2024

Protecting Emergency Responders from Moving Vehicles During Wildfire Responses

CUMBERLAND VALLEY VOLUNTEER FIREFIGHTERS ASSOCIATION

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Background

The Cumberland Valley Volunteer Firefighters Association/Emergency Responder Safety Institute conducted this project, *Protecting Emergency Responders from Moving Vehicles During Wildfire Responses*, under contract 70FA2022P00000034, authorized by the United States Fire Administration. The intent of this project is to identify, review, and (as needed) update documents, references, resources, and related training materials distributed on ResponderSafety.com to improve marketing and use of training materials regarding traffic incident management at wildfires.

Over the years, traffic management at wildfires has not received as much focus as it has received at limited-access highway incidents of all types. Recently, The Emergency Responder Safety Institute's (ERSI) Responder Safety Learning Network has released "Wildland Fires and Traffic Management," an online training module with related resources, that provides an excellent introductory session on this topic for integration into wildfire incident response training. As of March 1, 2024, 1079 individuals have completed "Wildland Fires and Traffic Management" (CVVFA-ERSI 2023). This includes individuals identifying in the following disciplines (data compiled 1/31/2024):

Discipline	**Individual course completions**
Fire	692
Fire Police / Other Traffic Management Unit	96
Emergency Management	42
Law Enforcement	28
EMS	26
Department of Transportation	21
Service Patrol	13
Towing & Recovery	7
Consultants	7
Contractors	2
Traffic Engineers	2
TOTAL COMPLETIONS	**936**

Subject matter experts reviewed this module for this project and found it to be an appropriate introduction to the topic to help responders to wildfires more safely manage traffic. Other than the programs this report references, there are few resources to train responders to wildfires in traffic incident management (TIM).

The topics and guidelines discussed in this document are written to align with the core principles of the National Incident Management System (NIMS) and Incident Command System (ICS).

Project Goals

Despite recent severe wildfire seasons, little attention has been paid to responder safety and traffic incident management during these events. Several struck-by[1] line-of-duty deaths have occurred at wildfire responses. These events have involved smoke obscuration causing low visibility on the roadway, insufficient vehicle backing safety practices, and improper boarding of firefighting apparatus. As buildings and infrastructure encroach further on undeveloped land, wildfire flames and smoke will affect more moving traffic on roadways. In addition, movement of wildland firefighting vehicles both on and off road pose a struck-by hazard to wildland firefighters. The goal of this project is to develop practical training in:

Traffic incident management recommended practices for roadways affected by wildland fires and firefighting operations.

Safety procedures to follow when wildland firefighting vehicles are operating near responders on foot, whether that is on a road or in the back country.

Important note: This program focuses solely on traffic control and the safety of responders operating near vehicles at a wildfire. Other safety aspects of wildfire response are outside the scope of this project.

Learning Objectives

At the conclusion of this research and product revision, learners should be able to:

- Explain why traffic control is important at wildfire responses.
- Describe the hazards that emergency responders face from moving vehicles at wildfire responses.
- List contributing factors in struck-by line-of-duty deaths at wildfire responses and associated recommendations to address these contributing factors.
- Explain how traffic incident management fits into the incident management plan.
- Explain the key elements of a risk assessment as it pertains to traffic incident management at wildfire responses.
- Explain actions to take at wildfire responses to address struck-by-vehicle hazards, including traffic control and responder safety practices.
- Describe the struck-by hazards present during evacuations and how to mitigate those hazards.
- List takeaways for the learner's role at wildfire responses that match their responsibilities for responder safety and traffic control actions to reduce struck-by-vehicle hazards.

[1] A struck-by incident is defined as incidents produced by forcible contact or impact between the injured person/damaged equipment and a separate striking object or piece of equipment.

Methodology

The research and revision effort included:

- Virtual meetings with subject matter experts
- Document, procedural, and operational practice research and review

Individual consults with additional persons identified with special interests and/or those with specialized experience in a particular relevant area.

