SIGNIFICANT INCIDENT INVESTIGATION
FINAL REPORT

TRUCK 411
BEACON HILL ROAD
AUGUST 12, 2014 – 0426 HOURS

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On August 12, 2014, the Fairfax County Fire and Rescue Department (FCFRD) experienced a significant apparatus collision event. Truck 411 responded to an emergency incident and the unit collided with a utility pole, rolled over, and came to rest after traveling approximately 166 feet. The personnel were seat belted and received minor injuries. We need to celebrate the fact that the personnel had their seat belts on during the response! The outcome may have been different and I am relieved that the injuries were not serious or worse for the personnel and their families.

I directed our Safety Section to implement a Significant Injury Investigation Team with internal and external members to examine the incident. The report is an organizational focused fact-based report, with findings and recommendations on how we can improve as a department and how we can further prevent near miss and apparatus collisions.

The Truck 411 Report will provide the FCFRD and other Fire and EMS Departments with fact-based case study findings and recommendations that will provide continual quality safety improvements for driver training, apparatus specifications, and safe driving techniques and skills.

Please take the time to read and discuss the Truck 411 Report. Embrace the findings and recommendations so that everyone goes home and we prevent Line of Duty injuries and deaths!

Respectfully,

Fire Chief Richie Bowers

Executive Summary:

At 0426 hours on August 12, 2014, Engine and Truck 411 were dispatched to a fire alarm activation in a residential structure at 2205 Windsor Road in the Alexandria section of Fairfax County. Engine and Truck 411 marked enroute with the engine leaving the fire station first. While responding on Beacon Hill Road in the vicinity of Oak Drive, the driver of Truck 411 lost control of the vehicle, struck a telephone pole, and overturned coming to rest in the side yard at 6800 Derrell Court.

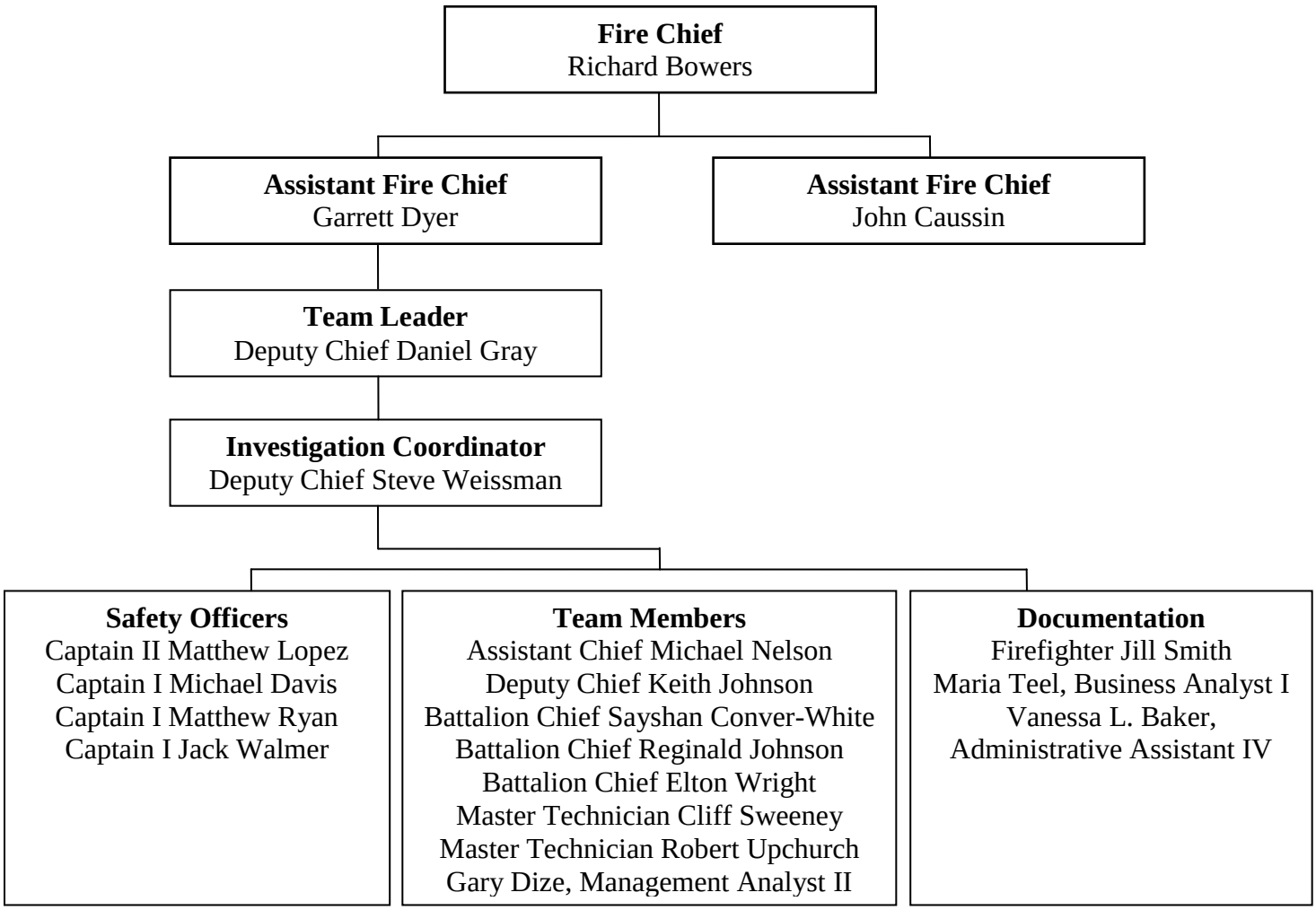
The four crew members were able to self-extricate and the officer contacted the Fairfax County Department of Public Safety Communications (DPSC) to report the collision. Additional apparatus were dispatched to their location and assisted the crew members. The four crew members were transported to a local hospital for treatment.

Beacon Hill Road remained closed while the Fairfax County Police Crash Reconstruction Unit (CRU) as well as the FCFRD Safety Section investigated the incident. Dominion Virginia Electric (DVE) was requested and responded to repair a utility pole.

Fire Chief Richard Bowers appointed the Significant Incident Investigation Team (SIIT) to investigate the circumstances and facts contributing to this event and to make recommendations to prevent further occurrences.

Significant Incident Investigation Team (SIIT):

The SIIT was activated on August 12, 2014 to investigate the circumstances and facts of Truck 411's collision. The team was assembled under the direction of Fire Chief Richard Bowers who appointed Deputy Chief Daniel Gray as Team Leader.



Acknowledgements:

The FCFRD would like to thank and recognize the following individuals and organizations that assisted in completing this report:

Deputy Chief Steve Weissman	Stafford County Fire and Rescue Department
Assistant Chief Michael Nelson	Montgomery County Fire and Rescue Service
Battalion Chief Sayshan Conver-White	Prince George's County Fire/EMS Department
Detective C.C. Snyder	Fairfax County Police Department Crash Reconstruction Unit
Battalion Chief John Price Captain I Michael Marks Captain II James Masiello	Safety 401C – Shift On Duty Safety Officer (Relief) Safety 402C – Shift On Duty Safety Officer Safety 403C – Shift On Duty Safety Officer
Captain II Glenn Mason Charlie Allen Apparatus Mechanics	Apparatus Section Supervisor – South Apparatus Shop South Apparatus Shop
Lisa Marston Mary Wiggington	Fairfax County Risk Management Division Fairfax County Risk Management Division
Uniformed Fire Officers Public Safety Communicators	Department of Public Safety Communications Department of Public Safety Communications

Additionally, we would like to recognize the members of the Fairfax County Police Department specifically the Crash Reconstruction Unit, Aviation Unit and Field Operations for their tireless efforts in assisting with the investigation of this incident.

