BOARD OF INQUIRY REPORT
LADDER COMPANY 26
INC# 09-1897
JANUARY 9, 2009

Report on: The Fatal Motor Vehicle Accident Involving Ladder Co. 26
Incident # 09-001897
25 Mission Park Drive
Roxbury, MA
District 5, Division 2

Fire Commissioner Roderick J. Fraser Jr. appointed a Board of Inquiry on January 15, 2009 to investigate the circumstances surrounding the death of Fire Lieutenant Kevin M. Kelley, Ladder Company 26 Group 4, which occurred on January 9, 2009.

Board of Inquiry

Deputy Fire Chief Robert J. Calobrisi Division 1 Group 3
Deputy Fire Commissioner Karen A. Glasgow Headquarters
Department Medical Examiner Michael G. Hamrock MD Headquarters *
District Fire Chief William P. Ahern Fire Investigation Unit
District Fire Chief John K. O'Donnell District 1 Group 1
District Fire Chief Francis G. Jones Safety Operational Unit Group 2
Fire Lieutenant Santiago Lasa Rescue Company 1 Group 2
Fire Lieutenant Richard F. Cook Fleet Maintenance Division
Fire Lieutenant William M. Gillis Engine Company 10 Group 1
Fire Inspector Christopher J. Sloane Major Case Unit Fire Investigation Unit
Firefighter Richard F. Paris Rescue Company 2 Group 1

* Served on the Board of Inquiry in a medical advisory capacity

ACKNOWLEDGEMENTS

The Board of Inquiry would like to acknowledge the following members of the Boston Fire Department who contributed to this report:

Fire Commissioner Roderick Fraser, Jr.	BFD Headquarters
Chief of Department Ronald Keating	BFD Headquarters
Chief of Operations Andrew O'Halloran	BFD Headquarters
Deputy Fire Commissioner Kathleen Kirleis	BFD Headquarters
Deputy Fire Chief David Granara	Emergency Medical Response
Deputy Fire Chief Peter Laizza	Fleet Facilities/Maintenance
Deputy Fire Chief Gerard Fontana	EP&P Division
Deputy Fire Chief Michael Doherty	Personnel Division
Deputy Fire Chief James Evans	Training Division
Deputy Fire Chief Richard DiBenedetto	Division 1/ Group 1
Deputy Fire Chief Joseph Finn	Division 1/ Group 2
Deputy Fire Chief Stephen Dunbar	Division 1/ Group 4
Deputy Fire Chief David Mager	Division 2/ Group 1
Deputy Fire Chief Joseph Fleming	Division 2/ Group 2
Deputy Fire Chief Robert Dunderdale	Division 2/ Group 3
Deputy Fire Chief John Hasson	Division 2/ Group 4
District Fire Chief Richard Hartnett	District 1/ Group 3
District Fire Chief George Bishop	District 3/ Group 3
District Fire Chief Andre Stallworth	District 4/ Group 3
District Fire Chief Charles Mitchell	District 9/ Group 3
District Fire Chief William Meyer	Commissioner's Office
District Fire Chief William Rice	Fire Investigation Unit (Ret.)
Fire Captain Arthur Johnson	Engine Company 37/ Group 3
Fire Captain Neal Mullane Jr.	Ladder Company 1/ Group 1
Fire Captain Stephen Creamer	Personnel Division
Fire Captain Edward Scigliano	Fire Academy Drillmaster
Fire Lieutenant Michael Walsh	Rescue Company 2/ Group 2
Fire Lieutenant Edward Glasheen	Tower Ladder 3/ Group 3
Fire Lieutenant William Dewan	Training Division
Fire Lieutenant James O'Brien	Fire Training Academy
Fire Lieutenant George O'Brien	Emergency Medical Response
Fire Lieutenant Robert Driscoll	Personnel Division
Fire Lieutenant James Teed	Engine Company 55 (Ret.)
Firefighter Stephen MacDonald	Public Information Officer
Firefighter Richard Ryan	Emergency Medical Response
Firefighter William Noonan	Fire Investigation Unit
Firefighter Kenneth Reddick	Fire Investigation Unit
Firefighter Christopher Morrison	Fire Investigation Unit

Firefighter Daniel Moore	Fleet Facilities/Maintenance
Firefighter Michael Searcy	Fleet Facilities/Maintenance
Firefighter Gerard Buckley	Fire Training Academy
Firefighter Gary Walker	Informational Technology
Firefighter John Walsh	ICT to Division 1/ Group 3
Firefighter Paul Capeless	ICT to Division 1/ Group 4
Firefighter John Cetrino	ICT to H-1/ Group 2
Firefighter Edward Loder	Rescue Company 1/ Group 2
Firefighter Daniel Robishaw	ICT to Division 1/ Group 4 (Ret)
President Edward Kelly	IAFF Local 718
Legislative Rep. Lawrence Curran	IAFF Local 718
Vice President A. Michael Mullane	IAFF 3rd District
Superintendent John Henderson	Fire Alarm Office
Principal Operator Barry Stafford	Fire Alarm Office
Operator Ralph Dowling	Fire Alarm Office
Operator Christine LaPorte- Dowling	Fire Alarm Office
Executive Assistant Andrew Warren	BFD Headquarters
Director of Transportation Shawn Herlihy	Fleet Facilities/Maintenance
Safety Coordinator William Stockwell	Fleet Facilities/Maintenance
Senior Administrative Assistant Mary Kane	Fleet Facilities/Maintenance
Principal DP Systems Analyst John Perry	Informational Technology
Senior Data Systems Analyst Linda Collins	Informational Technology
Senior Data Systems Analyst Ken Kasinoff	Informational Technology
Senior Data Systems Analyst Sally Chung	Informational Technology
Data Processing Systems Analyst William Hackett	Informational Technology
Data Processing Systems Analyst James Coveney	Informational Technology
Equipment Technician Andre Mercury	Informational Technology
Director Carol Petta	Payroll Division
Principal Administrative Assistant Mary Kilgallen	Commissioner's Office
Senior Administrative Assistant Deborah Burke	Fire Investigation Unit
Senior Administrative Assistant Jennifer Ryan	EP&P Division
Senior Administrative Assistant Joanne Allaine	Office of Admin. & Finance
Senior Administrative Assistant Kathleen Donovan	Office of Field Services
Senior Administrative Assistant Barbara Powers	Human Resources
Principal Storekeeper Kerry Manning	Stationery Office
Head Clerk Denise Barry	Training Division
Head Clerk Maria Figueroa	Emergency Medical Response

The Board of Inquiry would also like to acknowledge the following individuals and outside agencies that contributed to this report:

Safety & Occupational Health Specialist Stacy Wertman	NIOSH
Safety & Occupational Health Specialist Jay Tarley	NIOSH
President Stephen Wilde	Certified Fleet Services, Inc.
Deputy Superintendent Thomas Lee	BPD Homicide Unit
Sergeant Detective Kevin Buckley	BPD Homicide Unit

Sergeant Detective Kenneth Sprague	MBTA Transit Police
Director Carl Peterson	NFPA Public Fire Protection
Assistant Fire Chief Christopher Tracy	Fairfield, CT Fire Dept.
President Peter Carozza Jr.	UPFFA of Connecticut
Deputy Fire Chief Paul Berardi	Kansas City, MO Fire Dept.
Deputy Fire Chief Salvatore Monteleone	Kansas City, MO Fire Dept.
President Louie Wright	IAFF Local 42, Kansas City, MO
Battalion Chief Quentin Maver	Charlotte, NC Fire Dept.
Battalion Chief Mark Zellner	Milwaukee, WI Fire Dept. (Ret)
Fire Captain David Beste	Bellevue, WA Fire Dept.
Firefighter Frank Raffa	Worcester, MA Fire Dept.
Master Mechanic Arthur Warchol	Pelham, NH Diesel

TABLE OF CONTENTS

I.	Scope of Report	7
II.	Opening Summary	8
III.	Objectives	9
IV.	Investigation Methodology	10
V.	Timeline	12
VI.	Timeline Narrative	30
VII.	Accident Cause and Determination	45
VIII.	Training Records	56
IX.	Findings and Recommendations	
	1. Accident Review Policy	59
	2. Apparatus Chauffeurs	61
	3. Apparatus Replacement Plan	66
	4. Department Mechanics	70
	5. Alcohol/Drug Testing	72
	6. Data Collection and Identification of Department Fire Apparatus and Other Vehicles	73
	7. Motor Squad	75
	8. Outside Vendors	77
	9. Permanent Board of Inquiry Interdepartmental Cooperation & Scene Control	80
	10. Hiring Practices	83
	11. Preventive Maintenance	84
	12. Reserve Apparatus and Retirement of Apparatus	88
	13. Rules and Regulations	91
	14. Seat Belts	92
	15. Standard Operating Procedures	93
	16. Three Echelon Approach to Maintenance	94
	17. Training	95
	18. Technical Consideration	97
X.	Works Cited	99
XI.	Final Summary	101
XII.	Biography	102
XIII.	Glossary	103
XIV.	Appendix	
	A. Ladder Company 26 Apparatus Brake Maintenance History	109
	B. Death Certificate	113
	C. NFIRS Report Incident #09-001897	114
XV.	Bibliography	124

I. SCOPE OF REPORT

The Board of Inquiry focused on examining all information and facts that were available during the time period in which The Board was convened. All of The Board's findings and recommendations are based on information gathered, reported and verified during the course of The Board's investigation.

In instances where conflicting information or differing perspectives occurred, The Board endeavored to determine the reason for such discrepancies and in some cases expressed their viewpoint concerning said variations. In instances where facts could not be determined with certainty, speculative conclusions have been omitted from this Report.

The Board of Inquiry is cooperating and sharing information with other agencies that are currently conducting open and ongoing investigations into this accident.

II. OPENING SUMMARY

Boston Fire Department
Board of Inquiry Report on the
Fatal Accident of January 9, 2009
Involving Ladder Co. 26
25 Mission Park Drive
Roxbury, MA
District 5, Division 2
Incident Number 09-001897

At 1432 hours on January 9, 2009 a motor vehicle crash involving Ladder Company 26, resulted in the line-of-duty death of Fire Lieutenant Kevin M. Kelley. While returning to quarters from a medical assist call at 63 Parker Hill Ave. the brakes on Ladder 26 failed. Ladder Co. 26, with a complement of one officer and three firefighters, accelerated down Parker Hill Ave. unable to stop. At the bottom of the hill the fire apparatus crossed four lanes of roadway before colliding with two parked automobiles and an eight-foot high brick barrier, three courses thick; finally coming to rest inside an after-school computer-learning center on the first floor of a high-rise building located at 25 Mission Park Drive. Fire Lieutenant Kevin M. Kelley of Ladder Company 26 died within minutes of impact, and all three firefighters sustained various serious injuries. Boston Emergency Medical Services (BEMS) also transported four children and one adult, all with non-life threatening injuries, from the learning center to local hospitals.

III. OBJECTIVES

The most important objective in every line of duty death investigation is to prevent the same situation from occurring in the future.

The objectives of this Board of Inquiry are as follows:

1.) To determine the direct and indirect causal factors which resulted in a line-of-duty death, particularly those factors that could be used to prevent future occurrences of a similar nature, including:

- Identifying inadequacies involving the apparatus, equipment, protective clothing, standard operating procedures, supervision, training, or performance. *
- Identifying situations that involve unacceptable risk. *
- Identifying previously unknown or unanticipated hazards. *

2.) To ensure that the lessons learned from the investigation are effectively communicated to prevent future occurrences of a similar nature. (When appropriate, this should include dissemination of the information through fire service organizations and professional publications). *

* The above excerpts were taken from the International Association of Fire Chiefs "Guide for Investigation of a Line-of-Duty Death."

IV. INVESTIGATION METHODOLOGY

The Board of Inquiry divided the investigation into several manageable sections. These sections included:

- Document retrieval and analysis.
- Codes and Standards.
- Personal interviews.
- Legal interpretation.
- Special Operations.
- Report preparation.

With personal interviews and legal interpretation being the exceptions, all Board members participated in the gathering of information that was considered relevant to the investigation. All personal interviews were conducted by two Board members who have been trained in the proper methods of interviewing. The attorney on The Board made all legal interpretations.

All relevant findings and recommendations from the above mentioned sections were then integrated into the final Report.

Throughout the investigation, Board members reviewed the following sources of information:

1. Three interviews of Boston Fire Department (BFD) members involved in the accident.
2. Fourteen interviews of BFD members who responded to the scene of the accident.
3. Ten interviews of civilians.
4. One interview of a civilian involved in the transport of Ladder 26 (L-26) to the MBTA Transit Police Facility.
5. Interviews of two Boston Emergency Medical Services (BEMS) Paramedics.
6. Demonstration presented by a truck mechanic on the operation, maintenance and repair of fire apparatus air brake systems.
7. Documents, manuals, laws, rules, regulations, codes, standards, reports, web-sites, Standard Operating Procedures, magazine articles, etc., listed in the Bibliography.
8. BFD National Fire Incident Reporting System (NFIRS)
9. Local Boston newspaper articles of relevance.
10. BFD L-26 maintenance records.
11. Age analysis of all BFD fire apparatus as of January 9, 2009.
12. Analysis of BFD fire apparatus maintenance expenditures from FY 1993 to FY 2009, inclusive.

13. Analysis of BFD maintenance/repair expenditures for L-26, from July 11, 1995 to January 2009.
14. BFD Training Academy curriculum.
15. BFD training records.
16. Internal BFD e-mails and memos.
17. Letters of note between the President of Boston Firefighters' Local 718 and the Fire Commissioner.
18. Letters of note between BFD and City Hall.
19. Special Orders of the BFD.
20. Photographs of the accident scene and L-26.
21. Photographs taken during the forensic investigation of L-26.
22. Video tapes from security cameras in proximity to the accident.
23. Fire Alarm radio tapes of the incident.
24. Computer Aided Dispatch (CAD) times and text of the incident.
25. Weather history for Boston, MA on January 9, 2009.
26. Ladder Company 26 Tour Reports.

Based upon information that was obtained from some of the material listed above, a timeline was created and utilized to reconstruct the incident responses of Ladder Co. 26 from 0800 hours January 9, 2009 leading up to the time of the fatal accident and continuing until L-26 was transported to the MBTA Transit Police Facility on January 10, 2009. Other information was analyzed to determine if there were any identifiable factors that through act or omission to act could have contributed to or prevented the accident.

It is The Board of Inquiry's opinion that it is of vital importance that the recommendations arising from this Report be implemented in a timely manner to prevent further accidents of this nature from occurring in the future. Any and all temporary procedures that have been implemented by the BFD during the preparation period of this Report, as a result of the accident involving Ladder 26, should be assessed and where appropriate, incorporated into the recommendations of this Report.

V. TIMELINE

Timeline for Incident #09-001897

January 9th & 10th, 2009

1

Unit Designations Used:

E = Engine Company	L = Ladder Company
R = Rescue Company	Car 8 = District 8 Chief
TL = Tower Ladder Company	Car 9 = District 9 Chief
C7 = Deputy Chief Division 2	Car 10 = District 10 Chief
Car 3 = District 3 Chief	H-1 = Safety Chief
Car 5 = District 5 Chief	H-4 = Tunnel Support Unit
H-6 = Division 1 Collapse Unit	H-8 = Division 2 Collapse Unit
H-2 = Lighting Plant	M-5 = Motor Squad
C-1 = Fire Commissioner	C-2 = Chief of Department
T-1 = Special Operations Chief	T-21 = Special Operations Member
C-16 = Department Chaplain	FAO = Fire Alarm Office

CISM = Critical Incident Stress Management

BEMS = Boston Emergency Medical Services

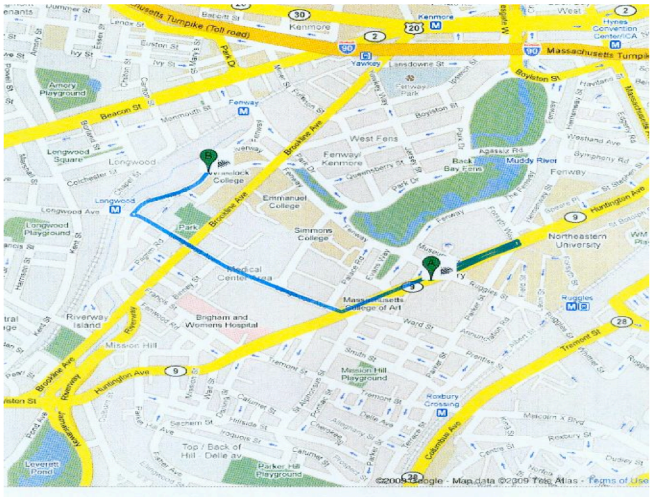
Timeline Legend: Green = Estimated Red = Actual time

2

Ladder 26 Engine 37

560 Huntington Avenue

3



08:14:13

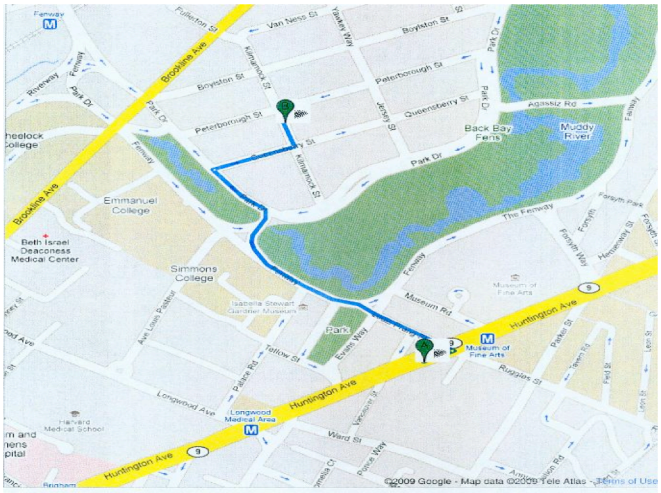
L26 responds to 180 The Riverway from quarters.

08:25:01

L26 returns to quarters.

Code 522 Water or Steam Leak

4



10:24:30

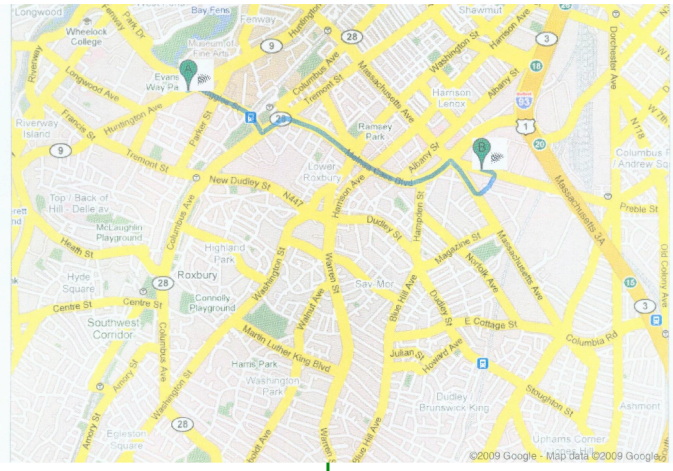
L26 responds to 33 Kilmarnock St from quarters.

10:31:17

L26 returns to quarters.

Code 521 Water Evacuation

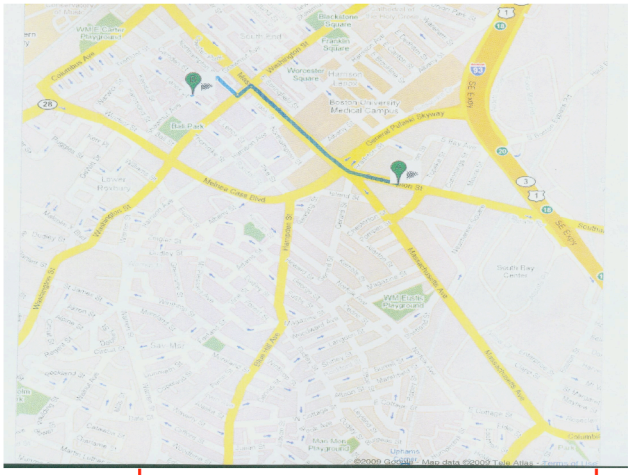
5



10:55

L26 leaves quarters to go to Fire Headquarters at 115 Southampton St.

6

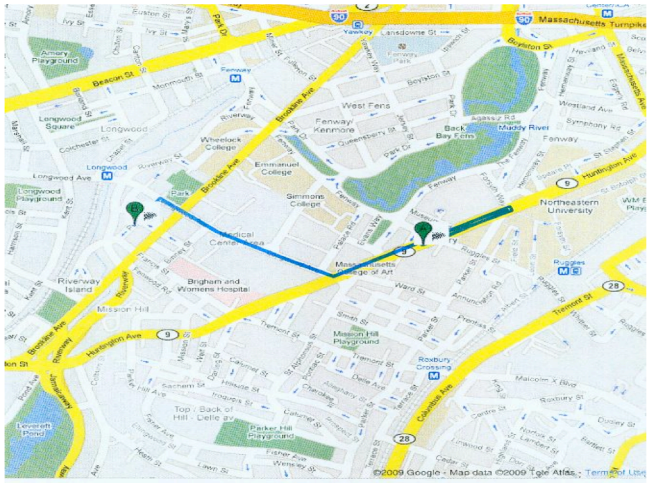


11:42:20
L26 responds to 589 Shawmut Avenue
from Fire Headquarters.

11:50:33
L26 returns
to quarters.

Code 445 Arcing, Shorted Electrical Equipment

7



13:23:59

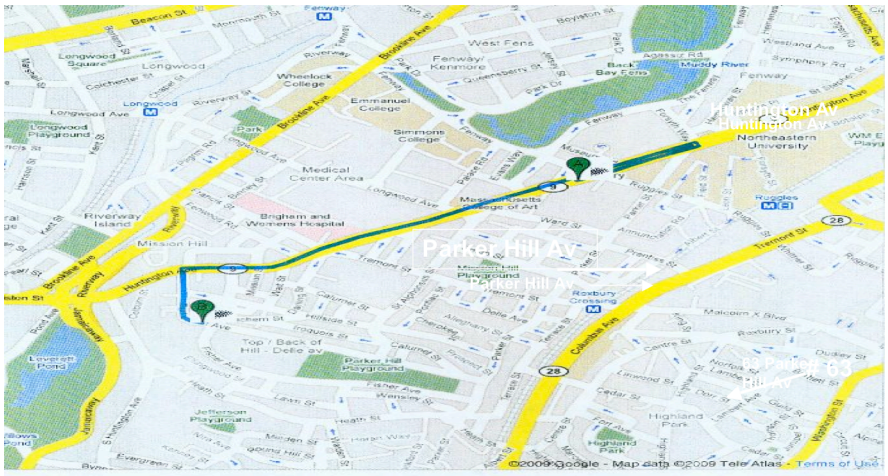
L26 responds to 185 Pilgrim Rd.
from quarters.

13:30:46

L26 returns
to quarters.

Code 500 Other Service Call

8



14:05:37

Ladder 26 responds to

63 Parker Hill Avenue from quarters.

Code 321 EMS call

9

14:09:46

L26 responding up Parker Hill Avenue.

Picture from security camera located at 16 Parker Hill Avenue.

(Note: Camera time stamp is not accurate.)

10

14:10:08
L26 arrives at

63 Parker Hill Avenue.

14:14:30
L26 update

for BEMS.

11

From 63 Parker Hill Avenue. (Driveway facing Parker Hill Avenue.)

L26 makes three point turn at pole.

(Note: L26 's brakes were functioning properly at this time.)

12

Leaving driveway of 63 Parker Hill Avenue. 13

L26 returning from 63 Parker Hill Avenue.

Picture from security camera at 16 Parker Hill Avenue. 14

(Note: Camera time stamp is not accurate.)

14:32:07

L26 hits two parked vehicles and brick wall.

15

14:32:08

L26 hits high-rise building located at
25 Mission Park Drive.

16

14:32:23	14:32:32	14:33:07
First 911 call reporting crash received from 25 Mission Park Drive.	L26 Roof Man reports crash to FAO via BFD portable radio on Channel 1.	L26 Open-Up Man confirms need for BEMS assistance.

17

Rear view of L26 lodged into high-rise building at 25 Mission Park Drive. 18

Rear view of L26 lodged into high-rise building at 25 Mission Park Drive. 19

Passenger side view of L26 lodged into high-rise building at 25 Mission Park Drive.
20

Driver side view of L26 lodged into high-rise building at 25 Mission Park Drive.

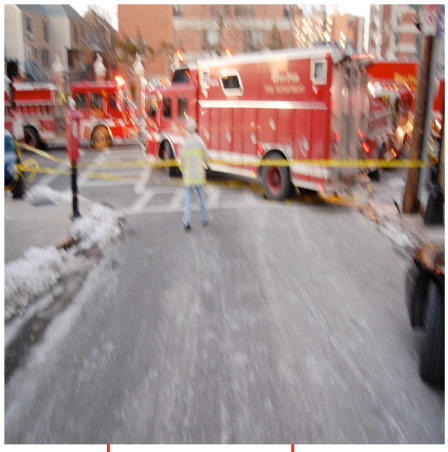
21

Damage to parked car, brick masonry wall and high-rise building.

22

Passenger side view of L26 lodged into high-rise building at 25 Mission Park shows aerial ladder supporting lintel beam. 23

Aerial view of accident site at 25 Mission Park Drive. 24



14:37:32
E37 arrives at Code A (i.e. BFD motor vehicle accident)

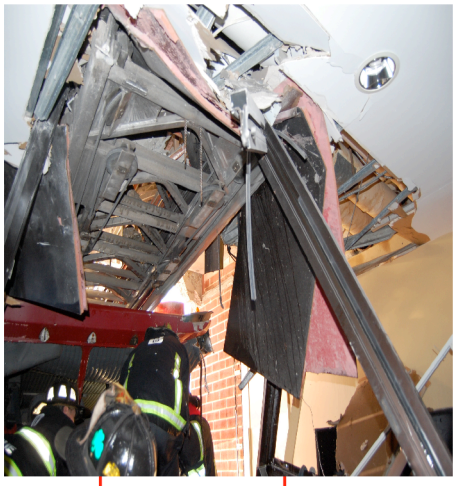
14:37:48
E37 reports members trapped

14:38:13
Engine 42 and Rescue 2 arrive on scene

14:38:30
Car 5 and Car 9 arrive on scene

14:39:02
Car 9 requests Building Collapse Unit (H-8) to respond

25



14:39:41
Rescue 2 requests Rescue 1 to respond

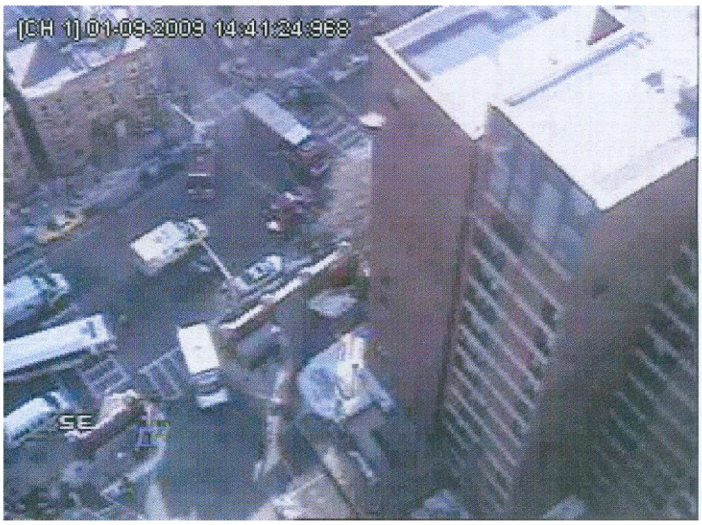
14:40:00
Rescue 1 and Building Collapse Unit both responding

14:40:56
Car 9 requests FAO to "Knock down the repeater"

14:41:09
H1 (Safety Chief) on scene

14:41:24
Car 9 requests Division 2 Deputy Chief (C7) to respond

26



Aerial view of public safety operations at 25 Mission Park Drive.

27

Aerial view of public safety operations at 25 Mission Park Drive.

