



FIRE AND RESCUE DEPARTMENTS
OF NORTHERN VIRGINIA
FIREFIGHTING AND
EMERGENCY OPERATIONS
MANUAL

**OPERATING
PROCEDURES
FOR ROADWAY
INCIDENTS**

Third Edition

Issued: November 2003
Revised: October 2012

ACKNOWLEDGEMENTS

Operating Procedures for Roadway Incidents was developed through a cooperative effort of the following Northern Virginia fire departments:

- City of Alexandria
- Arlington County
- City of Fairfax
- Fairfax County
- Fauquier County
- Fort Belvoir
- Fort Myer
- Loudoun County
- City of Manassas
- Marine Corps Base Quantico
- Metropolitan Washington Airports Authority (MWAA)
- Prince William County
- Stafford County

The Northern Virginia Fire Operations Board managed the development of the first edition of the manual (released in November 2003), the second edition of the manual (released in August 2008), and the current third edition. The first and second edition content was developed by the Operations Board's Technical Writing Group.

The Board would like to thank the following individuals and organizations for their help in the development of this manual:

Steve Weissman, Stafford County (content editing, third edition)

AAW Publication Services: Andrea A. Walter (editing and layout, second and third editions)

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PREFACE

The most common emergency response, and the one that possibly has the greatest potential for an unfavorable outcome to department members, are operations at the scene of a vehicle accident or other types of emergency incidents occurring on roadways and highways.

The purpose of this manual is to provide officers and emergency responders with a uniform guide for safe operations at incidents occurring on roadways. It is intended to serve as a guideline for decision making and can be modified by incident officers as necessary to address existing incident conditions.

The key changes in the Third Edition of *Operating Procedures for Roadway Incidents* are as follows:

- The Commonwealth of Virginia has published a document, [*Virginia Work Area Protection Manual \(VA DOT, 2011\)*](#), that identifies the roles and responsibilities of responding public safety and private agencies. This manual incorporates those standards and guidelines to ensure compliance with Federal regulations and laws of the Commonwealth of Virginia.
- The manual had a name change from *Operating Procedures for Highway Incidents* to *Operating Procedures for Roadway Incidents*. It is well identified that vehicle collisions occur on all types of roadways and are not specific to just highways.

INTRODUCTION

Each year many significant incidents occur on roadways within the Washington-Metropolitan area. Whether it is on an interstate highway or on a secondary road, the potential for injury or death to members is ever present. Care of the injured, protection of the public, safety of the emergency responders, protection of the environment, and clearance of the traffic lanes should all be priority concerns of the Incident Commander operating at the scene of a highway accident.

The primary objectives for any operation at the scene of a roadway incident are to:

- Establish a safe operating area (work area) to prevent injuries to emergency workers.
- Provide emergency care and transportation of the sick or injured.
- Establish water supply.
- Protect the environment.
- Restore normal traffic flow.
- Keep as many traffic lanes open as possible.
- Preserve evidence for investigators.
- Use the ICS/Unified Command System to manage resources.

It is extremely important that all activities blocking traffic lanes be concluded as quickly as possible, and the flow of traffic be allowed to resume promptly.

Establishing a water supply officer is an early and critical consideration at incidents requiring firefighting operations. Foam units, tankers, and units with large-diameter hose are likely to be needed for incidents that require more water than is typically carried on engine companies.

Sources of water vary greatly, ranging from hydrants located on or near the highway to static water sources that may be quite remote from the scene. Preplanning the location of available water sources must be a regular part of district familiarization. Each section of highway should have a pre-incident plan (for limited access highways), or a street map showing available water sources.

Restoring the roadway to normal, or as near to normal as possible, creates a safer environment for the motorists and emergency responders. Additionally, it improves the public's perception of the agencies involved and reduces the time and dollar losses resulting from the incident.

Definitions

The key definitions used in this manual are:

- **Advance Warning** – notification procedures that advise approaching motorists to transition from normal driving status to that required by the temporary emergency traffic control measures ahead of them.
- **Block** – positioning a fire department apparatus on an angle to the lanes of traffic creating a physical barrier between upstream traffic and the work area.
- **Buffer Space** – the distance or space between personnel and vehicles in the protected work area and nearby moving traffic.