Findings

Research and subject matter expert input identified three key findings which underpinned the development of a training approach to improving responders' traffic incident management and responder safety knowledge and skills.

Finding 1. There are no nationwide standards or approaches for traffic incident management training and equipment at wildfire responses.

Finding 2. Blocking the roadway(s) that access and/or traverse parks and forested areas is the primary traffic management method, if possible.

Finding 3. Very few organizations have standard operating guidelines and/or training for traffic incident management at wildfires or wildland-urban interface fires.

To address the identified training gaps in these findings, this project proposes the following approach for training wildland firefighters and associated personnel in traffic incident management and responder safety near moving vehicles at wildfire responses.

1. Register for and complete the Responder Safety online training module, "Wildland Fires and Traffic Management"
    a. Go to https://learning.respondersafety.com/ and register. There is no charge.
    b. Complete the program "Wildland Fires and Traffic Management." https://learning.respondersafety.com/Training_Programs/Wildland-Fires-and-Traffic-Management.aspx
    c. The Resources tab in the module lists related support materials as part of this training.
2. Complete the self-guided PowerPoint presentation "Traffic Incident Management at Wildland Fires," developed for this project, as a review prior to deployment individually or as a group.
3. For refresher in the field, reference the tools developed for this project, which are available in the Resources & References section of this report:
    a. Roadway Incident Cue Card for Wildfire Responses
    b. Implementing a Traffic Incident Management Area at Wildfires
4. At the organizational level, develop and/or review related Standard Operating Guidelines, prior to initiating wildfire-related traffic management practices (refer to the Resources & References section of this report for more information).

Training Details

Key learning efforts must center on a review of traffic incident management considerations for roadways and back country operations affected by wildfires, wildland firefighting tasks, and vehicle movement.

The subject matter experts on this project worked with existing local, regional, state, national and federal agencies to collect current content on the subject. This data, along with an analysis of prior vehicle-related incidents at wildfires identified seven common contributing factors:

- Lack of adequate traffic controls
- Responders standing in or traversing active roadways
- Decreased visibility due to smoke
- Dark or poorly lit conditions
- Failure to assess needs
- Failure to communicate
- Lack of inclusion of traffic incident management at the incident command level

These contributing factors partially form the basis of the training approach developed for this project.

In addition, there are several overriding foundational safety principles to incorporate into the training:

- Life safety is the first priority. Saving property and natural resources is the second priority.
- Know where escape routes and safety zones are at all times.
- Maintain situational awareness.
- Keep an eye on potential problem areas, especially managing emergency and civilian traffic.
- Know and adhere to equipment placement guidelines.
- Establish strong communications with all involved agencies, including understanding everyone's role in the command structure.

Safety at wildfires requires vigilance regarding:

- Fire development
- Weather
- Poor access and traffic congestion
- Dangerous road and bridge conditions
- Power lines, flammable tanks, and other hazards

Additional wildfire safety information can be found on pages 11 through 15 of the National Wildfire Coordinating Group's *Incident Response Pocket Guide, PMS 461* (NWCG-IRPG).

Addressing Contributing Factors

Addressing the contributing factors to real-world struck-by incidents at wildfires suggests we consider ways to avoid and/or mitigate traffic-related incidents at these fire events. Some ways to achieve this include:

- Cooperative interagency response planning prior to an incident, including policies, response procedures, resource allocation, training, and contingencies.
- Implementing traffic control at the scene begins with incident command assigning traffic control tasks. This should be part of the Incident Action Plan (IAP), and related safety plan.
- Creating the traffic incident management (TIM) plan during the pre-planning process includes defining what measures will be taken, how traffic control will be implemented, when it will be implemented, and who will implement it.
- The TIM plan should have contingencies for situations where the primary traffic control agency is not on scene.

At the organizational level, address known contributing factors with these recommended actions:

- Evaluate department training, equipment, and procedures to determine if they are sufficient for operating on or near roadways and meet traffic control needs at wildfire responses.
- If needed, establish an agreement and pre-incident plans with partner agencies who can provide traffic control.
- Engage in public education about safe driving practices near wildfire scenes.
- Know what advance warning methods are available in jurisdictions where the department responds to wildfires and how to use or activate them.