28

14:49:41
C-7 assumes Huntington Avenue Command

14:50:00
Lt. Kelley pronounced by BEMS paramedic

14:50:07
H-8 Collapse Unit on scene

14:53:45
C16 responding (Dept Chaplain)

29

14:56:00
T21 – Special Operations on scene

14:59:00
Tunnel Collapse Unit (H-4) on scene

15:00:00
L26 driver removed from cab

15:01:00
FAO reports Fire Commissioner (C-1) is responding

30

15:02:00
FAO reports Chief of Department (C-2) is responding

15:10:00
TL3 and H6 on scene

15:15:00
E10 on scene

15:28:26
C-7 requests Lighting Plant (H-2) to respond

15:30
BFD Motor Squad (M-5) on scene

31

15:35:46
C7 requests City of Boston Building Dept and structural engineer to respond

15:38:00
City of Boston Building Inspector on scene

15:40:31
Lighting Plant (H-2) on scene

15:59:00
Fire Commissioner (C-1) on scene

32

16:25:24
BFD Critical Incident Stress Management Team responding

16:26:00
Fire Lieutenant Kevin Kelley removed from L26

16:27:00
Shoring and extrication operations proceed.

21:35:00

33

21:35:26
L26 free from building but must be prepared for moving.

22:15:23
Safety Chief (H-1) returning to quarters.

22:21:05
Car 9 returning to quarters.

22:27:02
Rescue 1 returning to quarters.

34

22:29:00
Rescue 2 returning to quarters.

22:31:00
TL 3 returning to quarters.

22:31:04
E42 returning to quarters.

22:39:08
C-7 returning to quarters. Car 8 assuming incident command

23:39:26
L26 being removed from building by tow truck company

35

00:15:00
L26 towed to MBTA secured garage at 238 Southampton St.

00:32:01
Car 8 returning to quarters. Car 3 assuming incident command.

02:12:13
Car 3 returning to quarters. Car 10 assuming incident command.

03:30:27
Car 10 returning to quarters.

Incident closed.

36

VI. TIMELINE NARRATIVE

The following is a written summary of events that occurred on Friday, January 9, 2009 from 0800 hours to Saturday, January 10, 2009 at 0330 hours. All times cited in this section of the Report were obtained from the Boston Fire Alarm Office (FAO) Computer Aided Dispatch (CAD) system and Boston Fire Department (BFD) radio transmissions and logs. The stated times are as close to accurate as possible. Any discrepancies are a result of BFD companies not immediately announcing their arrival at the scene due to the magnitude of the incident that was initially encountered. Said discrepancies are duly noted in the preceding Timeline section of this Report.

At 0800 hours on Friday, January 9, 2009, Ladder Company 26 of the BFD started their day tour of duty with a complement of one officer and three firefighters (FFs): Fire Lieutenant Kevin M. Kelley, a driver, an open-up man and a roof man. Lieutenant Kelley was working off his regularly assigned group, as a result of having swapped with a fellow company officer. The driver was permanently assigned to Ladder 26, while the roof man and open-up man were respectively detailed into the company from Engine 20 and Ladder 28, to cover two Ladder 26 FFs who were on sick and injured leave.

Prior to commencing the day tour of duty at 0800 hours, Ladder 26's driver checked the truck's fuel and equipment, portable radios, batteries and tires, while Lieutenant Kelley assigned the other two detailed FFs their responsibilities. The Engine 20 detailed FF would assume the duty of roof man, who sat behind the driver, and the Ladder 28 detailed FF would serve the role of open-up man, who sat behind Lieutenant Kelley.

At 0814 hours Ladder 26 was dispatched from quarters by the FAO to respond to 180 The Riverway for a reported water or steam leak. After arriving at the location and mitigating the incident, Ladder 26 cleared the scene and returned to quarters at 0825 hours.

At 1024 hours Ladder 26 was dispatched from quarters by the FAO to respond to 33 Kilmarnock Street for a water leak. After arriving at the location and mitigating the incident, Ladder 26 cleared the scene and returned to quarters at 1031 hours.

At 1055 hours Ladder 26 left their quarters and went to BFD Headquarters at 115 Southampton Street to reportedly pick up a piece of equipment. At 1142 hours Ladder 26 was dispatched from BFD Headquarters by the FAO via department radio to respond to 589 Shawmut Avenue for an arcing and/or shorted electrical equipment call. After arriving at the location and mitigating the incident, Ladder 26 cleared the scene and returned to quarters at 1150 hours.

At 1323 hours Ladder 26 was dispatched from quarters by the FAO to respond to 185 Pilgrim Road for an "other service call." After arriving at the location and mitigating the incident, Ladder 26 cleared the scene and returned to quarters at 1330 hours.

At 1405 hours Ladder 26 was dispatched from quarters by the FAO to respond to 63 Parker Hill Avenue for a "difficulty breathing," medical assist call. Upon arriving at the Landmark Senior Living Community at 1410 hours, Fire Lieutenant Kelley instructed Ladder 26's driver to turn the apparatus around in the parking lot, so it would be facing out toward Parker Hill Avenue. Fire Lieutenant Kelley, the roof man, and the open-up man then left the apparatus together to attend to the medical assist call. (See Photo 1).

Photo 1

Ladder 26's driver turned the apparatus around as instructed, and after applying then releasing the brakes, heard an accompanying sound of air. Upon coming to a full stop, he shifted the transmission into neutral and manually set the parking brake (i.e. Maxi Brake). The driver then disembarked from the apparatus and stood in front of it while his fellow members worked the medical assist call. According to Ladder 26's driver, the truck remained in place while he stood in front of it, and all of these actions were performed on a level grade with no incline in the parking lot.

At 1414 hours Lieutenant Kelley gave an update to the FAO on the patient's status, saying, "Members are administering oxygen." At approximately 1415 hours, a Boston Emergency Medical Services (BEMS) ambulance arrived at 63 Parker Hill Avenue. Once at the location, BEMS unit members assisted Ladder 26 with administering oxygen to the patient, and then assumed command of the incident. Upon transferring patient care to the BEMS unit, Lieutenant Kelley and his crew exited the building and returned back to Ladder 26.

At approximately 1431 hours all Ladder 26 members mounted the apparatus and prepared to return to quarters. Upon leaving the parking lot and turning slightly to the left, the driver sighted a parked car on his left hand side and a utility pole located directly in front of him, on the opposite side of 63 Parker Hill Avenue. (See Photo 2). After determining that he needed to negotiate a three-point turn to clear it, the driver came to a full stop at the pole, shifted the apparatus into reverse, and backed up about one foot. Upon coming to a full stop, he then shifted the truck back into drive and maneuvered it along a right hand, downward curve before proceeding down Parker Hill Avenue. (See Photo 3). According to Ladder 26's driver, he negotiated the three-point turn on a slight decline and the truck's brakes were functioning properly at this time, although he could not recall hearing an accompanying release of air after applying then releasing the brakes.

Photo 2

Photo 3

NOTE: According to Boston Police Department (BPD), Suffolk County District Attorney's Office (DA's Office) and Board interviews, all of Ladder 26's members stated that they were not aware of any apparatus malfunctions and/or brake problems from the start of the day tour of duty at 0800 hours to the time the driver completed negotiating the aforementioned three-point turn at 1431 hours.

At 1432 hours Ladder 26 started traveling down Parker Hill Avenue and began to gain speed. The driver applied the foot brake, but the pedal went straight to the floor, offering no resistance. At this point, the driver repeatedly tried pumping the foot brake, with the same result. The driver, now knowing that Ladder 26's brakes were compromised, immediately told Lieutenant Kelley, "I can't stop. We have no brakes." After he heard this, Lieutenant Kelley yelled, "We don't have any brakes?" to which the driver confirmed, "What do we do, we're not stopping, we don't have any brakes."

Upon realizing that Ladder 26 was not going to stop, the driver shifted the apparatus into neutral and then applied the parking brake. Not hearing the normal release of air after he engaged it, the driver then pushed the parking brake device in and out a couple of times hoping that it would activate. Once again, the driver stated that he did not hear a release of air, nor see and/or hear the low air pressure warning alert activate in the apparatus at any time he was attempting to apply the parking brake.

NOTE: Based on BPD/DA's Office and Board interviews, L- 26's driver, open-up man and roof man all stated that they could not recall seeing and/or hearing the apparatus' low air pressure warning signal activate while responding to or from 63 Parker Hill Avenue. Eleven months after the accident, during a final interview with The Board, the open-up man said he thinks he heard what he believes to be the low air pressure warning signal operate while in L-26's quarters, prior to the company responding to one or more of the previous four emergency calls. When asked by The Board if L-26's driver had to wait for the apparatus' air to build up before the truck could leave the firehouse, the open-up man stated, "No, L-26 was able to leave quarters immediately." It should be noted that both L-26's driver and roof man respectively testified that neither of them were aware of seeing and/or hearing the apparatus' low air pressure warning signal activating at any time during Ladder 26's entire day tour of duty, thus failing to corroborate the open-up man's most recent statement that was made to The Board.

With the total loss of his service and parking brake systems, Ladder 26's driver then considered turning the apparatus into a pole and/or some parked cars that were located on the left hand side of Parker Hill Avenue. As the driver started steering Ladder 26 toward the pole and parked cars, Lieutenant Kelley instructed him, "Don't hit the pole or the cars. Turn right back down and keep it in line." Obeying his officer's order, the driver steadied the steering wheel and proceeded straight downhill, continuing to pick up speed in the process.

NOTE: According to BPD/DA's Office and Board interviews with Ladder 26's FFs who were seated in the rear compartment, there appeared to be differing accounts about what was actually said by Lieutenant Kelley to Ladder 26's driver relative to either "hitting" or "not hitting" the parked cars. The open-up man, who was seated directly behind the officer facing forward, said he heard Lieutenant Kelley say something about "parked cars." Conversely, the roof man, who was seated directly behind the driver facing forward, said he heard Lieutenant Kelley say something about the parked cars to the left of them, like "put it into the cars." According to Ladder 26's open-up man, the roof man later recanted his initial statement and told him that he heard Lieutenant Kelley say, "Don't hit the cars. There are pedestrians walking."

NOTE: According to BPD/DA's Office and Board interviews with Ladder 26's FFs, none of them could recall seeing pedestrians walking on either side of Parker Hill Avenue at or after the time Ladder 26 started its downward descent. However, although The Board could not confirm if Lieutenant Kelley actually said anything about "pedestrians walking," a security camera tape at 16 Parker Hill Avenue reveals Ladder 26 passing a pedestrian walking down a sidewalk on the even numbered side of Parker Hill Avenue, about halfway between Hillside Street and Huntington Avenue just prior to the incident. In addition, the BPD Investigative Report states that a second civilian was walking down a sidewalk on the odd numbered side of Parker Hill Avenue to the intersection of Huntington Avenue and pushed the pedestrian button on the traffic light at the bottom of the hill just prior to the accident.

Photo 4

NOTE: The Board believes that these conflicting accounts may have in fact been attributable to the inordinate amount of noise that was permeating from the engine housing. Located in the center of the apparatus' rear passenger compartment where the open-up and roof man were sitting, the engine housing was missing a diamond plate hatch door that had been covered with cardboard and medical adhesive tape to protect the opening (See Photo 4). As a result of this repair, which in effect magnified the engine noise, both firefighters freely admitted that it was difficult to hear what Lieutenant Kelley and Ladder 26's driver were actually saying to each other.

As Ladder 26 approached the intersection of Parker Hill and Huntington Avenues, the driver noticed that the traffic light was green in their direction, and that there were no trolleys and/or automobiles in the area that would obstruct the apparatus' freewheel down the hill. The driver stated that since he was very familiar with the area and did not want to hit anything or anybody, he focused on aiming for a brick masonry wall that was located directly ahead on Huntington Avenue.

Realizing that the apparatus was not going to stop, Lieutenant Kelley turned to Ladder 26's open-up man and roof man in the rear passenger cab and yelled, "Brace yourselves, we're going to crash." Lieutenant Kelley then proceeded to activate Ladder 26's emergency warning device (i.e. air horn, siren or electronic siren) to alert any nearby traffic and/or bystanders in the area.

NOTE: According to BPD/DA's Office and Board interviews with Ladder 26's FFs and other civilian witnesses, there were differing accounts as to whether Lieutenant Kelley applied the apparatus' air horn, siren and/or electronic siren to warn traffic and bystanders in the area. Based on this information, The Board believes that Lieutenant Kelley did in fact activate some type of emergency warning device, although it cannot be conclusively determined if it was an air horn, siren, electronic siren or a combination thereof.

Upon hearing Lieutenant Kelley's warning that they were going to crash, the open-up man turned a couple of times and tried to brace himself before impact. He stated that he was not wearing a seat belt because the restraining device was difficult to apply. Meanwhile, the roof man, who said that he could see out of the top portion of the windshield, sat down to brace himself and reached over to buckle his seat belt just prior to impact.

NOTE: It has been definitively determined by The Board that Ladder 26's roof man was the only member of the company that was wearing a seat belt at the time of the accident.

As Ladder 26 reached the bottom of Parker Hill Avenue, it proceeded to cross a four-lane traffic and trolley intersection at Huntington Avenue, strike two parked vehicles, knock down an eight-and-a-half foot high, three course thick brick masonry wall, careen up and over a concrete stair embankment, and crash into a ten foot high glass facade wall. Ladder 26 eventually came to rest inside of the first floor of a 14 story, residential apartment building at 25 Mission Park Drive. (See Photos 5, 6, and 7) According to a number of witnesses, seven children were in the Betty Powers Computer Learning Center on the first floor at this time, participating in an after school program.

NOTE: The accident location that was initially recorded in a number of public safety agency incident reports was 835 Huntington Avenue. Upon further investigation, The Board subsequently determined that the actual address of the impacted building was 25 Mission Park Drive. For National Fire Incident Reporting System (NFIRS) purposes, the latter address will be referred to throughout the remainder of this Board of Inquiry Investigative Report.

Photo 5

Photo 6

Photo 7

Photo 8

NOTE: According to the Boston Police Department Accident Reconstruction Team Report, Parker Hill Avenue had a posted speed limit of 25 miles per hour (mph) and a 13 % downward grade. Preliminary estimates indicated that L-26 had accelerated to an approximate speed of 57 mph and that approximately 20 seconds had elapsed from the time it descended down Parker Hill Avenue and struck the building at 25 Mission Park Drive. (See Photo 8).

Upon impact, the front tip of Ladder 26's metal aerial ladder pierced a wooden panel at the top of the glass wall and then protruded up and through the ceiling, where it displaced a lintel support beam and compromised the building's service utilities. This included a severed sprinkler system pipe, which immediately started discharging a steady stream of cold water on the apparatus. Fortunately, once Ladder 26 stopped, it had entered approximately four to six feet into the building, and its aerial ladder provided a makeshift shoring system that in effect acted as a support beam, carrying both the wall and ceiling load. (See Photo 9). .

Photo 9

In addition to the building damage described above, Ladder 26 also sustained a bent aerial ladder tip, a broken windshield, a butter-flied steering wheel, a sheared off air dryer and driver's side door, a crushed front bumper and a front cab that was bent approximately two feet inward facing the apparatus' driver and front passenger seats. (See Photo 10).

Photo 10

NOTE: Ladder 26's air dryer, (which was originally mounted in the center behind the apparatus' front bumper) and its mobile department radio (which was initially located on the dashboard between the driver and officer), were never recovered as evidence after the incident. The Board believes that both of these items were inadvertently disposed of by non-BFD assigned clean up crews the day after the accident.

At 1432 hours the BFD FAO received its first emergency phone call from 25 Mission Park Drive, with the caller stating that "A fire truck just crashed into an apartment building."

Immediately following the crash, Ladder 26's open-up man said that he opened the rear cab passenger side door and started crawling on his knees to the driver's side of the apparatus. Once there, he heard the roof man calling for him and then witnessed water cascading down into the truck, onto the driver. The open-up man heard a civilian passerby call for help and then the former jumped up onto Ladder 26 to see the driver slumped over the steering wheel. He quickly glanced over to Lieutenant Kelley, who was outstretched on the officer's side front seat.

Simultaneously, initially after impact Ladder 26's roof man said that he saw and heard children screaming and people scrambling about in the computer room. He heard a gushing sound of water, unbuckled his seat belt and then attempted to open the cab door, but it was jammed shut. After the roof man started banging on the cab door's window with his arm, a civilian passerby eventually opened the door from the outside, asked the roof man if he was all right and then proceeded to the front of the apparatus to assist the driver. After acknowledging to the civilian passerby that he was fine, the roof man

jumped out of the cab and onto the ground, experiencing pain in his left leg that he thought he had broken as a result of the accident.

After realizing that he could not enter the building from the front as a result of it being blocked by all of the strewn debris, the roof man grabbed his BFD portable radio and called the FAO, reporting, "Ladder 26 has crashed into a building at Huntington Avenue and Parker Hill Avenue." He then entered the building from the right side access ramp of 25 Mission Park Drive and started to clear some debris, while performing a primary search for any occupants. After checking under the truck and not finding any people, he moved along to the front of the apparatus and heard the driver moaning and hunched over the steering wheel. The roof man then quickly glanced over to Lieutenant Kelley and sensed that the officer had not survived, based on the extent of the injuries that he observed.

At 1433 hours the FAO called Ladder 26 and asked if they required the services of BEMS. The open-up man confirmed at this time that Ladder 26 did need BEMS to respond to the incident. Upon hearing this radio transmission, the FAO immediately dispatched Engines 37 and 42, Rescue 2, District 5 and District 9, the Technical Rescue Chief.

At this point, Ladder 26's roof man attempted to jump onto the truck's front bumper to evaluate Lieutenant Kelley, but could not because of his injured left leg. He then reached up to Lieutenant Kelley and started to shake him, but there was no response. Upon performing a secondary search of occupants to confirm that there were no other people injured or trapped, the roof man noticed the civilian passerby and the open-up man standing on a pile of debris, attempting to rouse Ladder 26's driver. The roof man then moved around to the front of the apparatus to see if he could assist with helping the driver.

Ladder 26's driver, who was initially knocked unconscious after the truck hit the brick wall, was now lucid and hysterical, flailing his arms and yelling for someone to turn off the water directly above him. Hearing the driver gasping for air and gurgling, the civilian passerby positioned him upright and moved his head away from the water, fearing that the driver could drown. At the same time, Ladder 26's open-up man attempted to shield the driver and Lieutenant Kelley from the rushing water, and started to yell for someone to shut the water off. He then attempted to free Ladder 26's driver, but could not because the latter's legs had been pinned between the dashboard and front seat. Upon realizing that the driver would have to be extricated, the open-up man and roof man then started talking to him, trying to calm him down.

At 1437 hours BFD, BPD and BEMS personnel began to arrive on the scene. The roof man, who had re-entered the building from the right side access ramp to conduct another search for occupants, was approached by a BEMS member who asked him if he had been involved in the accident. After indicating that he had, the Emergency Medical Technician (EMT) told him to "Get away from the truck, we need you to sit down." The roof man then told the EMT, "I have to make sure that everyone in the room is accounted for," to which the EMT replied, "Everyone has been accounted for." BEMS personnel then sat the roof man down on a chair, moved him onto a stretcher and prepared to

transport him to a hospital. Prior to entering the ambulance, the roof man managed to secure Lieutenant Kelley's fire helmet and shield.

NOTE: According to witnesses, there were seven children between the ages of 9 to 15 years old that were present in the Betty Powers Computer Learning Center at the time of the accident. Four children and one 45-year-old adult were reported to have been transported by BEMS to local hospitals with non-life threatening injuries. This included one child with a left leg and left shin sprain, one child with a closed head injury, and one child with leg, hip and lower back pain. Medical information on the fourth child and adult was not available to The Board. In addition, two of the four children transported to the hospital were also reported to have sustained post traumatic stress disorders, adjustment reactions and/or severe emotional distress.

NOTE: According to the BFD Medical Examiner, the injuries that were sustained by Ladder 26's roof man included a left leg comminuted fracture of the proximal tibia and a left leg laceration.

Photo 11

Members of Engine 37 immediately moved to the front of Ladder 26 to check on the condition of the driver and officer, who were both positioned in the front seat. (See Photo 11). A FF from Engine 37 went to the driver's side to check on his condition. The FF then informed his Captain that the driver was trapped and that the officer, Lieutenant Kelley, was seriously injured.

After sizing up the scene, the Captain of Engine 37 informed the FAO via radio that Ladder 26 members were trapped and requested Rescue 2 to respond. Fire Alarm informed the Captain that Rescue 2 had already been dispatched. The Captain of Engine 37 then moved to the inside of the building, where Ladder 26 had stopped, to check on the condition of Lieutenant Kelley. The Captain checked for a pulse but could not detect one.

At 1438 hours, the District 5 and District 9 Chiefs simultaneously arrived on scene with Engine 42 and Rescue 2 and immediately performed a size-up of the building and Ladder 26. The District 5 Chief then conferred with the District 9 Chief and noted that the aerial ladder tip had penetrated the first floor ceiling, thus compromising the pre-cast concrete under floor, the exterior curtain wall and the lintel support.

NOTE: The District 5 Chief for the January 9, 2009 tour of duty is the regularly assigned Captain of Ladder 26, who was filling in as an Acting Chief for the day.

Due to his seniority in rank and his familiarity with Engine 37 and Ladder 26, the District 9 Chief relieved the District 5 Chief and assumed incident command. The District 9 Chief then requested the District 5 Chief to ensure that the Deputy Chief (BFD Division 2 Commander) was notified and responding.

Upon arriving at the scene, the Engine 42 company officer immediately ordered his members to chock the rear wheels of Ladder 26, due to the truck having come to rest on a slight incline. As a precaution, he then ordered an attack hose line be advanced to the rear of Ladder 26 and that the area be cordoned off with barrier tape to limit unauthorized access onto the scene.

At 1439 hours Rescue 2 requested Rescue 1 to respond to the scene. At 1441 hours the District 9 Chief again requested the FAO to have C-7, the Division 2 Deputy Chief respond.

Upon exiting the building, the Captain of Engine 37 informed the District 9 Chief that members of L-26 were trapped and required extrication. At this time, he also notified the District 9 Chief that the impact of L-26's crash had caused serious structural damage to the interior of the building. With this information in hand, the District 9 Chief requested a full technical rescue response. This brought the addition of Tower Ladder 3, Engine 10 and H-6, the Collapse Support Unit.

At approximately 1447 hours C-7, the Division 2 Deputy Chief, arrived on scene. He immediately performed an initial size-up and then received a briefing from the District 9 Chief, who now became the Technical Rescue Operations Chief. It was apparent to the Deputy Chief that Ladder 26's impact had caused serious structural damage to the building, along with compromising the heating, sprinkler and electrical systems.

Upon assuming incident command at 1449 hours, the Deputy Chief's immediate concern was for the life safety of Ladder 26's company members. The initial report that he received from the District 9 Technical Rescue Operations Chief was that Ladder 26's driver was seriously injured, entrapped and had to be extricated, and that the officer was unconscious and seriously injured.

There was confusion at the scene in trying to identify what firefighters were actually assigned to Ladder 26 for the day tour of duty. Although the Incident Commander (IC) had printed a current copy of the Division 2 unit roster from his Mobile Computer Terminal (MCT) while enroute, doubt still remained because Lieutenant Kelley was working off his regularly assigned group and two other members from Ladder 28 and Engine 20 had been detailed into Ladder Company 26 for the day tour. One member had been transported to the hospital and one member was unaccounted for. The missing member was eventually located and identified by the District 9 Chief as Ladder 26's open-up man. The member was injured and appeared to be in a state of shock. He was then removed from the scene and transported to a local hospital for medical treatment by BEMS Ambulance.

NOTE: According to the BFD Medical Examiner, the injuries that were sustained by Ladder 26's open-up man included contusions to the head and left knee and a cervical strain of the neck.

Photo 12

At approximately 1450 hours the District 9 Chief notified the IC that a BEMS paramedic had officially pronounced Lieutenant Kelley. Upon receiving this information, the IC directed all BFD resources toward extricating Ladder 26's driver. (See Photo 12).

The members of Rescue 2 were already in the process of accomplishing this task using extrication tools. Rescue 2's officer asked for two rams and some cutters, and then via department radio requested that Rescue 1 bring their cutting torch to the scene. The officer of Rescue 2 then instructed his members to make forty-five degree angle cuts at the floor rocker panel and driver's side steering column in an attempt to remove the driver. After making these cuts, Rescue 2's officer directed his members to use the hydraulic ram to separate the steel from around Ladder 26's driver's legs and body. The driver was subsequently extricated from Ladder 26 at 1500 hours and then transported to a local hospital for medical treatment by BEMS Ambulance.

NOTE: According to the BFD Medical Examiner, the injuries that were sustained by Ladder 26's driver included head, right shoulder and right leg tibial plateau bone contusions, and facial/bilateral ear lacerations.

At this point the incident became a recovery effort to remove Lieutenant Kelley from the collapse zone. During this time, other Technical Rescue Units arrived on the scene. This included H-1 (Safety Chief), Engine Companies 28 and 10, Tower Ladder Companies 10 and 3 and H-6 (Collapse Support Unit). Upon arrival, all Technical Rescue Units were respectively ordered by the IC to stabilize the exterior wall and interior of the building with specialized shoring and cribbing, establish a collapse zone and shut down the building's services. Shutting down the building's services required additional manpower to check all elevators and to rescue any trapped occupants. (See Photos 13 and 14).

Photo 13

Photo 14

At 1456 hours, the IC was notified that occupants were trapped in the elevator on the fourth floor of the building. At 1511 hours while in the process of attempting to free said occupants, an Engine 28 firefighter injured his ankle, which required him to be removed from the building and transported to the hospital.

At approximately 1515 hours a Unified Command Post was established with the BPD and BEMS to coordinate all tactical operations and to control any information that would be disseminated to the media. Other agencies that the IC requested to respond to the scene were the Massachusetts Bay Transit Authority (MBTA), The City of Boston Building Department, The City of Boston Inspectional Services Division (ISD) and a tow truck company. The IC also requested that the Building Department have a structural engineer respond in order to evaluate the integrity of the building, to assist the Technical Rescue Team/ Structural Collapse Units in their recovery efforts, and to provide technical advice for shoring up the structure to remove Ladder 26.

At approximately 1625 hours the IC called the FAO and requested that the BFD Critical Incident Stress Management Team (CISM) respond to the incident. At approximately 1626 hours Lieutenant Kelley was removed from the apparatus by off-duty Ladder 26 members who had arrived on scene. Lieutenant Kelley was then placed into a BEMS ambulance and transported to the Office of the Chief Medical Examiner.

NOTE: According to The Commonwealth of Massachusetts Medical Examiner's Certificate of Death, Lieutenant Kelley died from blunt force traumatic injuries to the head within minutes of initial impact.

BFD Technical Rescue Team members then conferred with structural engineers to discuss various options and methods of how to safely secure and shore the interior of the affected building. Tasks and objectives such as selective removal of debris, shoring and construction were identified and approved by the engineers prior to presenting a plan of action to the IC.

Once the plan was reviewed by the Safety Chief and approved by the IC, the removal of Ladder 26 proceeded. Under the direction of the structural engineers, two tow trucks were used to lift the fire truck, and then cribbing was placed underneath Ladder 26 to steady it. This was done to allow the tow truck operators proper clearance to safely walk Ladder 26 out of the building and down a slight incline to level ground. Once the apparatus was removed from the building at approximately 2340 hours, the tow truck operators manually caged Ladder 26's rear brakes, so that said vehicle's wheels could roll freely. Upon properly securing the apparatus, the tow truck operators then transported Ladder 26 to a secured MBTA storage garage at 238 Southampton Street at approximately 0015 hours on January 10, 2009.

NOTE: In order to facilitate the safe towing of L-26, the truck's front bumper and power steering mechanism were removed prior to towing. These two parts, along with other loose debris from L-26, were subsequently placed into the rear of a pick-up truck owned by a management company for the Mission Park Development. L-26 and the pick-up truck were then both transported to the MBTA facility under BPD escort.

The final step was to secure the premises so that it would be safe for private contractors and building management to enter and make the necessary repairs to bring the building's utility services back on-line. Loose debris, partitions and glass windows were cleaned out and removed, and the building's lintel support was checked and secured.