- **Downstream** – the direction that traffic is moving as it travels away from the incident scene.
- **Incident Space** – the protected work area at a vehicle-related roadway incident that is shielded by the block from apparatus and other emergency vehicles. Also commonly referred to as Work Area, which is the prevalent term in this manual.
- **Taper** – the action of merging several lanes of moving traffic into fewer moving lanes.
- **Transition Zone** – the lanes of a roadway within which approaching motorists change their speed and position to comply with the traffic control measures established at an incident scene.
- **Upstream** – the direction from which traffic is traveling as vehicles approach the incident scene.
- **Work Area** – also known as Incident Space, the protected area at a vehicle-related roadway incident that is shielded by the block from apparatus and other emergency vehicles.

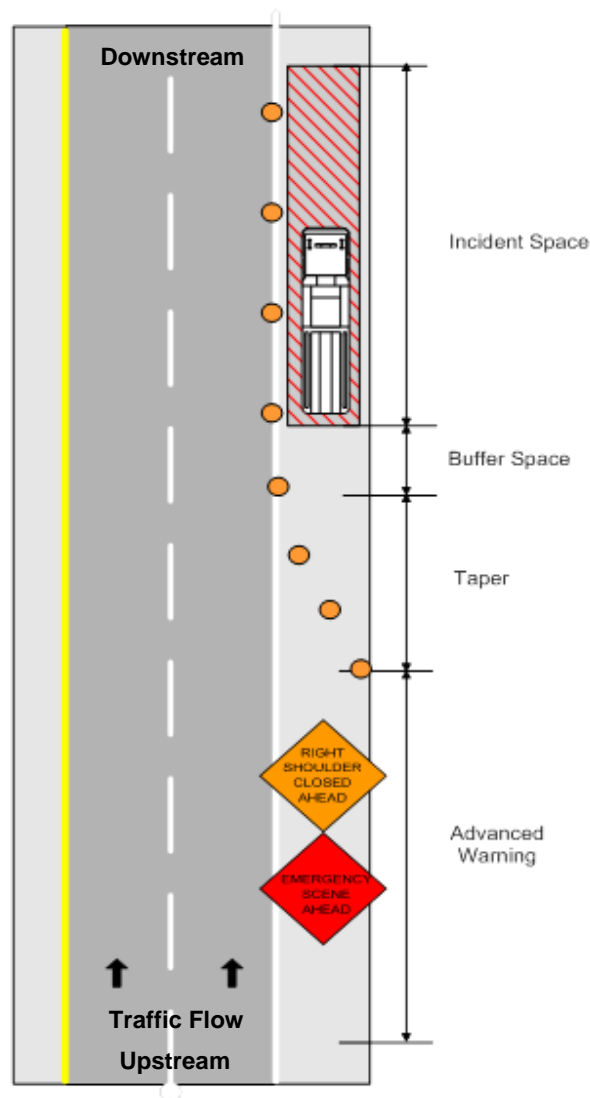


Figure 1: Upstream and Downstream on an Emergency Incident

References

The primary references used in the development of this manual are listed below.

- U.S. Department of Transportation, *Manual on Uniform Traffic Control Devices* [23 CFR 655, Subpart F., 2009], <http://mutcd.fhwa.dot.gov/>
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- International Safety Equipment Association, ANSI/ISEA 107–2010: American National Standard for High-Visibility Safety Apparel and Headwear, <http://www.safetyequipment.org/c/std107-2010.cfm>
- Code of Virginia (§ 46.2-888, “Stopping on highways; general rule” (also known as the Move It” law), <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+46.2-888>

INCIDENT RESPONSE AND UNIFIED COMMAND

Managing a highway incident is a team effort. Each responding agency has a role to play in an effective incident operation. Law enforcement organizations, the Virginia Department of Transportation, and fire and rescue departments all play important roles in the management of highway incidents. It is not a question of, “Who is in charge?” but, “Who is in charge of what?”