Recommended actions emergency responders can take on the ground to directly address contributing factors by limiting exposure to hazards from moving vehicles include the following:

- Don high visibility apparel[2] prior to exiting the emergency vehicle.
- Do not exit the emergency vehicle until instructed to do so.
- Exit the fire apparatus on the side away from the roadway or where exposure to moving vehicle hazards is minimized.
- Implement traffic control measures appropriate to the situation.
- Post a lookout to watch for oncoming traffic.
- Follow proper backing up procedures, including using a spotter.[3]
- Terminate emergency responses on roadways as quickly as possible to reduce personnel exposure to moving traffic and other hazards.

[2] High visibility apparel should be compliant with the requirements in the *Manual on Uniform Traffic Control Devices for Streets and Highways*.

[3] A video of a recommended backing up procedure is available here: https://www.respondersafety.com/training/backing-up-emergency-vehicles/

This project developed a pocket "Cue Card" for field use in traffic management at wildfires, which is available in this report's Resources & References section, to help guide implementation.

Analyzing the contributing factors showed there are recommended training and equipment actions emergency responders can take to limit exposure to possible incidents, including:

- Craft pre-incident plans that include scene safety and traffic control cooperatively across all agencies.
- Train on standard operating guidelines and procedures, including deploying temporary traffic control and conducting manual traffic control.
- Instruct driver/operators in positioning apparatus to protect emergency responders from oncoming traffic (blocking) and safe backing procedures.
- Equip emergency vehicles with devices to assist in safe backing up.
- When operating on or near moving vehicles, require wearing high visibility personal protective equipment appropriate to the current task that is compliant with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), Occupational Safety and Health Administration (OSHA) regulations (if applicable), and National Fire Protection Association (NFPA) standards.

Effectively performing traffic management duties at wildfire responses has several dimensions, including:

- Understanding the scene and incident
- An awareness of the surroundings, including topography, location of area roads (including slopes), and vegetation conditions and fuel class.
- Awareness of pre-plan and response plan details in place.
- Knowing weather conditions and continually checking the local weather forecast, paying particular attention to issues relevant to the local area, such as the Low Visibility Occurrence Risk Index (LVORI), which contributes to super fog.
- Knowing the capabilities of the personnel on scene, particularly for officers and supervisors tasked with emergency responder safety.
- Knowing the traffic control devices available and how to best deploy them.
- Assigning trained and qualified personnel to set up and maintain temporary traffic control devices.

These are all aspects of situational awareness. Each responder and each officer is responsible for personnel and civilian safety and should constantly monitor the situation and be aware of anything that might adversely affect operational safety. Communicate hazards immediately, revising practices as appropriate.

Positive response outcomes start with and end with strong incident command. Command is responsible for:

- Sizing up the situation.

- Analyzing how the wildland fire might impact nearby roadways.
- Determining which traffic control measures are necessary on each of those roadways given those potential impacts and associated hazards.
- Directing the trained and qualified personnel to implement those measures.
- Requiring SOPs to be followed.
- Monitoring the traffic incident management area setup as the incident evolves and directing changes to traffic control as the situation changes.
- Assessing hazards of moving vehicles off-road in the back country and implementing appropriate vehicle movement safety procedures, including banning exterior riding, requiring a spotter when backing up, and cordoning off encampments.

The incident commander integrates these concerns into applying appropriate traffic control practices for safe operations.

Emergency service organizations (ESO) respond to a wide variety of incidents involving operations on or near a roadway. Wildfires are just one type of these incidents but pose unique challenges. Operations at wildfires pose special risks to personnel performing fire, rescue, and EMS functions.