At 2146 hours the IC requested a detail assignment of one District Chief and one Engine Company. Due to extremely cold temperatures, the IC ordered that an assigned fire detail be rotated every two hours. The District 8 Chief and Engine 33 were dispatched and upon their arrival, briefed on the current status of the operation by the IC.

Following the briefing at 2239 hours, the Deputy Chief transferred incident command to the District 8 Chief and returned to quarters. Subsequently, at 0011 hours, District 8 transferred command to District 3, who remained on scene with Engine 51 until being relieved by District 10 and Engine 52 at 0212 hours. Upon clearing the scene and returning to quarters, District 10 officially terminated the incident at 0330 hours on January 10, 2009.

VII. ACCIDENT CAUSE AND DETERMINATION

At 1432 hours on January 9, 2009, the brakes on Ladder 26 failed, resulting in a crash that injured three firefighters and caused the line-of-duty death of Fire Lieutenant Kevin M. Kelley. The fact that the brakes failed is not in dispute; but there remain several questions to be answered. What made the brakes fail? Were there any identifiable factors that through act or omission to act could have contributed to or prevented the accident? The Board members are not experts in fire apparatus or air brake systems. They used information provided to them by experts and from interviews, maintenance and training records, consensus standards, professional manuals, Standard Operating Procedures/Guidelines from the fire departments of three comparably sized cities, and information found on the Internet, in attempting to produce a rational explanation for the cause of the accident.

Three independent forensic analysts retained respectively by Boston Firefighters' Local 718, The National Institute for Occupational Safety and Health (NIOSH), and The Suffolk County District Attorney's Office (DA's Office) recorded in their reports, expert opinions, primarily on the braking system of Ladder 26. The Board reviewed each of these reports. Where differences in their opinions were identified as being significant, The Board noted said differences below. The opinions of all three experts were generally consistent. The following are the causal findings of The Board's investigation.

All references to Ladder 26 (L-26) specifically refer to the apparatus assigned to that company on January 9, 2009; a 1995 Emergency-One Hurricane Four Door Tilt Cab, 110 foot Aerial Ladder, with a front gross axle weight rating (GAWR) of 18,700 pounds and a rear GAWR of 30,250 pounds, with a total gross vehicle weight rating (GVWR) of 48,950 pounds. The vehicle was equipped with an Allison Model HTB-741 four-speed automatic transmission with a retarder system. Vehicle Identification Number (VIN) 4ENDABA88S1004907, Massachusetts Registration FIRE 3710. The state inspection sticker was current with a date of March 28, 2008.

NOTE: The aforementioned retarder system is activated by means of a dashboard-mounted switch and is not operational when the transmission is in the neutral position.

A. Brake Analysis

On March 27, 2008 an outside vendor performed a considerable amount of maintenance/repair work on L-26. The work consisted of replacing tie-rod ends; drag link ends; king pins; rear springs; rear brake drums, shoes, and hardware; front disc brake pads; radiator work; and a front end alignment. The automatic slack adjusters, rotors, and air chambers were not replaced at that time. According to Boston Fire Department (BFD) maintenance records, this was the last brake job L-26 received before the date of the accident. The last brake adjustment occurred on May 16, 2008.

Of the 287 days that elapsed from the date of the last brake job until the date of the accident, L-26 was out-of-service for 44 days and in-service for 243 days. L-26

responded to 2394 incidents during those 243 days. All of the chauffeurs of Ladder Co. 26, who were interviewed by members of The Board, indicated that they had experienced no recent problems with the brakes on L-26.

L-26 was towed from the accident scene to the MBTA Transit Police facility at 238 Southampton Street, where it was garaged in a secure location. According to witnesses who observed L-26 being removed from the building by wrecker, both of the rear wheels were offering some resistance (i.e. dragging). The spring brakes were engaged but not to the extent that both brakes were continuously locked, indicating the brakes were out of adjustment. The rear brakes were caged prior to transport, i.e. the spring brakes were manually released with caging bolts. The front wheels are not equipped with spring brakes. Caging the brakes allows the wheels to turn freely. Three days elapsed between the time that L-26 was transported and the rear brakes were disassembled for analysis.

During the analysis performed by the forensic analyst retained by the DA's Office, L-26 was weighed. The front axle weight was recorded as weighing 16,100 pounds. The rear axle weight was recorded as weighing 29,150 pounds. Both of these readings are within the respective GAWR's.

The forensic analyst retained by the DA's Office noted that the left rear brake was covered in rust. (See Photo 15)

Photo 15

Photo 16 shows that the left rear leaf springs and air chamber were covered in rust as well.

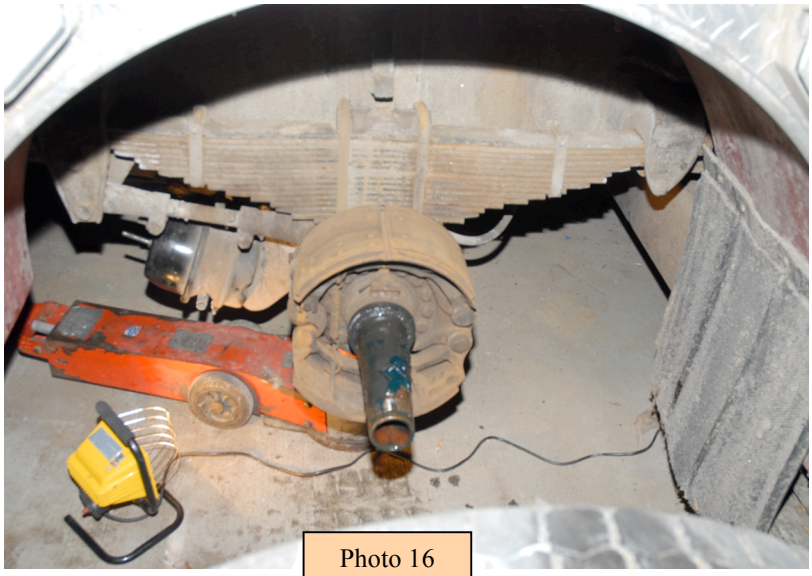


Photo 16

The forensic analyst retained by the DA's Office did not mention rust on the right rear brake in his report. (See Photo 17).

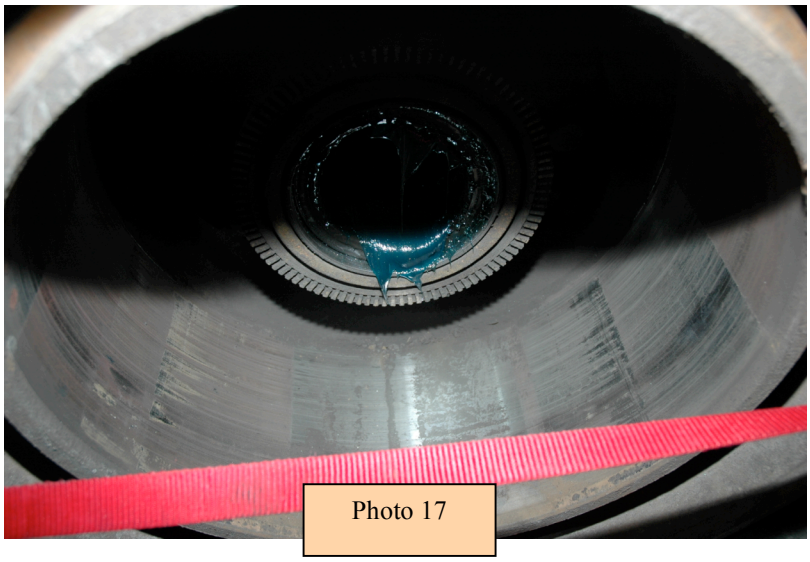


Photo 17

Photos of the right rear leaf springs show lesser amounts of rust.
The right rear air chamber shows no signs of rust. (See Photo 18).

Photo 18

An observation, regarding the left rear brake, made by the independent forensic analyst that was retained by Boston Firefighters' Local 718 (L-718) and printed in *"Special Report for The Boston Firefighters Local 718 Ladder 26"* states in part:

> *"The interior of brake drum was covered with rust and was pitted. It showed absolutely no signs of wear. The brake shoes appear that they have never been used.....Prior to the accident, it is apparent that a brake job had been done by a person or persons unknown and the brake at this location might have worked for a few applications and then never worked again."* [1]

[1] See Craven, Ralph. "Special Report for the Boston Firefighters' Local 718, Ladder 26." 21 Jan. 2009.

The Board believes that the measurements taken and explained below, contradict the position of the independent analyst, specifically with respect to the statements: *"The brake shoes appear that they have never been used."* and *"...the brake at this location might have worked for a few applications and then never worked again."* [2]

NOTE: The Board recognizes that L-718's independent analyst was limited in the scope of his investigation, as he was relegated to the status of observer only. The BPD and the DA's Office had classified the accident as a crime scene. This prevented anyone, other than those authorized, from handling the evidence. The independent analyst did not have access to the measurements at the time of his investigation.

With respect to the rust and the L-718 independent analyst's statement, *"It showed absolutely no signs of wear."* [3] The Board's investigation found these facts: 1.) Salt-loaded road spray speeds the process of rusting on iron and iron dust commonly found on brake parts; 2.) Conditions on the roadways of the City of Boston that time of year were conducive to salt-loaded road spray; 3.) Rust can develop in a matter of days under the right conditions.

The Board concluded that lacking scientific analysis of the accumulated rust, observation alone is not an accurate indicator of elapsed time. However, based upon the additional opinion of two other experts, the left rear brakes were not working for an undetermined amount of time prior to the accident.

NIOSH also retained the services of an independent forensic analyst who operates an emergency response vehicle repair facility in the Midwest and is affiliated with the NFPA 1071 Standard for Emergency Vehicle Technician Professional Qualifications Committee. He began his investigation on Tuesday, February 3, 2009. He was given permission by the BPD and the DA's Office to handle and examine the evidence. On February 5, 2009, he took measurements that indicate the pads on both rear brakes wore down at approximately the same rate. The left rear brake pads showed slightly less wear than the right rear brake pads. This fact was subsequently reported in his findings that were sent to NIOSH. Twelve measurements were taken with a caliper on each of the four rear brake pads.

NOTE: Of the measurements taken from the right upper shoe, only eight were recorded.

The overall thickness of the rear lower brake pads averaged .558 inches with an average deviation of + .050 inches between the two pads, i.e. left lower vs. right lower pads. The overall thickness of the rear upper brake pads averaged .584 inches with an average deviation of + .022 inches between the two pads, i.e. left upper vs. right upper pads. All of these measurements are well within the safety range, as the thickness of new brake pads is .750 inches. The measurements indicate that the pads on the rear brake shoes had worn down approximately .18 inches less than one-third their original

---

[2] Op. cit., Craven, Ralph. Pgs. 6 and 7 of 9.
[3] Ibid., p. 6 of 9.

thickness.[4] This indicates that the brake shoes, i.e. the pads (linings) on the brake shoes, did show signs of wear and had in fact been used.

NOTE: Measurements taken by the forensic analyst retained by the DA's Office were slightly different than those referenced above.

NIOSH's independent analyst also observed the rust in the left rear brake drum and stated in his notes:
"The left rear drum was completely rusted with rust flaking off the braking surface. This indicates that the brakes were not touching the drum on the left rear wheel." He also made note of the following: *"We would have expected to see much more wear and overheating on the right rear brake linings since the left rear was not braking at all."* [5]

Based upon the slight difference in the measurements of the rear brake linings taken by both the DA's Office and NIOSH's independent analysts, The Board concluded that in the past, and since the last brake job, both of the rear brakes did work; but, the left rear brake was not in working order the day of the accident. Although the slight difference in the measurements of the respective brake shoe linings would suggest that the left rear brake had not been in working order for a relatively short, undetermined, period of time, comments recorded by the expert forensic analysts suggest otherwise.

NIOSH's independent analyst also inspected the front disc brakes and noted:
"The rotors did not show signs of overheating, but did have slight heat stress cracks, which would be considered normal." [6]

A disc that has been subjected to extremely high temperatures, which may be caused by continued hard stops or by brake system imbalance, will first show signs of blueing. If that condition is not corrected, it can result in the development of a martensite condition or cause the disc to crack.

Based upon the stated opinion of experts, and the lack of "blueing," The Board concluded that the front disc brakes: 1.) Were not imbalanced and 2.) Had not been providing a disproportional amount of L-26's overall braking capability. But, both front brakes were out of adjustment and incapable of providing maximum braking capacity.

---

[4] See Wilde, Stephen. Ladder 26 Investigative Findings on Brakes by NIOSH Expert. 2, 3 Feb. 2009.
[5] Ibid., p. 6.
[6] Ibid., p. 4.

Reports issued prior to the date of the accident by the National Transportation Safety Board (NTSB)[7], NIOSH[8], and warnings issued by the International Association of Fire Chiefs (IAFC)[9] were reviewed by The Board and gave cause to investigate the matter of adjusting automatic slack adjusters (ASAs). The Board could find no evidence that any of the aforementioned reports or warnings were ever brought to the attention of any member or members of the Maintenance Division. The forensic analyst retained by the DA's Office disassembled the left rear automatic slack adjuster for inspection and noted in his report titled *Boston Fire Department Ladder 26 Motor Vehicle Autopsy Investigative Report*:

"*The inspection of the left rear automatic slack adjuster revealed that the pawl pull assembly engagement teeth had been stripped due to improper attempts to adjust the slack adjuster….While the slack adjuster would remain functional in rotating the s-cam, the automatic adjusting feature was destroyed due to the damaged condition present."* [10]

The forensic analyst retained by NIOSH had also recommended that the rear slack adjusters be disassembled and inspected.

Based upon the recorded opinion of experts, The Board determined that an unidentified person or persons, at one or more times, during the time period of October 31, 2005 (date of the last installation of ASAs) and January 9, 2009, improperly attempted to adjust the left rear slack adjuster. The ASA was subsequently unable to automatically adjust the left rear brake, which resulted in the left rear brake being out of adjustment, causing nonexistent braking of the left rear wheel on the day of the accident.

The Board's examination of maintenance invoices showed that at various times, replacement parts installed by outside vendors were different than those that were removed, and did not meet the manufacturer's specifications. Invoices show that the mixing of after-market parts that did not meet manufacturer's specifications with parts that did meet those specifications started as far back as January 15, 1999. Three items that are of particular concern are rear air chambers, rear brake shoe linings, and rear brake drums. The rear air chambers removed from L-26 were type 30/36. As shown below in *Section IX, Item #8 of Findings and Recommendations: Outside Vendors*, the manufacturer's specifications call for type 36/36 chambers. The required brake drums are "Severe Duty" type, whereas the brake drums removed from L-26 were "Heavy Duty" type. The brake shoe linings installed on L-26 were not the recommended extended service type.

---

[7] See National Transportation Safety Board. Safety Recommendation H-06-6 and 7. 15 Feb. 2006.

[8] See National Institute for Occupational Safety and Health. Fatality Assessment and Control Evaluation Investigative Report #F2001-36. 12 Sep. 2002.

[9] See International Association of Fire Chiefs. Lessons Learned from Fatal Crash. 15 Jun. 2006. [Online] Available. http://www.iafc.org/displayindustryarticle.cfm?articlenbr=30820

[10] See Chase, Brian F. "Boston Fire Department Ladder 26 Motor Vehicle Autopsy Investigation Report with Addendum A". 12 May 2009.

NOTE: The forensic analyst retained by the DA's Office recorded in his Report that the coefficient of friction of the brake shoes was of the wrong rating. He also noted that other brake components showed signs of excessive wear due to lack of proper maintenance, i.e. lubrication.

The Board rationalized that the improper brake shoe linings, brake drums, and air chambers individually are not exclusive factors that would have caused total brake failure.

However, along with other factors, The Board believes that improper brake chambers, improper brake shoe linings, and improper brake drums could have been a contributing causal factor in the accident, synergistically having been incapable of providing maximum braking capacity at a time when it was most needed. Also, based upon the opinion of an expert, both *" left and right diaphragms were bottoming out at the extent of travel within the air chamber housing resulting from brake application while mounted on the vehicle, limiting brake application at the right rear and preventing brake application at the left rear."*[11]

During the clean up of the accident area on January 10, 2009, a valuable piece of evidence was not recovered. This piece of evidence was a part of the air brake system, dislodged from under the front bumper of L-26, and is referred to as an "air dryer." The purpose of the air dryer is to remove moisture from the air brake system. Maintenance records indicate the last time the desiccant cartridge on the air dryer was changed was on March 10, 2006, making the cartridge 2 years and 10 months old. As stated below in Section IX, Item #13 of Findings and Recommendations: Rules and Regulations, air tanks on BFD apparatus had not been routinely drained, and L-26 was no exception. The Boston Firefighters' Local 718 independent analyst observed and noted in his report: *"The air tanks were inspected and when the petcocks were removed from the tanks, a black oily liquid puddled on the floor."* [12] (See Photo 19).
Due to damage to the air system incurred during the accident, the air supply on L-26 was depleted.

Photo 19

[11] Op. cit., Chase, Brian F. pgs. 26 & 30.
[12] Op. cit., Craven, Ralph p. 6 of 9.

With no air dryer and desiccant cartridge to analyze, there is no way to determine if the cartridge had outlived its useful life allowing moisture to build up in the tanks of L-26's air brake system. Since the black oily liquid was not retained for measurement and/or analysis, the exact volume and chemical composition was also not able to be determined.

NOTE: The forensic analyst retained by the DA's Office made reference to the air compressor of L-26 in his report: *"The subsequent research of the repair history of Ladder 26 revealed no record of service whatsoever for the air compressor since the vehicle was owned by the Boston Fire Department - despite the engine hours of 13,925.4 and the fact that the ladder truck was some 13-14 years old at the time of the crash."* Regarding the lack of maintenance he states: *"When neglected, and due to wear, the air compressor becomes less and less efficient - to the extent that blow-by occurs. Such a condition, whereas compressed air passes by the piston ring and oil is forced into the air system, results in increased and insufficient air pressure build time by the compressor, saturated and ineffective air dryer desiccant, and oil saturated air brake chamber diaphragms – a potentially unsafe condition."* [13]

Based upon these observations, The Board concluded that it was probable that L-26's air tanks contained moisture. There was also evidence that excessive amounts of oil had leaked into the air brake system from a malfunctioning air compressor and collected in the air lines and air tanks. The oil most certainly would have had a detrimental effect on the operation of the air dryer's desiccant cartridge.

According to his testimony, the driver, in an attempt to stop L-26 while it was traveling down Parker Hill Ave., stated that he activated the parking brake. The BPD interviewer asked: *"And no response? There was no slowing of the vehicle?"* The driver's answer: *"Nothing."* The driver was also asked: *"So, you didn't hear any alarms or see any flashing lights relative to air pressure?"* The driver's answer: *"I did not."* [14] Information provided by two of the aforementioned forensic analysts determined that while limited, the right rear brake was still operational. The forensic analyst hired by the DA's Office bench tested the "Park Brake Control Valve" and found that it: *".... allowed for manual release at 48 PSI* (pounds per square inch) *air pressure, and provided automatic application at 30 PSI of air pressure."* [15] It operated, on the bench, as it was designed to operate. There was no evidence, i.e. tire marks, on Parker Hill Ave. to indicate that the right rear wheel locked, even if for just a moment.

NOTE: During inspection of the area, after the accident, truck tire skid marks were found on Parker Hill Ave. Further investigation determined that Ladder 26 did not make them. Due to their location on the roadway, it was established that the skid marks in question had to have been laid down by another truck.

---

[13] Op. cit., Chase, Brian F. pg. 31
[14] Ibid., p. 10.
[15] Ibid., p. 33.

Based upon the driver's testimony, the results of the bench test on the park brake control valve, the lack of an audible and/or visual low air warning signal, and the lack of tire marks on Parker Hill Ave., The Board rationalized that when manually applied, the parking brake evidently did not engage. Also, the air pressure on L-26 did not drop below 30 PSI, thereby prohibiting the parking brake from automatically engaging until after the crash when L26's air supply was totally depleted.

The temperature in Boston on January 9, 2009 was slightly below normal. The mean temperature for the day was 25°F; winds were out of the west-northwest at 16 miles per hour (mph), with gusts up to 30 mph, and a wind chill of about 8°F.[16] The location of the last incident that L-26 responded to, i.e. 63 Parker Hill Avenue, is open to the wind.

The Board decided that there was a probability of moisture accumulation in Ladder 26's air brake system. Along with the cold, windy conditions on that day The Board acknowledges that while it would be speculative to presume that ice had formed in a brake part or parts, such a condition, if present, could have caused total brake failure.

B. Safety Audit/Training

The issue of proper driver's training is also important. Items #2 and #17 of Section IX, *Findings and Recommendations: Apparatus Chauffeurs* and *Training*, address this subject. If proper comprehensive training had been offered and a procedure had been in place, along with other safety checks, inspection of the brakes and draining of air tanks would have been clearly identified as a daily requirement. As recently as December 2006, the subject of a safety audit was discussed within the BFD. In a letter addressed to the Fire Commissioner dated December 28, 2006, the Boston Firefighters' Local 718 President requested *"....an audit of the Boston Fire Department's safety and health program."* On January 4, 2007, The Fire Commissioner acknowledged receipt of the letter and agreed, *"....that such an audit should be conducted as soon as possible."* The Board investigated, but was unable to determine why a safety audit was never conducted. Periodic safety audits as recommended in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program, Section 2-3.2*,[17] should have been conducted every three years in order to determine that proper safety related procedures were being followed, (e.g. inspecting brakes and draining air tanks) along with the prospect that new and/or existing apparatus hazards might have been discovered prior to the accident.

The Board concluded that the lack of a recurring safety audit, proper training, and guidelines for chauffeurs to conduct daily fire apparatus safety inspections was in

---

[16] See Weather Underground. "History for Boston MA January 9, 2009." wunderground.com. [Online] Available.http://www.wunderground.com/history/airport/KBOS/2009/1/9/DailyHistory.html?req_city=Roxbury&req_state=MA&req_statename=Massachusetts

[17] See NFPA 1500, "Standard on Fire Department Occupational Safety and Health Program." National Fire Protection Association. 2007 Ed. All applicable sections.

part responsible; in that, had they been conducted, provided, in effect, and followed respectively on January 9, 2009, the occurrence of such an accident may have been reduced.

C. Maintenance

The Motor Squad, along with other responsibilities, performs basic fire apparatus preventive maintenance (PM): e.g. lube, oil and filter change, at the BFD Shop. The Board was unable to find evidence that manufacturer's specifications concerning PM were being followed. The Board has determined that there are several reasons for this: 1.) More technically difficult maintenance and repairs had to be performed by outside vendors. 2.) Fire apparatus had to be taken out of service in order for outside vendors to perform PM. 3.) There was no specified funding for PM. 4.) There was, if not in fact, at least a perception that there were limited funds available for overall apparatus maintenance, with the majority being applied to major repairs. 5.) There was no one person assigned the responsibility for overseeing a PM program. 6.) The number of members assigned to the Motor Squad experienced a steady decline from a high of 16 in 1993 to a low of 7 in 2008, leaving fewer members to perform more work, 24 hours per day, on an aging fleet. Members who left the Motor Squad due to retirement or transfer were not replaced.

- On March 24, 2004 the BFD Superintendent of Maintenance sent a Memorandum to the BFD Deputy Chief of Training & Maintenance, requesting *"....three more Motor Squad technicians and a data entry/file clerk to enter information on the maintenance performed on all Fire Department vehicles."* The Board could find no record that either request was filled.
- On September 13, 2004 the BFD Superintendent of Maintenance sent a Memorandum to the BFD Deputy Chief of Operations, Support Services requesting *"....two permanent positions to be immediately filled on the Motor Squad."* The Board could find no record that this request was filled.
- On April 26, 2007 the Deputy Fire Chief of Maintenance sent an e-mail to the Fire Commissioner, requesting that the BFD hire an experienced fleet mechanic to perform preventive maintenance on all apparatus. This request was never acted upon and the position was never filled.
- On November 15, 2007 the Deputy Fire Chief of Maintenance sent an e-mail to the Fire Commissioner requesting that the BFD change the designation of a recently retired Maintenance Division member and to assign his replacement the position of performing PM of vehicles, Monday through Friday. The request was never acted upon and the retired member's position was left unfilled.

The Board found one clear example of how a Motor Squad reduced in size, with no member assigned the specific responsibility to oversee preventive maintenance, may have resulted in an avoidable collision. Reference is made to Appendix 'A' *Ladder Company 26 Brake Maintenance History,* Items 19, 21, 22 and 24 through 28 inclusive:

(22) On January 24, 2006 the rear brakes of L-26 were adjusted.

[(19) The most recent replacement of rear brakes and drums previous to that date took place on December 2, 2004].

(24) On March 23, 2006, two months since the last brake adjustment, all of the brakes were adjusted.

[(21) The most recent replacement of front brakes previous to that date took place on October 31, 2005.]

(25) On July 1, 2006, three months and seven days since the last brake adjustment, the rear brakes were adjusted and a notation was made, "Will need rear shoes soon."

(26) On July 9, 2006, eight days since the last brake adjustment, the rear brakes on L-26 were adjusted and a notation was made, "needs brake-job soon."

(27) On August 7, 2006, 29 days since the last brake adjustment, brakes were adjusted and a notation was made, "Need brakes ASAP."

(28) On August 22, 2006, 15 days since the last brake adjustment, the brakes failed. L-26 struck a building and was subsequently placed out of service.

The Board concluded that lack of a proper preventive maintenance program based upon manufacturer's specifications; lack of experienced/certified fleet mechanics to perform the more technically advanced preventive maintenance; lack of a member assigned with the specific responsibility to oversee preventive maintenance; and lack of specified funding to finance a PM program were all contributing factors; in that, had a program, specified funding, and personnel been in place, the accident may have been avoided.

VIII. TRAINING RECORDS

Fire Lieutenant Kevin M. Kelley and the apparatus chauffeur working the day tour of duty on January 9, 2009 were both assigned to Ladder Company 26. Their annual BFD training consisted of Back to Basics, the Maze Drill, Rapid Intervention Team (RIT) and EMS First Responder certification.

Back to Basics is a drill that consists of fire companies practicing running hose lines and raising ground ladders during live fire exercises conducted at the BFD's Fire Academy burn building at Moon Island. The operation and placement of aerial ladders is also an evolution that is practiced during this program.

The Maze Drill is a search and rescue exercise, the primary purpose of which is to build a firefighter's confidence in their personal protective equipment (PPE), which includes a helmet, fire coat, gloves, bunker pants, boots, self contained breathing apparatus, flashlight, and a personal alert safety system device. Conducted inside a specially built trailer set up with man-made obstacles, it is a training evolution that is designed to teach the firefighter various survival tactics should they become separated from their crew and trapped by fire and/or building collapse.

RIT training is a sixteen-hour program that was designed to instruct and drill firefighters on mayday protocols, self-survival skills, and operating procedures that are utilized on the fireground to rescue a fellow member or company in distress. RIT training consists of proper operation of the RIT bag, members' duties and functions, search and rescue of a missing or disoriented firefighter, establishing an air supply for the member, radio procedures, multiple team extrications and rope management.

EMS First Responder is an annual refresher program that includes training in first aid, basic life support (BLS) and cardiopulmonary resuscitation (CPR), including the use of an automatic/semi-automatic external defibrillator.

The recent training history for Fire Lieutenant Kevin M. Kelley includes the following:

<u>2008</u>
Lethal Exposure
Bullard Thermal Imaging Essentials
Back to Basics
EMS Refresher Course

Upon being appointed to the BFD as a Firefighter-on-Probation (FFOP), FLT. Kelley was detailed to the Department's Moon Island Training Academy from December 6, 1978 to February 14, 1979. Subsequent to graduating Drill School, FLT. Kelley was assigned to Ladder Company 8 on February 17, 1979.

NOTE: Due to a change in the BFD's record keeping system, The Board was unable to document any additional training that Fire Lieutenant Kelley received prior to 2008.