Unified Command allows all agencies with jurisdictional authority or functional responsibility for the incident to jointly provide management direction to an incident through a common set of incident objectives and strategies and a single Incident Action Plan (IAP). Unified Command is appropriate at a multi-jurisdictional incident, such as a collision that crosses city and county lines, or a multi-departmental incident, such as a collision on an interstate, that brings responders from fire, EMS, law enforcement, VDOT, and other agencies. Under Unified Command, all agencies with jurisdictional authority or functional responsibility for any or all aspects of an incident participate in the command structure, contribute to overall incident management, and develop incident priorities.

SAFETY CONSIDERATIONS

Management of incidents on the interstate system and local roadways requires the expertise and resources of the local fire and rescue departments, local police departments, Virginia State Police, and the Virginia Department of Transportation, working in concert.

While the safety of emergency services members is the paramount concern for the law enforcement officer in charge, the flow of traffic must be kept in consideration at all times.

Keeping the safety of all members in mind and coordinating needs with other emergency services units, the officer in charge should begin to open closed lanes and place units in service as soon as practical.

Responder Personal Safety

Beginning July 1, 2012, all emergency responders within the right-of-way, who are either exposed to traffic or to emergency vehicles and equipment within the incident scene, shall wear high-visibility safety apparel that meets the requirements of the ANSI/ISEA 107–2010 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear.”

Firefighters or other emergency responders working within the right-of-way and engaged in emergency operations directly exposing them to flame, fire, heat, and/or hazardous materials shall wear retroreflective turnout gear that is specified and regulated by the National Fire Protection Association. Once the incident is mitigated, personnel shall don approved high-visibility apparel in lieu of turnout gear.

Situational awareness is the continuous responsibility of all emergency responders. Responders should be aware of the status of all the incident factors that impact safe, quick clearance. Any changes that could potentially have a negative impact on life safety, incident stabilization, and property/environmental conservation should be brought to the attention of the Incident Commander through the chain-of-command. Unsafe conditions should be mitigated as soon as possible and communicated to all those potentially impacted.

To avoid the errant or distracted driver, responders should never turn their backs to traffic. They should face traffic and remain alert at all times. It often helps to designate another person as a lookout or spotter to watch for dangers and provide warnings. Responders should always have an escape plan to get out of the way of errant drivers. Use of the acronym LCES can aid the Incident Commander, spotter, or Safety Officer in developing an Incident Action Plan; LCES stands for Lookouts, Communications, Escape Routes, and Safety Zones.

RESPONSE

Emergency response to incidents on limited access highways should include at least one unit traveling in each direction on the highway. Many times, callers are excited and may incorrectly report their direction of travel. A unit responding from each direction eliminates any delay that may be caused by this situation.

When responding to incident locations reported to be on restricted access lanes, such as high occupancy vehicle (HOV) lanes separated by physical barriers, jurisdictions shall use the nearest traffic entry point to determine the appropriate units for response.

When units respond together in the same direction, they should remain in single file. This reduces confusion to the motorists on the highway as to how to appropriately yield the right-of-way to emergency apparatus.

Vehicle operators shall reduce apparatus speed when using the shoulder of the road with due regard for the safety of those who may inadvertently pull into the path of their vehicle. When the shoulder must be used for response, apparatus operators must use extreme caution and be aware of:

- road signs,
- debris,
- guard rails,
- oversized vehicles and stopped vehicles, and
- standing water.

Designated median strip crossovers marked “Authorized Vehicles Only” shall only be used when apparatus can complete the turn without obstructing the flow of traffic in either travel direction, or when all traffic movement has stopped.

Response to access/egress ramps should be in the normal direction of travel unless the officer can confirm that the oncoming traffic has been stopped and that no civilian vehicles will be encountered on the ramp.

The use of U-turn access points in “Jersey” barriers is extremely hazardous and shall be used only when the situation is necessary for immediate lifesaving measures.

Unless a roadway is completely shut down, fire and EMS crews shall avoid crossing over lanes of traffic on foot, especially lanes with traffic moving in the opposite direction from where their apparatus is parked. Any action that allows members to operate in a non-shielded environment shall be avoided whenever possible.

Crossing “Jersey” barriers, bridge railings, or physical barriers designed to keep vehicles on the roadway can be physically challenging and extremely dangerous of crew members and shall be avoided whenever possible.

