bad weather, majority citing **Hydroplaning** as the cause.
  Only 2 collisions listed vehicle as using emergency equipment; intersection collisions played an even lesser role.

Deaths of Law Enforcement Officers by Motor Vehicle Crashes: A review of FARS Data

- The deaths of LEO's in Motor Vehicle Crashes have increased by ***80%*** during the past 28 years, while the deaths of LEO's by other reasons have decreased by around ***50%,***
- Since the late 1990's, approximately half of all LEO deaths are a result of motor vehicle crashes, ***54% between 2005 to 2007***.

Crash by shift:

- 22.9% of the crashes occurred from 0800 – 1559
- 35.5% of the crashes occurred from 1600 – 2359
- 41.6% of the crashes occurred from 0000 – 0759
- Crashes based on the month of the year had no dominant pattern, and crashes based on the day of the week were distributed largely evenly.

Seatbelt Usage:

- 42.4% Non-use of restraints in fatality accidents
- 18.9% of the total deaths of LEO's as occupants were ejected
- 15.1% totally ejected
- 3.8% partially ejected

Emergency Equipment Involvement:

- 58% Not using Emergency Equipment
- 42% Using Emergency Equipment

Roadway Configuration

- 64.5% Not Physically divided roadway
- 23.6% Divided Highway, Median Strip – without barrier
- 8.3% Divided Highway, Median Strip – with barrier

- 70.4% Straight section of roadway
- 65.7% Level Roadway
- 28.6% Grade
- 28.9% On a curve
- 3% Hillcrest

- **The greatest percentage of crashes occurred on a straight, level section of roadway!!**

Unfortunately no officer is immune:

- 45% Sheriff's deputies.
- 32% municipal officers.
- 11% highway patrol/state police officers.

Age of Involved Officers:

- 32% - 20 to 29 Years of Age
- 36% - 30 to 39 Years of Age
- 18% - 40 to 49 Years of Age
- 8% - 50 to 59 Years of Age
- 5% - 60+ Years of Age

Years of Service Highlighted:

- 58% of officers had less than ***5 years of service.***
- 32% of the officers had less than ***23 months of service.***
- 6 officers had only a ***few months of experience.***

Session II – Problematic Areas Encountered by Police

Problematic Areas Encountered by Police:

- Traffic stops
- Motorist assists
- Stalled vehicles
- Debris in the roadway
- Accident scenes

On Managing Risk in Law Enforcement Traffic Operations; As presented by **Gordon Graham,** 2009 IACP Impaired Driving Conference;

Top Ten Issues Affecting Traffic Officers

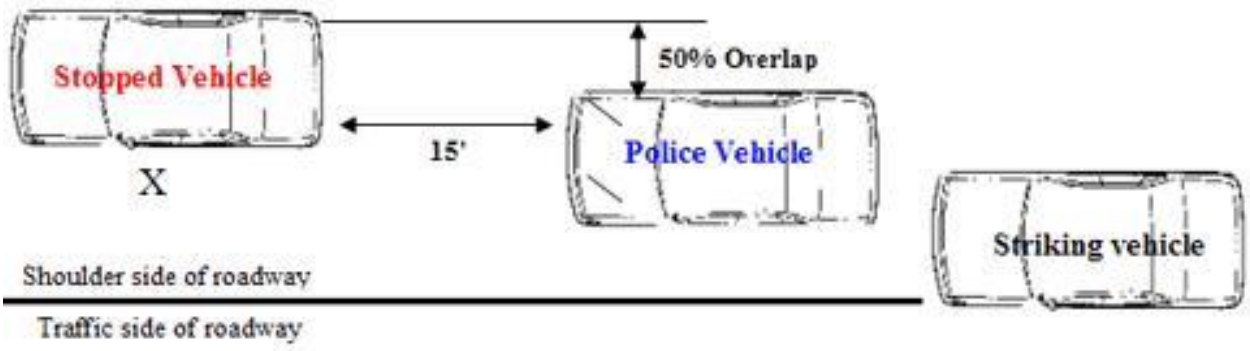
1. **Fatigue** – If you're not getting seven hours of sleep a night, you are suffering from fatigue.
2. **Distractions** – Computers, cell phones, PDA's, MDT's.
3. **Complacency –** Any high risk task is just as dangerous as it was the first time you did it.
4. **Hubris** –Confidence is good, Cockiness is not. (Hubris is defined as extreme haughtiness or arrogance).
5. **Risk Homeostasis** – Sometimes we do things to make people safer, and in fact make them less safe – Such as ABS Brakes.
6. **Right Side Approaches** – Get out of traffic!
7. **Digital Recorders** – "Cops without recording devices are en route to nothing but trouble".
8. **Report Writing** – Take the time to do it right.
   i. Does it match the in car video?
   ii. Does it match the dispatch tapes?
9. **Roadway Incursions** – Increase your visual conspicuity!
10. **Seatbelts** – Use them.