The recent training history for Ladder 26's chauffeur includes the following:

2008
Back to Basics
Hazardous Materials Incident Management

Upon being appointed to the BFD as a FFOP, Ladder 26's chauffeur was detailed to the department's Moon Island Training Academy from April 24, 2007 to July 27, 2007. As a new recruit, Ladder 26's chauffeur participated in an intensive 14-week, 560-hour training course that included the following curriculum:

General Academic Classes – Consists of listening to lectures, watching audio/visual materials, taking notes, studying prepared tests and handouts and successfully completing periodic written and oral examinations. There are weekly examinations and a 70% average must be maintained by the third week for a new recruit to continue training at the Academy.

Physical Fitness Training – Consists of vigorous physical exercise sessions, such as stretching, aerobic activity and running.

Firefighting Skills Training Operations – Consists of climbing, lifting, lowering, carrying and operating all types of firefighting tools, ladders, equipment and apparatus, frequently under simulated emergency conditions during timed evolutions, and successfully completing periodic practical skill examinations. Other scenarios include, but are not limited to, search and rescue operations, thermal imaging and portable fire extinguisher use, survival suit applications, automobile fires, structural fires, gas fires and hazardous material incidents. All of these activities are performed while wearing heavy fire protective clothing and self contained breathing apparatus (SCBA) in confined space areas.

Live Firefighting Training – Consists of carrying and dragging lines of hose and operating hose nozzles and related equipment during actual fire extinguishing activities while wearing heavy fire protective clothing and SCBA in the presence of smoke, heat and gases within confined space areas.

New firefighter recruits are also required to pass an Emergency Vehicle Driver's Training Program that includes 8 ½ hours of classroom training and a practical "hands on" driving test consisting of eight various evolutions. Said program is described in greater detail under *"Apparatus Chauffeurs,"* in the *Findings/Recommendations* section of this Report.

In addition to the above, the only other formalized driver's training that Ladder 26's chauffeur had on the BFD was driving the apparatus back to quarters from incidents in a non-emergency mode, under the supervision of a company officer. This specific training started in November, 2007 and continued intermittently until August, 2008, at which time L-26's chauffeur completed his probationary requirements and was allowed to drive the apparatus to emergency responses as a permanently appointed firefighter.

NOTE: Based on BPD/DA's interviews, Ladder 26's chauffeur stated that he had driven the apparatus at least a total of 10 twenty-four hour tours of duty he worked from August, 2008 to January, 2009, prior to the date of the accident. He also estimated that he had driven Ladder 26 to at least fifty emergency calls and had never experienced any problems with the apparatus' brakes during this period of time.

Prior to being appointed to the BFD, Ladder 26's chauffeur served active duty as a firefighter in the United States Air Force (USAF) from August, 2003 to December, 2006. He attended the Department of Defense (DoD) Fire Academy from October 2003 to January 2004 and successfully attained Firefighter I and II, Aircraft Rescue Fire Fighting (A.R.F.F.), Hazardous Materials Operations and Hazardous Materials Technician certification. In addition, Ladder 26's chauffeur also stated that he had driven a fire engine pump with an air brake system upon being activated by the USAF Reserves from January, 2008 to June, 2008.

IX. FINDINGS AND RECOMMENDATIONS

1. ACCIDENT REVIEW POLICY

The current motor vehicle accident review policy of the Boston Fire Department (BFD) can be found in Standard Operating Procedures[18] (SOP) #22 *Department Motor Vehicle Accidents.* SOP #22 is a poorly written, outdated document, which makes reference to other documents i.e. R&R 22.1, and SOP 22.13 that do not apply.

SOP #22.12 states in part: *"The Deputy Fire Chief of the Division on duty where the accident occurred shall, within ten days, conduct a hearing…"* Information on the past driving record of the apparatus chauffeur, that should be available, in order to conduct a thorough hearing, does not exist. Also, the present guideline indicates that a hearing shall be conducted for all accidents. The Board believes that this policy as written is impractical and that it is unnecessary to conduct a hearing for every accident.

It is recommended elsewhere in this document that SOP #22 be updated.

The Board further recommends that the Accident Review Policy written as part of SOP #22 include:

1.1 Specific guidelines as to when a hearing should be conducted.

1.2 The BFD should consistently enforce their "Accident Investigation Policy and Procedure."

NOTE: (Terminology within the BFD refers to a motor vehicle accident involving a department vehicle as a "Code A.")

The Board also recommends:

1.3 That every "Code A" be assigned a separate incident number by the Fire Alarm Office.

1.4 That the Officer or Senior Firefighter-in-Charge of the unit involved in the "Code A" be responsible for completing the National Fire Incident Reporting System (NFIRS) Report.

1.5 That the BFD review and update all Accident Reporting Forms.

[18] See Boston Fire Department Standard Operating Procedures. Current series.

1.6 That the BFD establish an accident information database containing:

- The incident number of the accident.
- Chauffeur's name.
- Apparatus involved (Identified by both its property number and Company number [Refer to Recommendation #6.1]).
- Location of accident.
- Equipment failures, if any.
- Estimated total cost of damage to all vehicles.
- Extent of any injuries associated with the accident.
- Any additional information determined necessary for future use.

1.7 That the information in the accident investigation database be made readily available to all Deputy Fire Chiefs.

1.8 That all BFD members, not only the driver, who are involved in any vehicle accident that results in personal injury and/or fatalities should be required, in addition to completing a Form 5A, record their own personal notes regarding the incident prior to speaking with any outside entity.

1.9 That the BFD take the corrective action necessary to avoid repetitive occurrences of accidents.

2. APPARATUS CHAUFFEURS

The ability to drive a motor vehicle is dependent upon many factors. Education, training, experience, coordination, depth perception, spatial awareness, and vision are some of these factors. In the case of driving a piece of fire apparatus during emergency responses, an individual's ability is tested to even greater limits than while driving a smaller vehicle under non-emergency conditions. There is more to a chauffeur's responsibility than to arrive at an incident scene intact. Once on the scene, the chauffeur must be able to operate the apparatus efficiently and safely.

The present system that was in place on January 9, 2009 on the Boston Fire Department (BFD) concerning fire apparatus chauffeurs is problematic in many respects. Massachusetts General Laws [19] (MGL) exempts firefighters from the requirement of testing for and obtaining a Commercial Driver's License [20] (CDL). Other than the requirement to be *"in possession of a motor vehicle driver's license,"* [21] the standard to which any given chauffeur is expected to aspire, with respect to ability, is subjective and determined only by the chauffeur's company officer. There are presently no substitute requirements to take the place of those listed in the CDL Manual. This problem is exacerbated in that there is no training provided by the BFD or requirements within the promotional system that trains or tests a company officer's ability to determine if a chauffeur is qualified. The only formal driver's training received by members of this Department is The VFIS Emergency Vehicle Driver's Training Program [22] that is conducted while firefighters are in drill school and consists of:

Classroom Day One:

Module 1 – Introduction	1 Hour
Module 2 – Extent of Problem	1 Hour
Module 3 – Personnel Selection	1 Hour
Module 4 – Necessity of SOG's	30 Minutes

Classroom Day Two:

Module 5 – Legal Aspects	1 Hour
Module 6 – Vehicle Dynamics	1 Hour
Module 7 – Vehicle Inspections	1 ½ Hours
Module 8 – EVOC/Safety	1 ½ Hours

Total Classroom Training – 8 Hours 30 Minutes

[19] See Massachusetts General Laws Chapter 90: Section 13A Seat belt use required; Exemptions; penalty.
[20] See Commonwealth of Massachusetts Registry of Motor Vehicles. Commercial Driver's License Manual, Section 5. "Air Brakes". Pp. 5.1 – 5.11. Revised, Sep. 2008.
[21] See Boston Fire Department, Rules and Regulations. 1 Jun. 1997.
[22] See Klein, Louis J.; Lane, Stephen C.; Steffens James T. "Emergency Vehicle Driver Training Program." Participant Manual. 1997 VFIS (Rev. 10/2000).

This is followed by the Emergency Vehicle Operator Competency Course (EVOC), which includes a driving test that emphasizes the following evolutions:

1) Straight Line: Driving forward and reverse for a distance of 200 feet each way.
2) Confined Space: A 100 by 50 foot area where a three-point turn is negotiated.
3) Alley Dock: Where the vehicle is backed into a simulated dock that is 10 feet wide and 30 feet deep.
4) Serpentine: A 200 by 50 foot area where the vehicle is driven forward and in reverse through a series of four cones in a serpentine fashion.
5) Offset Alley: Includes maneuvering through two 10 foot wide alleys that are offset by 10 feet and spaced 48 feet apart.
6) Parallel Parking: Requires the driver to drive past and back into a parallel parking space that is eight feet longer than the vehicle being parked.
7) Diminishing Clearance: A 100-foot long evolution that gradually narrows over its entire length to a final width of eight feet and two inches.
8) Stop Sign.

The EVOC Competency Course is a basic program conducted on a level driving surface. There is no advanced training provided to address panic stopping on wet or dry surfaces, driving in traffic, or handling the vehicle on steep grades.

A written exam is also given at the Fire Academy. All continuing driver's training is done on-the-job after a firefighter has been assigned to a company and is then conducted under his/her company officer's guidance.

The BFD began a driver's training program around 1991. It consisted of one-hour of classroom instruction, followed by a "hands-on" course that was similar to the one described above. The course also consisted of a section that included traveling down a steep incline, shifting the apparatus into lower gear and braking to a stop. Every BFD fire company conducted this training, and remedial driver's training was offered to those companies who either needed and/or requested it. The course ran for approximately six months and was then discontinued for reasons The Board is unable to determine.

The Board's investigation found this to be the only time that apparatus chauffeurs were given instruction on downshifting transmissions to a lower gear while traveling down a steep grade. The Board also determined that no effective training has been given on the proper use of transmission retarding devices.

Chapter 16 of the Rules and Regulations of the Boston Fire Department [23], titled *"Apparatus Chauffeurs,"* is ambiguously written and provides little guidance as to the duties and responsibilities of a chauffeur. There is no specific Boston Fire Department Standard Operating Procedure (BFD/SOP) [24] that addresses responsibilities or expectations of apparatus chauffeurs. *BFD/SOP No. 13, "Response To Fires And Other Emergencies"* lists several requirements for apparatus chauffeurs, but it also is vaguely written and lacks comprehensive detail. For example, SOP 13.8 states: *"Chauffeurs shall*

[23] Op. Cit., BFD/R&R 1 Jun. 1997.
[24] Op. Cit., BFD/SOP. Current series.

be alert at all times so as to avoid accidents and shall maintain full control of the apparatus. Every effort must be made to avoid accidents." In neither of the aforementioned documents is any reference made as to how a chauffeur would check to see if any of the safety requirements listed in the CDL Manual are being performed.

The number of different chauffeurs who drive and operate the fire apparatus poses another problem. Depending upon the company, any number from 12 to 16 or even 20 different firefighters could be driving a single piece of apparatus. This presents a situation where individual chauffeurs do not feel personally responsible for the apparatus.

There are currently no guidelines that prevent a firefighter on probation (FFOP) from being allowed, or in some cases, required to drive and operate a piece of fire apparatus when they have less than one year's experience on the job and/or have not achieved a given level of training.

Based upon all of the foregoing apparatus chauffeur related factors, The Board makes the following recommendations:

2.1 Establish the position of Apparatus Engineer. The position of Apparatus Engineer shall be filled by members who have been provided appropriate training and have passed a skills test on the operation and driving proficiency of both pumper and aerial apparatus, based upon the appropriate sections of NFPA 1002, *Fire Apparatus Driver/Operator Professional Qualifications.*[25]

2.2 Develop a refresher program for Apparatus Engineers and require that all Apparatus Engineers attend annually in order to retain their title. The recertification program should be based on the following items:

- Actual emergency vehicle driving experience, both during emergencies and non-emergencies.
- Observed proficiency and supervisory reports relative to performance in the field.
- Length of time since last recertification.
- Introduction of new emergency vehicles.
- Introduction of new technology on existing emergency vehicles.

2.3 Assign a minimum number of Apparatus Engineers to each company, with an added goal of providing coverage for Apparatus Engineers who are on extended leave.

2.4 Include the Deputy Fire Chief of Training and the Joint Safety Committee in all reviews and recommended improvements to its current apparatus operator training program.

2.5 The BFD should develop and implement a comprehensive driver's training program that includes:

- Classroom instruction.

[25] See NFPA 1002, "Standard for Fire Apparatus Driver/Operator Professional Qualifications." National Fire Protection Association. 2003 Ed. All applicable sections.

- Hands on basic vehicle control.
- Emergency vehicle defensive driving operation.
- Pre-trip vehicle walk-around safety inspection [(i.e. 360° Commercial Driver's License (CDL) "Circle Check")] after members are properly trained.

2.6 Members who have successfully completed the requirements as set forth in item 2.5 shall be qualified to cover the position as Acting/Apparatus Engineer when said Apparatus Engineer is on vacation and/or on any other leave of less than four tours. A qualified Apparatus Engineer should cover leaves of greater than four tours other than vacation.

2.7 All on-the-job driver's training should be conducted under the guidance of either a qualified Apparatus Engineer or a qualified member of the Training Division.

- Under no circumstances should a chauffeur trainee be allowed to drive a piece of apparatus while responding to an emergency.

2.8 Establish a minimum time period of one year before firefighters on probation are allowed to drive apparatus while responding to an emergency.

2.9 The BFD should develop and issue an SOP outlining the specific maintenance and safety requirements to be conducted by Apparatus Engineers. The intervals at which these maintenance and safety requirements are to be performed (i.e. daily, weekly, monthly etc.) should also be defined.

2.10 At a minimum, and on each day tour of duty, apparatus chauffeurs should perform the following maintenance functions:

- Check oil.
- Check vehicle batteries.
- Check fuel level.
- Check all gauges for proper operation.
- Check tires for proper air pressure, tight lug nuts, cuts, and depth of tread.
- Drain air tanks.
- Check operation of Maxi-Brake (i.e. emergency brake).
- Check running lights and emergency warning lights.
- Clean apparatus windows, mirrors, body, etc.
- Report any and all deficiencies that cannot be corrected to the Officer-in-Charge of the company.
- Complete the apparatus check list.

2.11 Establish a weekly fire apparatus checklist.

- One copy of which shall be forwarded to the BFD Director of Transportation.
- One copy retained in the company file for a period of one year.

2.12 When the apparatus chauffeur is under the direct supervision of an officer, said officer shall also assume full responsibility for the apparatus chauffeur's actions.

2.13 Update and re-issue Chapter 16 (i.e. *Apparatus Chauffeurs*) of the BFD Rules and Regulations.[26]

NOTE: Due to the accident on January 9, 2009 the BFD has recognized the need for and has implemented a driver's training course that will be provided to all firefighters. The Board recognizes that some of the above listed recommendations may be part of this driver's training program.

[26] Op. cit., BFD/R&R. 1 Jun. 1997.

3. APPARATUS REPLACEMENT PLAN

The Board conducted a thorough examination on the status of all Boston Fire Department (BFD) apparatus. The purpose of this part of the investigation was to determine if the fire apparatus' age contributed in any way to the accident involving Ladder Co. 26, or to the potential for future accidents. The Board subsequently determined that as a general rule, there is no evidence that age alone either caused the accident or added to the potential for future accidents, but age of the apparatus did contribute in an indirect manner. As fire apparatus ages, the need for preventive maintenance (PM) with its associated costs increases and the possibility of missing that PM is what enhances the potential for part failure and apparatus breakdown.

Apparatus age is not the only factor The Board took into consideration. The number and type of incidents to which a piece of fire apparatus responds, also a significant factor, was analyzed as well. Firefighter safety is also compromised in older fire apparatus, as their design does not comply with newer NFPA apparatus safety standards. For example, on January 9, 2009 there were two open-cab front-line pieces of apparatus in service (E-54A and E-54B) and eleven open-cab reserve pieces of apparatus in service (SP-4, SP-8, SP-18, SP-52, SP-53, ST-7, ST-18, ST-19, ST-21, ST-24, ST-29).

From the late 1960's throughout the early 1980's the general condition of BFD fire apparatus was poor. The front-line fleet consisted of fire apparatus from no less than nine different manufacturers. (American LaFrance, Ward LaFrance, Mack, Sutphen, Seagrave, Maxim, Hahn, Salisbury, and Diamond-Reo). By the late 1970's some of the reserve apparatus was 30 years old. There was no apparent apparatus replacement plan in place.

Since the early 1980's the front-line fleet of apparatus on the BFD, excluding special vehicles, has consisted of 34 engines, 23 ladder trucks, and 2 heavy rescue vehicles. (**NOTE:** From January 14, 1982 to June 9, 1986 there was only one Heavy Rescue Company in the City). From the early 1980's through the end of 2008 the number of reserve apparatus varied.

In 1984, the BFD started an aggressive apparatus replacement plan that continued through 1993, 10 years inclusive. During that time period, the BFD purchased 37 engines, 27 aerial ladder trucks, 2 tower ladder trucks, and 2 heavy rescue vehicles. This provided the BFD with a front-line fleet, 10 years old or newer, along with several reserve pieces of apparatus that were 10 years old. Over that time period, the BFD purchased an average of 6.8 pieces of front-line fire apparatus per year. One additional rescue vehicle was purchased for and paid for by the Big-Dig Project. From 1984 to 1993 all of the front-line fleet and many of the reserve pieces of apparatus had been built by the same manufacturer, Emergency One (E-One). The Board believes that such a large expenditure for fire apparatus, in this short period of time, could have been avoided had an apparatus replacement plan been in place during the 1970's and early 1980's. By the end of 1993, a 10-year apparatus replacement plan had been put in place and was being implemented.

From 1994 until the end of 2008, a period of 15 years inclusive, the BFD purchased 28 engines, 14 aerial ladder trucks, 3 tower ladder trucks and 2 heavy rescue vehicles. During that time period, the BFD purchased an average of 3.1 pieces of front-line fire apparatus per year. An additional 5 engines were added to the front-line fleet, having been paid for by the Big-Dig Project. The reserve fleet of the BFD had risen to an average age of over 19 years.

The Board's analysis relative to the age of the BFD's ladder truck fleet revealed that no new ladder trucks were placed into service in 2007, 2006, 2003, 2001, 2000, 1999, or 1998. Two were placed into service in 2005, four in 2004, and one in 2002. From February 7, 1997 until July 8, 2004, a period of seven years and five months, only one ladder truck was purchased and put into service by the BFD. The Board believes that this lack of a structured apparatus replacement plan has resulted in an aged fleet. For the past three years, Ladder Co. 26 has been the busiest ladder company in the City. On January 9, 2009 the 1995 E-One aerial assigned to Ladder Co. 26 had been in service for 13 years and 6 months. During that time period, Ladder Co. 26 has responded to over 49,000 incidents.

A document, produced by the Office of the Deputy Fire Commissioner of Administration and Finance, with the heading *Boston Fire Department Apparatus Schedule*, dated January 9, 2009,[27] and reviewed by The Board, indicated that the newest reserve ladder truck was 16.14 years old and the oldest was 23.92 years old, with an average age of 19.41 years. Reserve apparatus must be maintained to the same operational standards as front-line apparatus. The Board acknowledges that on the date this Report is published, the average age of reserve apparatus will most likely be older than that referenced on January 9, 2009. That date was selected for demonstrative purposes only, and may or may not be an indication of the worst case scenario.

According to the *Report from the MMA Consulting Group Inc. dated October, 1995 on page IX-8 Recommendation 9-4* states: *"The city should develop a fifteen year capital replacement program. Major pieces of apparatus may be replaced in a shorter time span, but planning for major replacement needs a longer term perspective."* [28] Between January 1, 1997 and December 31, 2007 a period of eleven years inclusive, only eight, which is approximately one-third of the Department's 23 front-line ladder trucks, were replaced. This falls far short of the recommendations of the MMA report and clearly indicates a lack of adherence to an apparatus replacement plan.

On August 16, 1999 a letter was sent from the Fire Commissioner to the Chief Operating Officer (COO), Mayor's Office, City Hall. The letter notified the COO that the City of Boston had deviated from the previously established apparatus replacement schedule and that *"the department is behind three (3) pumps and eight (8) aerials.* (Aerial is another name for a ladder truck). *"If the city continues to disregard the schedule, it won't be long before we have to make huge expenditures to keep our fleet running."*

---

[27] See Boston Fire Department. Apparatus Schedule. 9 Jan. 2009.

[28] See Massachusetts Municipal Association Consulting Group Inc. City of Boston, Massachusetts Study of the Fire Department. Oct. 1995.

Managing Fire and Rescue Services 2002 Ed., a book published by the *International City/County Management Association,* states in part:

> *There is no national standard governing or making recommendations for the replacement of emergency vehicles. The decision is left up to each locality……The purchase of fire apparatus should be defined in a local replacement plan: fire department managers and firefighters, fleet maintenance managers and technicians, and local government managers should meet and develop a long-term plan for the replacement of fire apparatus and emergency vehicles……unless some plan exists and is implemented, the department will eventually face an accumulation of unreliable emergency vehicles and the associated effect on the budget of a large vehicle-purchase package.* [29]

On February 27, 2007 the Fire Commissioner's *Report on the Readiness of the City's Fire Fighting Apparatus* [30] was submitted to the Chief Financial Officer (CFO) of the City of Boston. The Fire Commissioner stated his concerns: *"The reserve units are very old and breakdown often bringing into question the reliability of the City's apparatus fleet."* He went on to say: *"The reserve fleet of ladder trucks is in poor material condition and the maintenance division is routinely shuffling reserve ladder trucks to keep the city's ladder companies fully operational."* Regarding the age of fire apparatus, specifically the ladder truck fleet, the Fire Commissioner's Report states: *"The material condition of the city's ladder Truck Fleet is particularly alarming. In my view, the Ladder Truck Fleet is unsatisfactory and poses a potential liability for the city.*
The condition of readiness is poor and the front line apparatus is in constant need of repair." Appendix IV of the Fire Commissioner's Report included a *"Detailed 15-Year Apparatus Replacement Plan."* At the time of that report, a request was made to the CFO for an increase in the amount of funding for apparatus from one million dollars to 1.3 million dollars, *"…to enable the Fire Department to purchase 2 Ladder Trucks as soon as possible."* [31] Subsequently, an increase to the BFD's capital budget was made in response to that request.

In the spring of 2007, at the request of the Fire Commissioner, the Fleet Maintenance Division compiled figures and submitted a report titled *Replacement Plan for Apparatus*. [32] The plan included cost estimates for replacing apparatus and for refurbishing both ladder trucks and engines.

A document reviewed by The Board, dated November 15, 2007, titled *Goals for Fleet/Facilities* [33] delineated Short Term (1 year), Intermediate Term (2-5 years), and Long Range (5-10 years) goals. A point of particular interest listed under Intermediate

---

[29] See International City/County Management Association (ICMA). Managing Fire and Rescue Services. 2002 Ed. Pg. 213.
[30] See Boston Fire Department. Fire Commissioner's Report on the Readiness of the City's Fire Fighting Apparatus. 27 Feb. 2007.
[31] Ibid., p. 5.
[32] See Boston Fire Department. Replacement Plan for Apparatus. Mar./Apr. 2007.
[33] See Boston Fire Department. Goals for Fleet/Facilities. 15 Nov. 2007.

Goals and significant to this discussion is the item: *"Continue to ask the city to aggressively replace aging fleet to bring down average age of apparatus."*

According to NFPA 1901 Standard for Automotive Fire Apparatus:

"It is a generally accepted fact that fire apparatus, like all types of mechanical devices, have a finite life. The length of that life depends on many factors, including vehicle mileage and engine hours, quality of the preventative maintenance program, quality of the driver training program, whether the fire apparatus was used within the design parameters, whether the apparatus was manufactured on a custom or commercial chassis, quality of workmanship by the original manufacturer, quality of the components used, and availability of replacement parts, to name a few."

"In the fire service, there are fire apparatus with 8 to 10 years of service that are simply worn out. There are also fire apparatus that were manufactured with quality components, that have had excellent maintenance, and that have responded to a minimum number of incidents that are still in serviceable condition after 20 years. Most would agree that the care of fire apparatus while being used and the quality and timeliness of maintenance are perhaps the most significant factors in determining how well a fire apparatus ages." [34]

Based upon the information stated above and the analysis of other fire apparatus related materials, The Board makes the following recommendations:

3.1 The BFD, at a minimum, should adopt and implement a 15-year apparatus replacement plan as suggested in the Fire Commissioner's Report dated February 27, 2007. Major pieces of apparatus may need to be replaced in a shorter time span.

NOTE: This plan, according to the Apparatus Replacement Plan updated in February 2009, starting in FY 2009 and excluding special vehicles, proposes an average purchase of 5.7 pieces of fire apparatus per year, more specifically; 3.3 engines per year; 2.2 ladder trucks per year; and .2 heavy rescue vehicles per year. The Board believes that an up-front purchase of additional fire apparatus, greater than those numbers stated above, is needed in order to reap the greatest benefits of instituting a 15-year apparatus replacement plan.

3.2 All new apparatus purchased should be equipped with engine compression brakes and transmission retarders (e.g. Jacobs Braking System or similar devices).

3.3 The BFD should conduct an analysis annually, prior to the delivery of new apparatus, to determine if apparatus assigned to busy companies should be re-assigned to companies that respond to fewer incidents. This analysis should take into consideration the age of similar fire apparatus in adjacent locations (i.e. compare pumpers to pumpers and ladder trucks to ladder trucks), and avoid placing all of the older fire apparatus in one geographical area.

---

[34] See NFPA 1901 "Standard for Automotive Fire Apparatus," Annex D.2. National Fire Protection Association. 2009 Ed. Pg. 176.

4. DEPARTMENT MECHANICS

The Board's investigation has revealed that most of the apparatus mechanics employed by the Boston Fire Department (BFD) were laid off around 1981. At that time, due to budget constraints, it was determined that members of the Motor Squad would perform maintenance duties such as changing oil, batteries, tires and lubrication etc. More complex major repairs were sent to outside vendors. The cadre of apparatus mechanics was not rehired following the fiscal crisis.

There are concerns with the manner in which the Department has used outside vendors for repairs of fire apparatus. Those concerns are addressed elsewhere in this report.

According to the Report from the MMA Consulting Group Inc. dated October, 1995 in reference to *Recommendations Relating to Equipment and Maintenance:*

"There are two alternatives available to the Fire Department: develop its own fully staffed maintenance operation, or contract for services. In our judgment, the Fire Department does not have adequate facilities for maintenance and the Fire Department should contract for services. The contract for services should be carefully designed to ensure on-call service and the development of a specific maintenance program." [35]

During the investigation and writing period of this document, it appears that the BFD management has started planning to hire mechanics to maintain the fleet of fire apparatus and auxiliary vehicles.

Regarding apparatus mechanics, The Board makes the following recommendations:

4.1 The BFD should evaluate the need for and cost benefit of expanding and reorganizing the Maintenance Division. A thorough review of fleet management practices should be conducted to identify needed improvements to fleet management policies and procedures, as well as its associated organization structure, job descriptions, staffing levels, training programs, information systems and facilities.

4.2 That a complete evaluation is conducted to determine the adequacy of the maintenance facilities available to the mechanics, as referenced in the MMA Report in the above paragraph.

4.3 That necessary equipment is purchased to bring the maintenance garage up to an acceptable standard.

[35] Op. cit., MMA Consulting Inc. p. IX-3.

4.4 That all apparatus supervisors and mechanics hired by the BFD be Emergency Vehicle Technician (EVT) certified as per *NFPA 1071 Standard for Emergency Vehicle Technician Professional Qualifications 2006 Edition.*[36]

4.5 That all non-uniformed employees of the BFD who are responsible for driving fire apparatus should be in possession of a valid Massachusetts Driver's License of the appropriate class for the vehicles they will be expected to drive.

[36] See NFPA 1071, "Standard for Emergency Vehicle Technician Professional Qualifications." National Fire Protection Association. 2006 Ed.

5. ALCOHOL/DRUG TESTING

According to the letter from the Suffolk County District Attorney to the Fire Commissioner, dated December 10, 2009, toxicology testing on the driver of Ladder 26 and Lieutenant Kevin M. Kelley "*proved conclusively that neither man was impaired by alcohol or any drug.*" [37]

Considering that alcohol and/or drugs did not contribute to the cause of the accident, The Board concluded that the information contained in the DA's Report should be listed as a finding given the comprehensive nature of this report.