A quick determination of the need for the units responding in the opposite direction of travel must be made. The officer is to make a radio transmission to have them respond into the scene or to go in-service.

APPARATUS POSITIONING

The proper spotting and placement of apparatus is the joint responsibility of the driver and officer. The proper positioning of apparatus at the scene of an incident assures other responding resources of easy access, the establishment of a safe working area, and helps to contribute to an effective overall operation.

As soon as a unit arrives on the scene, the officer shall advise the communications center of the proper location, using terms such as north, east, south, or west directional references and noting whether an incident is prior to or after a landmark, such as an exit. Additionally, to assist with identifying the location of incidents on the roadway in a clear manner, lanes shall be identified as Inside Travel Lane, Middle Travel Lane(s), and Outside Travel Lane. Figure 2 depicts these three designations as described below:

- Inside Travel Lane – Lane 1
- Middle Travel Lanes – Lane 2
- Outside Travel Lane – Lane 3

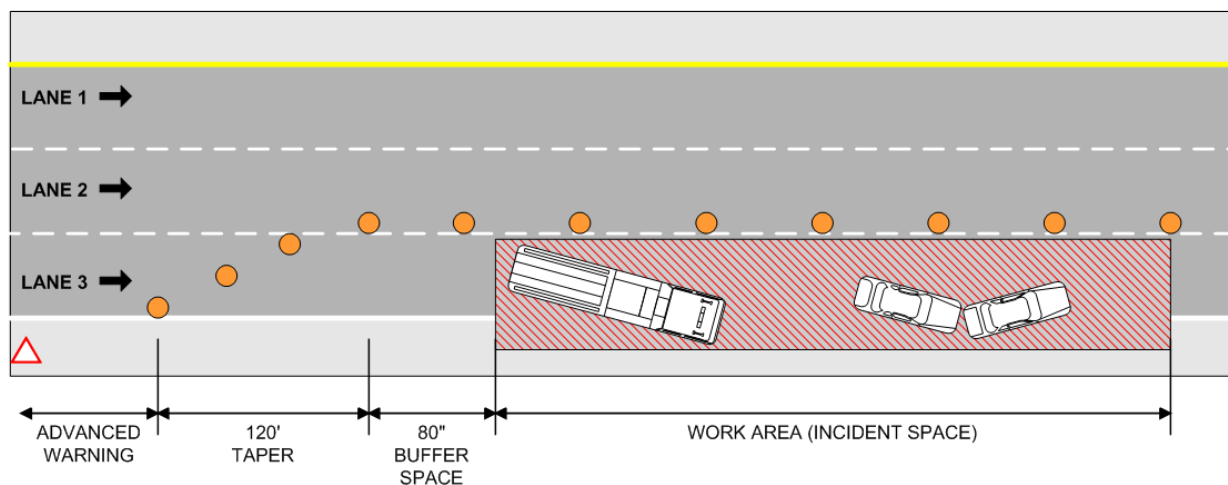


Figure 2: Lane Designations

A work area shall be established allowing EMS units and the rescue company, or other company responsible for extrication, to position in close proximity of the incident in a safe manner.

The first-arriving engine should position prior to the incident (can also be thought of as behind the incident based on the flow of traffic); the engine must be close enough to the involved vehicles to provide a hose line for protection but far enough away to allow room for other units to operate. This engine shall provide a shielding effect for members operating on the incident scene.

The engine company shall be placed at an angle to the lanes, with the pump panel toward the work area to protect the pump operator and front wheels rotated away from the incident. This is known as a “fend-off” position. In the event that a motorist strikes the engine, the engine will act

as a barrier and in the unlikely event the engine is moved upon impact, it will travel away from the work area.

At intersections or where the incident may be near the middle of the street, two or more sides of the incident may need to be protected. Block all exposed sides. Where apparatus is in limited numbers, prioritize the blocking from the most critical to the least critical.

Based on the number of vehicles involved and the configuration of the roadway, the incident space may require more than one engine company for adequate protection. Additional engine companies or the rescue company, if not needed for extrication, may be used for blocking. Blocking apparatus shall be placed at least 50 feet behind the first operating unit to create a safe working area.