Ford Motor Co. Crown Victoria Police Interceptor Comprehensive Report, July 2005:

Surveyed 80 Agencies: included 47 police departments and 29 state patrol agencies and found the following special law enforcement considerations:

- Officers spend 10 X more time in their vehicles.
- Over 1,000 times more likely to park on side of highway
- 4 X more likely to be in an accident.
- 75% park vehicles offset – left on traffic stops.
- 72.5% park in rear of stopped vehicle.
- 65% say their officers use driver's side approach.
- 46.2% report turning their wheels to the left.

This study examined various stop configurations and developed this recommended stop configuration:



S: Space between the vehicles about 1 car length (15 feet);
T: Turn steering wheel full to the right;
O: Overlap with stopped car approximately 50%;
P: Parallel to the roadway;
*** Consider applying emergency brake (Keeps vehicle from rolling after impact)**

Compared to other configurations tested, this configuration resulted in the <u>Highest Probability</u> of an officer avoiding involvement in an accident, a result <u>3X Higher</u> than some of the other configurations tested.

- The left offset and overlap between vehicles provides coverage.
- Angle of police vehicle wheels steers car away from officer.
- Spacing of at least 15' allows vehicle room to track away from officer.
- Patrol vehicle parallel to roadway offers smallest possible target.

<u>Ford Motor Co. Rear-end Crashes, February 2003:</u>

152 crashes studied of Police vehicles struck in the rear:
- 89 day-time accidents,
- 60 night-time accidents

78 patrol cars struck while on shoulder of road:
- 46 - (30%) on the right shoulder
- 32 - (21%) on the left shoulder
- 4 - (49%) not on shoulder or unknown

Driver maneuvers prior to crash:

- Brake/steer at sight of police car: 16 (11%).
- Brake/steer not at sight of police car: 54 (36%).
- Did not brake/steer prior to impact: 73 (47%).
- Unknown actions: 9 (6%).

Recommendations for Survival during Traffic Stops:

- ***Location of stop is <u>NOT</u> static:***
  - Move to safer location closer to shoulder.
  - Move to a parking lot.
  - Move to a side street.

- **Identify and avoid the kill zone between all vehicles.**

"*<u>7 Tips for Roadside Officer Safety</u>*," <u>Scott Buhrmaster</u>:

1. You control the traffic stop location.
2. Time your stop to take advantage of light and cover.
3. Use the passenger-side approach when possible.
4. Use the steering wheel as a writing surface.
5. Be prepared for wind/draft of passing vehicles.
6. Resist instantly retrieving dropped items.
7. Consider terrain: road surface, hillcrest, traffic flow, and shoulder.

David Grossi – LawOfficer.com article – 11/16/2010

- "It is well established and documented that passenger-side approaches are one of the best tactical tools police officers have in making vehicle stops, especially when compared to traditional driver-side approaches"
- Research conducted in California on officers undergoing Traffic Stop Training where a suspect was hidden in the rear seat:
  - 90% **Missed** the hidden suspect making a driver's-side approach
  - 100% **Discovered** the hidden suspect making a passenger-side approach

Recommendations for Survival – Motorist Assists

- Patrol vehicle facing opposite of traffic flow can create confusion:
  - Overhead lights, strobes can blind oncoming traffic.
  - Confused drivers can make wrong turns, stop improperly, go the wrong way.
  - Activating bright lights without considering your reasons may do more harm than good.
  - Those lights may actually decrease the driver's ability to see emergency responders on foot and accident scenes, debris, etc.
  - It's hard for people to tell if your car is moving or stopped when they approach
  - At night, the human eye perceives a blue light as moving towards it, a red light as moving away.