Regarding alcohol/drug testing, The Board makes no recommendations.

[37] See Conley, Daniel F. Suffolk County District Attorney. Letter to Commissioner Roderick Fraser. 10 Dec. 2009.

6. DATA COLLECTION AND IDENTIFICATION OF DEPARTMENT FIRE APPARATUS AND OTHER VEHICLES

During its investigative process, The Board identified an area that needs to be addressed within the Boston Fire Department (BFD) relative to the identification of fire apparatus and other vehicles. All front-line apparatus is currently identified by its company type and number (e.g. Ladder Co. 1 or Engine Co. 7). Reserve apparatus is identified by the letters "SP" or "ST" placed in front of the former company number of the apparatus (e.g. SP 52 is a spare pump that was formerly assigned to Engine Co. 52). ST is the designation given to spare ladder companies followed by a number. While attempting to create a maintenance time line for Ladder Co. 26 from the Motor Squad log, several entries were listed as repair work having been conducted on Ladder Co. 26. Further investigation revealed that the maintenance was performed on a "spare piece" that was temporarily assigned to Ladder Co. 26. This system presents a potential problem, in that preventive maintenance and/or repairs completed on one piece of fire apparatus may be incorrectly recorded as having been completed on another piece of fire apparatus. The possibility of inaccurate record keeping thus increases the chance that preventive maintenance (e.g. oil change and lubrication) can be missed on the front-line apparatus.

The Board identified the need for updating the method of data collection relative to fire apparatus and other BFD vehicles. Aside from the accident on January 9, 2009, two other incidents involving Ladder 26's brakes occurred on Parker Hill Ave. The first incident occurred on August 22, 2006 when the brakes failed, which led to Ladder 26 rolling backwards and striking a building. The second incident occurred on November 19, 2006 at 44 Parker Hill Ave. when the maxi-brake would not hold, which required that a firefighter remain in the truck applying the brakes manually to prevent the apparatus from rolling down the hill. Ready access to information on apparatus malfunctions would prove invaluable in identifying recurring problems, thereby promoting accident prevention.

The Board recommends the following regarding identification of BFD fire apparatus and other vehicles, as well as keeping various fleet records:

6.1 The Director of Transportation should develop a system by which every vehicle on the BFD is identified by a "Property Number" for inventory, maintenance and record-keeping purposes. For example, Property # P2009.4 could identify the fourth pump put into service during the year 2009.

6.2 The Property Number shall be prominently displayed on every BFD vehicle.

6.3 The Property Number, once assigned to a vehicle, shall remain with that vehicle until it is retired from service.

6.4 All entries on all records pertaining to that vehicle shall include the Property Number.

6.5 Along with conventional record keeping, the BFD Director of Transportation should develop an electronic database for quick access to important information regarding items such as preventive maintenance, repairs performed by both outside vendors and by department mechanics, accident (Code A) related damage etc.

6.6 The BFD should either train existing Maintenance Division personnel in "real-time" Firehouse Software Program data entry, and/or determine whether additional staff is required to support these activities.

6.7 If feasible, the BFD should utilize its existing Firehouse Software Program, which has the capacity for all fire companies to open service requests for their respective vehicles.

6.8 If the recommendation in item #6.7 above is unable to be implemented, the BFD should consider creating a Vehicle Defect Form and a Written Service Request Form that would respectively communicate vehicle defects and service requests to the Maintenance Division.

6.9 If a Firehouse Software Program is utilized, all BFD members who will have access must be properly trained on its use.

6.10 The Firehouse Software Program, at a minimum, should be configured to document and manage all vehicle maintenance and repair transactions, (including those performed by outside vendors); work order processing, parts management, repair history of the BFD fleet and associated data processing and management analysis.

6.11 Establish a "Red Tag" system for out of service (OOS) apparatus, i.e. a "red tag" defining why the apparatus is OOS is made out and affixed to the driver's side door handle. Only authorized personnel can remove the "red tag."

7. MOTOR SQUAD

Like all trucks, there is a certain amount of maintenance on fire apparatus that must be performed in the field. Flat tires, dead batteries, frozen aerial equipment, refueling at long stands and apparatus stuck in mud are but a few examples of maintenance that must be performed under less than desirable circumstances. Although some of these maintenance issues could be reduced through a comprehensive preventive maintenance program, many are unavoidable and will always exist. Maintenance of this nature can best be described as emergency repairs. Considering the extreme climatic conditions encountered in Boston, especially during the winter, it would be an imprudent use of limited resources to expect that every emergency repair could or should be handled by changing over to a reserve piece of apparatus, thus leaving the actual repair for someone at the shop to perform at a later time. An equally inefficient use of resources would be to place fire apparatus out of service to bring it into a central location for something as simple as having a light bulb changed.

This raises the question as to who is best suited to perform emergency repairs and to oversee the "changing over" of apparatus. It must be recognized that the need exists to perform emergency repairs under dangerous conditions, (e.g. de-icing an aerial device at the scene of a fire in sub-freezing conditions); members of the Motor Squad perform tasks of this nature. As in any multi-tiered maintenance program, different echelons perform different functions. Given the nature of the fire department and its 24 hours per day, 7 days per week mission, consideration must be given to performing emergency repairs at all times, day and night, including weekends and holidays. A properly trained Motor Squad is capable of providing emergency repairs along with necessary maintenance on fire apparatus while it remains in service within its response area. The Motor Squad is also capable of providing needed services not associated with fire apparatus, (i.e. thawing frozen hydrants, driving the department personnel transport vehicle, etc).

According to the Report from the MMA Consulting Group Inc. dated October, 1995 in reference to *Recommendations Relating to Equipment and Maintenance:*
"There are two alternatives available to the Fire Department: develop its own fully staffed maintenance operation, or contract for services. In our judgment, the Fire Department does not have adequate facilities for maintenance and the Fire Department should contract for services. The contract for services should be carefully designed to ensure on-call service and the development of a specific maintenance program." [38]

The referenced "*contract for services should be carefully designed to ensure on-call service"* never took place. The BFD chose to retain the services of the Motor Squad, which continued to perform these *"on-call service"* duties. The number of BFD members assigned to the Motor Squad has diminished steadily over the past several years. The reduced number of Motor Squad members, along with an aging fleet, obviously results in an increased workload.

[38] Op. cit., MMA Consulting Inc. p. IX-3

Over the years, leading back to 1981, the duties of the Motor Squad have changed. For reasons that are unable to explain, The Board believes that over time the Motor Squad has experienced "mission creep." That is, they have gradually taken on more responsibility than had been originally envisioned. For example, The Board's review of a document titled *"Duties of the Boston Fire Department Motor Squad"* [39] generated November 30, 2006, makes no mention of adjusting brakes as one of their duties. The Board was unable to determine if this document was ever actually distributed and established as policy. It is The Board's opinion that the lack of a comprehensive Motor Squad job description, which defines their specific duties and is posted for review and reinforced periodically, is the reason for this "mission creep."

NOTE: The Board is aware of the agreement that was instituted between the City of Boston and Boston Firefighters' Local 718, on or about December 21, 2009, relative to the civilianization of the Fleet Maintenance Division. Having taken that recent development into consideration, The Board believes the following recommendations are appropriate and in accordance with the comprehensive nature of this report. Given that The Board has not been advised of the operational procedures that the Fire Commissioner has since implemented to provide suitable 24 hour per day, 365 days per year emergency repairs to fire apparatus, further comment by The Board on this subject is not feasible.

Regarding the Motor Squad, it is the recommendation of this Board that:

7.1 The BFD retain the services of the Motor Squad, manned by specially trained firefighters, to perform emergency repairs and minor preventive maintenance 24 hours per day, 365 days per year.

7.2 The BFD should maintain an appropriate number of positions in the Motor Squad.

7.3 A detailed written job description must be developed and supervisors must oversee the operation so that "mission creep" is eliminated.

7.4 The BFD establish specific guidelines relative to how brakes are to be adjusted and who is authorized to perform a brake adjustment on fire apparatus equipped with automatic slack adjusters.

7.5 A system be developed, (either paper forms or electronic), that records all work performed by the Motor Squad so that The Director of Transportation may review it.

[39] See Boston Fire Department Duties of the Boston Fire Department Motor Squad. 30 Nov. 2006.

8. OUTSIDE VENDORS

Sending fire apparatus to outside vendors to perform major repairs has been the practice of the Boston Fire Department (BFD) for many years. After the layoff of most of the Department's mechanics in 1981, all major apparatus repairs have been contracted to outside vendors. Replacing brake parts commonly referred to as a "brake job," is an example of a major repair. The Board has determined that the use of outside vendors presents several potential problems that must be addressed by the BFD.

When the use of outside vendors increased nearly 30 years ago, there is no evidence that the BFD instituted any program, specifically a written policy, to check that work done by outside vendors was completed per the contract. In the case of Ladder 26, records indicate that on 06/26/2002 an outside vendor, along with performing other brake work, replaced the rear air chambers with 36/36 chambers. (**NOTE**: These numbers indicate the area in square inches on the diaphragm surface of the respective chamber. The first number refers to the service chamber; the second number refers to the spring or emergency brake chamber). On 12/11/2003, the same outside vendor installed 30/36 air chambers that do not meet the manufacturer's specifications, which call for 36/36 chambers.

Generally, the procedure used by outside vendors is to install the same type and grade of parts that are removed. Once an improper part is installed there is great potential for it to be replaced, in the future, with another incorrect part. With the possible exception of vendors who work exclusively on fire apparatus, as a general rule, outside vendors do not have access to and therefore do not reference the manufacturer's specifications manual to determine which replacement parts are required.

Considering the number of alarms responded to by Ladder Co. 26 that were free of brake problems during the various intervals of time between brake chamber replacements, The Board rationalized that the installation of improper brake chambers in and of themselves are not an exclusive factor that would have caused brake failure. **However, along with other factors, The Board believes that the installation of improper brake chambers could have been a contributing causal factor in the accident that occurred on 01/09/2009.** Lack of proper oversight of the work being performed by outside vendors allows improper parts to be substituted for parts that are expected to meet the manufacturer's specifications.

Another example of this problem is shown on the invoice from an outside vendor dated 03/27/2008, in that the set of rear brake drums that were replaced were heavy duty type, not the severe duty type as recommended by the manufacturer. Again, although the rear brake drums on Ladder 26 did not meet the manufacturer's recommendations, The Board rationalized that the installation of improper brake drums alone are not an exclusive factor that would have caused brake failure. **However, along with other factors, improper rear brake drums could have been a contributing causal factor in the accident.**

It stands to reason that a vendor who repairs all types of trucks will work on the next truck in line, if parts are available. All of the vendor's customers, not just fire

departments, need their vehicles repaired and returned to service as soon as possible. When a piece of fire apparatus needs repair, it generally takes its turn in line. Even when dealing with vendors that work substantially or entirely on fire apparatus, each piece of apparatus must wait its turn in line. The manner in which the BFD has tried to minimize the length of time that apparatus is out of service at a vendor's garage is to conduct business with multiple vendors. Many times, calls are made to a number of vendors and the one that can accommodate the repair most expeditiously is selected.

It must be recognized that the length of time a piece of fire apparatus is out of service for repairs, while significant, is not the most important factor. Top quality repair work is of the utmost importance. The length of time fire apparatus is out of service for repairs is most concerning due to the fact that the BFD has had an inadequate number of serviceable reserve fire trucks available to serve as replacements for front-line apparatus. The issue of reserve apparatus is addressed elsewhere in this document.

It has been determined that outside vendors will sometimes sub-contract a repair job to another garage without the full knowledge or consent of the BFD. The last major brake repair work that was performed on Ladder 26 was completed by outside vendor # 1 but the invoice submitted to the BFD was from outside vendor # 2. The invoice from outside vendor # 2, dated 05/06/2008, showed no indication that the work had been sub-contracted to outside vendor # 1. This practice is not necessarily a bad thing. In fact, it may actually allow for a quicker turn around time on the repair of a piece of apparatus to in-service status, provided that certain guidelines are established and followed.

Regarding the use of outside vendors, The Board makes the following recommendations:

8.1 The BFD should routinely provide outside vendors with written service specifications (including a desired completion time), and require that said vendors provide detailed invoice information relative to what repairs were actually completed on a respective piece of apparatus.

8.2 All BFD apparatus that is sent to an outside vendor for repairs should be thoroughly inspected and road tested as soon as all repairs are completed.

- Said inspection and road test should be conducted by a qualified, certified mechanic prior to returning the apparatus to in-service status.
- Said mechanic should produce written documentation as to the outcome/status of his/her inspection and road test.

8.3 All vendors who perform major repair work on apparatus should provide the BFD with verification (i.e. documentation) that all work performed is conducted by qualified mechanics and/or certified Emergency Vehicle Technicians (EVT's).

8.4 Before installation, the vendor should identify parts that need to be replaced as being the proper replacement parts based upon manufacturer's specifications.

8.5 The BFD should establish a list of qualified local outside vendors that have access to procuring repair parts in a timely manner, thus reducing apparatus downtime. In order to be placed on the list of qualified vendors, a pre-existing contract between the BFD and the outside vendor, clearly stating the requirements and expectations of the former, should be in place.

Regarding the use of sub-contractors by outside vendors, The Board makes the following recommendations:

8.6 Notify the BFD before repairs are started that such an arrangement has been made with a sub-contractor.

8.7 The sub-contractor should be on the BFD list of approved outside vendors.

8.8 All paperwork should be in order identifying who completed what aspect of the repair.

8.9 The BFD should receive written documentation that all replacement parts are in compliance with manufacturer's specifications.

9. PERMANENT BOARD OF INQUIRY INTERDEPARTMENTAL COOPERATION & SCENE CONTROL

The current practice of appointing a Board of Inquiry after a line-of-duty death has occurred is problematic. Valuable time is wasted assembling the board. The learning curve that is present whenever a person or persons are appointed to take on a new task is time consuming as well. Other professional investigations conducted by the Boston Police Department (BPD) and the Suffolk County District Attorney's Office (DA's Office) are well underway by the time the Boston Fire Department (BFD) assembles a Board of Inquiry.

Internal Boards of Inquiry perform a very important function. Along with analyzing and considering information and evidence provided by outside experts and agencies, they have both the intimate knowledge and job experience to properly address a respective inquiry. The Board of Inquiry's report has the potential to provide recommendations that are far-reaching and not only parochial in nature, tailored to provide the greatest effect, having that personal understanding of the system or problem they are analyzing. A Board of Inquiry's report should be comprehensive, factual, and timely. If a comprehensive, factual report is not prepared and presented within a reasonable amount of time, its justifiable impact will be diminished.

When interdepartmental cooperation is not initiated from the very beginning, the potential for misunderstanding is great. Lack of a standing Board of Inquiry exacerbates the problem. The Board understands that the DA's Office has, by statute, the duty and authority to direct and control all death investigations within the City of Boston. Thus, the fatal accident involving Ladder 26 was declared a crime scene on January 9, 2009. After a period of investigation, on or about July 31, 2009 the BPD and the DA's Office declared that the accident was no longer considered a criminal case. The Board was advised at that time that evidence gathered would be made available to them. The Board made inquiries relative to the release of the evidentiary information to both the BPD and the DA's Office approximately every two weeks thereafter. On December 14, 2009 the DA's Office released the report;[40] four months and two weeks after it had declared the accident was no longer classified a crime and seven months after the expert forensic analyst hired by the DA's Office had submitted his completed report on May 12, 2009.[41]

These reports contained information, the review of which, The Board considered essential in order to complete a comprehensive, factual report. The one important missing component of this report is its timeliness. On December 28, 2009, two weeks after the BPD/DA's Office reports were released, another packet of information was received at

---

[40] See Buckley, Kevin J. Sergeant Detective, Boston Police Department. "Report on Boston Fire Department Ladder 26 Fatal Accident, CC#090015879". 31 July 2009.

[41] See Chase, Brian F. "Boston Fire Department Ladder 26 Motor Vehicle Autopsy Investigation Report with Addendum A". 12 May 2009.

Fire Headquarters from the DA's Office containing transcripts of the interviews that they had conducted. The review of this material by The Board caused yet another delay that has compromised the completion of this Report. The Board has been unable to ascertain why all of this information was not made available to them in a timelier manner.

The Board has identified several pieces of uncollected evidence that should have been preserved at the scene of the accident. BFD members trained in the proper discipline were not assigned when the accident scene was cleaned up. Their presence most likely would have prevented the evidence from being discarded.

Scene control at incidents that involve serious and/or fatal injuries to firefighters presents unique operational problems. Once word of the incident makes its way to the media, off-duty members start to arrive at the incident's location. Accountability can quickly get compromised and members who originally responded to the incident often work to a point of exhaustion.

Regarding the Permanent Board of Inquiry, The Board recommends:

9.1 That a permanent Board of Inquiry, with alternates, be assembled.

9.2 That the plan provide for an immediate response of a designated (or provisional) Team Leader, the Deputy Fire Commissioner for Labor and Legal, a Safety Chief, a member of the Fire Investigation Unit, and a member representing Boston Firefighters' Local 718 when a fatal incident occurs.

9.3 That remaining team members be assigned to a Line-of-Duty Death (LODD) investigation team within 12 to 24 hours.

9.4 That a permanent Board be adequately trained on the proper techniques of collecting and preserving evidence, managing interviews and preparing investigative reports. If applicable, a qualified fire and/or accident investigator can provide the other team members with this training.

9.5 That a permanent Board be utilized to investigate serious or multiple firefighter injuries and/or fatalities

9.6 That a list of potential LODD investigation team members be identified and appointed to The Board of Inquiry, based upon individual abilities and qualifications. At least one member of the team should be trained and qualified in investigative procedures.

9.7 That members of the Board of Inquiry, prior to their appointment, shall agree to and sign a "Statement of Confidentiality."

9.8 That once designated, the BFD LODD investigative team be provided with a pre-assembled equipment kit, which would contain the following items:

- Note paper
- Graph paper
- Pens, pencils, color pencils, highlighters

- Digital camera, lenses, extra batteries
- Pocket tape recorder with extra batteries
- Tape measures 25' and 100'
- Chain of custody forms/tags
- Plastic bags for evidence collection
- Flashlight with extra batteries
- Footwear (heavy duty, waterproof)
- Gloves (leather, rubber, heavy duty, latex)
- Hat/Helmet
- Candy bars, gum, other quick energy food

9.9 That the respective Commissioners of the BPD and BFD designate administrative officials within their departments to establish a Memorandum of Understanding (MOU) that clearly defines the collection, maintenance and photographing of all relevant evidence at a fatal incident, which involves both departments. Once established, the MOU should be presented to the Suffolk County District Attorney for that office's inclusion in the MOU.

Regarding scene control, The Board recommends:

9.10 That the Incident Commander (IC) establishes Level III Accountability as outlined in BFD Standard Operating Procedure #2, *Personnel Accountability System,* [42] which shall be overseen by an Accountability Officer.

NOTE: Level III Accountability requires the strict control of entry, of all personnel working at the incident, into a defined area.

9.11 That the IC establishes a scene perimeter with yellow safety barrier tape as soon as possible, upon arriving at the incident.

9.12 That the IC assigns police officers and/or fire officers to enforce restricted entry into the hot zone.

9.13 That a Unified Command Post be established and properly staffed with at least one representative from each agency working at the incident.

9.14 That the IC, through the Fire Alarm Office, immediately notify the permanent Board of Inquiry to report to the scene as soon as possible, whenever a serious or multiple firefighter injury and/or fatality occurs.

[42] Op. cit., BFD/SOP. Current series.

10. HIRING PRACTICES

There is one issue that The Board believes needs to be addressed in terms that do not impugn any individual. The purpose of bringing up this issue is not to single out any one person or persons, but to point out what The Board sees as certainly ineffective, and possibly inappropriate, upper management hiring procedures and political interference.

Historically, the Boston Fire Department (BFD) positions of Superintendent of Maintenance and Assistant Superintendent of Maintenance have, almost exclusively, been reserved for appointment through the political process. There is credible evidence that some of these political appointments have been filled not at the discretion of the Fire Commissioner, but at the direction of City Hall. There is equally credible evidence that most of the people appointed to these positions have worked tirelessly in an attempt to carry out the responsibilities of their respective positions, albeit to varying degrees of success. The problem is that these appointments have been made exclusively as political rewards, with little or no consideration to the professional qualifications or aptitude of the individuals selected to fill these positions.

Since January 10, 2009 the BFD has taken steps to appoint people who reportedly have proper credentials for the apparatus maintenance positions for which they are being hired. Their appointment is a management prerogative, carrying with it the associated responsibility of overseeing these positions. It is neither the intent nor the responsibility of this Board to rate the accomplishments of these people. Rather, it is The Board's intention to acknowledge, even though all of the proposed positions have not yet been filled, that it does appear the BFD is headed in the right direction with respect to the proper oversight of fire apparatus maintenance.

Relative to hiring practices, The Board recommends:

10.1 That the BFD continue on its present hiring path.

10.2 That all persons, i.e. supervisors and mechanics, are qualified by certification [e.g. Certified Emergency Vehicle Technicians (EVT)] [43] for the positions to which they are being hired.

[43] See NFPA 1071, "Standard for Emergency Vehicle Technician Professional Qualifications." National Fire Protection Association. 2006 Ed.

11. PREVENTIVE MAINTENANCE

Preventive maintenance (PM) plays a significant role in the length of time a piece of fire apparatus is able to remain in service. PM of fire apparatus exists on the Boston Fire Department (BFD), but not to the specifications recommended by the manufacturers. As a piece of fire apparatus ages, PM becomes more important in its overall operational reliability. A PM program must be comprehensive. As a piece of apparatus ages, certain items that break or wear out may have not been replaced for reasons of cost. For example, on Ladder 26 (L-26), part of the engine cover, adjacent to the rear right seat, was covered with cardboard and held in place with medical adhesive tape (See Photo 20).

According to the report written by the expert forensic analyst retained by the Suffolk County DA's Office: *"Pre-existing deficiencies noted during the inspection of the vehicle subsequent to the crash of January 9, 2009, included an inoperative left rear passenger door latch* (See Photo 21) *and severely rusted-through protective steel enclosure for electrical system components."* [44] The report also made note of: *"...strikingly evident exhaust leak at the muffler/tailpipe junction, as well as at the tailpipe due to the presence of a significant rust hole."* [45]

Based upon invoices on file from outside vendors, the odometer on L-26 broke sometime between December 2, 2004 and October 31, 2005. The odometer reading was locked at 77,712 miles, where it remained for the next three years and two months. From that time forward, PM based upon the apparatus mileage was not possible. Considering the amount of time that the odometer was registering mileage versus the three years and two months it was not, The Board reasoned that there might have been 100,000 miles or more on L-26 at the time of the accident.

The engine hour meter removed from L-26 by the Boston Police Department as evidence registered 13925.4 hours.

Photo 20

Photo 21

[44] Op. cit., Chase, Brian F. p. 20 of 46

[45] Ibid., p. 19 of 46

In 2006, the International Association of Fire Chiefs (IAFC) warned the fire service of potential problems associated with adjusting brakes equipped with automatic slack adjusters (ASAs) following an investigative report released by the National Transportation Safety Board (NTSB). While conducting an investigation of an apparatus crash-related firefighter fatality, the National Institute of Occupational Safety and Health (NIOSH) learned that fire departments might not fully appreciate the hazards related to manual adjustment of ASAs.[46] [47] The Board found no evidence that there was a dependable policy in place within the BFD to seek out information of this nature. Consequently, it appears that this information was never disseminated to the proper fleet maintenance personnel within the department.

The Board makes the following recommendations regarding preventive maintenance:

11.1 The BFD should develop and institute a PM program for emergency vehicles, which would be divided into three levels of maintenance.

1) Routine Maintenance:
This is the primary level of maintenance for ensuring that emergency vehicles are properly serviced and maintained. This level of maintenance should include daily, weekly, and monthly inspections. Items to be included are:
- Fluid level check.
- Wheels and tires.
- Electrical systems and devices.

Apparatus chauffeurs must be responsible for conducting routine maintenance and completing the applicable documentation.

2) Scheduled Maintenance:
Scheduled maintenance is dependent upon a number of items including:
- Manufacturer's recommended schedule.
- Amount of use of the vehicle.
- Organizational policy.
- Professional standards.

Most importantly, a regular schedule must be developed and followed for all BFD emergency vehicles.

[46] See Fire Rescue One. "Manual Adjustment of Automatic Slack Adjusters May Contribute to Unexpected Brake Failure on Automotive Fire Apparatus." Fire Rescue 1 Press Release. 23 Oct. 2009. [Online] Available. http://www.firerescue1.com/fire-products/apparatus-accessories/press-releases/599617-Manual-Adjustment-of-Automatic-Slack-Adjusters-May-Contribute-to-Unexpected-Brake-Failure-on-Automotive-Fire-Apparatus/

[47] See International Association of Fire Chiefs. Lessons Learned from Fatal Crash. 15 Jun. 2006. [Online] Available. http://www.iafc.org/displayindustryarticle.cfm?articlenbr=30820

The scheduled maintenance interval may be determined in a variety of ways, which may include:

- Hours of operation, which requires an operational hour meter on the vehicle. (After 50 to 75 hours of operation).
- Mileage, where maintenance is correlated to a certain number of miles as recorded on the vehicle's odometer (i.e. around 2,000 logged miles).
- Fuel consumption, where maintenance is usually recommended after the use of approximately 250 gallons of fuel.

3) Crisis Maintenance:

Whereby corrective maintenance is scheduled by the classification of the items requiring repair.

Three classifications that would most often be utilized include:

Classification "A" (Immediate) includes all items, which require that the vehicle must be removed from service immediately.

Classification "B" (As soon as possible) includes items, which are important and require prompt attention; however, they do not require that the vehicle be removed immediately from service.

Classification "C" (With next PM) includes items, which should be corrected, but can be addressed at the next regularly scheduled PM.

11.2 The BFD should develop and implement apparatus inspection and maintenance procedures using manufacturer's specifications. These inspections should employ written or computerized checklists and be accompanied by detailed instructions for their use.

11.3 The BFD Maintenance Division needs to implement a reporting system that clearly defines how all maintenance and repair activities are to be performed, as well as establishing a gauge to determine how effectively they are being performed.

11.4 Maintenance information that is currently distributed to the field on the S (i.e. Share) Drive should be sustained, particularly regarding inspection and out of service status of BFD apparatus.

11.5 Automatic greasing systems utilized on select pieces of BFD apparatus should be abolished as it gives maintenance a false sense of security that vital braking components (e.g. slack adjusters) are properly lubricated, when in fact, they may not be. All lubrication of apparatus components should be conducted manually. This is particularly true in the City of Boston, where inclement weather is prevalent.

11.6 The BFD should ensure that inspection, maintenance, repair, and service records are maintained for all vehicles and equipment used for emergency operations and training.

11.7 The Director of Transportation and the Fleet Safety Coordinator should subscribe to NIOSH and NTSB Publications on Safety Advisories for Fire Apparatus.

Examples of NIOSH and NTSB Safety Advisory Publications can be found in footnotes.[48] [49] [50] [51] [52]

[48] See National Institute for Occupational Safety and Health. Fatality Assessment and Control Evaluation Investigative Report #F2001-36. 12 Sep. 2002.

[49] See National Transportation Safety Board. Collision Between a Ford Dump Truck and Four Passenger Cars. Glen Rock, Pennsylvania. 11 Apr. 2003.

[50] See National Transportation Safety Board. Safety Recommendation H-91-3 through 6. 29 Apr. 1991.

[51] See National Transportation Safety Board. Safety Recommendation H-06-6 and 7. 15 Feb. 2006.

[52] See National Transportation Safety Board. Special Investigative Report Emergency Fire Apparatus. 19 Mar. 1991.

12. RESERVE APPARATUS AND RETIREMENT OF APPARATUS

On the Boston Fire Department (BFD), reserve apparatus is commonly referred to as "spare apparatus." Adequate numbers of reserve apparatus must be maintained in order to be able to provide an effective front-line fleet. When it is necessary to place a front-line piece of fire apparatus out of service, it is replaced temporarily with a piece of reserve apparatus.