The rescue or extrication company shall position in front of the first-arriving engine in the most advantageous tactical position for extrication functions. It is important that the rescue company position within the area shielded by the first-arriving engine company.

EMS units shall position past the incident but within the incident space in a manner that allows for rescue company functions, patient loading, and rapid egress from the scene. It is important that EMS units position within the shielded work area.

Command and staff vehicles shall position past the incident, but within the incident space in a manner that facilitates command functions and allows for rescue company functions and patient loading into EMS vehicles. It is important that command and staff vehicles position within the shielded work area.

If units arrive prior to the first-due engine company, the positioning plan must be altered with scene safety as the basis for deviation. The first-arriving unit, regardless of type, will take the position normally taken by the first-arriving engine company to shield the scene for members, patients, and witnesses; the engine will take the blocking position behind that unit when arriving on scene.

Firefighting Operations on Roadways

While operating on vehicle fires or fires on roadways, additional lanes may be necessary to safely deploy attack lines and for personnel safety. Personnel shall ensure that the appropriate PPE is donned to include SCBA. Caution shall be exercised to avoid walking into oncoming traffic due to limited visibility caused by smoke in the area of the fire. In some cases the roadway will have to be closed at a sufficient distance from the incident to ensure firefighter safety, facilitate hose line deployment, and to prevent civilian vehicles becoming involved if a flammable liquids container should rupture or develop a leak. The work area must be expanded to shield personnel from traffic and provide a safe area for firefighting operations.

If taking the primary blocking position behind the fire will expose the engine to the possibility of fire extension, the engine may be placed beyond the fire; the second apparatus, and third if necessary, shall always be placed between oncoming traffic and the incident and emergency responders engaged in operations. At times, particularly when fire is small and a period of

examination and overhaul is necessary, it may be possible to move an involved vehicle and the fire apparatus off the roadway to a safe location. Even when the operation occurs off the roadway, apparatus shall be in place to provide a safe working area.

Positioning on EMS Incidents

The vulnerability of EMS units on the roadways has led to the need for standardization of positioning on EMS incidents.

EMS units shall have the priority position to the front of the incident address with access to the driveway. If an EMS unit is going to operate on scene without a suppression unit, then they shall either position off the roadway in a driveway (preferred), or place cones to facilitate the flow of traffic around the emergency vehicle and operating responders, Figure 3.

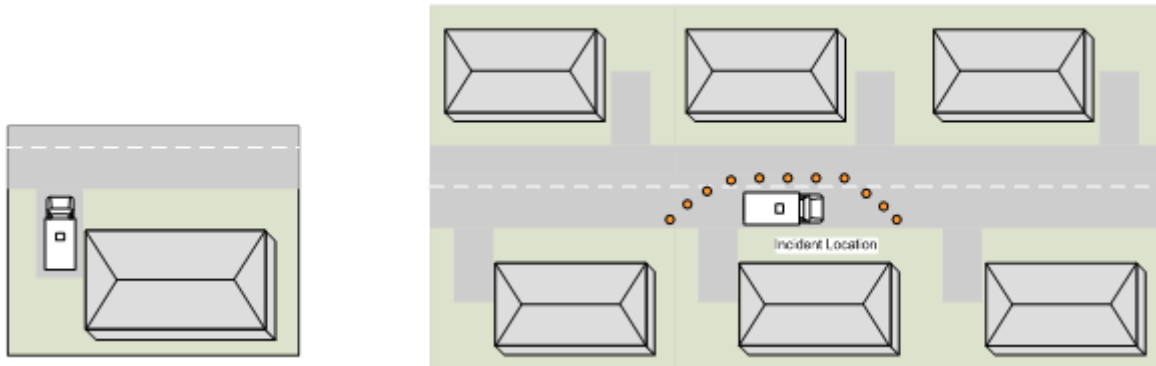


Figure 3: Two Options for EMS Unit Positioning without Suppression Units Present

Suppression units, when responding with EMS units, shall position to provide a shield for the back of the EMS unit. If the suppression unit arrives prior to the EMS unit, it shall position so the EMS unit can park in the front of the address when it arrives. This may require the suppression unit to stop short of the address or pull past the address if traveling from the opposite direction. The suppression unit driver should take the time to place cones and facilitate the flow of traffic if necessary, Figure 4. Suppression pieces should remain on scene in position until the EMS unit has left to transport the patient.