Session III — Contributing Factors in Police Vehicle Incidents

Overview of Contributing Factors of Accidents:

- Training/or lack thereof;
- Training budget/or lack thereof;
- Drivers/vehicle conditions;
- Emergency equipment;
- Officer fatigue.

National Institute of Justice – Law Enforcement Technology Study:

- 90% of all LE agencies have less than 50 officers.
- Half of the 90% have less than 10 total officers.
- 83% cite budget constraints.
- 26% lack technology training.
- 14% cite lack of available training.

"Driver Training/Lack of Training," Scott Ashley *Officer.com*, August 2006:

Most departments require annual or bi-annual weapons qualification, but, **seldom if ever**; require EVOC training after the basic academy training.

Officers drive more than they shoot.

Recommendations for Driver's Training "Captain Travis Yates"

- **Complete an Intense Program every 2-4 Years:**
  - Review SOP's, State Statutes, Case Law.
  - Driving Range:
    - ✓ Defensive and precision driving maneuvers and exercises;
    - ✓ High Speed and realistic conditions.

- **On Off Years, complete an annual refresher:**
  - Review SOP's State Statutes, Case Law.
  - Driving Range:
    - ✓ Practice basic skills and maneuvers.

Dale Stockton – "8 Tips for Safely Deploying Tire-Deflation Devices"

- Get out of the Road, and out of the Danger Zone
- Have a Plan and a Barricade
- Time is the Critical Element (Make sure you have proper time to set up)
- Misjudging the Speed and Distance of the approaching car can be Deadly
- Do Not Assume that the vehicle will continue in a straight line
- Practice, Practice, Practice and do it before you have to do it for real
- Use Extra Caution when considering a nighttime deployment
- Finally, remember that no pursuit is worth your life.

Alternative Tire Deflation Devices currently Available (Not a complete list):

NightHawk

- Portable
- Remotely deployed and retracted
- STOP STICK inside
- Zero debris left on the roadway
- Reliable in all weather conditions
- Manufacturer – Pacific Scientific Energetic Materials Company

The X-Net

- Vehicle Portable – 45.5 Pounds
- Lay net across the roadway
- Barbs in the mat cling to the tires
- Net is picked up, wraps around tires and axle
- Stops car within a few rotations
- Reusable
- Remote Deployment Device Available
- Launches with a foot pedal – under 2 seconds
- Can stop a Ford F-150 @ 30 MPH in 151'
- Manufacturer – QinetiQ – United Kingdom

****** A wide variety of tire deflation devices and pursuit intervention techniques are available, and are being updated regularly. The overall goal is to reduce the amount of exposure the officer faces to deploy/utilize the equipment for optimal safety. The above list provides only a few examples of new technology available, and research should be conducted on the latest equipment and techniques available.

Jim Donahue, "The Deadliest Jobs in Policing"

- You are 190% more likely to die from an accident event than you are from being shot.
- A cop who is writing a ticket outside his car is 400% more likely to die than a cop who is inside the car.
- For every hour you spend on the range, spend two hours on the driving track.
- For every hour spent on defensive tactics, spend two hours studying tactics when you are in/around your car.
- In service training should be developed on all new technology introduced to the car.
- EVOC training should require qualification, similar to weapons.
- Telling a cop DO NOT USE IT won't work, we have to teach them how to use it in the safest manner.

The "Driver Factor":

- Drunk
- Disoriented
- Distracted
- Drugged
- Dumb
- Disturbed

"Risks of the Road" Kevin P. Morison, *American Police Beat*:

1. **Alcohol** has been a **contributing factor** in the **deaths of nearly one in five officers** who've been **struck and killed** by other vehicles.

2. Officers struck and killed outside their vehicles represent **9%** of **all total officers killed** in the last three decades, **3rd only to shootings and vehicle accidents.**

"Officer Deaths Caused by Drunk Driver's Increasing" – Craig Floyd - Policeone. Com

1. The number of officer's killed in traffic-related incidents caused by persons under the influence of alcohol has risen a staggering **41%** over the last three decades.

Information Handling & Emergency Equipment Considerations:

- Gather information from various sources.
- Make informed decisions based on experience, knowledge, and skill.
- Perform the action.

Information Overload:

- Too much information to process.
- Unable to comprehend given information while in motion.
- Leads to improper and unsafe reaction or maneuver.