Lack of adequate reserve apparatus can lead to a "domino effect" when it comes to implementing an effective maintenance program for front-line apparatus. If there are not sufficient numbers of reserve apparatus, required, time-sensitive, preventive maintenance on front-line apparatus is neglected. Along with not having a specified preventive maintenance budget, this can result in a reactive maintenance program where only major repairs are addressed.

In many cases, reserve apparatus cannot be maintained to the same standard because of its age and original design. For example, there are still reserve apparatus being utilized that are of the open-cab design. On January 9, 2009, six of the eleven reserve ladder trucks were of the open-cab design. That is, only the driver and officer positions are fully protected within a cab; not the two firefighters located in the jump seats.

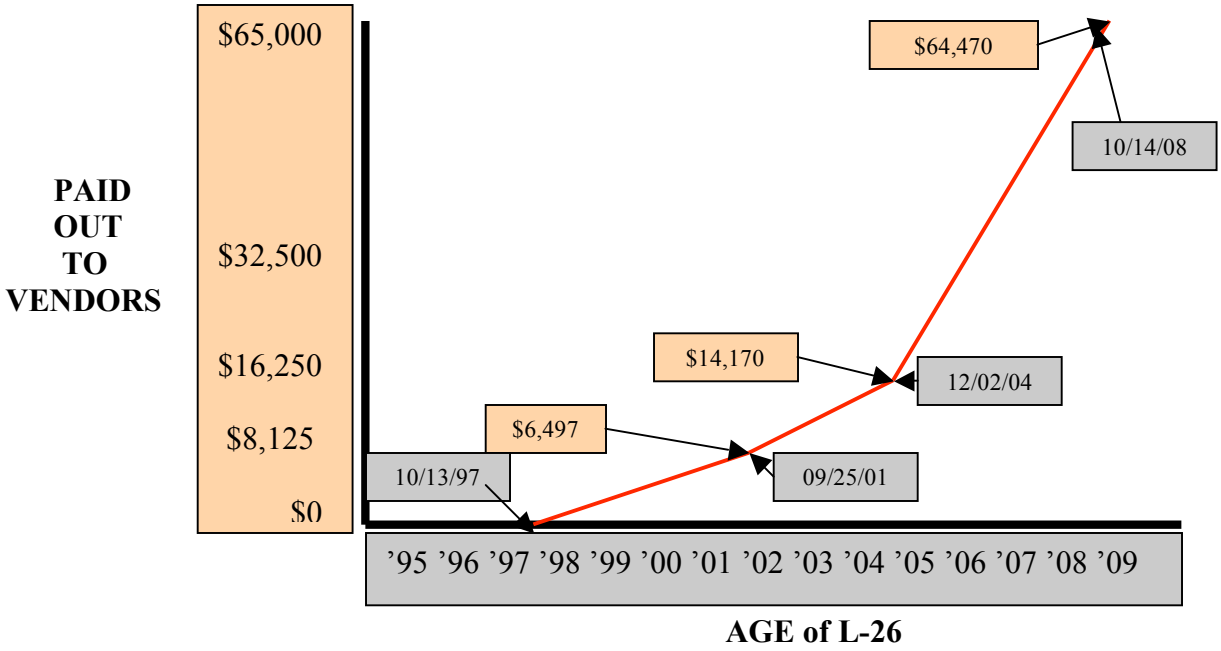
Problems such as excessive, sooty diesel emissions, broken gauges, broken gate valves, leaking water tanks, inoperative front suction connections, inoperative emergency lighting, broken heaters and window defrosters, inoperative window cranks, inoperative door locks and handles are but a small sample of some of the problems associated with reserve apparatus. One of the reasons this occurs is due to the age of reserve apparatus when it is finally removed from front-line status. In many cases, due to its poor condition, the apparatus should be retired.

Frustration with the condition of fire apparatus led to the creation of a website maintained by Boston Firefighter's Local 718. The purpose of the website was to allow members to report equipment failures. The website ran from January 13, 2008 to March 3, 2008. During that time period 45 reports were posted, none of which involved Ladder 26. Postings wavered from their original intent and the site was subsequently dissolved.

In order for the BFD to be able to maintain an effective reserve apparatus fleet, it must first increase the frequency by which it purchases front-line apparatus. The issue of apparatus replacement is addressed elsewhere in this Report. As apparatus gets older, it requires more costly and time consuming maintenance and repairs. This is evidenced by the substantial increase in the funds expended for outsourced repairs over the past several years. Ladder 26 is a good example of a piece of fire apparatus that cost considerably more to maintain as it aged. The following demonstrates the cost versus age issue:

On the date of the accident, Ladder 26 (L-26) was 13 years and 6 months old. The first record of maintenance provided by an outside vendor was on October 13, 1997; L-26 was 2 years and 3 months old. By September 25, 2001 when L-26 was 6 years and 2 months old, the BFD had paid outside vendors a total of $6497.00. From that date until December 2, 2004, a period of 3 years and 3 months, when L-26 was 9 years and 5 months old, an additional $7673.00 had been paid to outside vendors. From December 2,

2004 until October 14, 2008, a period of 3 years and 10 months, when L-26 was 13 years and 3 months old, an additional $50,300.00 had been paid to outside vendors. Nearly 43% ($28,024) of the total funds ($64,470) were expended in the last 2 years. (These figures do not include the additional costs expended at the BFD shop for maintenance items such as tires, batteries, light bulbs, air filters, fuel filters, oil filters, oil changes, lubrication etc. These figures also exclude the costs of an outrigger repaired due to an accident. These figures do include the costs for body repair for an accident on 08/22/06, a consequential cost due to brake failure). When taking into consideration the added cost of the manufacturer's recommended preventive maintenance, had it been performed per schedule, these figures would be considerably higher.



In order to be certain that all front-line and reserve fire apparatus in service on the BFD meets a minimum standard, The Board recommends:

12.1 That all fire apparatus be maintained to the appropriate sections of *NFPA 1911 Standard for the Inspection, Maintenance, Testing and Retirement of In-service Automotive Fire Apparatus, 2007 Edition,* [53] and to manufacturer's specifications.

12.2 That an adequate number of properly maintained spare fire apparatus be kept in reserve on a continuing basis.

NOTE: An "adequate number" is variable and determined by the age and reliability of the front-line fleet. This Board has neither the information necessary to make such decisions nor the expertise required to make recommendations as to the exact number of reserve fire apparatus that should be maintained. On January 9, 2009, according to records produced by the Office of The Deputy Fire Commissioner of Administration and Finance, [54] the BFD had 11 reserve ladder trucks with an average age of 19.41 years.

[53] See NFPA 1911, "Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus." National Fire Protection Association. 2007 Ed. All applicable sections.
[54] Op. cit., BFD Apparatus Schedule. 9 Jan. 2009.

13. RULES AND REGULATIONS

Over time, collective bargaining agreements change, old positions are eliminated, new positions are established, old committees are dissolved, and new committees are formed. One document that has not changed since June 1, 1997 is the Rules and Regulations of the Boston Fire Department (BFD). Inconsistencies and outdated information in the Rules and Regulations can lead to subjective interpretation. Without clear and consistent Rules and Regulations, along with effective enforcement, many important functions are at first performed occasionally, then not at all.

Such is the case relative to draining the air tanks on apparatus. *Rules and Regulations 16.10* states: "*He/she shall bleed the air tanks on apparatus required by the Maintenance Division.*" [55] Nowhere does it state how often this should be done and/or which apparatus are on the Maintenance Division's "required" list.

The Board has determined that over time, most likely coincidental with the introduction of air dryers on fire apparatus, the procedure of draining the air tanks on fire apparatus was at first performed intermittently, then not at all.

Concerning Rules and Regulations, The Board recommends:

13.1 That the BFD updates the Rules and Regulations specifically, but not exclusively, as they pertain to all aspects of maintaining, driving and operating fire apparatus.

13.2 That BFD R&R 16 *Apparatus Chauffeurs* [56] be rewritten in its entirety.

13.3 That the BFD include on their monthly list of required company drills, those *Rules and Regulations* that specifically, but not exclusively, pertain to all aspects of maintaining, driving and operating fire apparatus.

[55] Op. cit., BFD/R&R. 1 Jun. 1997.
[56] Ibid. p 36.

14. SEAT BELTS

The Board considered the matter of seat belt use. It has been determined that Ladder Co. 26 Fire Lieutenant Kevin M. Kelley was not wearing a seat belt at the time of the accident. Due to the severity of damage involved, it is unknown whether the outcome would have been different had he been wearing a seat belt. The Board was also able to determine that two of the other three Ladder Co. 26 firefighters were not wearing seat belts.

The Board is convinced, as a general rule, that seat belts save lives and reduce the severity of injuries. The Board reached out to three other fire departments, Charlotte NC, [57] Milwaukee WI,[58] and Bellevue WA[59] on many apparatus related matters, including the issue of seat belts. Bellevue is a suburb of Seattle WA with nearly identical fire department guidelines. The reason for selecting these three cities for comparison purposes is two-fold: 1.) They represent the east coast, the mid-west and the west coast; 2.) Each of these cities have populations of around 600,000 persons (in this case, referencing Seattle WA not Bellevue WA), similar to Boston. All of these cities and states mandate the use of seat belts while riding in fire apparatus.

Regarding seat belts, The Board strongly recommends:

14.1 That the Boston Fire Department (BFD) establishes a program with a goal of requiring one hundred percent compliance with a mandatory seat belt use policy.

14.2 That this policy be made part of the Rules and Regulations of the BFD.[60]

14.3 That this policy be made part of the Standard Operating Procedures of the BFD.[61]

14.4 The SOP should state: Drivers shall not move fire apparatus until all firefighters on the vehicle are seated and secured with seat belts in approved riding positions.

14.5 That Company and Chief Officers be held responsible for the enforcement of this policy in their respective vehicles.

14.6 That a sign with the words "SEAT BELTS MUST BE WORN" be permanently affixed in plain view of each seating position on all Department vehicles.

14.7 That the BFD, in association with Boston Firefighters' Local 718, be a major proponent behind repealing the part of Massachusetts General Law that specifically exempts "passengers of authorized emergency vehicles" from wearing seat belts.[62]

---

[57] See Charlotte (NC) Fire Department. "Driver Checkout Guidelines." Standard Operating Guidelines SOG 302.02. 1 Jan. 2009.
[58] See Milwaukee (WI) Fire Department. Motor Vehicle Instruction Guide. Mar. 2009.
[59] See Bellevue (WA) Fire Department. "Driver/Operator Training." Standard Operating Procedures. 28 Nov. 2008.
[60] Op. cit., BFD/R&R. 1 Jun. 1997.
[61] Op. cit., BFD/SOP. Current series.
[62] Op. cit., MGL. Chapter 90.

15. STANDARD OPERATING PROCEDURES

During the investigation, it became necessary for The Board to review many of the Boston Fire Department (BFD) Standard Operating Procedures (SOP's).[63] The purpose for referencing the SOP's was to: 1.) Obtain guidance for the report and 2.) Determine if the existing SOP's are current and provide comprehensive guidance on the subject matters for which they were originally written.

The Board referenced:

- *Boston Fire Department/Incident Command System* [64]
- *SOP 2 Personnel Accountability System*
- *SOP 13 Response to Fires and Other Emergencies*
- *SOP 18 Procedure upon Dispatching of Department Members to a Hospital from a Fire or Other Incidents*
- *SOP 22 Department Motor Vehicle Accidents*
- *SOP 52 Ladder Companies*
- *SOP 62 Line of Duty Death*

The Board could find no instance where failure to follow the BFD/SOP's general guidelines caused or contributed to the injuries of the three firefighters or the fatal injury to Fire Lieutenant Kevin M. Kelley.

The Board has determined that SOP's 13, 18, 22, 52, and 62 are outdated.

Regarding Standard Operating Procedures, The Board recommends:

15.1 Updating and re-writing SOP's 13, 18, 22, 52, and 62.

15.2 That SOP 62 specifically states: "The Health and Safety Committee, after agreeing to and signing a "Statement of Confidentiality," should review the full report, paying particular attention to the recommendations to prevent future occurrences of a similar nature. The committee should be asked to endorse the recommendations of The Board of Inquiry. The Health and Safety Committee should have the option to request the Deputy Chief-in-Charge of The Board of Inquiry to refer the report back to The Board of Inquiry, if the report is considered inaccurate or inadequate or if the recommendations are not feasible."

15.3 That an additional SOP be written and issued addressing the duties and responsibilities of department members relative to the inspection, maintenance, and testing of fire apparatus**.** The information in this SOP should include guidelines on how to maintain a logbook, which is recommended elsewhere in this document.

15.4 The BFD should establish a list of major defects to be referred to in evaluating when a vehicle shall be declared unsafe. Said list should be part of the SOP.

- Any fire department vehicle found to be unsafe shall be "Red Tagged" and placed out of service until repaired.

---

[63] Op. cit., BFD/SOP. Current series.
[64] See Boston Fire Department. Incident Command System. 1 Jan. 2006.

16. THREE ECHELON APPROACH TO MAINTENANCE

The Board recommends that the Boston Fire Department (BFD) adopt a three echelon approach to maintaining BFD vehicles as described below:

16.1 Logbook: All vehicles, including fire apparatus, chief's vehicles, support vehicles etc. should be assigned a logbook. The logbook would be issued on the day the vehicle is commissioned and then be carried in that vehicle at all times. The logbook would include the entire maintenance and accident history of that individual piece of apparatus. For the purposes of the logbook, the vehicle/apparatus would be referred to by its vehicle number, not its company number, (i.e. P2009.4 not Engine Co. 7). The Director of Transportation should work out the design of the logbook. Daily entries would be required by the chauffeur and checked by the company officer. The quarterly inspection of quarters by the District Chief should include checking the logbook(s). The BFD Director of Transportation should also conduct a quarterly inspection of the logbook.

16.2 First Echelon Maintenance: Basic daily maintenance of a vehicle would be considered first echelon maintenance. In addition to completing the daily apparatus check sheet, the chauffeur performs a safety check of the vehicle, checking fluids, tire air pressure, and fuel level. All of this information would then be recorded in Section I of the logbook by the chauffeur/driver.

16.3 Second Echelon Maintenance: This level of maintenance would be logged in Section II of the logbook. It would include such items as tire changes, oil changes, battery and light replacement etc. Entries into Section II are to be made by members of the Motor Squad or the Fleet Maintenance Division. This information would also be entered in the work log of the person who performs the maintenance, which in turn would be input into a database at the Fleet Maintenance Division.

16.4 Third Echelon Maintenance: In Section III the Fleet Maintenance Division would enter all of the major maintenance conducted on a vehicle. It would list such items as replacing springs, transmission work, brake replacement etc.

16.5 Vehicle Accidents (Code A): Section IV would list all of the accident related information particular to that specific vehicle. The required information for this section might list something like: minor dent to right rear of vehicle on diamond plate back step, or lost right mirror.

NOTE: AN ELECTRONIC FORM OF THIS APPROACH MAY BE AVAILABLE AND SHOULD BE RESEARCHED BY THE FLEET MAINTENANCE DIVISION.

17. TRAINING

The Board's investigation revealed that the present driver's training course provided by the Boston Fire Department (BFD) does not teach a full curriculum.[65] For example, the driver of Ladder 26 (L-26) stated that he received no training on the proper operation of the transmission retarder or how to interpret the air gauge readings. In his interview with the Boston Police Department, he informed the investigator that he had been told by other L-26 firefighters that if the air pressure goes below a certain level, the low air pressure warning alert would sound, although he never personally experienced this happening during the time he drove L-26.[66]

As a result of the accident involving Ladder Co. 26, the BFD Training Division, under the direction of the Deputy Chief of Training, is in the process of developing a new, comprehensive driver's training program. Past driver's training has consisted of a basic Emergency Vehicle Operator Course (EVOC) taught to firefighters-on-probation during their recruit training program. Follow-up driver's training is conducted on-the-job, overseen by the company officer. Some of the following recommendations apply not only to driver's training, but also to all aspects of departmental training. Many of the training recommendations of The Board may have been addressed by the time this document is released.

The Board makes the following training related recommendations:

17.1 All BFD members who have either been called to active duty and/or have been on an extended leave of absence from the department shall be required to attend a Back to Basics "Hands On" Refresher Course upon their return to full duty.

- This course shall include, but not be limited to, a refresher course on driver's training.
- The length of the Refresher Course shall be determined by the BFD Drillmaster, based upon the student's ability to meet predetermined benchmarks.

17.2 The BFD shall maintain training records for each member indicating training dates, subject covered, satisfactory completion, and if any certification has been achieved.

17.3 The BFD shall provide training and education for all fire department members commensurate with their duties and functions that they are expected to perform. Members shall be provided with training and education commensurate with their duties and responsibilities before being permitted to engage in emergency operations.

Examples of required training recommended in this item include:

- Driver's training for firefighters.

[65] Op. cit., See Klein, Louis J
[66] Op. cit., Chase, Brian F. p. 10 of 46.

- Apparatus operation for both firefighters and company officers.
- Basic accident scene investigation for chief officers.

17.4 The BFD shall provide training and education for all members to ensure that they are able to perform their assigned duties in a safe manner that does not pose a hazard to themselves, fellow members, or the general public.

17.5 All training and education shall be conducted by qualified instructors and/or fire officers.

NOTE: The type of training and/or education provided determines the level of qualification required, e.g. formal training at the Fire Academy would require a Certified Fire Instructor whereas a company officer without a certification would be considered qualified to conduct an informal company level drill.

17.6 The BFD shall include in the driver's training program information on the potential hazards of engine, transmission, and/or driveline retarders [67] [68] and shall develop written procedures relative to the use of such retarders.

17.7 The BFD shall include in the driver's training course specific information on properly operating the Maxi-Brake as well as instruction on shifting to a lower gear while driving downhill on a steep grade.

[67] See, for example, Los Angeles City Fire Department. Training Bulletin # 48 Jacobs Engine Brake "Jake Brake." Jul. 1989.
[68] See, for example, Bellevue (WA) Fire Department. "Driver/Operator Training." Jacobs Brake Operation. 2 Jan. 2007

18. TECHNICAL CONSIDERATIONS

All technical rescue responses are time consuming and labor intensive. All members working a technical rescue discipline must have proper training and an understanding of the task that they will be required to perform. All of the technical rescue companies that responded and operated at 25 Mission Park Drive on January 9, 2009 were properly manned with firefighters who were trained by the Boston Fire Department/Special Operations Command (BFD/SOC). Their ability to work together proved invaluable.

The timely and proper dispatching of technical rescue companies, apparatus, and equipment when needed or requested is paramount. Knowledge of what types of incidents (e.g. building collapse, trench rescue, high angle rescue, confined space rescue), require a technical rescue response is important when it comes time to dispatch resources.

The effective use of the Incident Command System (ICS) allows all Team Leaders the opportunity to communicate effectively with Command and to fully understand the plan, which they are required to develop and execute.[69]

There are some phases of a technical rescue incident that may require the assistance of outside expertise. At this incident, the Deputy Chief's request for a structural engineer proved invaluable. There was a need to evaluate the structural integrity of the building and for an expert's opinion on how to most effectively shore up the structure. This allowed for a safe and effective tactical operation.

When the BFD requests outside expertise for any future incident, the following questions will have to be considered:

- Will outside assistance be readily available to the BFD if an incident occurs on the weekend and/or at 3 a.m. in the morning?
- How long will it take for outside assistance to arrive on scene?
- Where is the required outside assistance coming from?

Technical rescue operations can be very time consuming. Operational issues that have to be taken into consideration when working at technical rescue incidents in the future include:

- Hydration.
- Fatigue.
- Weather.
- Nutrition.
- Rehabilitation.
- Proper shelter for rehabilitation.
- The need to call off-duty specially trained personnel to respond for extended operations.
- The physical and mental state of BFD members who are tasked to work at technical rescue incidents.

[69] Op. cit., BFD/ICS. 1 Jan. 2006.

The Board makes the following recommendations regarding the future safe and effective management of technical rescue responses:

18.1 Technical rescue companies should be staffed with a full complement of Technical Rescue Trained members at all times. The present staffing of 2 officers and 9 firefighters city-wide is inadequate, when taking into consideration the types and magnitude of technical rescue emergencies the BFD could be presented with at any given time.

18.2 A special box assignment should be established for division and city-wide technical rescue responses, e.g. prefix signal 4-4 before the box could indicate a division only technical rescue response. A prefix signal 5-5 before the box could indicate a city-wide technical rescue response.

18.3 The BFD should provide specific training to the Fire Alarm Office members. Training would consist of the different types of technical rescue incidents and the equipment that is needed for each response, along with familiarization of the equipment that is presently assigned to BFD technical support vehicles.

18.4 The BFD should make arrangements to retain the services of an on-call structural collapse expert, trained to FEMA standards. The Incident Commander of a technical rescue structural response emergency would be authorized to request the assistance of the said expert when conditions dictate.

18.5 The BFD should have in place a method to recall off-duty technical rescue trained members. Protracted technical rescue incidents bring about environmental and personnel considerations such as: fatigue, nutrition, inclement weather, cold, and heat, all of which play an important role in the efficiency and safety of BFD members.

18.6 The BFD/ICS span of control indicates that control is limited to five members for a company commander and five companies for a section leader. On a citywide technical rescue response, the span of control is seven companies, which exceeds the recommended ICS protocol. Therefore, the BFD should have both divisions' technical rescue chiefs dispatched to a citywide technical rescue operation.

X. WORKS CITED

Bellevue (WA) Fire Department. "Driver/Operator Training." Jacobs Brake Operation. 2 Jan. 2007

Bellevue (WA) Fire Department. "Driver/Operator Training." Standard Operating Procedures. 28 Nov. 2008.

Boston Fire Department. Apparatus Schedule. 9 Jan. 2009.

Boston Fire Department. Duties of the Boston Fire Department Motor Squad. 30 Nov. 2006.

Boston Fire Department. Fire Commissioner's Report on the Readiness of the City's Fire Fighting Apparatus. 27 Feb. 2007.

Boston Fire Department. Goals for Fleet/Facilities. 15 Nov. 2007.

Boston Fire Department. Incident Command System. 1 Jan. 2006.

Boston Fire Department. Replacement Plan for Apparatus. Mar./Apr. 2007

Boston Fire Department. Rules and Regulations. 1 Jun. 1997.

Boston Fire Department. Standard Operating Procedures. Current series.

Buckley, Kevin J. Sergeant Detective, Boston Police Department. Report on Boston Fire Department Ladder 26 Fatal Accident, CC#090015879. 31 Jul. 2009.

Charlotte (NC) Fire Department. "Driver Checkout Guidelines." Standard Operating Guidelines SOG 302.02. 1 Jan. 2009.

Chase, Brian F. "Boston Fire Department Ladder 26 Motor Vehicle Autopsy Investigation Report with Addendum A." 12 May 2009.

Commonwealth of Massachusetts Registry of Motor Vehicles. Commercial Driver's License Manual, Section 5."Air Brakes." Pp. 5.1 – 5.11. Revised, Sep. 2008.

Conley, Daniel F. Suffolk County District Attorney. Letter to Commissioner Roderick Fraser. 10 Dec. 2009

Craven, Ralph. "Special Report for the Boston Firefighters' Local 718, Ladder 26." 21 Jan. 2009.

International Association of Fire Chiefs. Lessons Learned from Fatal Crash. 15 Jun. 2006. [Online] Available. http://www.iafc.org/displayindustryarticle.cfm?articlenbr=30820

National Institute for Occupational Safety and Health. Fatality Assessment and Control Evaluation Investigative Report #F2001-36. 12 Sep. 2002.

National Transportation Safety Board. Safety Recommendation H-06-6 and 7. 15 Feb. 2006.

NFPA 1500 "Standard on Fire Department Occupational Safety and Health Program." National Fire Protection Association. 2007 Ed. All applicable sections.

NFPA 1901 "Standard for Automotive Fire Apparatus," Annex D.2. National Fire Protection Association. 2009 Ed. Pg. 176.

Weather Underground. "History for Boston MA January 9, 2009." wunderground.com. [Online] Available. http://www.wunderground.com/history/airport/KBOS/2009/1/9/DailyHistory.html?req_city=Roxbury&req_state=MA&req_statename=Massachusetts

Wilde, Stephen. Ladder 26 Investigative Findings on Brakes by NIOSH Expert. 2, 3 Feb. 2009.

XI. FINAL SUMMARY

The Board of Inquiry has concluded that there are several causative factors that may have collectively contributed to the Ladder Co. 26 accident on January 9, 2009, which resulted in the line-of-duty death of Fire Lieutenant Kevin M. Kelley.

The following list is a summary of the causal findings that have been delineated in the *Accident Cause and Determination* section of this Report:

1. An aging fleet of apparatus:
2. Need for certified mechanics to perform major repairs:
3. Installation of improper parts by outside vendors dating back to January 15, 1999:
4. Lack of adequate funding for preventive maintenance:
5. No employee assigned the specific responsibility of overseeing a preventive maintenance program:
6. Inadequate preventive maintenance program that did not meet the manufacturer's recommendations:
7. Insufficient manpower in the Maintenance Division:
8. Antiquated record keeping:
9. Lack of a system to communicate apparatus related safety bulletins:
10. An inadequate driver's training program:
11. Lack of a comprehensive daily apparatus inspection program:
12. Failure to drain apparatus air tanks on a daily basis:
13. Lack of a periodic thorough and objective safety audit based upon NFPA 1500:
14. Insufficient maintenance of L-26's air supply, air compressor and air reservoir tanks, according to manufacturer's recommendations; and
15. Severely reduced braking force due to improper brake adjustment of both front brakes and the right rear brake, and nonexistent brake force at the left rear brake.

XII. BIOGRAPHY
FIRE LIEUTENANT KEVIN M. KELLEY

Fire Lieutenant Kevin M. Kelley
Date of Birth: March 4, 1956

Appointed to the Boston Fire Department on December 6, 1978
Assigned to Ladder Company 8 on February 15, 1979
Terminated from position due to Proposition 2 ½ layoffs on July 22, 1981
Reinstated to Firefighter and transferred to Headquarters on June 30, 1982
Transferred to Ladder Company 24 on August 25, 1982
Transferred to Engine Company 10 on January 22, 1983
Promoted to Fire Lieutenant and transferred to Headquarters on July 11, 1988
Transferred to Ladder Company 2 on September 28, 1988
Transferred to Engine Company 37 on April 29, 1989
Transferred to Ladder Company 26 on October 31, 1990

XIII. GLOSSARY

Aerial	1.) Another name for a ladder truck. 2.) The hydraulically powered ladder permanently affixed to a ladder truck.
Air Chamber	The part of an air brake system that converts air pressure force into mechanical push rod force which engages the brake shoes of the foundation brake system.
Apparatus	See "Fire Apparatus."
ASA	Automatic Slack Adjuster, the part of an air brake system designed to automatically adjust brakes.
BEMS	Boston Emergency Medical Services.
BFD	Boston Fire Department.
BFD/ICS	Boston Fire Department/Incident Command System.
BFD/SOC	Boston Fire Department/Special Operations Command.
Big-Dig Project	A nickname given to the multi-year, major, construction project that involved placing several lane-miles of roadway underground in downtown Boston.
Blueing	A brake disc that shows signs of blueing has been subjected to extremely high temperatures. This condition may be caused by continued hard stops or by brake system imbalance.
Board	Board of Inquiry.
BOI	Board of Inquiry, the eleven member body, appointed by the Fire Commissioner, responsible for investigating the fatal accident of January 9, 2009 involving Ladder Co. 26.
BPD	Boston Police Department.
Brake Caliper	The fixed component of a disc brake holding the pistons that apply an inward force to press the brake pads onto the rotor.
Brake Disc	See "Brake Rotor."
Brake Linings	The friction material, which contacts the brake disc (rotor), or brake drum to retard the vehicle's speed.