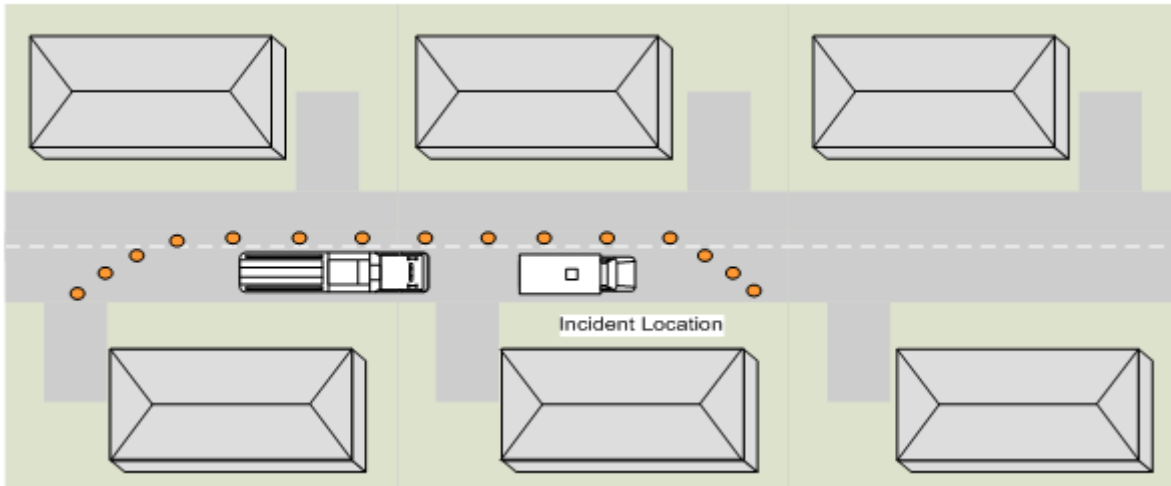


Figure 4: EMS Unit Positioning with Suppression Unit

Incident Space Safety

Prior to exiting apparatus, members shall:

- Check to ensure that traffic has stopped in the travel lane(s) in which the apparatus is positioned to avoid the possibility of being struck by a passing vehicle.
- Communicate with all members that traffic has come to a stop and it is safe to exit.
- Look down and in all directions to ensure that debris and/or hazards on the roadway will not become an obstacle that could result in personal injury.

All members shall be in full protective clothing or traffic vests, as the situation dictates. Refer to the earlier section on [Responder Personal Safety](#) for details.

As soon as possible, the engine operator should place flares or traffic cones as appropriate. Flares or traffic cones assist in channeling traffic away from the incident, Figure 5.