"Emergency Code Runs" Travis Yates, *Law Officer* Vol. 4 No. 7:

As speed and traffic noise increase, siren effectiveness decreases. Phenomenon, known as ***out-running or over-driving siren,*** can begin at **55 MPH.**

"Getting There Safely" JP Molnar, *Law Officer* Vol. 4 No. 8:

U.S. DOT study concluded siren audibility at intersections was only 25-40 feet, translating to a safe entry speed of approximately 10 MPH:

- Humans have difficulty locating high-pitched noises.
- Informal studies indicate siren pitch has little effect on overall audibility.
- The air horn, with lower frequency tones, affects driver behavior more a than normal siren.

"Drive to Survive, Inspect Before You Drive" – Travis Yates, *Law Officer* Vol. 5 Issue 4

- **Frequency** – If a vehicle is shared, a daily inspection is recommended
- **Emergency Equipment** – Lights, Siren, Headlights, Radio
- **Tires** – Tread, Inflation, Overall Condition
- **Interior** – Warning Lights, Brake Pedal, Seatbelt, Secure all objects
- **Exterior** – Windshield, Windows, Damage
- **Trunk** – Gear secured and packed so as not to puncture fuel tank or shift on turns
- **Fluids** – Fluid levels should be checked – oil, transmission, W/W fluid, Brake Fluid
- **Weapons** - Ready Condition?
  - Loaded?
  - Obstruction in the barrel?

"FAST" – John Demand – Policeone.com -01/25/12

Focus
Attention
Situational Awareness
Tempo

- Will a few seconds delay really make a difference?
- Would pulling over to the curb or shoulder to answer a call on your MDT or radio be safer?
- Does driving at breakneck speed really get you there that much faster?
- During a traffic stop can you take your time in filling out a ticket or paperwork to continually scan your surroundings for threats or danger?
- Have you given yourself time to think about how you are going to approach a scene or are you just trying to get there as fast as possible?
- Ask Yourself on each call –
  - What am I driving into?
  - What threats might exist?
  - Could I be ambushed?
  - What are my cover and concealment?
  - How can I remain focused and maintain Situational Awareness?

Officer Fatigue and Its Effects:

Rochelle Sharp, *USA Today*:

- Sleep-related accidents most common in early morning and mid-afternoon.
- Frequently result in more serious injuries…because drivers who fall don't try to avoid hitting other vehicles and other objects.

"Destroying Myths and Discovering Cold Facts" – Force Science Research Institute- 03/24/11
"Anti-Fatigue Measures could cut cop deaths 15%

- 56% get less than 6.5 hours of sleep daily
- 91% report felling fatigued "Routinely"
- 14% were tired whey they started their shift
- 85% drove while drowsy
- 39% have fallen asleep at the wheel

Gordon Graham, 2006:

- "Administrators won't talk about it, but our cops are ticking time bombs for lack of sleep."
- Officer fatigue is a life-threatening issue. Approved napping should be an on-duty necessity.
- Fatigue played significant role in at least 3 officer deaths in one state alone.

Special Agent Dennis Lindsey, DEA:

- Ability to maintain speed and road position on a simulator was significantly reduced when normal awake period is prolonged by 3 hours.
- After 24 hours of sustained wakefulness, brain's metabolic activity can decrease by 65%.
- As people "try to fight through periods of fatigue, the human body, in an effort to rest, goes into micro sleeps anywhere from 2-10 seconds at a time.
- Fatigue is 4X more likely to cause workplace impairment than alcohol or other drugs.

"Police Fatigue," Dennis Lindsey:

- Harvard Medical Study Group reports that nearly 40% of active-duty officers suffer from sleep abnormalities.
- Sleep abnormalities include: sleep apnea, insomnia, shift-work disorder, restless leg syndrome, and narcolepsy with temporary paralysis.

"Tired Cops," Bryan Vila:

> "Being awake for 18-20 hours resulted in roughly the same deterioration of performance for most subjects who have a ***BAC of .10%"!***

"2011 IACP Presentation" – Bryan Villa

> "A drowsy driver does not experience a steady decrease in driving ability. You get random, but increasingly frequent lapses of attention. You space out for a few seconds".
>
> "The longer the shift is in darkness, the more at risk of fatigue you are. If you've been up for 12 hours, you're more at risk at four in the morning than…four in the afternoon".