In many instances, an ESO responds to a "primary incident" along a roadway, only to become the victim of a "secondary incident": the nightmare in which a firefighter, EMS provider, police officer, or other responder is suddenly struck and killed by a vehicle while operating at the primary incident. No one individual or group can control drivers of other vehicles, but there are fundamental steps an organization can take to improve the level of safety at primary incidents to decrease the chance of a secondary crash. These same basic TIM practices contribute to safe, efficient operations at wildfires:

- Pre-planning
- Advance warning
- Visibility
- Blocking[4]
- Safe backing of emergency vehicles
- Personal protective equipment
- Evacuation

Brief highlights of each of these practices follow. These practices relate to wildland incidents and associated challenges of fire size, fire movement related to factors like topography and wind including sudden shifts in fire direction, evacuating residents, conflicting traffic movement (as responders move into areas residents are moving out of), smoke obscuration, and similar behavioral or fire/smoke movement situations.

[4] Blocking uses a fire apparatus or other large vehicle to physically protect an emergency scene by providing a safe area for incident operations.

Pre-Planning

Key principles include:

- Implement an inter-agency pre-planning entity, such as a Traffic Incident Management Committee, and process to coordinate, communicate, and collaborate on effective planning and response to wildfires.
- Include traffic incident management in the incident response pre-planning process; integrate TIM at wildfires into SOPs, responsibilities, available resources, and procedures.
- Plan for specific, known hazards and risks, including scenarios that would impact major roadways.
- Conduct inter-agency training.
- Hold after action reviews to debrief and analyze responses to previous incidents, glean lessons learned, and apply those lesson learned.

Advance Warning

Key principles include:

- Give traffic plenty of warning: Use signs, cones, flares, flaggers, vehicles, and warning lights bring attention to the presence of emergency response.
- Leave plenty of space between responders and moving traffic.
- Traffic speed and volume as well as sight conditions dictate the distance and types of advance warning that are adequate.
- Wildland apparatus are typically not equipped with signs or cones. Organizations may need to create resource lists to provide this equipment.

Visibility

Key principles include:

- Outfit emergency vehicles with high visibility markings and emergency lighting compliant with applicable standards and regulations.
- “Be Seen and Not Hurt.” Keep the scene well-lit so responders can be seen.
- Direct scene lighting down at the operations area, not at drivers.
- Extinguish forward-facing white lights on emergency vehicles so they do not interfere with drivers’ vision.
- Dust, smoke, limited sight distance, and sharp curves are common on rural and unimproved roads, increasing visibility challenges.

Blocking

Key principles include:

- Protect the operations area with an angled blocking apparatus.

- Proper positioning of larger vehicles between moving traffic and emergency operations is key to providing a safety barrier for wildfire response personnel.
- Be prepared to shut down the roadway, if needed, and be prepared to reposition if needed, for example for evacuation.
- Blocking apparatus remains in place until operations being protected are complete.

Backing Apparatus

Avoid backing emergency vehicles when possible. However, there will be times when the situation requires backing a vehicle, often quickly. Safe backing procedure specifics can vary, but a department's backing up SOP should include:

- A preference for avoiding backing up unless absolutely necessary.
- A defined backing up procedure.
- A requirement to use a trained spotter every time.
- A description of the roles and responsibilities of driver and spotter.
- A high visibility PPE requirement.
- A required 360º check of the backing area.
- A description of hand signals and radio communication protocols between driver and spotter.
- Required constant eye contact between spotter or backer and driver
- Listing of situations requiring immediate stoppage of the apparatus, including when:
    - Eye contact with the spotter is lost
    - The driver is confused by signals or instructions
    - The driver receives visual, verbal, or radio communication to stop
- Guidance for illumination of the spotter and backing area at night and enhanced equipment like lighted flashlight cones for hand signals.
- Driver and spotter training evolutions for backing.
- Consequences and enforcement procedures if the SOP is not followed.

Video of a recommended backing up procedure is available on ResponderSafety.com: https://www.respondersafety.com/training/backing-up-emergency-vehicles/

Having a spotter is not a guarantee that nothing will go wrong; vigilance and following SOPs is needed. Training needs to be conducted and supervision needs to occur when any backing activity is in progress, especially near other moving traffic.