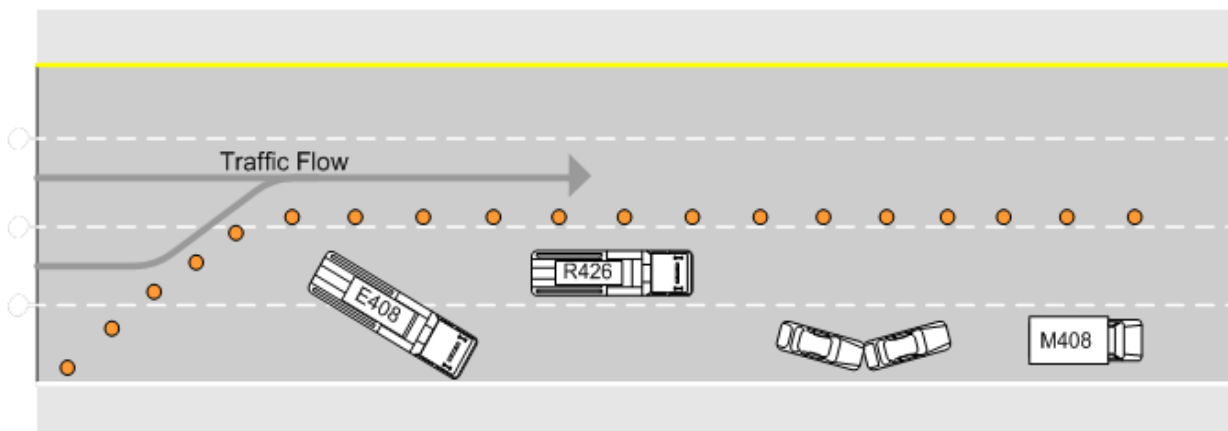


Figure 5: Channeling Traffic Away from an Incident

Once a Buffer Space of 80 feet has been established, cones and/or flares shall be deployed. This “Taper” length should begin diagonally across the roadway beginning at the Buffer Space and working downstream toward traffic for at least 40 feet. Each lane marker is 10 feet in length and there is 30 feet between markers.

Roadways facilitating speeds of 55 mph or greater should have longer Taper and Buffer Spaces which assists in establishing a safe work zone.

The person placing cones or flares shall always face oncoming traffic and if cannot be directly observed, should be accounted for after a reasonable time to ensure they have not been struck or injured.

Directional arrows mounted on apparatus shall be used whenever feasible.

If it is necessary to channel traffic around a curve, hill or ramp, the first cone or flare shall be placed prior to the hill or curve. The intent is to warn oncoming traffic of a hazard ahead. The rest of the cones shall be placed diagonally across the lanes around the work zone, Figure 6.

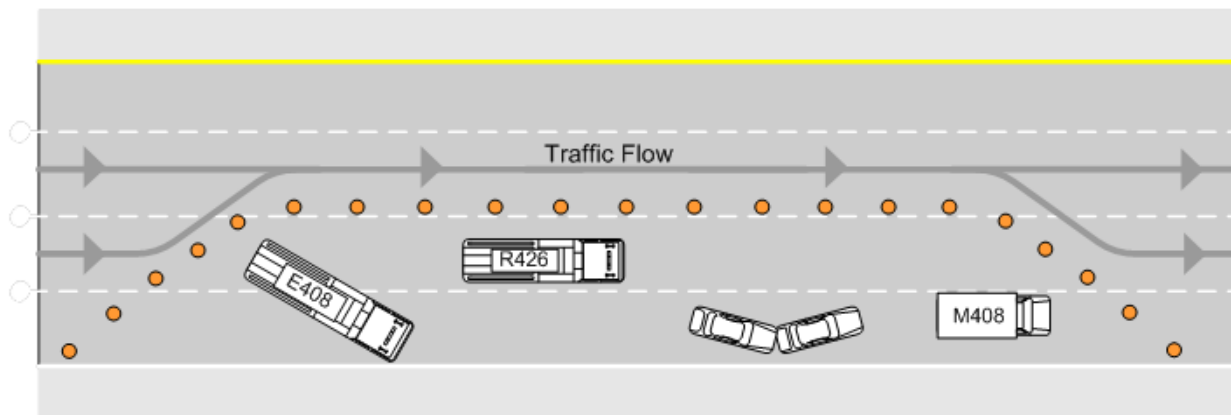


Figure 6: Sample Placement of Flares/ Traffic Cones to Channel Traffic Flow

Parking of Other Response Vehicles

Except for those vehicles needed in the operation and those used as a physical barrier for the work area, other response vehicles should be parked together in a designated area.

Parking other response vehicles completely out of available travel lanes greatly assists in the movement of traffic.

VISIBILITY CONSIDERATIONS ON ROADWAY INCIDENTS

When an incident occurs during daylight hours, with all involved vehicles and emergency vehicles sufficiently off the highway lanes on the shoulder, and traffic is congested and passing slowly, flashing lights may be turned off. However, if the emergency warning lights are turned off, the emergency flashers must be activated.

The issue of visibility becomes even more significant with nightfall. As the human eye becomes adapted to the dark, the first color to leave the spectrum is red. This is important due to the fact that our warning lights are red. The color red tends to blend in to the nighttime surroundings.

Glare vision and recovery is the amount of time required to recover from the effects of glare once a light source passes through the eye. From light to dark vision recovery takes at least six seconds. From dark to light, vision recovery takes three seconds. At 50 miles per hour, the distance traveled during a second is approximately 75 feet. In six seconds a vehicle has traveled 450 feet before the driver has fully regained night vision.