Introduction:

On the morning of August 12, 2014, at 0426 hours, DPSC received a 911 call reporting the activation of a residential fire alarm at 2205 Windsor Road, in the Alexandria section of Fairfax County. DPSC dispatched Engine and Truck 411 at 0426 hours.

Engine and Truck 411 marked enroute with the engine leaving the fire station first. While responding on Beacon Hill Road in the vicinity of Oak Drive, the driver of Truck 411 lost control of the vehicle and struck and fractured a utility pole, resulting in a localized power failure. Truck 411 then overturned on Beacon Hill Road and came to rest in the side yard of 6800 Derrell Court. Engine 411 was not aware that Truck 411 was involved in a collision and continued to the dispatched location. Truck 411's officer made notification to DPSC of the collision and requested assistance. Engine 411 then cleared the incident at 2205 Windsor Road and responded to Truck 411's location.

Truck 411's four crew members were evaluated by EMS personnel on the scene. They sustained minor injuries and all were transported to Mount Vernon Hospital.

The SIIT was directed to investigate the events leading to Truck 411's collision, gather information, validate the facts relevant in determining the causal factors, and to make recommendations to prevent a similar occurrence.

The Fire Chief tasked the team with the following:

- Ensure findings are factual, credible and have been validated by two means.
- Focus on organizational processes.
- Review all written statements.
- Review the transcripts of the incident communications.
- Review all relevant procedures, manuals, standing orders, and pertinent documents for insight into the need for preventative action and/or procedural changes by the department.
- Examine equipment involved to determine if procedural safeguards were in place.
- Research any similar occurrences through national and local organizations.
- Review the Current Driver Training Program.

Dispatched Incident – Fire Alarm in a House:

Date: August 12, 2014

Dispatch Time: 0426 Hours

Incident Number: E142240257

Incident Address: 2205 Windsor Road, Alexandria, VA

Fire Box Number: 1191

Weather[1]:

Temperature:	69.8° F
Humidity:	94%
Precipitation:	Rain
Wind:	Calm
Sky:	Cloudy

Road:

Composition:	Asphalt
Condition:	Good
Surface:	Wet

1. Weather Underground, Alexandria, VA. (www.wunderground.com)

Event Synopsis:

On the morning of August 12, 2014, at 0426 hours, the DPSC received a 911 call reporting the activation of a residential fire alarm at 2205 Windsor Road in the Alexandria section of Fairfax County. DPSC processed the incident and dispatched Engine and Truck 411 at 0426 hours.

Engine and Truck 411 marked enroute at 0428 hours with the engine leaving the fire station first. Members assigned to Truck 411 donned their protective equipment, boarded the apparatus, took their assigned positions, and buckled their seatbelts. The officer was the last to board and prior to the vehicle moving, confirmed that his personnel were safely in position and belted in.

There was a light rain falling throughout the night so roads were wet. Truck 411 left the station and proceeded to Richmond Highway. The driver made a left turn onto Richmond Highway, traveled a short distance, and made a left turn onto Beacon Hill Road. Truck 411 had all emergency warning lights activated and the siren was operating. The officer was looking up the street and reviewing dispatch information on the Mobile Communications Terminal (MCT).

While responding on Beacon Hill Road Truck 411 was approaching a left curve on a downgrade prior to Oak Drive. The officer stated that he felt the truck was going too fast as they approached the curve so he reminded the driver that it was just a fire alarm. The driver attempted to correct the speed by allowing the Jacobs Engine Brake to engage and shortly thereafter felt the rear of the truck slide.

Truck 411 left the roadway to the right just beyond the intersection with Smithway Drive and struck a utility pole. It continued off-road, struck a fence, tree and three vehicles all parked in the driveway at [redacted] Smithway Drive. It then entered into a counter-clockwise rotation as it slid across the concrete driveway. Truck 411 continued to slide across the front yard and driveway striking a fence and mailbox at 2403 Beacon Hill Road.

After leaving the concrete surface, the officer-side tires dug into the soft ground causing it to rollover 270 degrees. During the rollover it struck another fence and gouged the driveway at 6800 Derrell Court. Truck 411 came to rest on the driver's side after striking a vehicle parked at 6800 Derrell Court.

After coming to rest, Truck 411's officer immediately checked on the welfare of his crew. They acknowledged that they were not injured and began assisting each other in safely exiting the apparatus by climbing out onto the cab. The officer attempted to notify DPSC of the collision; however, the truck's mobile radio was inoperable due to a loss of the vehicle's electrical power. Notification of the collision to DPSC and a request for assistance was made via his portable radio.

The utility pole they struck was fractured and severely damaged. Wires were on the ground and in close proximity to the apparatus. The crew members confirmed prior to dismounting that the wires were not in contact with the apparatus. Citizens attempting to assist the crew began to walk towards the apparatus and, unknowingly, the downed power lines. Fearing for the citizens' safety, the crew directed them away from the apparatus.

Engine 411 was not aware that Truck 411 had been involved in a collision and continued to the original incident. Upon hearing the radio transmission about the collision, they verified with the homeowner at 2205 Windsor Road that no emergency existed, cleared the call, and proceeded to Truck 411's location.

Engine 411's crew began to assess the situation, requested additional assistance and made proper notifications. The engine crew confirmed that the truck was secured, there was no electrical power to the truck's engine and no leaks or hazards were emanating from the overturned apparatus. The truck crew was assessed for injuries. Truck 411's four crew members sustained minor injuries and were transported to Mount Vernon Hospital.

Command staff and department senior leadership responded to the scene to ensure the welfare of the crew members and to begin the investigation and recovery process. The CRU was requested to perform a full analysis of the events leading to this collision.

The FCFRD Safety Section was directed to activate an investigation team to gather information, validate the facts relevant in determining the causal factors, and to make recommendations to prevent a similar occurrence. The team also reviewed current policies and practices as it relates to operations, administrative, safety, communications, and training.

Findings, Discussion and Recommendations:

Vehicle Speed

Findings

During the response Truck 411 reached the speed of 58 miles per hour (mph).

Discussion

Engine and Truck 411 responded to 2205 Windsor Road for a reported fire alarm in a house. The route of travel from Fire Station 11 was a left onto Richmond Highway and then an immediate left turn onto Beacon Hill Road.

Beacon Hill Road is identified by the Virginia Department of Transportation (VDOT) as a Secondary Road. Factors considered by VDOT in determining reasonable and safe speed limits are categorized into two phases: the engineering investigation and the traffic investigation. The engineering investigation involves a study of the geometric design of the road. Engineers review such items as: lane width, terrain, pavement type, and condition. The traffic investigation involves gathering and analyzing traffic-related data. The study includes: prevailing vehicle speeds, average test runs, traffic volumes, accident experience, traffic control devices that affect or are affected by vehicle speeds.

The posted speed limit for Beacon Hill Road is 35mph. Traveling eastbound approaching the 2500 block is a yellow caution sign identifying an approaching curve in the road. The sign does not indicate a change in the authorized speed limit.

During the course of the investigation it was determined that Truck 411 reached a speed of 58mph on Beacon Hill Road. This has been validated by the CRU final report and from Pierce Manufacturing through the Detroit Diesel Electronic Controls (DDEC) Report. (See Appendix E).

Recommendations

Unit officers shall ensure that drivers maintain the vehicle speed as directed in Standard Operating Procedures (*S.O.P.) 01.08.03 Apparatus Response Categories*. All personnel shall re-familiarize themselves with this policy. Drivers shall take into consideration road conditions due to inclement weather, traffic, pavement type, and geometric design in lowering the vehicle's authorized speed.

APPARATUS:

Truck 411 (Vehicle #7169) is a 2007 Pierce Dash equipped with the required safety equipment that met or exceeded National Fire Protection Association (NFPA) standards at the time of manufacture. During the rollover of this vehicle all safety systems operated as designed. All subsequent NFPA standard changes have been incorporated into the department's vehicle specifications up to three years prior to their adoption.