Brake Pads	The replaceable friction pads that pinch the brake rotor when the brakes are applied. Brake pads consist of a friction material bonded or riveted to a rigid backing plate.
Brake Rotor	Shiny metal disc that brake pads squeeze to stop the vehicle; hence the name disc brakes.
Brake Shoes	The curved pieces of metal on which brake linings are bonded. The shoes push the lining against the brake drum in order to slow and stop the truck.
C-7	Radio call sign for the Deputy Fire Chief in charge of Division 2.
CAD	Computer Aided Dispatch.
CDL	Commercial Driver's License.
Certified Fire Instructor	A Fire Instructor certified by the Massachusetts Fire Training Council.
CFO	Chief Financial Officer of the City of Boston.
Chauffeur	Firefighter assigned to drive and operate a piece of fire apparatus.
CISM	Critical Incident Stress Management Team of the Boston Fire Department.
Code "A"	A term, used within the BFD that refers to a motor vehicle accident involving a BFD vehicle.
Code "B"	A term, used within the BFD that refers to a breakdown of a department motor vehicle.
COO	Chief Operating Officer of the City of Boston.
Deputy Chief	A Fire Chief in charge of a Division.
Director of Transportation	The non-uniformed member of the BFD with direct and primary responsibility for the proper year-round maintenance of the BFD's fleet of 200+ vehicles. (This position was established on the BFD subsequent to the accident).
District Chief	A Fire Chief in charge of a District.
DP	Data Processing, a section of the Boston Fire Department
Driver	1.) Portable radio call sign of the member assigned as chauffeur of a ladder truck. 2.) Another name for a chauffeur of a piece of fire apparatus.
EAP	Employees Assistance Program.

EMT	Emergency Medical Technician
EP&P	Emergency Planning and Preparedness Division of the Boston Fire Department
Engine Company	Fire apparatus that carries up to 750 gallons of water, 2000 feet of hose, 1000 gpm (gallons per minute) pump, equipment and personnel.
E-One	Emergency One, Ocala, FL; manufacturer of fire apparatus.
EVOC	Emergency Vehicle Operator Course.
EVT	Emergency Vehicle Technician.
FAO	Fire Alarm Office.
FEMA	Federal Emergency Management Agency.
FFOP	Firefighter on Probation.
Fire Apparatus	A general fire service term for a motor vehicle fire truck; includes engines, aerial ladders, rescue vehicles, tower ladders, and others.
Fire Commissioner	Administrative Head of the Fire Department.
Firefighter	All uniformed personnel of the Fire Fighting Force, below the rank of Lieutenant.
FIU	Fire Investigation Unit of the Fire Prevention Division of the Boston Fire Department.
Fleet Safety Coordinator	The non-uniformed member of the BFD who directs the operation of the BFD's Fleet Maintenance Safety Program. (This position was established on the BFD subsequent to the accident.)
Form 5A	A generic BFD form used for reporting purposes.
FY	Fiscal Year
GAWR	Gross Axle Weight Rating
General Order	A directive issued by the Fire Commissioner.
GVWR	Gross Vehicle Weight Rating
IAFC	International Association of Fire Chiefs.

Incident Commander /IC	The person who assumes overall command and control of all personnel and equipment at an emergency. The person in this position may change as the incident escalates and as higher-ranking personnel arrive.
ICS	Incident Command System.
ICT	Incident Command Technician
ISD	Inspectional Services Division of the City of Boston.
Joint Safety Committee	Contractually referred to as the Health and Safety Committee; a committee established by mutual agreement between the Fire Commissioner and Boston Firefighters' Local 718 consisting of representatives of each party for the purpose of promoting and recommending sound health and safety practices and rules.
Jump Seat	The seats on a piece of fire apparatus located immediately behind the driver and officer positions. Some are forward facing, some are rear facing. In an open-cab design, these seats are rear facing; not entirely protected from the elements and not enclosed by means of a door and cab.
L-26	Ladder 26, the apparatus assigned to Ladder Co. 26 on January 9, 2009; a 1995 Emergency-One Four Door Tilt Cab, 110 foot Aerial Ladder, (VIN) 4ENDABA88S1004907, Massachusetts Registration FIRE 3710.
Ladder Company	Fire apparatus that carries a 110-foot aerial ladder, extension ladders, power and hand tools, forcible entry and extrication tools, EMS equipment and personnel.
LODD	Line-of-Duty Death.
Martensite Condition	This condition indicates that the brake disc (rotor) has been subjected to extremely high temperatures caused by an improperly balanced braking system, a dragging brake or continued severe brake applications. These extremely high temperatures cause structural changes to occur in the disc material, which makes it more susceptible to cracking.
Maxi-Brake	A common name for the emergency spring/parking brake system on a vehicle with air brakes.
MBTA	Massachusetts Bay Transit Authority.
MCT	Mobile Computer Terminal.

MGL	Massachusetts General Laws.
Motor Squad	Uniformed members of the BFD assigned to the Maintenance Division who perform specific fire-ground duties and emergency repairs and specified preventive maintenance on fire apparatus.
MOU	Memorandum of Understanding.
MVA	Motor Vehicle Accident.
NFIRS	National Fire Incident Reporting System.
NFPA	National Fire Protection Association; a nonprofit organization whose mission is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically based consensus codes and standards, research, training, and education.
NIOSH	National Institute for Occupational Safety and Health, an institute within the Center for Disease Control and Prevention.
NTSB	National Transportation Safety Board
Officer	A general term used to denote a firefighter that has been promoted to Lieutenant or Captain.
OOS	Out of Service.
Open-up Man	Portable radio call sign of the member assigned the position of open-up man on a ladder company.
PM	Preventive Maintenance.
Property Number	(Proposed) A number assigned to every piece of fire apparatus for inventory, maintenance and record keeping purposes that remains with the vehicle until it is retired from service.
Pumper/Pump	Another name for an engine.
R&R	Rules and Regulations of the Boston Fire Department.
Red Tag	(Proposed) A tag, red in color, affixed to a department motor vehicle on the driver's side door handle indicating the vehicle is out-of-service and stating the reason why.
Reserve Apparatus	A piece of fire apparatus that is placed in service on a temporary basis while the front-line piece of apparatus is out-of-service.
RIT	Rapid Intervention Team

Roof Man	Portable radio call sign of the member assigned the position of roof man on a ladder company.
Safety Chief	District Fire Chief assigned to the Safety Operational Unit.
Senior Firefighter	The member designated to assume charge of a company in the absence of a company officer.
SOP	Standard Operating Procedure.
SP	The initials that designate a spare pump; also known as a reserve engine.
Spare Apparatus/ Spare Piece	Another name for reserve apparatus.
Special Order	A directive issued by the Chief of Department.
ST	The initials that designate a spare truck; also known as a reserve ladder truck.
Technical Rescue Chief	A District Fire Chief specially trained in a number of technical rescue disciplines who commands a Technical Rescue Team.
Technical Rescue Company	A company specially trained in a number of technical rescue disciplines. There are seven such companies in the BFD, working as two teams, in groups of three and four companies respectively.
Technical Support Vehicle	Vehicles used to transport specialized equipment that is employed by Technical Rescue Teams.
Transit Police	The law enforcement arm of the MBTA.
Unified Command Post	The location from which an incident is managed by representatives of several agencies to assure that a consistent response plan is developed and deployed and that all actions are performed in a safe, well-coordinated manner.
UPFFA	Uniformed Professional Fire Fighters Association
VIN	Vehicle Identification Number.

XIV. APPENDIX

APPENDIX 'A'
LADDER COMPANY 26 APPARATUS BRAKE MAINTENANCE HISTORY

The apparatus assigned to Ladder Co. 26 on January 9, 2009 was a 1995 Emergency-One Hurricane Four Door Tilt Cab, 110 foot Aerial Ladder, with a front gross axle weight rating (GAWR) of 18,700 pounds and a rear GAWR of 30,250 pounds, with a total gross vehicle weight rating of 48,950 pounds. Vehicle Identification Number (VIN) 4ENDABA88S1004907, Massachusetts Registration FIRE 3710. The state inspection sticker was current with a date of March 28, 2008. The date Ladder 26 was placed in service was July 11, 1995.

The following is a chronological synopsis of the maintenance history of Ladder Co. 26, limited to maintenance on the air brake system.

NO.	DATE	EVENT/MAINTENANCE PERFORMED	WHERE PERFORMED
1.)	10/13/1997	Adjusted brakes.	Outside Vendor
2.)	01/15/1999	Replaced rear brake shoes, drums, and s-cams.	Outside Vendor
3.)	03/10/1999	Replaced front brake pads, rotors and overhauled the calipers.	Outside Vendor
4.)	07/26/2001	Adjusted brakes.	Outside Vendor
5.)	09/21/2001	Placed out of service (OOS). Needs brakes.	Motor Squad
6.)	09/25/2001	Replaced rear brake shoes, drums, and re-bushed cam shaft brackets on 2 rear wheels; Replaced front brake pads, remove, machine and install 2 front rotors.	Outside Vendor
7.)	10/17/2001	Air leak, needs air distribution block under front bumper, none in stock.	Motor Squad
8.)	11/08/2001	Air leak reported but unable to locate.	Motor Squad
9.)	11/19/2001	Replaced air line off compressor. Replaced front air junction box.	Motor Squad

NO.	DATE	EVENT/MAINTENANCE PERFORMED	WHERE PERFORMED
10.)	06/16/2002	Unable to adjust brakes placed OOS	Motor Squad
11.)	06/26/2002	Replaced front and rear automatic slack adjusters, (ASAs) replaced 2 type 30 front air brake chambers, replaced 2 type 36/36 air brake chambers, repaired cam shaft splines on rear wheels, adjusted brakes 4 wheels.	Outside Vendor
12.)	01/23/2003 (Day)	Replaced main air line to compressor	Motor Squad
13.)	01/23/2003 (Night)	Code B (Break Down) Spit valve on air dryer leaking, drained air tanks, leak stopped.	Motor Squad
14.)	08/07/2003	Unable to adjust rear brakes due to broken adjusting lock, removed and replaced, adjusted brakes.	Motor Squad
15.)	11/06/2003	Maxi-Brake not holding, adjusted brakes.	Motor Squad
16.)	11/18/2003	Maxi-Brake not holding, adjusted brakes.	Motor Squad
17.)	11/26/2003	OOS Steering gear and springs, Maxi-Brake not holding.	Motor Squad
18.)	12/11/2003	Replaced 2 type 30/36 air brake chambers. **(NOTE: The manufacturer's specifications calls for 36/36 air chambers)**	Outside Vendor
19.)	12/02/2004	Replaced rear brake shoes, drums, and re-bushed cam shaft brackets on 2 rear wheels.	Outside Vendor
20.)	10/24/2005	OOS for brakes.	Motor Squad

NO.	DATE	EVENT/MAINTENANCE PERFORMED	WHERE PERFORMED
21.)	10/31/2005	Replaced front brake pads, remove, machine and install 2 front rotors, replaced 2 front calipers, replaced 2 front and 2 rear ASAs. Replaced 2 front air chambers	Outside Vendor
22.)	01/24/2006	Code B (Break Down) Adjusted rear brakes.	Motor Squad
23.)	03/10/2006	Replaced right front air valve. Replaced air dryer cartridge.	Motor Squad
24.)	03/23/2006	Adjusted all brakes.	Motor Squad
25.)	07/01/2006	Adjusted rear brakes. Will need rear shoes soon.	Motor Squad
26.)	07/09/2006	Adjusted rear brakes. Needs brake job soon.	Motor Squad
27.)	08/07/2006	Adjusted brakes. Need brakes ASAP.	Motor Squad
28.)	08/22/2006	Code A (Accident), OOS, brakes failed.	Motor Squad
29.)	08/29/2006	Replaced front calipers, pads, rotors and air chambers. Replaced rear drums, shoes and s-cams.	Outside Vendor
30.)	11/19/2006	Adjusted rear brakes. Holding now.	Motor Squad
31.)	12/10/2006	Code B (Break Down) adjusted brakes, replaced left front brake air line.	Motor Squad
32.)	01/09/2007	Adjusted brakes.	Outside Vendor
33.)	03/03/2007	Adjusted Maxi-Brakes.	Motor Squad
34.)	04/15/2007	Right front rotor broken off hub housing. Placed OOS.	Motor Squad

NO.	DATE	EVENT/MAINTENANCE PERFORMED	WHERE PERFORMED
35.)	04/18/2007	Replaced front disc pads, rotors and calipers.	Outside Vendor
36.)	03/12/2008	Adjusted all 4 brakes	Motor Squad
37.)	03/27/2008	Replaced front disc pads, replaced rear brake drums and shoes.	Outside Vendor
38.)	05/16/2008	Adjusted brakes.	Motor Squad
39.)	10/14/2008	Major air leak at dump valve, replaced brake hose.	Outside Vendor

APPENDIX 'B'

REGISTRY DIVISION OF THE CITY OF BOSTON

COUNTY OF SUFFOLK, COMMONWEALTH OF MASSACHUSETTS, UNITED STATES OF AMERICA

Certificate R № 81937

I, the undersigned, hereby certify that I hold the office of ..... City Registrar of the City of Boston and I certify the following facts appear on the records of Births, Marriages and Deaths kept in said City as required by law.

The Commonwealth of Massachusetts
MEDICAL EXAMINER'S CERTIFICATE OF DEATH
REGISTRY OF VITAL RECORDS AND STATISTICS

OCME CASE NUMBER: 2009-781
REGISTERED NUMBER: 000240
STATE USE ONLY

1 DECEDENT – NAME FIRST: Kevin
MIDDLE: M
LAST: Kelley
2 SEX: M
3 DATE OF DEATH (Mo., Day, Yr.): January 9, 2009

4a PLACE OF DEATH (City/Town): Boston
4b COUNTY OF DEATH: Suffolk
4c HOSPITAL OR OTHER INSTITUTION – Name (If not in either, give street and number): 835 Huntington Avenue

5 PLACE OF DEATH (Check only one): ☐ DOA ☐ Other: ☐ Nursing Home ☐ Residence ☒ Other (specify): In Fire Truck
6 SOCIAL SECURITY NUMBER: [redacted]
7 IF US WAR VETERAN Specify War: Vietnam

8a DECEDENT OF HISPANIC ORIGIN? (If yes, specify):
8b RACE (specify): White
9 EDUCATION (highest grade completed): Elem-Sec (0-12): 12 College (1-4, 5+):

10a Date of Birth: MOS / DAYS / YRS / MINS: 52
10b DATE OF BIRTH (Mo., Day, Yr.): March 4, 1956
11 BIRTHPLACE (City and State or Foreign Country): Boston, MA

12 MARRIED, NEVER MARRIED, WIDOWED OR DIVORCED: Married
13 LAST SPOUSE (full name at birth or adoption): [redacted]
14a USUAL OCCUPATION (Prior, if retired): Lieutenant
14b TYPE OF BUSINESS/INDUSTRY: Boston Fire Dept.

15a RESIDENCE – No. and Street, City/Town, County, State/Country: [redacted] A
15b Zip Code: 02170

16 FATHER'S NAME & PLACE OF BIRTH: Thomas J. Kelley
17 STATE OF BIRTH (If not in US, name country): MA
18 MOTHER – full name at birth or adoption: Margaret B. Grant
19 STATE OF BIRTH (If not in U.S. name country): MA

20 INFORMANT'S NAME: [redacted]
21 MAILING ADDRESS: [redacted]
22 RELATIONSHIP: Wife

23 METHOD OF IMMEDIATE DISPOSITION: ☐ Burial ☐ Cremation ☐ Removal from State ☐ Donation ☐ Other
24 FUNERAL SERVICE LICENSEE OR OTHER DESIGNEE: Edward J. Keohane
25 LICENSE #: 5343

25a PLACE OF DISPOSITION (Name of cemetery, crematory, or other): Cedar Grove Cemetery
25b LOCATION (City/Town/State): Boston, MA

25c DATE OF DISPOSITION (Mo., Day, Yr.): January 14, 2009
25d NAME AND ADDRESS OF FACILITY OR OTHER DESIGNEE: Keohane Funeral Home, 785 Hancock St., Quincy, MA 02170

PART I – CAUSE OF DEATH – SEQUENTIALLY LIST IMMEDIATE CAUSE THEN ANTECEDENT CAUSES THEN UNDERLYING CAUSE

		APPX INTERVAL
a. Immediate Cause	BLUNT FORCE TRAUMATIC INJURIES TO HEAD	MINUTES
b. Due to		
c. Due to		
d. Due to		

PART II – OTHER SIGNIFICANT CONDITIONS CONTRIBUTING TO DEATH
31 AUTOPSY? ☐ Yes ☐ No: Yes

32 MANNER OF DEATH: Natural ☐ / Accident ☑ / Pending Investigation ☐ / Homicide ☐ / Suicide ☐ / Could not be determined ☐
33a DATE OF INJURY: Jan 09, 2009
33b TIME OF INJURY: UNKNOWN AM PM
33c INJURY AT WORK? ☐ Yes ☐ No: Yes

34 DESCRIBE HOW INJURY OCCURRED: FIREFIGHTER IN FIRE TRUCK WHICH STRUCK A BUILDING
34a PLACE OF INJURY (Type): BUILDING
35 LOCATION/ADDRESS OF INJURY: 835 HUNTINGTON AVENUE, BOSTON, MA

36 MEDICAL EXAMINER CERTIFICATION
37c APPX TIME OF DEATH: 02:49 PM
37d DATE PRONOUNCED: January 09, 2009
39 LICENSE #: 28405
37e TIME PRONOUNCED: 02:49 PM AM PM
(Name and Address): EARL KASDON, M.D., 720 ALBANY STREET, BOSTON, MA.02118
On the basis of examination and/or investigation in my opinion death occurred at the time, date, and place and due to the cause(s) stated.
Signature: for: Earl Kasdon ☑ MD ☐ DO
37b DATE SIGNED: January 10, 2009

38 IN FAVOR OF ORGAN DONEMENT? ☐ Yes ☐ No: No
40b IF YES, DATE
40c IF YES, TIME AM PM
40d NAME OF PRONOUNCER
TITLE: ☐ RN ☐ PA ☐ NP

41 DATE BURIAL PERMIT ISSUED: January 12, 2009 194
42 RECEIVED IN CITY/TOWN OF: BOSTON
43 DATE OF RECORD: JAN 16 2009
BURIAL AGENT SIGNATURE: Joyce Reynolds
CLERK'S SIGNATURE: [signature]

ther hereby certify that by annex- the Records of the following- l cities and towns are in the ly of the City Registrar of :—

	ANNEXED
oston	1637
Boston	1804
ry	1868
ester	1870
stown / on	1874
oxbury	
Park	1912

WITNESS my hand and the SEAL of the CITY REGISTRAR

on this NOV 19 2009 Day of ..... A.D.

[signature] City Registrar

By Chapter 314 of the Acts of 1892, "the certificates or attestations of the Assistant City Registrars shall have the same force and effect as that of the City Registrar."

APPENDIX ‘C’

NFIRS REPORT INCIDENT #09-001897

A

FDID ★	State ★	MM Incident Date ★	DD	YYYY	Station	Incident Number ★	Exposure ★
25035	MA	01	09	2009		09-0001897	000

☐ Delete ☐ Change ☐ No Activity

NFIRS -1 Basic

B Location★

☐ Check this box to indicate that the address for this incident is provided on the Wildland Fire Module in Section B "Alternative Location Specification"; use only for Wildland fires.

Census Tract ____ - ____

☒ Street address
☐ Intersection
☐ In front of
☐ Rear of
☐ Adjacent to
☐ Directions

Number/Milepost	Prefix	Street or Highway	Street Type	Suffix
000835		HUNTINGTON	AV	

Apt./Suite/Room	City	State	Zip Code
	Boston	MA	02115 -

Cross street or directions, as applicable

C Incident Type ★

352 Extrication of victim(s) from vehicle
Incident Type

D Aid Given or Received★

1 ☐ Mutual aid received
2 ☐ Automatic aid recv.
3 ☐ Mutual aid given
4 ☐ Automatic aid given
5 ☐ Other aid given
N ☒ None

Their FDID | Their State
Their Incident Number

E1 Date & Times

Midnight is 0000

Check boxes if same as Alarm Date.

	Month	Day	Year	Hr Min Sec
ALARM always required				
Alarm ★	01	09	2009	14:35:16
ARRIVAL required, unless canceled or did not arrive				
☐ Arrival ★	01	09	2009	14:35:27
CONTROLLED Optional, Except for wildland fires				
☐ Controlled				
LAST UNIT CLEARED, required except for wildland fires				
☐ Last Unit Cleared	01	10	2009	02:54:40

E2 Shift & Alarms

Local Option

Shift or Platoon	Alarms	District
		05

E3 Special Studies

Local Option

Special Study ID# | Special Study Value

F Actions Taken ★

22 Rescue, remove from harm
Primary Action Taken (1)

24 Recover body
Additional Action Taken (2)

30 Emergency medical services, Other
Additional Action Taken (3)

G1 Resources ★

☐ Check this box and skip this section if an Apparatus or Personnel form is used.

	Apparatus	Personnel
Suppression	0034	0001
EMS		
Other		

☐ Check box if resource counts include aid received resources.

G2 Estimated Dollar Losses & Values

LOSSES: Required for all fires if known. Optional for non fires.

		None
Property	$ ____ , 000 , 000	☐
Contents	$ ____ , 000 , 000	☐

PRE-INCIDENT VALUE: Optional

Property	$ ____ , 000 , 000	☐
Contents	$ ____ , 000 , 000	☐

Completed Modules

☐ Fire-2
☐ Structure-3
☐ Civil Fire Cas.-4
☒ Fire Serv. Cas.-5
☐ EMS-6
☐ HazMat-7
☐ Wildland Fire-8
☒ Apparatus-9
☒ Personnel-10
☐ Arson-11

H1★ Casualties ☐ None

	Deaths	Injuries
Fire Service	001	003
Civilian		

H2 Detector

Required for Confined Fires.

1 ☐ Detector alerted occupants
2 ☐ Detector did not alert them
U ☐ Unknown

H3 Hazardous Materials Release

N ☐ None
1 ☐ Natural Gas: slow leak, no evacuation or HazMat actions
2 ☐ Propane gas: <21 lb. tank (as in home BBQ grill)
3 ☐ Gasoline: vehicle fuel tank or portable container
4 ☐ Kerosene: fuel burning equipment or portable storage
5 ☐ Diesel fuel/fuel oil: vehicle fuel tank or portable
6 ☐ Household solvents: home/office spill, cleanup only
7 ☐ Motor oil: from engine or portable container
8 ☐ Paint: from paint cans totaling < 55 gallons
0 ☐ Other: Special HazMat actions required or spill > 55gal., Please complete the HazMat form

I Mixed Use Property

NN ☐ Not Mixed
10 ☐ Assembly use
20 ☐ Education use
33 ☐ Medical use
40 ☐ Residential use
51 ☐ Row of stores
53 ☐ Enclosed mall
58 ☐ Bus. & Residential
59 ☐ Office use
60 ☐ Industrial use
63 ☐ Military use
65 ☐ Farm use
00 ☐ Other mixed use

J Property Use★ Structures

131 ☐ Church, place of worship
161 ☐ Restaurant or cafeteria
162 ☐ Bar/Tavern or nightclub
213 ☐ Elementary school or kindergarten
215 ☐ High school or junior high
241 ☐ College, adult education
311 ☐ Care facility for the aged
331 ☐ Hospital
341 ☐ Clinic,clinic type infirmary
342 ☐ Doctor/dentist office
361 ☐ Prison or jail, not juvenile
419 ☐ 1-or 2-family dwelling
429 ☐ Multi-family dwelling
439 ☐ Rooming/boarding house
449 ☐ Commercial hotel or motel
459 ☐ Residential, board and care
464 ☐ Dormitory/barracks
519 ☐ Food and beverage sales
539 ☐ Household goods,sales,repairs
579 ☐ Motor vehicle/boat sales/repair
571 ☐ Gas or service station
599 ☐ Business office
615 ☐ Electric generating plant
629 ☐ Laboratory/science lab
700 ☐ Manufacturing plant
819 ☐ Livestock/poultry storage(barn)
882 ☐ Non-residential parking garage
891 ☐ Warehouse

Outside

124 ☐ Playground or park
655 ☐ Crops or orchard
669 ☐ Forest (timberland)
807 ☐ Outdoor storage area
919 ☐ Dump or sanitary landfill
931 ☐ Open land or field
936 ☐ Vacant lot
938 ☐ Graded/care for plot of land
946 ☐ Lake, river, stream
951 ☐ Railroad right of way
960 ☒ Other street
961 ☐ Highway/divided highway
962 ☐ Residential street/driveway
981 ☐ Construction site
984 ☐ Industrial plant yard

Lookup and enter a Property Use code only if you have NOT checked a Property Use box:

Property Use 960

Street, Other

NFIRS-1 Revision 03/11/99

Boston Fire Department 25035 01/09/2009 09-0001897

K1 Person/Entity Involved
Local Option

Business name (if applicable) | Area Code - Phone Number

☐ Check This Box if same address as incident location. Then skip the three duplicate address lines.

Mr.,Ms., Mrs. | First Name | MI | Last Name: NONE | Suffix: X

Number | Prefix | Street or Highway | Street Type | Suffix

Post Office Box | Apt./Suite/Room | City

State | Zip Code

☐ **More people involved? Check this box and attach Supplemental Forms (NFIRS-1S) as necessary**

K2 Owner ☐ Same as person involved? Then check this box and skip The rest of this section.
Local Option

Business name (if Applicable) | Area Code - Phone Number

☐ Check this box if same address as incident location. Then skip the three duplicate address lines.

Mr.,Ms., Mrs. | First Name | MI | Last Name | Suffix

Number | Prefix | Street or Highway | Street Type | Suffix

Post Office Box | Apt./Suite/Room | City

State | Zip Code

L Remarks
Local Option

Ladder 26 called off Code "A" returning from incident # 09-0001892 Ladder 26 had struck 2 parked cars, a brick fence and an exterior wall of 835 Huntington Ave. The front cab of L26 went inside the building trapping the driver and officer, both needed to be extricated. Additional Apparatus and personnel were requested for extrication and shoring of building. The driver, [redacted] was transported to Brigham's and Women's Hospital. Acting Captain Kevin M. Kelley, was pronounced dead approximately 5 minutes after my arrival by the paramedic on scene, was transported to city morgue. Passengers [redacted] (body trama) and [redacted] (fractured leg) were transported to Beth Israel Hospital.

L Authorization

Officer in charge ID	Signature	Position or rank	Assignment	Month	Day	Year
[redacted]	[redacted]	DEP	DV2	01	23	2009

☐ Check Box if same as Officer in charge.

Member making report ID	Signature	Position or rank	Assignment	Month	Day	Year
[redacted]	[redacted]	FCP	L26	01	17	2009

Boston Fire Department 25035 01/09/2009 09-0001897

FDID ★	State ★	MM	DD	YYYY	Station	Incident Number ★	Exposure ★	Complete Narrative
25035	MA	1	9	2009		09-0001897	000	

Narrative:

Ladder 26 called off Code "A" returning from incident # 09-0001892 Ladder 26 had struck 2 parked cars, a brick fence and an exterior wall of 835 Huntington Ave. The front cab of L26 went inside the building trapping the driver and officer, both needed to be extricated. Additional Apparatus and personnel were requested for extrication and shoring of building. The driver, [redacted] was transported to Brigham's and Women's Hospital. Acting Captain Kevin M. Kelley, was pronounced dead approximately 5 minu[redacted] by the paramedic [redacted] body trama) and [redacted] (fractured leg) were transported to B[redacted].

A

FDID ★	State ★	Incident Date ★ (MM / DD / YYYY)	Station	Incident Number ★	Exposure ★	Delete / Change
25035	MA	1 / 9 / 2009		09-0001897	0000	☐ Delete ☐ Change

NFIRS - 5
Fire Service
Casualty

B Injured Person

Identification Number

1 [X] Male ★ 1 [X] Career
2 [ ] Female 2 [ ] Volunteer

First Name: Kevin | MI: M | Last Name: Kelley | Suffix:

C Casualty Number ★

Casualty Number: 1

D Age or Date of Birth ★

Age: 52 In years **OR** Date Of Birth: [redacted] Month Day Year

E Date & Time of Injury Midnight is 0000.