Personal Protective Equipment

Key principles include:

- Dress for the occasion. Wear ANSI/ISEA 107-compliant high visibility apparel, a helmet, boots, and eye protection at all times.

- If safety warrants it and there is no other way to provide a reasonable level of protection, don't hesitate to completely shut down the roadway to protect personnel. Always close the road in consultation with law enforcement and implement detours.
- Minimize closure time, keeping in mind that closure creates other hazards by stopping or re-directing traffic, particularly on major roadways and interstates.

Evacuation

Pre-planned and emergency evacuation procedures and routes are implemented at command's direction. Incident command is responsible for assigning tasks and requesting resources to handle evacuation, how traffic is routed, how do emergency vehicles enter the evacuated area, and how law enforcement engages in the operation.

The National Wildfire Coordinating Group's *Smoke and Roadway Safety Guide (PMS 477)* and NWCG *Smoke and Roadway Safety Pocket Card (PMS 477-1)* provide excellent guidance in understanding the nature of the challenges smoke obscuration poses and developing the response organization's approach to managing these challenges, including roadside response safety. The *Guide* suggests:

- Anytime traffic flow is affected by an incident, contact the jurisdictional law enforcement agency for assistance.
- Conduct all operations as far from traffic lanes as possible.
- When working near traffic and not involved in fire suppression or containment activities, high visibility vests must be worn.
- Park all vehicles on the same side of the roadway.
- Exit the emergency vehicle on the side away from the roadway whenever possible.
- Post lookouts to watch for and control traffic in both directions.
- Use road flares or other advance warning and channelizing devices.
- Operate pumps from the non-traffic side or from the cab of the fire apparatus.
- Keep all hose, fire tools, and equipment out of traffic lanes.
- Assessing safety risks to personnel and public posed by smoke on roads
- During initial attack and/or daily size-up on extended attack, evaluate the potential of smoke to impact roadways up to 10 miles away.
- Identify drainages and topographic features that may allow smoke to impact roadways during the night and early morning.
- Establish local fire and traffic movement baselines or thresholds that, when combined with smoke, indicate that the potential for reduced roadway visibility exists and TIM practices need to be modified.
- Stay vigilant on key weather variables, such as
    - Critical surface temperature
    - Relative humidity
    - Surface wind speed
    - Cloud cover

and mitigate roadway visibility hazards accordingly.

Conclusion

While maintaining or restoring traffic flow is the transportation profession's goal, traffic incident response priorities include:

1. Life safety
2. Fire containment or suppression, or other Incident mitigation action
3. Preservation of property and environment
4. Maintaining or restoring traffic flow

To prepare your wildland firefighting personnel for interactions with moving vehicles:

1. Register for and complete the Responder Safety online training module, "Wildland Fires and Traffic Management"
    a. Go to https://learning.respondersafety.com/ and register. There is no charge.
    b. Complete the program "Wildland Fires and Traffic Management." https://learning.respondersafety.com/Training_Programs/Wildland-Fires-and-Traffic-Management.aspx
    c. The Resources tab in the module lists related support materials as part of this training.
2. Complete the self-guided PowerPoint presentations "Traffic Incident Management at Wildfires" Part 1 and Part 2, developed for this project, as a review prior to deployment individually or as a group.
3. For refresher in the field, reference the tools developed for this project, which are available in the Resources & References section of this report:
    a. Roadway Incident Cue Card for Wildfire Responses
    b. Implementing a Traffic Incident Management Area at Wildfires

At the organizational level, develop and/or review related Standard Operating Guidelines, prior to initiating wildfire-related traffic management practices (refer to the Resources & References section of this report for more information).If you do not have a specific SOG, simply reviewing the key points presented in this report, taking the recommended training, and using the provided resources will help you better understand the challenges YOU face, and how YOU should handle those challenges.

Please see the Resources & References that follow to help you learn more about this topic, develop customized standard operating guidelines, train others, and respond to traffic management needs at wildfires.

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