Engine Braking System

Findings

During the course of the investigation it was discovered that there is a lack of understanding among field-level personnel of the fleet's vehicle safety systems, including but not limited to the Engine Braking Systems.

Discussion

Fire department driver/operators shall be educated on vehicle engine braking systems and the relationship between these systems and other safety systems, such as Anti-Lock Braking System (ABS) and Automatic Stability Control (ASC). This information shall be updated as technology evolves.

This technology, specific components, and their proper use and limitations should be understood by anyone driving fire department apparatus. While these systems are crucial to the safety of our personnel, they simply cannot overcome physics. This educational process should focus on the consequences of not adjusting speed and vehicle components to current road and weather conditions, the driver's responsibility for recognizing these dynamic conditions and how driver/operators should adjust their speed.

Recommendations

The department shall capture and distribute all information related to a specific vehicle to department personnel. This information needs to be incorporated into a web-based system readily available to anyone operating a fire department vehicle. The information could also be accessed by using the department's vehicle number or the manufacturer's "job" number.

Tools, Equipment, Books:

Findings

There were no tools stored within the cab, however, during the collision, the map books dislodged from their holder.

Discussion

NFPA 1500, Fire Department Occupational Safety and Health Program states in section 6.1.5; "Where tools, equipment or respiratory protection is carried within enclosed seating areas of fire apparatus or the patient compartment of an ambulance, such items shall be secured by either a positive mechanical means of holding the item in its stowed position or by placement in a compartment with a positive locking device."

The FCFRD has adopted the best practice to not store tools or equipment within the apparatus cab. The enforcement of this best practice eliminated injury to our personnel. This is a testament to the company officers and personnel assigned to Truck 411.

The map books are stored in a holder with a drop-down bar that relies on gravity to secure them. In a rollover situation, this current design allows the books to be ejected.

Recommendations

The Apparatus Section shall evaluate the current design of the map book holders, its location, and alternatives to the current design.

Self-Contained Breathing Apparatus (SCBA) Brackets:

Findings

During the course of the investigation it was identified that one SCBA (utilized as a spare) was ejected from its brackets in an unoccupied seat. It dislodged upon rollover coming to rest in the forward section of the cab between the driver and officer. The SCBA brackets, upon inspection after the collision was not damaged.

Discussion

Personnel must be familiar with the brackets used on our apparatus. Use, maintenance, and operation shall directly reflect the manufacturer's recommendations. This needs to be incorporated into the station's vehicle information files and readily available to all personnel.

During the course of the investigation it was discovered that although personnel were in compliance with *S.O.P. 03.06.02 Vehicle Maintenance Log* on SCBA daily checks, this policy does not specify who must sign for the SCBA inspection. For example, although each individual inspects their own SCBA, the apparatus technician often signs for all the SCBA inspections.

Recommendations

The current *S.O.P. 03.06.02 Vehicle Maintenance Log* does not specify who is responsible for signing the daily SCBA inspection form. It is the committee's recommendation that the end user shall be responsible for the daily inspection and signing of the form. To reflect this change, the current form *SCBA Field Inspection Record (FRD-036)* shall be revised.

The daily inspections of the SCBA brackets shall reflect the manufacturer's recommendation to include proper functionality, position and operation in order to ensure the SCBA is secured correctly.

Side Airbag Supplemental Restraint System:

Findings

Truck 411, a 2007 Pierce Dash is equipped with a RollTek side airbag system. During the rollover the airbag system did not activate.

Discussion

The RollTek side airbag system activates when a pendulum mounted in the top of the cab is tilted 51 degrees off center. Upon activation a signal is sent to the air bag actuators, seatbelt tensioners and driver seat which adjusts to a pre-determined safe height. The RollTek side airbag system is wired through the vehicles main power switch which is located under the dash board at the drivers left knee. When Truck 411 impacted the utility pole there was a total loss of electrical power rendering the system incapable of activating.

During the investigation it was revealed through manufacturer testing and documentation that the airbag system would have operated as designed, if there was not a loss of electrical power. The system is designed with a one second power reserve for activation. This is the current industry standard. In this incident, one second was insufficient due to the fact that rollover did not occur immediately after impact. This provides a false sense of security for our members.

Recommendations

Indications are that the industry is planning on changing their specifications to reduce the time of reserve power. We recommend having a discussion with the apparatus manufacturers, NFPA Apparatus Committee, and the system designers to modify this system to ensure the safety to our

personnel. This discussion shall include, but not limited to, increasing the time of the reserve power, provide direct wiring of the system or to develop a stand-alone supplemental power supply dedicated to the side airbag system.

Seatbelts:

Findings

The proper utilization and compliance with department policy minimized injuries to our members.

Discussion

The officer on Truck 411 has a reputation for strict adherence to the department's seatbelt policy; it is well known to his subordinates and fellow members. Additionally, the driver under the direction of the officer did not move the apparatus until all occupants were seated and secured. A direct and favorable outcome resulted in the proper use of seatbelts.

Recommendations

All personnel shall reaffirm their commitment to follow the current personnel safety policies of the department, regarding seatbelt use. (*S.O.P. 02.03.04 Personnel Safety).*

Driver's Seat Back:

Findings

During the collision the driver's seat back dislodged from its frame.

Discussion

Truck 411, a 2007 Pierce Dash is designed with a removable driver's seat back. This seat design is found with all Pierce Dash series models in our fleet. Its purpose is to gain access to an electrical compartment for the mechanic. At some point during the collision the driver's seat back dislodged from its normal operating position. During the course of the investigation it was determined that the pins securing the seat back to the base had been removed.

Recommendations

Drivers of this model apparatus shall ensure inspection and proper placement of these pins during the daily inspection. Additionally, personnel who remove these pins for maintenance purposes Department of Vehicle Services (DVS), station personnel, apparatus section, etc. shall ensure that they are properly replaced and secured.

The apparatus section shall develop a safety bulletin outlining the issue and describing the inspection process. This safety bulletin will be distributed for educational purposes with illustrations of the pin locations and it will be available to other departments that own this style of vehicle.

Electrical Power Failure:

Findings

During the course of the investigation it was discovered that upon impact the master switch was moved to the "off" position, causing a total loss of vehicle power.

Discussion

After impact with the utility pole, Truck 411 had a total vehicle electrical failure. This resulted in the loss of lights, radios, and the activation of the vehicle's safety systems. During the course of the investigation it was revealed that:

- The officer attempted to utilize the mobile radio without success.
- Firefighters reported no interior lights were on.
- All emergency lights were off.
- The engine was no longer running.
- The master switch was found in the "off" position; however, no one at the incident reports touching the master switch.
- The RollTek system, which includes the seatbelt pretensioners, requires power from the batteries to the vehicle chassis to activate.

It was determined that the master switch was worn and easily switched to the "off" position. A cursory look at in-service apparatus revealed similar issues with these types of master switches.

Recommendations

Inspection of the master switch shall be conducted during the daily apparatus check and scheduled preventative maintenance to ensure the switch is operating properly.

The Apparatus Section shall evaluate the current switch, its location and alternatives to the current design and advocate that our manufacturer extended power supply capacity for the RollTek system.

ADMINISTRATIVE:

Apparatus Response Categories:

Findings

During the course of the investigation it was determined that Truck 411's response was within the parameters of *S.O.P. 01.08.03 Apparatus Response Categories* and the Code of Virginia §46.2-920-B. The driver's response of Priority 1 (lights and sirens) was within the current guidelines for dispatch to a fire alarm in a house.

Discussion

A Priority 1 response by all fire and rescue units dispatched on a fire alarm in a house increases the level of risk to both citizens and employees. The response to any activated fire alarm includes an engine and truck company per the department's Communications Manual.