"Driving Tired," Tony Scotti, *Officer.com*:

"Most officers don't think fatigue is a serious impediment to their driving ability until **fatigue has become so serious that they are in real danger**.

- Fatigue warning signs:
  - ✓ Hard time concentrating on driving;
  - ✓ Take risks, fatigue dulls the mind;
  - ✓ Difficulty in maintaining lane discipline;
  - ✓ Speeds up and slows down erratically;
  - ✓ Vision deteriorates; attention focuses forward;
  - ✓ Tunnel vision and loss of peripheral vision.

Recommendations to Combat Fatigue:

"Sleep Deprivation Can Cost You Your Life," Pamela Kulbarsh, RN: *Officer.com*, February 2007. Kulbarsh's recommendations to combat fatigue:

- Drink caffeine early in the shift.
- Understand body's re-boot cycle: night shift workers hit bottom at 4-5 a.m.
- Take short breaks throughout the shift.
- Move, get out of the vehicle, walk climb steps, breathe fresh air.
- Look out for each other.
- Don't leave tedious tasks for shift's end.
- 20 minute naps revive alertness, mood, performance, concentration.
- Heavy meals cause sluggishness.

Session IV— Strategies for Survival – Static Locations

Secondary collisions: Federal Highway Administration:

- Likelihood of a secondary crash increases by 2.8% for each minute the primary incident continues to be a hazard.
- Secondary crashes (due to congestion resulting from a previous crash) are estimated to represent 20% of all crashes.
- Two out of three expressway collisions result from congestion due to a minor accident or disabled vehicle.

USFA Traffic Incident Management Systems:

- A DOT report indicated approximately 18% of all traffic fatalities occur nationally as a result of secondary crashes.
- Minnesota DOR studies estimate 15% of all collisions result from an earlier incident.
- Secondary collision is often more serious than the original collision.

Incident Classification, Responder Responsibilities:

"Responders arriving at a traffic incident should, within 15 minutes of arrival on scene, estimate the magnitude of the traffic incident, the expected time duration of the traffic incident, and expected queue length, and then set up the appropriate temporary traffic controls for these estimates."

Incident types:	**Expected Duration:**
▪ Minor incident	Less than 30 Minutes
▪ Intermediate incident	30 Minutes to 2 Hours
▪ Major incident.	More than 2 Hours

Minor incident: 30 minutes

- Highest frequency
- Shortest duration,
- Minor crash or disabled vehicle
- Responders – police & tow vehicle
- Little traffic influence.
- Traffic control provided by responders, if needed.

Intermediate incident: 30 minutes-2 hours

- Lower frequency
- Longer duration
- Serious crashes
- Full closures for short periods possible,
- Traffic control normally needed to divert traffic:
  - Proper TTC: signing+ should be used.
  - Keep warning in advance of end of queue.

Major incidents: 2 hours

- Lowest frequency but longest duration
- Road closure for extended period for reconstruction & clean-up
- Proper traffic control in place ASAP to provide notice to approaching motorists.
- Establish detour route, if possible; consider truck traffic
- May require additional resources, i.e. MODOT, etc.

Temporary Traffic-Control Devices: Signs and Cones:

- Traffic cones: standard > collapsible
- Warning signs
- Flares: electronic > chemical
- Stop/slow paddles
- Flags
- Arrow and variable message signs

Emergency Vehicle Placement:

- Limit number of responding vehicles.
- Place essential pieces inside work area.
- Park unneeded vehicles off roadway.
- Park ALL vehicles on same side of roadway, providing ***escape route*** for errant vehicles.
- Create work area large enough ***to accommodate responders*** **SAFELY!!!**
- Place apparatus to protect scene.

Perception reaction time defined:

- The amount of time drivers need to perceive, analyze, react, and complete their maneuvers;
  - PRT = 2.5 seconds under "normal conditions".
  - PRT = 5+ seconds for work zones.

Surprise VS Reaction Time: "Every Moment Counts," Tony Scotti:

- A driver who knows they have to brake can achieve the best possible reaction time of 0.7 Seconds.
- When the need to brake is a complete surprise, the best estimate is 1.5 Seconds.