The headlights on the apparatus can temporarily blind vehicles that are approaching fire and rescue apparatus. If not needed to illuminate the scene, drivers shall turn off vehicle headlights when parked at incidents. This is extremely important when operating on roadways at night. Studies conducted show that at 2½ car lengths away from a vehicle with its headlights on, the opposing driver is completely blinded.

Drivers of oncoming vehicles will experience the problem of glare recovery. This essentially means individuals are driving by the incident scene blind. The wearing of protective clothing and or traffic vests will not help the blinded driver see members standing in the roadway.

The best combination of lights to provide maximum night visibility is as follows:

- Red warning lights on,
- Headlights off,
- Fog lights off,
- Pump panel lights on,
- Spot lights on rear and front on and directed on to a traffic cone, and
- Traffic directional boards operating.

CLEARING TRAFFIC LANES

Virginia's Incident Clearance Law (also known as the "Move It" Law or Virginia Code § 46.2-888 "Stopping on highways; general rule") requires motorists involved in crashes where the vehicles can be driven and no one is injured to move the vehicles to a location where they will obstruct traffic as little as possible. During property damage-only accidents, parties shall be notified to move their vehicles out of the travel lanes until the police arrive. Expediting the removal of damaged or disabled vehicles from the travel lanes enhances the overall level of safety on the roadway and reduces associated congestion and delay.

When possible, EMS units should move from the roadway as soon as practical. There may be cases where an EMS unit might be able to load patients and move to a nearby parking lot to carry out patient care prior to moving on to a hospital. This reduces the exposure to the ambulance, as well as the crew and patient, and may help facilitate re-opening of the roadway.

Reducing and/or shutting down traffic lanes can create other problems and safety concerns. It is critical when operational phases (extrications, medical care, and suppression) are completed, that apparatus be repositioned to allow traffic to flow on as many lanes as possible.

Unnecessarily closing, or keeping traffic lanes closed, greatly increases the risk of a secondary incident occurring in resulting traffic backup. One minute of stopped traffic causes an additional four-minute delay in travel.

Keeping the safety of all members in mind and coordinating the needs with the other emergency services, the officer in charge should begin to open closed lanes and place units in service as soon as practical.

TRAFFIC INCIDENT LEVELS

Not all traffic incidents are the same. Depending on its nature and location, one incident may impact travel more significantly than another. Officers should consider the magnitude of the incident and should consider declaring the most appropriate Traffic Incident Level when the operation will seriously impact the traffic movement in the area of the incident. The Virginia Department of Transportation has adopted a three-level system to describe the incidents impact on travel. Notification to the Transportation Operations Center (TOC) will be made through the local Communications Center and will trigger the TOC to deploy assistance and issue appropriate motorist information alerts.

Traffic Incident Levels		
Level 1	Minor	Impact to the traveled roadway is estimated to be less than <u>30 minutes</u> with no lane blockage or with minor lane blockage.
Level 2	Intermediate	Impact to the traveled roadway is estimated to be between <u>30 minutes and 2 hours</u> with lane blockages, but not full closure of the roadway.
Level 3	Major	Impact to the traveled roadway is estimated to be <u>more than 2 hours</u> , OR the roadway is closed in any single direction; significant area-wide congestion is expected.

APPENDIX A: QUICK SAFETY TIPS AT ROADWAY EMERGENCIES

Some quick tips for safe operations at roadway incidents are as follows:

- Wear the appropriate PPE.
- Do not trust moving traffic.
- Never take a partial lane.
- Never assume traffic will behave the way you expect.
- Proper apparatus positioning is the first step to providing safety of the working crews at the scene of an incident.
- Many motorists and truck drivers have no regard or respect for emergency vehicles or personnel on the scene. In many cases, they don't even slow down near an accident scene.
- Never allow traffic to come around both sides of an accident scene.
- Request police assistance as soon as possible.
- Summon additional resources as necessary, forecast additional needs early.
- Ensure scene is controlled before commencing operations.
- Start operations at roadway incidents defensively.
- Do not allow personnel to “wander” around the scene.