As part of the investigation, a research study was conducted to determine current trends in fire service response patterns, related to fire alarm activations with no additional calls or supporting information. The research method used to collect data was an online survey of numerous fire departments. Of the responses received at time of publication, 11 were comparable in size and call volume to the FCFRD.

Once the responses from these comparable departments were isolated, the results indicate that most comparable departments only dispatch one engine (no special service) to investigate a fire alarm in a residential, single-family home, when there are no supporting calls. Only half of the comparable departments added a special service to fire alarms in multi-family and commercial occupancies.

In addition, at one-third of the overall participants in the survey indicate that their department has varying levels of response (emergency and non-emergency) for units alerted to the same incident. When multiple units are dispatched, some departments (including three compatibles) only allow the **closest unit** to respond emergency (lights and siren), while the other units proceed to the call non-emergency, until the first arriving unit provides additional information. Other departments with varying levels of response only allow the first engine to respond emergency, while remaining units proceed non-emergency

The results of the full study, which includes ***all*** responses, is available for review at:
https://www.surveymonkey.com/results/SM-WZQSM36L/

Results from the ***comparable departments only*** are available at:
https://www.surveymonkey.com/results/SM-XDXSW36L/

This research and other similar studies should be used when considering modifications to dispatch procedures intended to improve responder and public safety.

Recommendations

FCFRD Senior Leadership should consider discussions regarding response to fire alarm activations with no supporting cause or supplemental information.

Changing the Culture of Safety:

Findings

The culture of the department towards safety must continue.

Discussion

Our success in reducing deaths and injuries is directly related to our ability to change behaviors and attitudes towards safety. Culture change is viewed by some as a threat which allows unsafe behaviors, personal complacency and bad attitudes to endure. Changing the culture means reversing these negative patterns to improve safety so we may continue our mission to save lives and property and more importantly go home to our families.

The Safety Section consistently reinforces the importance of operating safely; from turn-out time until the time of arrival and through its safe conclusion, the proper use of Personal Protective Equipment (PPE) and seatbelts, safe response speeds, identifying ways to reduce and eliminate injuries and exposures are just a few. No one is advocating removing our firefighters from a progressive approach and an aggressive charge in doing their jobs. Leadership needs to ensure that it's completed in a safe balance.

During the committee's investigation it was found that all personnel were wearing their seatbelts. Truck 411's officer is a safety advocate; he enforced the use of seatbelts reducing the injuries sustained to the crew. They shall be commended. Their message must be heeded by all members.

Recommendations

There shall be "zero tolerance" for disregarding the seatbelt policy, proper utilization of PPE and safe driving practices. Unit officers shall be responsible to order the driver of any vehicle to slow down if the speeds of the vehicle or the driver's actions are considered unsafe for driving conditions.

COMMUNICATIONS:

Findings

The Automatic Vehicle Locator (AVL) data for Truck 411 was not available from the tracking interface for incident # E1422240257

Discussion

Unit locations are tracked real-time in the Computer Aided Dispatch (CAD) system, including vehicle speed through the tracking interface. The hardware Global Positioning System (GPS), antenna, trimble unit, MCT dock, and MCT) installed in each unit will provide GPS data to the tracking interface through cellular service or WiFi within the fire stations after connecting to three satellites. The Department of Information Technology – Radio Service Center (DIT-RSC) Technician completed the examination of the hardware from Truck 411 and determined the equipment worked correctly. The DIT-RSC Technician then verified these findings through use of a test laptop and a hand held GPS device. DIT-RSC personnel suspect weather could have played a role in the GPS antenna not making connection with three satellites as required by the tracking interface.

Approximately six hours prior, during incident #E142232790, 7816 Accotink Drive, AVL data was collected for Truck 411 traveling the same route, with the same assigned personnel, and for the same event type fire alarm in a house. This information has been reviewed by the SIIT.

Recommendations

Representatives from DIT-RSC, DPSC, and FCFRD need to determine if this lack of AVL data is a systemic problem. In addition, a secondary means to capture this data or an improved system should be researched. Consider redundant technologies that include video, audio recording, speed monitoring and GPS recording systems.

TRAINING:

Driver Qualification Process

Findings

The initial driver training program conducted during recruit school developed by the Training Division is known as the Emergency Vehicle Driver Program (16 hours). Personnel are certified as Emergency Vehicle Operator Course (EVOC) Class II, under the Commonwealth of Virginia Department of Fire Programs (VDFP). This permits a firefighter to only drive utilities and EMS units.

Discussion

Once personnel graduate from recruit school they are not enrolled in the driver qualification program for VDFP-EVOC Class III, (engines, aerials, and other apparatus over 26,000 lbs.) until after completing the probationary firefighter school.

Recommendations

This seems to be a logical progression for new driver/operators. It is recommended to the Training Division Staff to review and evaluate the current driver training and probationary firefighter school to identify future training needs. Additionally, a review of all current drivers' status shall be completed to ensure they meet the current certification requirements.

Current Driver Training Program:

Findings

A review of the current minimum driver qualification program was conducted to identify areas of concern as it relates to this investigation.

Discussion

1. The Current Driver Training Program does not require Driver Pumper Operator (DPO), or Aerial Driver Operator (ADO) certifications as pre-requisites of the qualification process for EVOC III. These courses are voluntary.
2. Supervised driving experience – Mileage and response requirements for emergency and non-emergency driver training. Currently 50 supervised driving miles during daylight hours and 25 supervised driving miles at night. Minimum of ten non-emergency responses and five emergency responses under direct supervision.
3. No clearly defined timeline to complete the driver qualification course, only a re-test timeline. If a candidate is unsuccessful in passing a written test or practical, they have one year to complete the re-test.
4. No standard driver progression i.e. ambulance, engine, aerial.
5. There is a lack of knowledge of vehicle safety systems/braking systems and how to apply them under various driving conditions. (See Apparatus Discussion and Recommendations)
6. The Current Driver Training Program does not offer skid control driver training as part of the course. This training allows drivers to learn techniques to control a vehicle when driving during hazardous road conditions, such as snow, ice, rain, and roll-over potential. The FCFRD does not have its own driving track with a large enough area for this type of training. It is reliant upon

either an outside vendor with the equipment and skid vehicle or the FCFRD would have to purchase the equipment and a Train-the-Trainer course for our own instructors to provide the training.

Recommendations

1. Require DPO and ADO certifications as a pre-requisite for all apparatus technicians and back-up drivers.
2. Increase the required number of supervised emergency responses to 25.
3. Establish a timeline from start to finish for the initial driver qualification training.
4. Establish a standard progression in apparatus qualifications i.e. ambulance, engine, then aerial or other apparatus. Personnel need to demonstrate proficiency at their current level with a minimum of documented driving hours before advancing to the next apparatus.
5. Develop a training program to familiarize personnel with the overall vehicle components, safety systems, and proper operating procedures.
6. The driver training coordinator shall evaluate options available to provide skid control driver training as part of the driver qualification program.

Driver Training Continuing Education:

Findings

Currently the FCFRD does not conduct driver training continuing education for our personnel.