Converting miles per hour (MPH) to feet per second (FPS):

- Multiply speed in miles per hour by 1.47 to obtain number of feet a vehicle travels in one second;
  - Example: 60 mph = 60 (1.47) = 88 fps.
  - At 60 mph, driver travels 88 feet in ONE second.
- Estimating converting MPH to FPS:
  - Approximate by multiplying MPH by 1.5.
  - Example: 60 mph = 60 + 30 = 90 fps.

Reflective Clothing and Safety Equipment:

- In a simulated work-zone, the average driver detected a pedestrian dressed:
  - In typical non-reflective clothing at 125 feet.
  - One wearing a reflective vest at 891 feet.
  - At 30 mph, required stopping distance is 196 feet.
  - At 55 mph, required stopping distance is 495 feet.

Administrative rule-making – 23 CFR 634:

- Final rule published on November 24, 2006.
- Effective date November 24, 2008.
- Requires ANSI Class 2 or 3 for all workers within the right of way of federal-aid highways.
- The 2009 MUTCD supersedes 23 CFR and applies the high-visibility safety apparel requirement to all roadways
- Includes incident responders as well as volunteer workers.
- Includes some exceptions for LEOs.

Tapers-installation, Removal, Configurations:

Defined:

"A taper is a gradual transition of traffic accomplished by the use of channeling devices such as cones, flares, etc."

Minimum length of MERGING taper (L) in feet necessary to close a 12-ft lane

Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	at least 0.5 L
Shoulder Taper	at least 0.33 L
One-Lane, Two-Way Traffic Taper	50 feet minimum, 100 feet maximum
Downstream Taper	50 feet minimum, 100 feet maximum