Date of Injury: 1 Month, 9 Day, 2009 Year
Time of Injury: 14:35:16 Hour Minutes

F Responses

0
Number of prior responses during past 24 hours

G1 Usual Assignment

1 [ ] Suppression
2 [ ] EMS
3 [ ] Prevention
4 [ ] Training
5 [ ] Maintenance
6 [ ] Communications
7 [ ] Administration
8 [ ] Fire investigation
0 [ ] Other

G2 Physical Condition Just Prior To Injury

1 [ ] Rested
2 [ ] Fatigued
4 [ ] ILL or Injured
0 [ ] Other
U [ ] Undetermined

G3 Severity

1 [ ] Report only, including exposure
2 [ ] First aid only
3 [ ] Treated by physician (no lost time)
4 [ ] Moderate (lost time)
5 [ ] Severe (lost time)
6 [ ] Life threatening (lost time)
7 [X] Death

G4 Taken To

1 [ ] Hospital
4 [ ] Doctor's office
5 [X] Morgue/funeral home
6 [ ] Residence
7 [ ] Station or quarters
0 [ ] Other
N [ ] Not transported

G5 Activity at Time of Injury

14 Riding fire department vehicle
Activity at time of injury

H1 Primary Apparent Symptom

21 Cut or laceration
Primary apparent symptom

H2 Primary Area of Body Injured

10 Head, Other
Primary injured body part or area

I1 Cause of Firefighter Injury

6 Contact with object (firefighter moved into/onto)
Cause of Injury

I2 Factor Contributing to Injury

63 Vehicle collided with nonvehicular object
Contributing Factor

I3 Object Involved in Injury

[ ] None

36 Wall, including other v
Object involved in injury

J1 Where Injury Occurred

1 [ ] Enroute to FD Location
2 [ ] At FD location
3 [ ] Enroute to incident scene
4 [ ] Enroute to medical facility
5 [ ] At scene in structure
6 [ ] At scene outside
7 [ ] At medical facility
8 [X] Returning from incident
9 [ ] Returning from med facility
0 [ ] Other

J2 Story Where Injury Occurred

1 [ ] Check this box and enter the story if the injury occurred inside or on a structure
[ ] Story of Injury [ ] Below grade
2 [ ] Injury occurred outside

J3 Specific Location Complete as Applicable

65 [ ] In aircraft
64 [ ] In boat or ship or barge
63 [ ] In rail vehicle
61 [X] In motor vehicle
54 [ ] In sewer
53 [ ] In tunnel
49 [ ] In structure
45 [ ] In attic
36 [ ] In water
35 [ ] In well
34 [ ] In ravine
33 [ ] In quarry or mine
32 [ ] In ditch or trench
31 [ ] In open pit
28 [ ] On steep grade
27 [ ] On fire escape/outside stairs
26 [ ] On vertical surface or ledge
25 [ ] On ground ladder
24 [ ] On aerial ladder or in basket
23 [ ] On roof
22 [ ] Outside at grade
00 [ ] Other

J4 Vehicle Type Complete ONLY if Specific Location code is>60

1 [X] Suppression vehicle
2 [ ] EMS vehicle
3 [ ] Other FD vehicle
4 [ ] Non-FD vehicle

Remarks

If protective equipment failed and was a factor in this injury, please complete the other side of this form.

NFIRS-5 Revision 8/18/99

Boston Fire Department 25035 01/09/2009 09-0001897

A

FDID ★	State ★	MM Incident Date ★	DD	YYYY	Station	Incident Number ★	Exposure ★	Delete / Change
25035	MA	1	9	2009		09-0001897	0000	

NFIRS - 5
Fire Service
Casualty

B Injured Person — 1 [X] Male ★ 1 [X] Career

Driver

C Casualty Number ★ — 2 (Casualty Number)

D Age or Date of Birth ★

Age: 24 (In years) **OR** Date Of Birth: [redacted] (Month Day Year)

E Date & Time of Injury — Midnight is 0000.

Date of Injury: 1 (Month) 9 (Day) 2009 (Year)
Time of Injury: 14:35:16 (Hour Minutes)

F Responses — 0 (Number of prior responses during past 24 hours)

G1 Usual Assignment

- 1 [ ] Suppression
- 2 [ ] EMS
- 3 [ ] Prevention
- 4 [ ] Training
- 5 [ ] Maintenance
- 6 [ ] Communications
- 7 [ ] Administration
- 8 [ ] Fire investigation
- 0 [ ] Other

G2 Physical Condition Just Prior To Injury

- 1 [ ] Rested
- 2 [ ] Fatigued
- 4 [ ] ILL or Injured
- 0 [ ] Other
- U [ ] Undetermined

G3 Severity

- 1 [ ] Report only, including exposure
- 2 [ ] First aid only
- 3 [ ] Treated by physician (no lost time)
- 4 [ ] Moderate (lost time)
- 5 [X] Severe (lost time)
- 6 [ ] Life threatening (lost time)
- 7 [ ] Death

G4 Taken To

- 1 [X] Hospital
- 4 [ ] Doctor's office
- 5 [ ] Morgue/funeral home
- 6 [ ] Residence
- 7 [ ] Station or quarters
- 0 [ ] Other
- N [ ] Not transported

G5 Activity at Time of Injury

12 — Driving fire department vehicle (Activity at time of injury)

H1 Primary Apparent Symptom

21 — Cut or laceration (Primary apparent symptom)

H2 Primary Area of Body Injured

10 — Head, Other (Primary injured body part or area)

I1 Cause of Firefighter Injury

6 — Contact with object (firefighter moved into/onto) (Cause of Injury)

I2 Factor Contributing to Injury

63 — Vehicle collided with nonvehicular object (Contributing Factor)

I3 Object Involved in Injury

[ ] None

36 — Wall, including other v (Object involved in injury)

J1 Where Injury Occurred

- 1 [ ] Enroute to FD Location
- 2 [ ] At FD location
- 3 [ ] Enroute to incident scene
- 4 [ ] Enroute to medical facility
- 5 [ ] At scene in structure
- 6 [ ] At scene outside
- 7 [ ] At medical facility
- 8 [X] Returning from incident
- 9 [ ] Returning from med facility
- 0 [ ] Other

J2 Story Where Injury Occurred

- 1 [ ] Check this box and enter the story if the injury occurred inside or on a structure
  - [ ] Story of Injury — [ ] Below grade
- 2 [ ] Injury occurred outside

J3 Specific Location — Complete as Applicable

- 65 [ ] In aircraft
- 64 [ ] In boat or ship or barge
- 63 [ ] In rail vehicle
- 61 [X] In motor vehicle
- 54 [ ] In sewer
- 53 [ ] In tunnel
- 49 [ ] In structure
- 45 [ ] In attic
- 36 [ ] In water
- 35 [ ] In well
- 34 [ ] In ravine
- 33 [ ] In quarry or mine
- 32 [ ] In ditch or trench
- 31 [ ] In open pit
- 28 [ ] On steep grade
- 27 [ ] On fire escape/outside stairs
- 26 [ ] On vertical surface or ledge
- 25 [ ] On ground ladder
- 24 [ ] On aerial ladder or in basket
- 23 [ ] On roof
- 22 [ ] Outside at grade
- 00 [ ] Other

J4 Vehicle Type — Complete ONLY if Specific Location code is>60

- 1 [X] Suppression vehicle
- 2 [ ] EMS vehicle
- 3 [ ] Other FD vehicle
- 4 [ ] Non-FD vehicle

Remarks

If protective equipment failed and was a factor in this injury, please complete the other side of this form.

NFIRS-5 Revision 8/18/99

Boston Fire Department 25035 01/09/2009 09-0001897

A

FDID ★	State ★	MM Incident Date ★	DD Incident Date ★	YYYY Incident Date ★	Station	Incident Number ★	Exposure ★	Delete / Change
25035	MA	1	9	2009		09-0001800000000		☐ Delete ☐ Change

NFIRS - 5
Fire Service
Casualty

B Injured Person — 1 [X] Male ★ 1 [X] Career

Open-up Man

C Casualty Number ★ — 3 (Casualty Number)

D Age or Date of Birth ★

Age: 46 (In years) **OR** Date Of Birth: [redacted] (Month Day Year)

E Date & Time of Injury — Midnight is 0000.

Date of Injury: 1 (Month) 9 (Day) 2009 (Year)
Time of Injury: 14:35:16 (Hour Minutes)

F Responses — 0 (Number of prior responses during past 24 hours)

G1 Usual Assignment

- 1 ☐ Suppression
- 2 ☐ EMS
- 3 ☐ Prevention
- 4 ☐ Training
- 5 ☐ Maintenance
- 6 ☐ Communications
- 7 ☐ Administration
- 8 ☐ Fire investigation
- 0 ☐ Other

G2 Physical Condition Just Prior To Injury

- 1 ☐ Rested
- 2 ☐ Fatigued
- 4 ☐ ILL or Injured
- 0 ☐ Other
- U ☐ Undetermined

G3 Severity

- 1 ☐ Report only, including exposure
- 2 ☐ First aid only
- 3 ☐ Treated by physician (no lost time)
- 4 ☐ Moderate (lost time)
- 5 [X] Severe (lost time)
- 6 ☐ Life threatening (lost time)
- 7 ☐ Death

G4 Taken To

- 1 [X] Hospital
- 4 ☐ Doctor's office
- 5 ☐ Morgue/funeral home
- 6 ☐ Residence
- 7 ☐ Station or quarters
- 0 ☐ Other
- N ☐ Not transported

G5 Activity at Time of Injury

14 — Riding fire department vehicle (Activity at time of injury)

H1 Primary Apparent Symptom

33 — Strain or sprain (Primary apparent symptom)

H2 Primary Area of Body Injured

21 — Neck (Primary injured body part or area)

I1 Cause of Firefighter Injury

6 — Contact with object (firefighter moved into/onto) (Cause of Injury)

I2 Factor Contributing to Injury

63 — Vehicle collided with nonvehicular object (Contributing Factor)

I3 Object Involved in Injury

☐ None

36 — Wall, including other v (Object involved in injury)

J1 Where Injury Occurred

- 1 ☐ Enroute to FD Location
- 2 ☐ At FD location
- 3 ☐ Enroute to incident scene
- 4 ☐ Enroute to medical facility
- 5 ☐ At scene in structure
- 6 ☐ At scene outside
- 7 ☐ At medical facility
- 8 [X] Returning from incident
- 9 ☐ Returning from med facility
- 0 ☐ Other

J2 Story Where Injury Occurred

- 1 ☐ Check this box and enter the story if the injury occurred inside or on a structure
  - ____ (Story of Injury) ☐ Below grade
- 2 ☐ Injury occurred outside

J3 Specific Location — Complete as Applicable

- 65 ☐ In aircraft
- 64 ☐ In boat or ship or barge
- 63 ☐ In rail vehicle
- 61 [X] In motor vehicle
- 54 ☐ In sewer
- 53 ☐ In tunnel
- 49 ☐ In structure
- 45 ☐ In attic
- 36 ☐ In water
- 35 ☐ In well
- 34 ☐ In ravine
- 33 ☐ In quarry or mine
- 32 ☐ In ditch or trench
- 31 ☐ In open pit
- 28 ☐ On steep grade
- 27 ☐ On fire escape/outside stairs
- 26 ☐ On vertical surface or ledge
- 25 ☐ On ground ladder
- 24 ☐ On aerial ladder or in basket
- 23 ☐ On roof
- 22 ☐ Outside at grade
- 00 ☐ Other

J4 Vehicle Type — Complete ONLY if Specific Location code is>60

- 1 [X] Suppression vehicle
- 2 ☐ EMS vehicle
- 3 ☐ Other FD vehicle
- 4 ☐ Non-FD vehicle

Remarks

If protective equipment failed and was a factor in this injury, please complete the other side of this form.

NFIRS-5 Revision 8/18/99

Boston Fire Department 25035 01/09/2009 09-0001897

A

FDID ★	State ★	MM Incident Date ★	DD	YYYY	Station	Incident Number ★	Exposure ★	Delete / Change
25035	MA	1	9	2009		09-0001897	0000	

NFIRS - 5
Fire Service
Casualty

B Injured Person — 1 [X] Male ★ 1 [X] Career

Roof Man

C Casualty Number ★: 4

D Age or Date of Birth ★

Age: 31 In years **OR** Date Of Birth: [redacted] Month Day Year

E Date & Time of Injury — Midnight is 0000.

Date of Injury: 1 Month, 9 Day, 2009 Year
Time of Injury: 14:35:16 Hour Minutes

F Responses: 0 — Number of prior responses during past 24 hours

G1 Usual Assignment

1 [ ] Suppression
2 [ ] EMS
3 [ ] Prevention
4 [ ] Training
5 [ ] Maintenance
6 [ ] Communications
7 [ ] Administration
8 [ ] Fire investigation
0 [ ] Other

G2 Physical Condition Just Prior To Injury

1 [ ] Rested
2 [ ] Fatigued
4 [ ] ILL or Injured
0 [ ] Other
U [ ] Undetermined

G3 Severity

1 [ ] Report only, including exposure
2 [ ] First aid only
3 [ ] Treated by physician (no lost time)
4 [ ] Moderate (lost time)
5 [X] Severe (lost time)
6 [ ] Life threatening (lost time)
7 [ ] Death

G4 Taken To

1 [X] Hospital
4 [ ] Doctor's office
5 [ ] Morgue/funeral home
6 [ ] Residence
7 [ ] Station or quarters
0 [ ] Other
N [ ] Not transported

G5 Activity at Time of Injury

14 Riding fire department vehicle
Activity at time of injury

H1 Primary Apparent Symptom

32 Fracture
Primary apparent symptom

H2 Primary Area of Body Injured

71 Leg, upper
Primary injured body part or area

I1 Cause of Firefighter Injury

6 Contact with object (firefighter moved into/onto)
Cause of Injury

I2 Factor Contributing to Injury

63 Vehicle collided with nonvehicular object
Contributing Factor

I3 Object Involved in Injury

[ ] None

36 Wall, including other v
Object involved in injury

J1 Where Injury Occurred

1 [ ] Enroute to FD Location
2 [ ] At FD location
3 [ ] Enroute to incident scene
4 [ ] Enroute to medical facility
5 [ ] At scene in structure
6 [ ] At scene outside
7 [ ] At medical facility
8 [X] Returning from incident
9 [ ] Returning from med facility
0 [ ] Other

J2 Story Where Injury Occurred

1 [ ] Check this box and enter the story if the injury occurred inside or on a structure
[ ] Story of Injury [ ] Below grade
2 [ ] Injury occurred outside

J3 Specific Location — Complete as Applicable

65 [ ] In aircraft
64 [ ] In boat or ship or barge
63 [ ] In rail vehicle
61 [X] In motor vehicle
54 [ ] In sewer
53 [ ] In tunnel
49 [ ] In structure
45 [ ] In attic
36 [ ] In water
35 [ ] In well
34 [ ] In ravine
33 [ ] In quarry or mine
32 [ ] In ditch or trench
31 [ ] In open pit
28 [ ] On steep grade
27 [ ] On fire escape/outside stairs
26 [ ] On vertical surface or ledge
25 [ ] On ground ladder
24 [ ] On aerial ladder or in basket
23 [ ] On roof
22 [ ] Outside at grade
00 [ ] Other

J4 Vehicle Type — Complete ONLY if Specific Location code is>60

1 [X] Suppression vehicle
2 [ ] EMS vehicle
3 [ ] Other FD vehicle
4 [ ] Non-FD vehicle

Remarks

If protective equipment failed and was a factor in this injury, please complete the other side of this form.

NFIRS-5 Revision 8/18/99

Boston Fire Department 25035 01/09/2009 09-0001897

FDID	State	Incident Date			Station	Incident Number	Exposure	Responding Units/Personnel
25035	MA	1	9	2009		09-0001897	000	

Unit	Notify Time	Enroute Time	Arrival Time	Cleared Time
A16F Union Local 718 President [redacted]	15:01:40	15:01:40	15:01:40	22:56:59
Staff ID\Staff Name	Activity	Rank	Position	Role
	15:25:09	15:25:09	15:59:00	22:56:59
Staff ID\Staff Name	Activity	Rank	Position	Role
[redacted]				
Staff ID\Staff Name	Activity	Rank	Position	Role
C1F Fire Commissioner Roderick Fraser	14:52:28	14:52:28	15:59:00	22:56:59
Staff ID\Staff Name	Activity	Rank	Position	Role
C22 Public Information Officer [redacted]		14:51:12	14:51:12	22:25:12
Staff ID\Staff Name	Activity	Rank	Position	Role
C6F Deputy Fire Chief, Division 1	14:54:22	14:58:00	14:59:10	14:59:10
Staff ID\Staff Name	Activity	Rank	Position	Role
C7F Deputy Fire Chief, Division 2	14:35:49	14:35:49	14:47:14	22:39:32
Staff ID\Staff Name	Activity	Rank	Position	Role
[redacted]	On Duty	Deputy Fire		

25035	MA	1	9	2009		09-0001897	000	Responding Units/Personnel
FDID	State	Incident Date			Station	Incident Number	Exposure	

Unit Narrative

In quarters and heard frantic radio message from L-26 which stated they had struck a building. Arrived on scene at 14:47 and assumed command.

My immediate impression was L-26 had loss brakes or control coming down Parker Hill Avenue and crossed Huntington Ave. crashed through a ten foot high brick wall and into a building. R-2 was on scene and requested R-1. This transmission alerted everyone that it was a serious accident. District 9 [redacted]-technical rescue chief) and E-42 were on scene when I arrived, along with D-5, [redacted] and E-37. 835 Huntington is a high rise with approximately 137 units fully occupied. Ladder 26 had caused serious damage to the first floor front rooms. A large heating pipe and sprinkler pipe were damaged and the electrical system was compromised. Building maintenance immediately shut off all electrical power, water, and the heating system.

My immediate concerns were members of L-26 who may be trapped in the vehicle. The first report was the driver, [redacted] L-26, was seriously injured. He needed to be stabilized and removed. R-2, [redacted] in charge, and R-1 [redacted] were in the process of stabilizing and treating FF [redacted]. The other member in the front seat was unconscious and seriously injured. A paramedic from EMS declared him dead at the scene. Confusion on scene on who was assigned to L-26. I had a current copy of the Divisions Unit Roster and reported Lt. Kevin Kelley was in the front seat and FF [redacted] L-28, and FF [redacted] E-20, were the other members on the day tour. One member had been transported and the other was located by [redacted] D-9, inside. He was injured and appeared to be in a state of shock. It took approximately 20 to 25 minutes to remove [redacted] from the cab of L-26 and place him in an ambulance. Technical rescue teams, under the supervision of [redacted] and Safety Chief [redacted], removed dangerous debris and stabilized the impact zone. It then became a police investigation under the homicide division. Only the police were allowed to take photos; they did not want duplicates.

We then pulled all department members back, setting up a collapse zone. We did not evacuate the entire building, only residents who requested it. With the elevators out of service I determined it would be safer and easier to leave residents in place. One problem we had to deal with people trapped in the elevator on the 4th floor. Under the supervision of A/DFC [redacted] D-5 Engine 28 forced open the doors and safely removed the trapped people. In the process, FF [redacted] injured his foot and was transported by EMS to the hospital.

Set up a Unified Command Post with Boston Police and EMS to coordinate all activities and information that would be given to the media. Other agencies immediately notified: MBTA, building department, and building management. Representative from inspectional services arrived and I requested a structural engineer to evaluate integrity of building. [redacted] ass't commissioner, arrived and informed me that the city subcontracted an engineering firm to evaluate buildings not him. He stated there may be a conflict of interest. Two engineer's arrived and had the technical rescue teams resupport the lintel damaged on the face of the building.

A private contractor arrived with a backhoe and front end loader and removed the damaged brick wall and debris around the front of the building to begin the process of removing 1-26 from the interior of the building. Under the direction of the engineers two tow trucks were moved into position and the ladder truck was lifted and cribbing was placed underneath to level the truck so it could be removed without causing further damage to the lintel. The operation to remove the truck took approximately two hours.

The final steps taken were to secure the building so it would be safe for private contractors and building management to enter and get the utilities back on-line. Loose debris was cut down and removed, glass windows were cleaned out, loose partitions were removed, debris was removed from the floor, and the support for the lintel was checked and resecured. The damage estimate for the building was approximately $200,000.

District 8 was called for a fire detail with an engine and a ladder truck to secure the area and assist in getting the building utilities back on line. The sprinkler system was still not working and the alarm system needed to be reset.

One critical person who assisted throughout was [redacted] the Public Information Officer. without his assistance with the media and as a source of information it would have been difficult to maintain the flow of information released.

XV. BIBLIOGRAPHY

Baxter, John. "Clean and Dry." *Overdrive.* May 2003.

Bellevue (WA) Fire Department. "Driver/Operator Training." Jacobs Brake Operation. 2 Jan. 2007.

Bellevue (WA) Fire Department. "Driver/Operator Training." Standard Operating Procedures. 28 Nov. 2008.

Bellevue (WA) Fire Department. "Engineers." Standard Operating Procedures. 13 Jun. 1994.

Boston Fire Department. Apparatus Schedule. 9 Jan. 2009.

Boston Fire Department. BFD Fire Academy Rules and Regulations. Dec. 1995.

Boston Fire Department. Box 4-281 Board of Inquiry Report. 22 Feb. 2008.

Boston Fire Department. Duties of the Boston Fire Department Motor Squad. 30 Nov. 2006.

Boston Fire Department. Fire Commissioner's Report on the Readiness of the City's Fire Fighting Apparatus. 27 Feb. 2007.

Boston Fire Department. Goals for Fleet/Facilities. 15 Nov. 2007.

Boston Fire Department. Incident Command System. 1 Jan. 2006.

Boston Fire Department. Replacement Plan for Apparatus. Mar./Apr. 2007

Boston Fire Department. Rules and Regulations. 1 Jun. 1997.

Boston Fire Department. Special Order No. 1 Part II Seat Belts. 4 Jan. 2006.

Boston Fire Department. Special Order No. 2 Part I Driver Safety. 16 Jan. 2009.

Boston Fire Department. Standard Operating Procedures. Current series.

Brown, Brian. "Shop Manager's Round Table." Fire Apparatus & Emergency Equipment. Apr. 2009.

Buckley, Kevin J. Sergeant Detective, Boston Police Department. Report on Boston Fire Department Ladder 26 Fatal Accident, CC#090015879. 31 Jul. 2009.

Charlotte (NC) Fire Department. "Driver Checkout Guidelines." Standard Operating Guidelines SOG 302.02. 1 Jan. 2009.

Charlotte (NC) Fire Department. "Daily Apparatus/Equipment Check-Off." Standard Operating Guidelines SOG 303.01. 1 Jan. 2009.

Charlotte (NC) Fire Department. "Apparatus/Vehicle Maintenance." Standard Operating Guidelines SOG 303.02. 1 Jan. 2009.

Charlotte (NC) Fire Department. "Reserve Apparatus." Standard Operating Guidelines SOG 303.03. 1 Jan. 2009.

Chase, Brian F. "Boston Fire Department Ladder 26 Motor Vehicle Autopsy Investigation Report with Addendum A." 12 May 2009.

Code of Federal Regulations. Title 49, Part 393, Subpart C. "Brakes."

Commonwealth of Massachusetts Registry of Motor Vehicles. Commercial Driver's License Manual, Section 5."Air Brakes." Pp. 5.1 – 5.11. Revised, Sep. 2008.

Conley, Daniel F. Suffolk County District Attorney. Letter to Commissioner Roderick Fraser. 10 Dec. 2009

Craven, Ralph. "Special Report for the Boston Firefighters' Local 718, Ladder 26." 21 Jan. 2009.

Fire Rescue One. "Manual Adjustment of Automatic Slack Adjusters May Contribute to Unexpected Brake Failure on Automotive Fire Apparatus." Fire Rescue 1 Press Release. 23 Oct. 2009. [Online] Available. http://www.firerescue1.com/fire-products/apparatus-accessories/press-releases/599617-Manual-Adjustment-of-Automatic-Slack-Adjusters-May-Contribute-to-Unexpected-Brake-Failure-on-Automotive-Fire-Apparatus/

Glennon, John C. "Air Brake Failure Analysis." *Crash Forensics.com.* [Online] Available. http://www.crashforensics.com/airbrakefailure.cfm

Henry, Don. Truck Checks: Air Brake Maintenance. *FIREFighting in Canada,* 2007-2009.

How Stuff Works. "How Does Rust Work?". science.howstuffworks.com. [Online] Available. http://science.howstuffworks.com/question445.htm

ICHIEFS. Line of Duty Death Response Plan. 2000.

International Association of Fire Chiefs Health and Safety Committee. Guide for Investigation of Line-of-Duty Death. [Online] Available. http://www.iafc.org/displaycommon.cfm?an=1&subarticlenbr=20

International Association of Fire Chiefs. Lessons Learned from Fatal Crash. 15 Jun. 2006. [Online] Available. http://www.iafc.org/displayindustryarticle.cfm?articlenbr=30820

International Association of Firefighters. Fire Fighter Line-of-Duty Death and Injury Investigations Manual. 1997, 2000.

International City/County Management Association (ICMA). Managing Fire and Rescue Services. 2002 Ed. Pg. 213.

Juratek. "Service Guide: Brake Discs." *Juratek.com.* [Online] Available. http://www.juratek.com/support-discs.php

Klein, Louis J.; Lane, Stephen C.; Steffens James T. "Emergency Vehicle Driver Training Program." Participant Manual. 1997 VFIS (Rev. 10/2000).

Los Angeles City Fire Department. Training Bulletin # 48 Jacobs Engine Brake "Jake Brake." Jul. 1989.

Massachusetts General Laws. Chapter 90: Section 13A Seat belt use required; Exemptions; penalty.

Massachusetts Municipal Association Consulting Group Inc. City of Boston, Massachusetts Study of the Fire Department. Oct. 1995.

Mercury Associates, Inc. Report on Maintenance Practices Assessment for the Boston Fire Department. Mar. 2009.

Milwaukee (WI) Fire Department. Motor Vehicle Instruction Guide. Mar. 2009.

National Institute for Occupational Safety and Health. Fatality Assessment and Control Evaluation Investigative Report #F2001-36. 12 Sep. 2002.

National Transportation Safety Board. Collision Between a Ford Dump Truck and Four Passenger Cars. Glen Rock, Pennsylvania. 11 Apr. 2003.

National Transportation Safety Board. Safety Recommendation H-91-3 through 6. 29 Apr. 1991.

National Transportation Safety Board. Safety Recommendation H-06-6 and 7. 15 Feb. 2006.

National Transportation Safety Board. Special Investigative Report Emergency Fire Apparatus. 19 Mar. 1991.

NFPA 1002, "Standard for Fire Apparatus Driver/Operator Professional Qualifications." National Fire Protection Association. 2003 Ed. All applicable sections.

NFPA 1071, "Standard for Emergency Vehicle Technician Professional Qualifications." National Fire Protection Association. 2006 Ed. All applicable sections.

NFPA 1500, "Standard on Fire Department Occupational Safety and Health Program." National Fire Protection Association. 2007 Ed. All applicable sections.

NFPA 1901, "Standard for Automotive Fire Apparatus." National Fire Protection Association. 2009 Ed. All applicable sections.

NFPA 1904, "Standard for Aerial Ladder and Elevating Platform Fire Apparatus." National Fire Protection Association. 1991 Ed. All applicable sections.

NFPA 1911, "Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus." National Fire Protection Association. 2007 Ed. All applicable sections.

NFPA 1912, "Standard for Fire Apparatus Refurbishing." National Fire Protection Association. 2006 Ed. All applicable sections.

Steffens, James. "Emergency Vehicle Driver Training Program, Participant Manual." Revised, Oct. 2000.

U.S. Department Of Transportation Federal Motor Carrier Safety Administration. Federal Motor Carrier Safety Regulations Pocketbook. Aug. 2006.

U.S. Department of Transportation. Increasing Safety Belt Use in Your Company. 2006.

Weather Underground. "History for Boston MA January 9, 2009." wunderground.com. [Online] Available. http://www.wunderground.com/history/airport/KBOS/2009/1/9/DailyHistory.html?req_city=Roxbury&req_state=MA&req_statename=Massachusetts

Wilde, Stephen. Ladder 26 Investigative Findings on Brakes by NIOSH Expert. 2, 3 Feb. 2009.

Worcester Fire Department. Board Of Inquiry Report "Worcester Cold Storage and Warehouse Fire."12 Jan. 2001.