Discussion

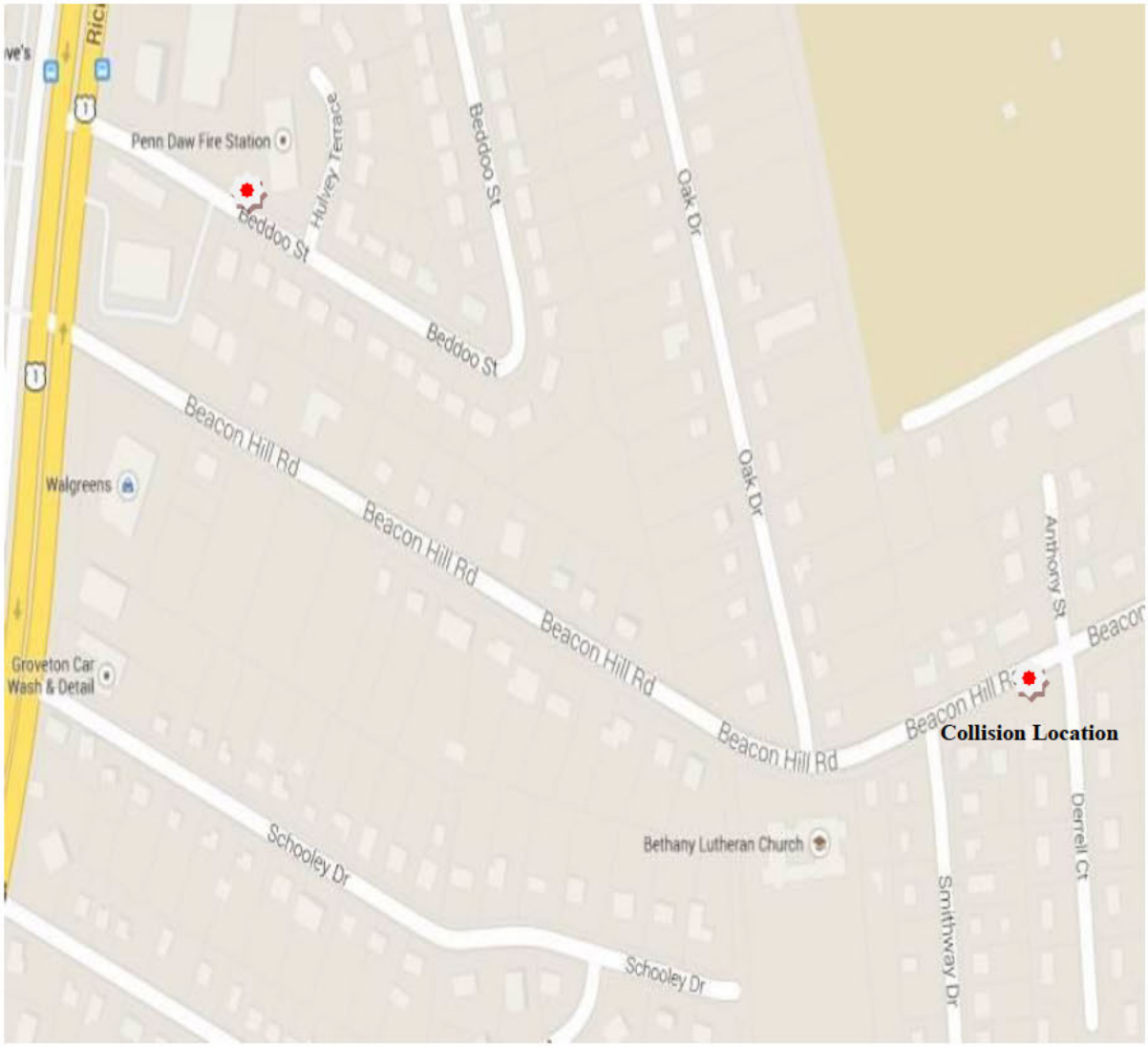
The driver training program is for new drivers and driver improvement training is used when a driver has been involved in a vehicle crash classified as Type I or II. NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program,* 2013 Edition, requires annual driver training with hands-on exercises.

Recommendations

Incorporate a driver training continuing education program to evaluate incumbent on an annual basis in accordance with NFPA 1451 to include department (S.O.P's).

Appendix A:

Location Map



Appendix B:

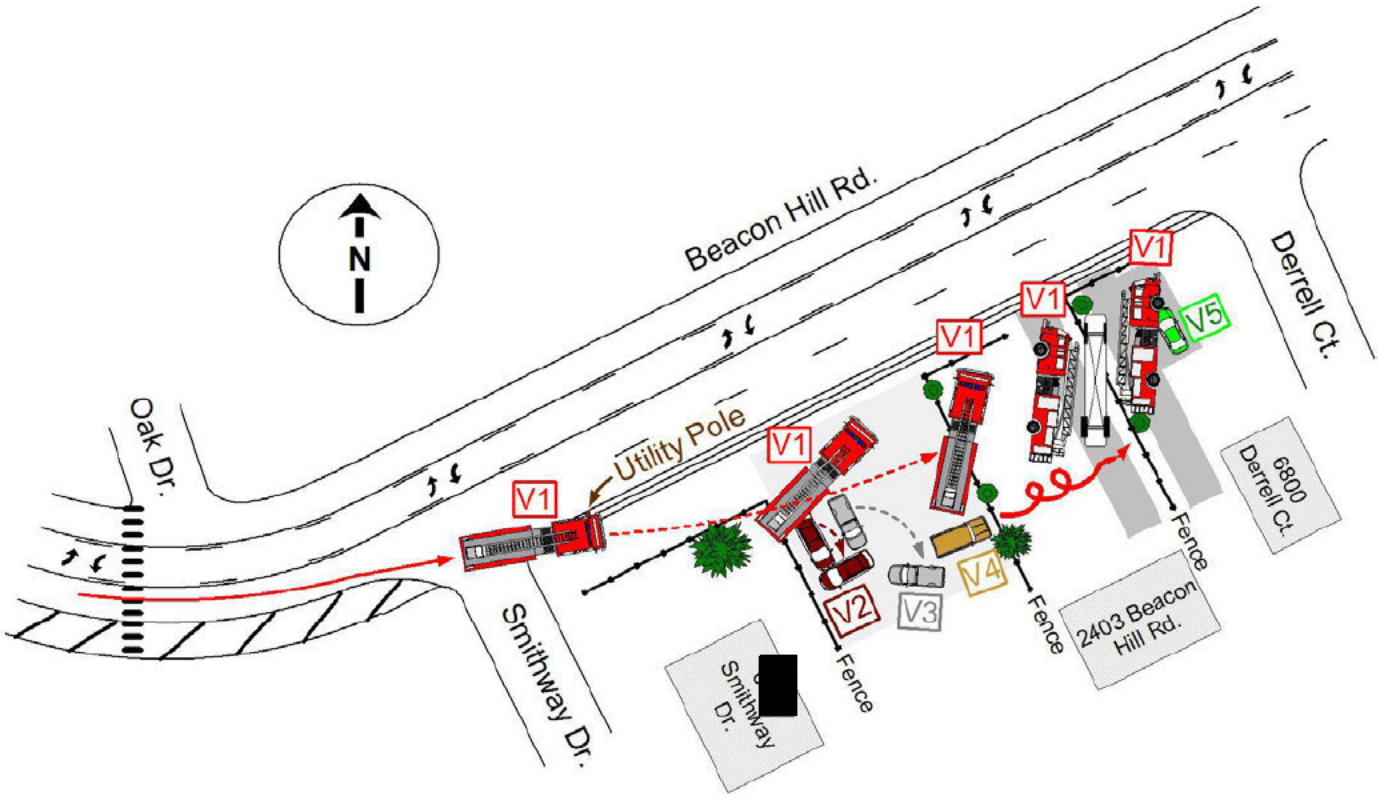
Scene Photographs

Eastbound Beacon Hill Road at [redacted] Smithway Drive

Truck 411 after being up-righted in the side yard of 6800 Derrell Court

Appendix C:

Scene Graphics

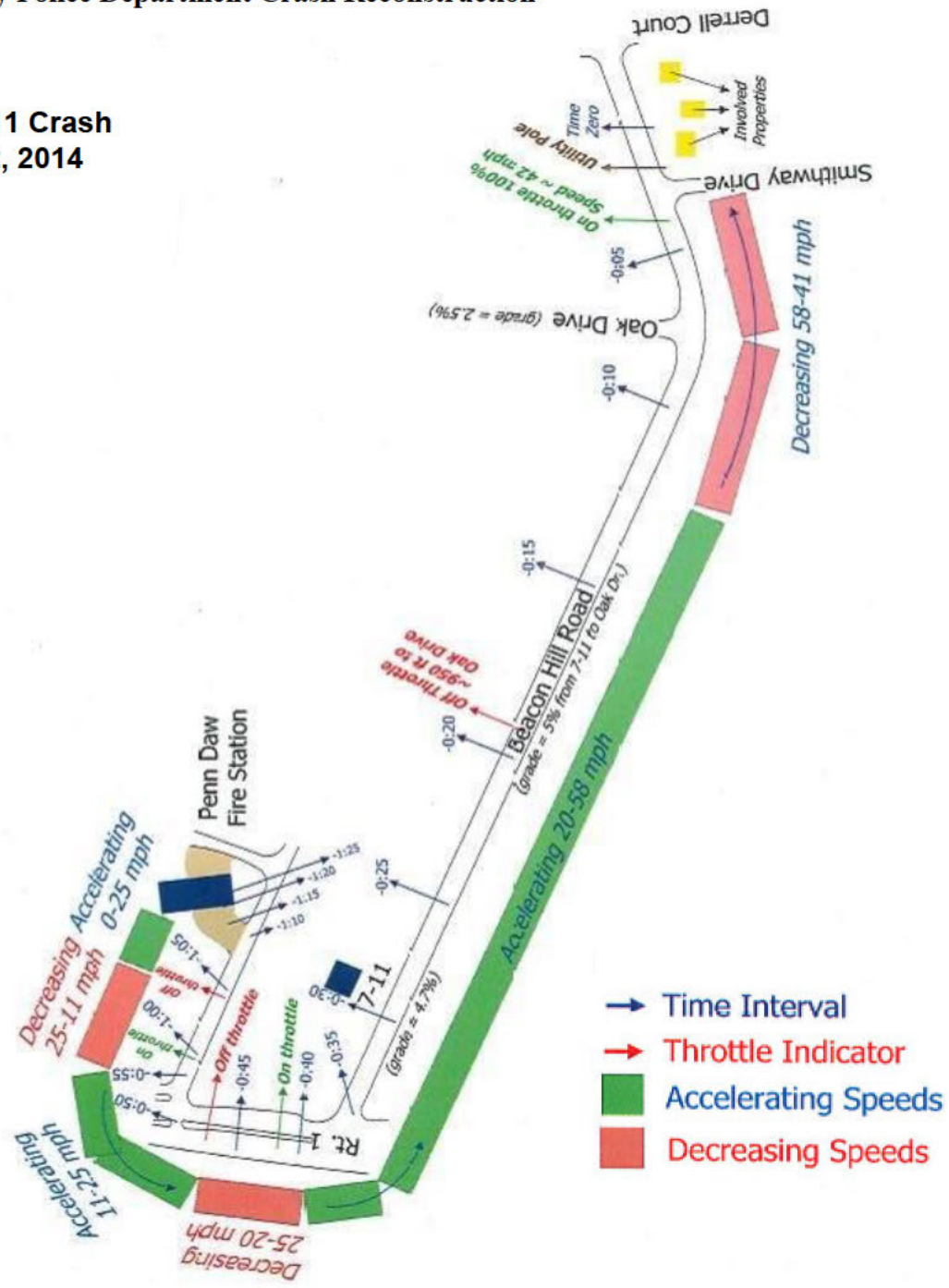


Measurements: (Approximates in Feet)
35' – Utility Pole – First Car Struck
121' – Utility Pole – Start of Roll
150' – Utility Pole – Truck on its top
166' – Utility Pole – Vehicle at rest on driver's side

Appendix D:

Vehicle Speed
Fairfax County Police Department Crash Reconstruction

FCFD T411 Crash
Aug. 12, 2014



Appendix E:

Detroit Diesel Electronic Controls (DDEC) Report
Pierce Manufacturing

DDEC® Reports - Last Stop Record

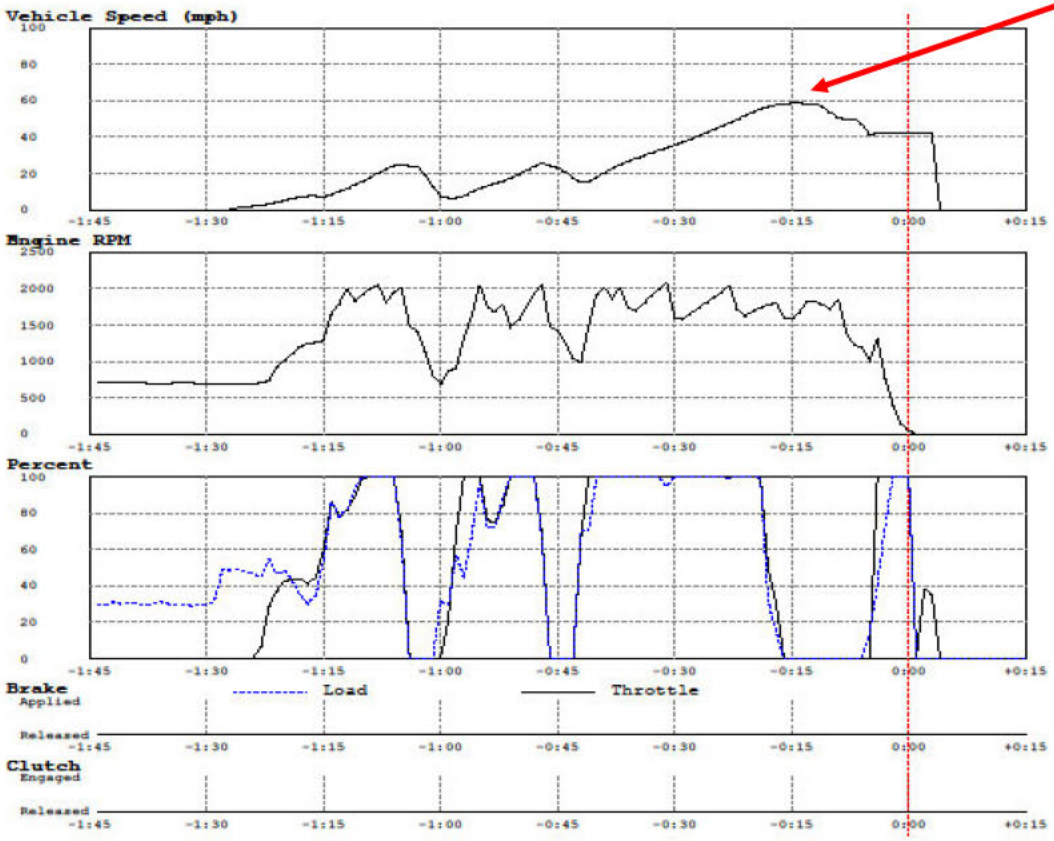
Print Date: 8/27/2014 3:05 PM
Pierce Manufacturing

Appleton , WI 54912
(920)832 -3508

Trip: 07/10/06 17:09:53 To 08/27/14 (EST)
Vehicle ID: 19147
Driver ID:
Odometer: 57850.5 mi
Engine S/N: 06R0927844

Trip Distance	57850.5 mi	Trip Time	6199:56:52
Trip Fuel	26696.13 gal	Fuel Consumption	4.31 gal/h
Fuel Economy	2.17 mpg	Idle Time	3715:15:40
Avg Drive Load	40 %	Idle Percent	59.92 %
Avg Vehicle Speed	23.3 mph	Idle Fuel	7049.00 gal

Last Stop Time: 08/12/14 4:08:07 (EST) Last Stop Odometer: 57850.4 mi



Vehicle speed documented at 58mph

Red Line indicates vehicle at rest after impact

082714123456AA.XTR ECM S/W: 2.020 Version: 8.04-00315-00000 Page 1/1

Appendix F:

Fairfax County Fire and Rescue Department
Standard Operating Procedures

The following S.O.P's were referenced:

01.08.03 Apparatus Response Categories (1/2008)

02.03.04 Personnel Safety (9/2008)

03.06.02 Vehicle Maintenance Log (11/2012)

FAIRFAX COUNTY FIRE AND RESCUE DEPARTMENT STANDARD OPERATING PROCEDURE		
	SUBJECT: APPARATUS RESPONSE CATEGORIES	**S.O.P.** 01.08.03
		PAGE 1 **OF** 3
	CATEGORY: Administration	**SUBCATEGORY:** Vehicle Protocols
	APPROVED BY: Richard Bowers **CHIEF, FIRE AND RESCUE DEPARTMENT**	**EFFECTIVE DATE:** November 6, 1992 **REVISION DATE:** September 1, 2008
	FORMS REQUIRED: None **NOTE:** Current forms are located on the department's Intranet.	