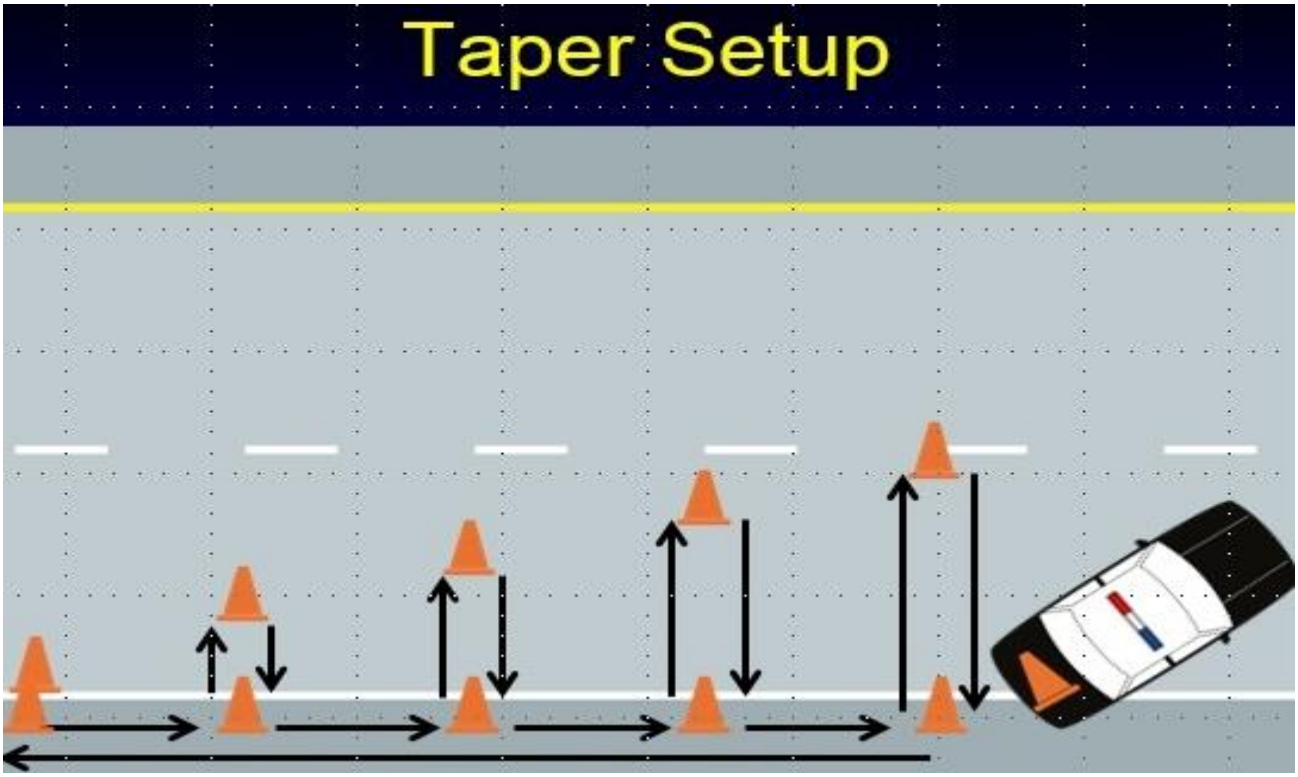
Note: Use Table 6C-4 to calculate L

Table 6C-4. Formulas for Determining Taper Length

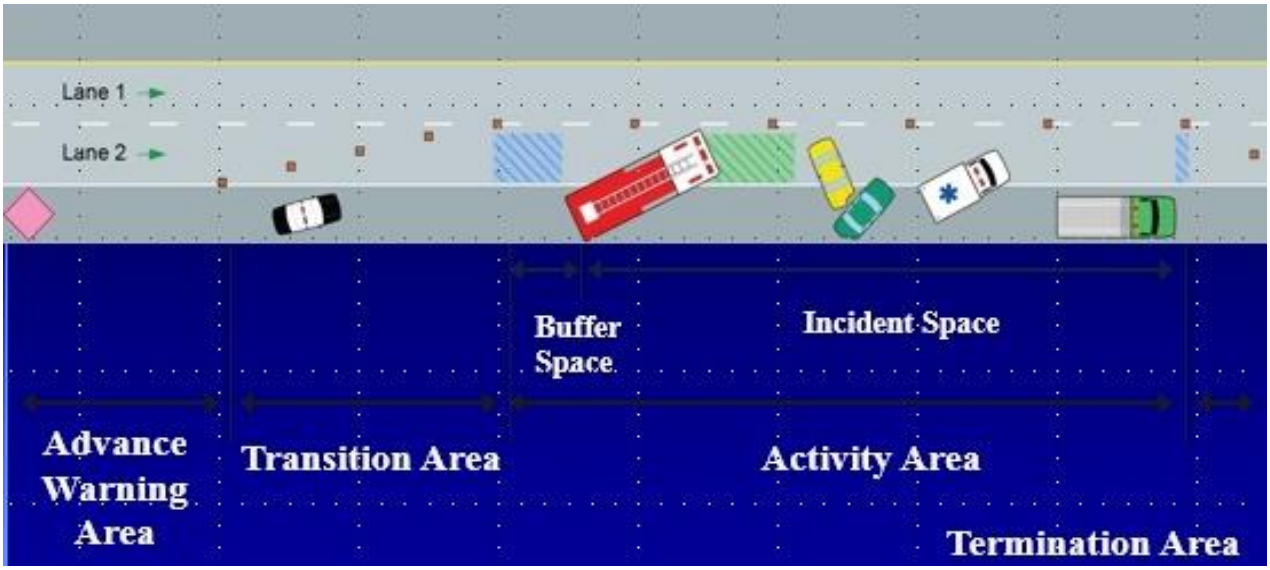
Speed (S)	Taper Length (L) in feet
40 mph or less	$L = \frac{WS^2}{60}$
45 mph or more	$L = WS$

Where: L = taper length in feet
W = width of offset in feet
S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

Temporary Traffic Control Zone Taper Set Up



MUTCD Components of a Temporary Traffic Control Zone



"Traffic Direction," *Calibre Press Survival Newsline*, Dr. Joel F. Shults:

- **Use all available tools:**
  - Always wear a reflective traffic vest;
  - Flashlight with a cone/traffic wand;
  - Set a pattern of Cones/Flares for passive control;
  - Position all vehicles for passive control;
- **Lower Your Expectations:**
  - Assume the motoring public is sensory deprived and intellectually stunted.
  - For every flashing light, assume average driver has lost **1/3** of his ability to think.
  - Make BIG obvious, unambiguously clear gestures.

Personal and Vehicle Safety Equipment

- Collapsible cones
- 2 Scene Tape
- Flashlights/light batons
- Electronic/chemical flares
- Ice walkers
- Hand-held signs