PURPOSE:

To categorize and to describe appropriate apparatus emergency response procedures to follow that will enhance safety and minimize risk to personnel and the public.

I. POLICY

All department personnel shall observe the following response categories and pertinent restrictions when responding to incidents and other requests for assistance. It shall be noted that the use of any emergency warning device is restricted to those vehicles recognized by the Fire Chief as official Fire and Rescue Department vehicles. The safe arrival of personnel and apparatus at the incident scene is the department's top priority. All personnel responding to incidents and other requests for assistance shall be fully seat belted and shall abide by the procedures outlined in SOP 02.03.04, Personnel Safety.

A. Priority 1

Department personnel shall:

1. Respond with due caution while using all emergency warning devices and headlights.

2. Adhere to all statutes governing emergency vehicle response, as well as to the following procedures:

   a. The maximum speed of any vehicle during an emergency response shall be governed by "due regard" for the safety of other motorists, traffic conditions, weather conditions, etc. However, the maximum speed shall not exceed 15 mph above the posted speed limit. When there is a posted advisory sign warning of an unsafe road condition (Right Curve – 20 mph) the vehicle's speed shall not exceed the advisory speed.

   b. All apparatus shall come to a complete stop at all stop signs and all traffic signals that are reflecting red in their direction of travel. The traffic shall be checked in all directions prior to proceeding through the intersection with due caution.

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c. The maximum speed through any traffic-controlled intersection in which the vehicle has the right of way (i.e., green light, blinking yellow light, etc.) shall be the speed limit of the street involved. For example, a 30-mph speed limit on a street may be exceeded if conditions permit. However, when encountering an intersection with the right of way, the speed of the responding apparatus shall be no more than 30 mph.

d. A vehicle that is responding in a Priority 1 mode and encounters a school bus with flashing red lights shall come to a complete stop, unless it is responding in the opposite direction of the bus on a divided highway. The vehicle may proceed once the bus driver has cleared the roadway of children, turned off the flashing lights, and waved the vehicle through.

e. A vehicle that is responding in a Priority 1 mode and encounters an unguarded railroad grade crossing shall come to a complete stop. The driver shall ensure that it is safe to proceed before crossing the railroad track(s). Drivers also shall use caution when approaching and crossing any guarded railroad crossing. Under no circumstances shall any Fire and Rescue Department vehicle proceed around gates that are closed at a railroad crossing.

B. **Priority 2**

1. Department personnel shall:

   a. Respond in a non-emergency mode without warning devices.

   b. Adhere to all statutes governing the operation of motor vehicles in the jurisdiction where the vehicle is being operated.

2. Response for public service calls, to include stalled elevators where no medical emergency is reported, shall be considered Priority 2 unless otherwise indicated or directed.

3. Patients shall be carefully evaluated before the mode of transport is decided. Priority 1 transports should be limited to patients in need of rapid medical intervention to prevent death or address serious medical needs. All other patients shall be transported Priority 2.

II. INCIDENT COMMANDER'S RESPONSIBILITY

A. In the event that more than one piece of apparatus is dispatched to an incident, it shall be the responsibility of the incident commander to determine the response priority of all other incoming apparatus as soon as possible.

B. When the situation reported by the first arriving unit via radio is of a non-urgent nature ("nothing showing," "patient breathing," etc.), the incident commander may advise the

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remaining responding units to proceed in a Priority 2 mode, depending on the situation and conditions found.

C. At the discretion of the incident commander, different response priorities may be assigned to different incoming units. For example, if the incident commander identifies the need to have the roof checked as soon as possible on an incident, he or she may direct the first-due truck company to continue to the scene Priority 1 and all other units to proceed to the scene Priority 2.

FAIRFAX COUNTY FIRE AND RESCUE DEPARTMENT STANDARD OPERATING PROCEDURE		
	SUBJECT: PERSONNEL SAFETY	**S.O.P.** 02.03.04 **PAGE** 1 **OF** 3
	CATEGORY: Personnel	**SUBCATEGORY:** Occupational Health and Safety
	APPROVED BY: Richard Bowers **FIRE CHIEF, FIRE AND RESCUE DEPARTMENT**	**EFFECTIVE DATE:** August 10, 1987 **REVISION DATE:** September 1, 2008
	FORMS REQUIRED: None	

PURPOSE:

To establish a Fire and Rescue Department position statement on safety and to establish safe practices for personnel.

I. POSITION STATEMENT

The Fairfax County Fire and Rescue Department (FRD) recognizes that a top priority of management is the safety and well being of its employees. It is committed to the continued education of department personnel in the areas of safety and health in recognizing and controlling hazards associated with the profession.

The effectiveness and efficiency of any operation is measured directly by its ability to control unnecessary losses. Accidents resulting in personal injuries and/or damages to property and equipment represent unnecessary suffering and waste.

A. The safety of employees, the public, and the operation is the department's first priority and every attempt shall be made to reduce the possibility of accidents.

B. Safety procedures shall take precedence over expediency or shortcuts.

C. It is the responsibility of management to provide safe equipment, tools, and apparatus with which to perform the various services within the department's mission.

D. Employees shall be expected to demonstrate an attitude that reflects this policy and to adhere to all standard operating procedures that impact areas of safety and health.

II. OBJECTIVE

An important goal of the department is to prevent the losses of lives and property by providing procedures to be followed that will ensure maximum protection of personnel. Because of the unusual and hazardous working environments to which they might be exposed, employees shall be held responsible for safely performing their duties and their responsibilities. Therefore, the following personnel safety procedures shall be followed.

III. DAILY INSPECTIONS

A. All apparatus, equipment, and protective clothing shall be inspected daily and maintained in a safe, sanitary, and reliable condition in accordance with appropriate department and manufacturer guidelines.

B. Proper documentation of inspections shall be made, and supervisors shall be notified of any defects.

C. All apparatus, equipment, or protective clothing found to be damaged or defective to the extent that the ability to safely use the items is affected or impaired shall immediately be removed from service.

D. Repairs and/or replacements shall be processed immediately by the shift commander.

IV. OPERATIONS

A. Personnel shall wear full protective clothing when responding to or engaging in any operation or incident where there is a risk of bodily harm.

B. Proper eye and face protection shall be worn to prevent eye injury or exposure due to particles, projectiles, or caustic and infectious fluids.

C. Protective footwear (issued black shoes or steel-toed boots) shall be worn at all times, which includes while riding apparatus and other vehicles. Authorized alternative footwear may be worn only while actively engaged in physical fitness training or boat activities. Personal footwear of the proper type shall be worn when actively engaged in physical fitness activities.

D. Personnel shall use self-contained breathing apparatus (SCBA) when engaged in any operation where they may be exposed to suspected contaminated or oxygen-deprived atmospheres. Personnel shall follow the procedures found in the department's *Respiratory Protection Program Manual* regarding all other operational environments.

E. Personnel shall use appropriate protective measures and equipment when in contact with persons known or suspected of having infectious diseases.

V. VEHICLES

A. All personnel who are on duty or official county business shall be fully seat belted when driving or riding in county, commercial, or private vehicles.

1. Vehicle drivers/operators shall be responsible for ensuring that all personnel are seated and seat belts fastened before the vehicle is placed in motion.

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2. During EMS transport, both the patient(s) and provider(s) shall be fully seat belted. Providers may remove their belt only if urgent patient care operations are required. In these cases, it should be re-fastened as soon as possible.

3. Personal safety takes precedence over donning SCBA while en route to a call. Most important is the safety that is provided by being properly belted while the vehicle is in motion, and this safety is provided only by the vehicle's restraint system, not the mounted SCBA. The difficulty of donning SCBA while belted is understood and acknowledged. Therefore, if SCBA cannot be safely donned while wearing a seat belt, personnel should wait until arriving at the incident scene before donning their SCBA.

B. Personnel shall not board or depart from any vehicle that is in motion. Standing in a moving vehicle is prohibited.

C. Personnel shall be in full turnout gear before a vehicle that is dispatched on a suppression incident is placed in motion. This policy does not apply to personnel on an EMS unit who shall don the appropriate turnout gear after arrival at the incident.

D. Whenever a driver/operator is out of the driver's seat, the parking/emergency brake shall be used if the apparatus is equipped with it. Two wheel chocks also shall be used on all apparatus; however, wheel chocks are not necessary when the apparatus is parked with the engine off and inside a department facility.

FAIRFAX COUNTY FIRE AND RESCUE DEPARTMENT STANDARD OPERATING PROCEDURE		
	SUBJECT: VEHICLE MAINTENANCE LOG	**S.O.P.** 03.06.02 **PAGE** 1 OF 3
	CATEGORY: Buildings, Equipment & Supplies	**SUBCATEGORY:** Vehicles
	APPROVED BY: Richard Bowers **FIRE CHIEF, FIRE AND RESCUE DEPARTMENT**	**EFFECTIVE DATE:** April 1, 2001 **REVISION DATE:** November 26, 2012
	FORMS REQUIRED: FRD-041, Daily Apparatus and Equipment Inspection Report FRD-036, Self-Contained Breathing Apparatus Field Inspection Record FRD-205 EMS Equipment Daily Check Log FRD-212 ALS Medication Inventory Sheet FRD-162 Vehicle Inspection Form The Personal Injury Kit & Vehicle Accident Kit can be obtained from OHSD **NOTE:** Current forms are located on the department's Intranet	

PURPOSE:

To specify the procedures for the vehicle maintenance log.

I. PROCEDURES

A. All Operations' emergency response vehicles shall carry a "Vehicle Log" notebook marked with the vehicle identification number on the front cover. This log will be maintained daily by the operator or person responsible for inspecting the vehicle. The log will be a three-inch, three-ring notebook kept in the cab of the vehicle. The log shall be a permanent legal record of the vehicle similar to the station logbook. The following sections shall be maintained:

Section "A"	Daily Apparatus and Equipment Inspection Report (FRD-041)
Section "B"	Self-Contained Breathing Apparatus (SCBA) Inspection Record (FRD-036)
Section "C"	Inspection Records for EMS equipment (FRD-205 and FRD-212)
Section "D"	Vehicle Specifications
Section "E"	Vehicle Inventory
Section "F"	Personal Injury Kit
Section "G"	Vehicle Accident Kit

B. Sections "F" and "G" shall be maintained in all of the department's staff and support vehicles.

II. SECTION "A" - INSPECTIONS

A. A copy of the Vehicle Inspection and Maintenance Guidelines issued by the Apparatus Section shall be maintained in the front of Section "A" along with other procedures required by the station commander or division head.

B. A continuous daily log shall be maintained of the inspections and checks performed on the vehicle. The *Daily Apparatus and Equipment Inspection Report (FRD-041)* will be used for this purpose and shall be maintained in the following manner:

SUBJECT: VEHICLE MAINTENANCE LOG	**EFFECTIVE DATE:** April 1, 2001 **REVISION DATE:** November 26, 2012	**S.O.P.** 03.06.02
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1. The FRD-041 shall be completed each day the vehicle is in an operational capacity. Ready reserve vehicles not in daily use shall be inspected for readiness at a minimum of once a week on Sunday or per station policy. The form shall be maintained in the vehicle logbook for the current month. The document will then be maintained in the station files for three years. After three years, the FRD-041 may be discarded.

2. Record date of each inspection.

3. Indicate type of inspection using the following codes:

   "D" Daily
   "F" First day of the tour
   "W" Weekly (if applicable)
   "S" Special (after repair, returned to service, etc.)

4. Inspector's full signature and name. No initials permitted.

C. In addition to completing the FRD-041, operators shall complete a *Vehicle Inspection Form (FRD-162)* on the first day of each working tour. This form shall be maintained in the vehicle logbook for the current month. The document will then be maintained in the station files for three years. After three years, the FRD-162 may be discarded.

III. SECTION "B" - BREATHING APPARATUS INSPECTIONS

The current monthly *Self-Contained Breathing Apparatus (SCBA) Field Inspection Record (FRD-036)*, check sheets of each SCBA carried on the apparatus shall be stored in Section "B." Personnel must use their full name when signing the FRD-036. The FRD-036 shall be removed at the end of the month and retained in the station files for one year. At the end of one year, the records shall be sent to the Air Shop for archiving.

IV. SECTION "C" - EMS EQUIPMENT INSPECTIONS

Each vehicle that is equipped with oxygen and AED or a higher level of medical equipment shall document the daily inspection on the *EMS Equipment Daily Check Log (FRD-205)*. ALS units shall also maintain an *ALS Medication Inventory Sheet (FRD-212)*. Ready reserve vehicles not in daily use shall be inspected for readiness at a minimum of once a week on Sunday or per station policy. This information shall be maintained on each vehicle and shall be kept in Section "C." On the first of each month, the forms shall be moved to a station file for one year, and then may be discarded.

V. SECTION "D" - VEHICLE SPECIFICATIONS

The Apparatus Section shall provide the vehicle specification information for each vehicle. This information shall remain permanently in Section "D" of the vehicle log.

SUBJECT: VEHICLE MAINTENANCE LOG	**EFFECTIVE DATE:** April 1, 2001 **REVISION DATE:** November 26, 2012	**S.O.P.** 03.06.02
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VI. SECTION "E" - VEHICLE INVENTORY

All accountable items and their respective property control numbers will be recorded in Section "E" listing the location that they are stored on the vehicle. The log will contain a list of compartment numbers starting on the front of the driver's side of the vehicle and continuing towards the rear, around the back of the vehicle, and ending at the opposite side front compartment. The inventory shall be current and accurate at all times.

VII. SECTION "F" - PERSONAL INJURY KIT

A minimum of four personal injury kits shall be maintained on each vehicle and shall be kept in Section "F."

VIII. SECTION "G" - ACCIDENT KIT

A vehicle accident kit shall be maintained in Section "G" as specified in the Vehicle Accident Procedure, for each vehicle.

Appendix G

Reference Documents

- Fairfax County Fire and Rescue Department Standard Operating Procedures
- Fairfax County Fire and Rescue Department Communications Manual (July 2013)
- Fairfax County Fire and Rescue Department Driver Training Manual (July 2013)
- Fairfax County Emergency Medical Services Manual (2012)
- Code of the Commonwealth of Virginia, Title 46 §46.2-920-B
- Survey on Response Criteria; Regional and State-wide
- Pierce Manufacturing Vehicle Specifications
- Pierce Manufacturing – Detroit Diesel Electronic Controls Report
- Montgomery County Fire and Rescue Services, Directive Number 04-16 and 04-21